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Towards an emergency economic science: Beyond Adolph Lowe's critique to economics

Carlos Ezquerro González



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Carlos Ezquerro González

A thesis submitted in fulfilment of the requirements for the degree of Doctor
of Philosophy

Supervisor and tutor: Prof. Dr. Josep Maria Esquirol Calaf

PhD program: Contemporary philosophy and classical studies

Facultat de Filosofia, Universitat de Barcelona

September 2023

A la Clara i l'Amelia, les dues llums de la meua vida, us adoro

Abstract

We live surrounded by emergencies in a context of economic uncertainty: environmental damage, economic crises, and political conflict are only some examples that cast serious doubts about the political relevance of actual economic science and the effectiveness of its correlated economic policies. This is why this project aims to pave the way towards the future development of a methodically well-founded economic science that is capable of rigorously justifying economic policies. Methodologically, the foundation of economic science is understood under the tradition of methodical constructivism as developed by philosopher and mathematician Paul Lorenzen as the justification of economic theory from praxis and for praxis. This means determining the pre-scientific economic practices that make the theory possible, stating the objectives and tasks at which these pre-scientific practices are aimed, and assessing the suitability of economic theory to conceptualize the given pre-scientific practice so as to improve it, as a means to accomplish the pre-scientifically determined objectives and tasks. To reach my objective, I base on the work of economist Adolph Lowe, whose methodological critique of mainstream economics, built on a thorough analysis of the law of supply and demand, I analyze and update to the present day. With this, I show the limitations of the actual approaches to macroeconomic science and, thus, the need for an alternative approach that can be properly founded. Such an analysis consists of terminological and logical clarification of Lowe's claims as well as the claims of some critical voices raised against him, including suggestions for improvement when related to the aim of this project. Hereby I begin the construction of a precise and methodical scientific language, an ortho-language, which is a requisite for a proper foundation of economic science. With such a methodological apparatus and after such an analysis, I offer some guidelines on how a well-founded economic science, which I name 'emergency economic science', a science oriented to the resolution of emergencies, might look like, including potential implications concerning the economic and political system.

Resumen

Vivimos rodeados de emergencias en un contexto de incertidumbre económica: deterioro ambiental, crisis económicas y conflictos políticos son sólo algunos ejemplos que arrojan serias dudas sobre la relevancia política de la ciencia económica actual y la efectividad de sus políticas económicas correlacionadas. Por eso, este proyecto pretende trazar el camino hacia el futuro desarrollo de una ciencia económica metódicamente fundamentada y capaz de justificar rigurosamente las políticas económicas. Metodológicamente, la fundamentación de la ciencia económica se entiende bajo la tradición del constructivismo metódico desarrollado por el filósofo y matemático Paul Lorenzen como la justificación de la teoría económica desde la praxis y para la praxis. Ello significa determinar las prácticas pre-científicas en el ámbito económico que hacen posible la teoría, establecer los objetivos y tareas a los que se dirigen estas prácticas pre-científicas y evaluar la idoneidad de la teoría económica para conceptualizar esa práctica pre-científica dada con el fin de mejorarla, como medio para lograr objetivos y tareas determinados pre-científicamente. Para alcanzar mi objetivo, me baso en la obra del economista Adolph Lowe, cuya crítica metodológica a la ciencia económica dominante, construida a partir de un análisis exhaustivo de la ley de la oferta y la demanda, analizo y actualizo hasta el día de hoy. Con ello muestro las limitaciones de los enfoques actuales de la ciencia macroeconómica y, por tanto, la necesidad de un enfoque alternativo que pueda ser adecuadamente fundamentado. Dicho análisis consiste en una clarificación terminológica y lógica de las afirmaciones de Lowe, así como de las afirmaciones de algunas voces críticas contra sus propuestas, incluyendo algunas sugerencias de mejora en relación con el objetivo de este proyecto. Así comienzo la construcción de un lenguaje científico preciso y metódico, un orto-lenguaje, requisito para una adecuada fundamentación de la ciencia económica. Con este aparato metodológico y tras este análisis, presento algunas pautas para delinear una ciencia económica fundamentada, a la que llamo 'ciencia económica de emergencia', una ciencia orientada a la resolución de emergencias, incluidas las posibles implicaciones en cuanto al sistema económico y político.

Acknowledgments

This doctoral dissertation has its roots in a casual encounter in 2010 with the reconstructive technography of science and technology, developed by Manuel Medina and heir of the Erlangen School of constructive theory of science. Thirteen years and plenty of ups and downs later, I expect this work to be the first stone of a theoretical building to extend over my lifetime. Among all those who have contributed to this work, I want to mention here what I consciously believe now to be the most important ones.

First of all, I want to thank my former recently deceased supervisor, Manuel Medina, to whom I will be always intellectually indebted, and without whose research this thesis and the works that I expect to follow it would have been impossible. The political relevance of the theory of science is still alive, although through hard intellectual militancy and personal sacrifice. Most of Medina's latest developments and texts, which remain unpublished today, were shared by him among the members of the research group Prometheus 21 of the Universitat de Barcelona. To all those who have taken part in this group since 2010 I am also thankful, in particular to the unconditional core integrated by Mauro Medina, Pere Torrell, León Arellano, Esteban Mate, and my father, Jorge Ezquerro.

I also want to thank my other supervisor and tutor all over the project, Josep Maria Esquirol Calaf, for all the technical support, personal encouragement and academic orientation across these years. Without his advice, this project would have probably remained uncompleted. I do not want to lose the opportunity to thank some professors of the Universitat de Barcelona for their orientation both in academic and practical matters: Norbert Bilbeny, for his initial support as a tutor in the PhD Program of Citizenship and Human Rights; Tomàs Salvi Turró, for his wonderful teaching in modern history of philosophy, and his intellectual and personal support; José Romo, for his amazing teaching in history of science; and Josep Maria Romero, for his personal closeness and intellectual encouragement.

I do not want to forget the occasion to thank the people close to the consulting company Albea with whom I have discussed some ideas of this project: Marie-Luce Saillard, Umberto Cacchione, Holger August and, above all, my working colleague and ex-boss Mònica Rivera, whose comprehension and encouragement I truly appreciate.

Finally, in the intellectual domain, I want to thank in particular my colleague Guillem Muñoz, whose outstanding intellectual level and critical capacity have greatly contributed to this project through accurate criticism and observations. I expect our cooperation to extend into the future and build on the theory of emergency sciences to provide solutions in order to solve contemporary emergencies.

En el ámbito personal, quiero agradecer a mi padre y mi madre, además de su permanente apoyo, cariño y aprecio personales, haberme inculcado la semilla de la inquietud intelectual,

sin la cual este trabajo y toda la trayectoria académica y formativa que lo preceden no hubieran sido posibles. Con esa formación, mamá, aunque sigas sin creerme, me disteis más que cualquier artefacto material que se te pueda ocurrir. También quiero agradecer a mi hermano, además de su cercanía personal que lo convierte en tan amigo como hermano, por las discusiones que hemos mantenido en torno al controvertido concepto de ciencia y su dimensión política. No puedo imaginar una relación fraternal mejor que la nuestra, hermano.

Finalment, al meu nucli familiar, en el qual incloc sense dubtar-ho els meus dos gossets, el Rufus i La Dana, l'amor incondicional dels quals està fora dels límits de la humanitat, vull fer dos agraïments. A les meves filles Clara i Amelia, us agraeixo el vostre immens afecte cap a mi i la vostra comprensió, sobretot aquelles vegades en què el meu cansament i la meva frustració han afectat el meu estat d'ànim i el meu humor. Admiro la vostra intel·ligència, la resta de les vostres capacitats i us adoro com a filles. A mi mujer, Paula, la persona que mejor me conoce y me entiende, con quien llevo ya más de media vida y espero compartir la que me queda, te agradezco tu apoyo a lo largo de estos años y tu comprensión de la importancia que reviste este proyecto. Te quiero, admiro tu perseverancia y tu inteligencia y espero que me sigas ayudando a reflexionar acerca de la perspectiva feminista que este proyecto debe abarcar necesariamente.

This work has been possible due to the financial support of an FPU grant from the Spanish Ministry of Education.

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1 Introduction

Economic crises increase social conflict and confrontation and, consequently, the reconsideration of economic and political theories and practices. The Great Depression of 1929, with devastating social consequences, was a catalyst for the theories of John Maynard Keynes to find a way into academic economics and shape economic policies in several countries, particularly the US in the 1930s. The Great Recession of 2007, again with disastrous social effects, reopened an allegedly closed debate about the soundness of mainstream economics and the neoliberal tendency of economic policies in many Western economies. Now, the present economic uncertainty, with global inflation and energy crises on the horizon after the Russian war with Ukraine, right after the COVID-19 recession of 2020 was apparently over, still casts more doubts about the political relevance of actual economic science and the effectiveness of its correlated economic policies.

Mainstream economics today, although claimed to belong to social sciences, is basically conceived as a descriptive-predictive natural science. Despite the impossibility of generalizing in one single procedure all the activities of its several branches, they share what can be characterized as a naturalist bias. Broadly speaking, to inquire into economic questions, one needs to explain economic processes using mathematical models based on allegedly reasonable assumptions, which are to be statistically tested in order to be validated. Like in most natural sciences, specialization affects economic science such that some papers focus on theoretical questions whereas others concentrate on statistical validation. However, the duality of mathematization-statistical validation is a common denominator that encompasses most contributions to contemporary economic science. This shared feature reveals a naturalist understanding of economics, in analogy with natural sciences, as a science based on laws. Although the academic jargon has mostly changed from ‘laws’ or ‘principles’ to ‘models’ (Hausman, 2021), the law of supply and demand still dominates mainstream theories rooted in the neoclassic tradition. This hegemony is overwhelming above all in macroeconomics, the branch of economics mostly concerned with predictions and assessment of economic policies.

Even following the model of natural sciences, economists obtain much less accurate predictive results than other sciences like physics or biology. As a justification, after the prevailing orthodoxy, the present methodology, even if acknowledged not to be perfect, would be the best way to deal with the intrinsic limitations of economic science. These limits would be due to its undetermined subject matter - human beings and their economic interactions - which natural sciences would not have to tackle.

Facing the problem of predictive failure of economic science, German economist and sociologist Adolph Lowe published in 1965 his work *On Economic Knowledge. Towards a science of Political Economics* (from now on, *OEK*), re-edited in 1977 with some additions but no major rewriting of the original work. There he presents a methodological alternative

for economic science to be able to help satisfy the main economic goal, material provisioning of societies. Lowe presents economics as Political Economics, an instrument to design economic systems as a means to achieve politically determined ends. In other words, economic reality must be normatively shaped to establish the economic processes and practices so as to reach a certain political objective. His proposal, which both distinguishes and correlates the technical and normative dimensions of economic science, generates an intense academic debate, summarized in another book edited by Lowe's well-known student, economist Robert L. Heilbroner, and published in 1969 with the name *Economic Means and Social Ends. Essays in Political Economics* (from now on, *EMASE*).

Such a discussion about economic science and its effectiveness as a means of developing and justifying economic policies reached academic economics in the decade of 1960, with continuous social and political vindication in Western countries, the framework of the Cold War, and the consequent confrontation between two antagonistic economic systems. However, this important debate is not academically concluded but only politically truncated with the imposition of neoliberal economic policies by conservative governments and the consequent academic hegemony of economic theories based on the neoclassic tradition.

Nevertheless, the validity of neoliberal policies and their theoretical mainstream economic justifications as means of avoiding and solving economic crises are more and more seriously challenged. It is probably not exaggerated to say that economic crises today are not really solved but only arranged such that some negative effects are mitigated but the main roots of the problems remain untouched. Therefore, it is interesting to rescue the abovementioned debate about economic science to update it and draw conclusions, all the more so because the existing alternatives to mainstream economic science and policy are mostly ignored in the present.

In this sense, the main objectives of this dissertation are (1) to point out the limitations of the actual approaches to macroeconomic science so as to show the need for an alternative approach which can be properly founded; and (2) to offer guidelines on how such an approach might look like, including potential implications concerning the economic and political system. This alternative approach is only outlined here, so its thorough description and foundation remain a topic for future research.

To reach this main objective, the proposal of Adolph Lowe, who criticizes the mainstream macroeconomics of his time and offers an alternative approach, is critically examined. I point out both its strengths and its weak points, showing how the author's approach to theory of science may limit the scope of his otherwise sharp and far-reaching critique as well as of his original proposal.

As such, this dissertation can be conceived as a preliminary study to develop the foundation of proper economic science and its necessary relation with economic policy in future research undertakings.

A brief methodological remark about theory of science is in order here to clarify the objective. ‘**Foundation**’ or ‘**justification**’ (in German: *Begründung*) of science is understood here within the tradition of methodical constructivism following philosopher and mathematician Paul Lorenzen (1987, pp. 9-ff, 1994, pp. 128-ff.) as the justification of scientific theories from praxis and for praxis. This means reconstructing scientific theories in two main steps: (1) determining the pre-scientific (technical) practices which make the theory possible, stating the objectives and tasks at which these pre-scientific practices are aimed; (2) assessing the suitability of the theory to conceptualize the given pre-scientific practice so as to improve it, as a means to accomplish the pre-scientifically determined objectives and tasks. After this conception, the **foundation of economic science** is equivalent to the development of an **emergency economic science**, a science aimed at the solution of public problems or, as I name them after philosopher Manuel Medina (2016¹), ‘emergencies’ such as economic crises. Thus, the political relevance of setting a proper foundation of economic science is clear, and, in this sense, this dissertation departs from a strictly intellectual orientation to aim at practical relevance.

A thorough foundation of economic science would require starting from the economic practice, economic activity, stating its main objectives, and then carefully examining how the existing theory conceptualizes the practice in order to improve it. Only a pre-scientific sketch of such a foundation will be developed here because the proper foundation requires the development of a precise and methodical scientific language, an **ortho-language** (Lorenzen, 1987), a part of which will not be developed here. Although some terms are methodically introduced such that they can belong to such a future foundation, especially those belonging to the general theory of science under the influence of Paul Lorenzen, and also some important specifically economic terms coined in this dissertation, other specifically economic terms will be developed only in future undertakings starting from the considerations made in this dissertation. Over the text, a clear visual distinction will be made between defined terms belonging to the future ortho-language (in bold) and other terms clarified or simply used similarly to other authors’ use of the term.

What this text mainly does is go over Lowe’s claims as well as the claims of some critical voices raised against him, precisely clarifying their logical structure or the terms used, even suggesting modifications for terminological clarification or improvement, to detect both sound and weak points, whenever this might be relevant to sketch the foundation of economic science. On the one hand, the sound points which might be considered to be only historically valid or suspicious of being refuted at some point after the publishing of the examined works, are updated until the present day to check their actual soundness and relevance. On the other hand, the weak spots are identified and orientations for improvement are outlined. Therefore, except for the terms precisely introduced, which can

¹The referred work is an unpublished paper shared by Prof. Manuel Medina with the participants of a Seminar at the Universitat de Barcelona (UB) like myself. Unfortunately, no published document with this terminology is available right now either in paper or online version.

be considered a part of the required ortho-language, a part of this text can be considered what Paul Lorenzen calls ‘protreptischer Sprache’ (Lorenzen, 1987, p. 23), which can be translated as ‘**protreptic speech**’ appealing to the Greek roots of the German word. This is a kind of speech by which we enter into discussion with some parts of the tradition within a certain subject matter to criticize them and show the need for an ortho-language to precisely settle the issues at hand.

After this introductory chapter, the structure of this dissertation is as follows: Chapter 2 contains a brief presentation of Lowe’s critique to what he names ‘traditional Economics’ using his own terms, which I identify with mainstream macroeconomics today, as well as his proposal to overcome the detected shortcomings; in Chapter 3, firstly I present Lowe’s critique in detail, updating it into the present day, often introducing terms of an ortho-language and making it explicit where such precise terms are lacking and why this is important for a future foundation of economic science, and secondly I assess this critique focusing on Lowe’s naturalist conception of science and offering as an alternative a constructive conception of science which I consider to be more akin to his proposed solution; in Chapter 4, Lowe’s proposal of a Political Economics is presented together with what I reckon to be the most relevant critiques against it developed by other authors, some of them properly reinterpreted so as to constitute serious challenges only suitable to be overcome after a proper modification of Lowe’s proposal; in Chapter 5, basing on works by rather heterogeneous authors, I present an outline of such a modified proposal, a constructive reinterpretation of Political Economics which helps paving the way for the future foundation and development of an emergency economic science; finally, in Chapter 6 I summarize the results achieved over this dissertation.

2 A summary of Lowe’s critique and proposal

This chapter presents a summary of Lowe’s critique of traditional economics and his proposal of Political Economics, the two main contributions from the author examined in this dissertation in detail in chapters 3 and 4. I introduce this summary here because, in my view, it can help the reader briefly see the whole picture before its elements are thoroughly analyzed.

§1 Lowe and the works analyzed

To set the context for the ideas presented in this dissertation, a brief biographical sketch can be helpful. Adolph Lowe (1893-1995) was a reputed German economist and sociologist, one of the many brilliant European intellectuals emigrating from Europe to the US to escape from Nazism. Established at the New School for Social Research (NSSR) in New York in the 1940s, he maintained an active academic life in the US over his long life and only moved back to Germany in 1983, twelve years before his death². Among Lowe’s many contributions to economics and sociology, this dissertation focuses on his critique of mainstream economics and his proposal of an alternative economic theory, both the object of his work *OEK* (1965). His claims were the object of two Symposia held in the NSSR in 1968, whose main contributions, among them, a position paper by Lowe himself to summarize his ideas in *OEK* and a final paper answering some of the critiques to his work, were published a year later in the work *EMASE*.

The examined contributions of Lowe to economic science are by no means his only contributions but only those frequently labeled under ‘philosophy of economics’ or ‘economic methodology’. Although the two main works examined are *OEK* and *EMASE*, other works have been examined, too, to clarify certain points. In particular, some of Lowe’s latest works dealing with normative considerations related to the concept of freedom such as his late *Has Freedom a Future* (1988) have been also reviewed. This chapter is just a summary of Lowe’s views to be expanded over the remaining parts of the dissertation, so the references to Lowe’s claims will be omitted and left for such remaining parts.

§2 The observed problem: economic predictions

Lowe begins his major work *OEK* with the statement of a problem: economic science has not significantly improved its predictive results despite the progressive refinement and sophistication of statistical-econometric validation techniques. From that observation, after carefully examining how what he names ‘traditional Economics’ works, he concludes that traditional economics cannot provide a scientific foundation for economic policies within industrial capitalism.

²For a thorough picture of Adolph Lowe, the recent contribution by Wiechel-Kramüller (2021) is an interesting addition to the already existing biographies (Hagemann, 1996; Heilbroner, 1978; Lissner, 1996; Lowe, 2001; Nell, 2017).

To make sense of that claim, we need to understand what he means by ‘traditional economics’, how he understands science, and what he names ‘industrial capitalism’. We will later see how traditional economics is quite similar to mainstream economics today, in particular with mainstream macroeconomic analysis for policy assessment. Science is understood, following the tradition of analytic philosophy of science, as a theoretical undertaking aimed at the expansion of knowledge through the explanation of events. Industrial capitalism, which is how Lowe denotes his present day’s market-based economic system, is distinguished from previous versions of capitalism, which he considers to be closer to *laissez-faire* market economies, among other things, by the time span over which profits are maximized. Whereas XIX century *laissez-faire* economies were characterized by the short run as the time span for profit maximization, and this is how classic and neoclassic thinking conceptualized such economies, industrial capitalism shifts this time span to the long run, with important consequences for economic theory to be analyzed in detail later on.

To characterize economic science, the science about economic activity, Lowe claims that economic activity consists of the material provisioning of societies. He sees two dimensions to be distinguished under this practice: on the one hand, the technological dimension, how to combine different inputs such as environmental resources and human labor into desired outputs, which he considers to be close to natural sciences and engineering; on the other hand, the social dimension, how to organize production and circulation of outputs among the different members of society.

This second dimension, in relation to the historical emergence of market economies, is seen by Lowe as the turning point for the appearance of economic science, from classic economists up to Keynesian economists, also including the neoclassic marginalist revolution. Concretely, the answer is sought to the question of how it is possible to organize the production and circulation of outputs among the different members of society satisfactorily with a decentralized mechanism like the market instead of an intentional design by a central authority.

§3 Traditional economics and the law of supply and demand

In the latter sense, Lowe characterizes traditional economics as the science of market economies, where its keystone and main predictive tool consists of the well-known law of supply and demand (from now on, LSD). How this law relates, for any commodity, changes in prices with changes in quantities supplied or demanded, is quite familiar to anybody with basic notions of mainstream economics: given quantity changes, prices vary indirectly with the change in supplied quantities and directly with the change in demanded quantities; and given price changes, supplied quantities vary directly with it, and demand quantities vary indirectly with it. However, from this quite uncontroversial behavioral postulates of the law, Lowe infers two important motivational assumptions for such behavior to take place: firstly, maximization of receipts and minimization of

costs, which he names ‘extremum principle’; and, secondly, what he calls after economist John Hicks ‘stabilizing expectations’, which, in non-technical terms, consist of expecting quantity changes to be quite permanent and price changes to be quite temporary. As a consequence of the law’s behavioral postulates, market equilibrium emerges such that quantities supplied and quantities demanded coincide at the lowest possible price given the available production technology. Hence, Lowe conceptualizes the LSD as an argument where the original premises are its motivational assumptions and the final consequence is market equilibrium.

Even if in his time it was not as popular as it is today, Lowe accurately shows that the maximization problems that are often used in macroeconomic models today, among them profit maximization and utility maximization, are operationally equivalent to the LSD if they are to unambiguously determine behavior. On the one hand, profit maximization is obviously equivalent to the extremum principle. On the other hand, instead, the equivalence of the LSD and utility maximization is not that evident. To make it clear, Lowe analyzes the behavior of a buyer in response to a fall in price in terms of utility maximization and compares it with behavior as in the LSD. To conclude the equivalence, he uses the restrictions to utility maximization problems posed by its first developers, the early marginalists, for the principle not to become a mere tautology, compatible with any possible behavior and thus trivially and non-informatively true.

Lowe also shows the negative results of what economists sometimes call ‘empirical’ testing of the LSD: on the one hand, direct testing of the original premises, motivational assumptions, shows divergent motivations from the extremum principle; and, on the other hand, indirect testing of the conclusion, market equilibrium, even if not completely unambiguous despite the sophistication of econometric techniques, points to divergent outcomes from market equilibrium. After some digressions, Lowe concludes that the divergence from equilibrium is due to the lack of socially patterned behavior, different from the behavior required by the LSD.

As a consequence, he further concludes that no refinement of econometric techniques can solve the failure of forecasting techniques in traditional economics, based on the LSD, to guide economic policies.

In a brief reflection, Lowe also goes over a decisive point to any non-initiated in mainstream economics, the seemingly unjustified obsession with market equilibrium as an objective of economic policies if the aim of economic activity is aggregate material provisioning. He mentions the well-known welfare theorems and the corresponding equivalence, in terms of total output allocation, between market equilibrium and a certain definition of maximum efficiency, the well-known Pareto optimum.

§4 A methodological critique

To further clarify his claim of the necessary failure of predictive efforts within traditional economics, he compares its subject matter with that of natural sciences, basically physics, in order to show how their differences determine the predictive success of the latter concerning the predictive failure of the former. In his own terms, a suitable subject matter to make predictability possible would require (1) independence of human will, understood as an autonomous existence from human beings, and (2) sufficient order or randomness to allow for deductive or probabilistic inference. Whereas physics' subject matter, the behavior of particles, would not depend on human will and would behave orderly enough for theoretical inference, economics' subject matter, human behavior, would not. The insufficient order is shown through the surveys of motivational patterns and the econometric indirect tests of equilibrium. Instead, the dependence on human will is evident by the fact that humans only behave reacting to any economic stimulus after having interpreted it, which makes it possible that two different reactions emerge from an apparently identical economic stimulus.

§5 The proposal: a controlled economy

After diagnosing the forecasting failure of traditional economics to lie in non-patterned social economic behavior, Lowe's proposal consistently aims at achieving patterned behavior, which is the only secure way to achieve market equilibrium or any other macroeconomic goal. The way he proposes to reach it is controlling the economy, and control, understood as the shaping of behavioral patterns through measures of economic policy, is one of the aspects he takes more time to elucidate, probably aware of the critiques he might receive, which he did receive.

He makes two distinctions among control. Firstly, command control would be the prescription of actions with penalties for non-conformance whereas manipulative control would be the influence on spontaneous decisions without legally limiting them. Of course, Lowe assigns the focus on command to planned economies and the focus on manipulation to market economies. And secondly, primary control would be the conventional measures of public policy, aimed at changing behavioral patterns only indirectly through the shaping of the economic reality; whereas secondary control would be directly targeting behavioral patterns by affecting motivations, whether preferences or expectations. Preferences would be shapeable through manipulation only in the long run through education whereas, in the short run, shaping would require command measures like Keynesian public investment actions to compensate for goal-inadequate private investment. And expectations would be more easily shapeable, both in the short run and the long run, through measures of public information about the results of economic science in order to reduce uncertainty about the economic situation.

Anticipating the criticism that control, in particular command control, is incompatible

with the principle of micro-autonomy, or freedom of economic decision-making, Lowe replies that the models of traditional economics, guided by the LSD, do not conceptualize unconstrained decision-making. Instead, he claims, they conceptualize the patterned behavior required for a well-performing economic system. Some preferences would indeed be free, like the preference for apples over oranges, which Lowe considers to refer to ‘final goals’, whereas other preferences cannot be free if the LSD is to be valid. Indeed, the preference for more over less or whether to maximize receipts or not, which Lowe considers as ‘modal goals’, cannot be left free like those of final goals.

In this sense, Lowe’s paradoxical claim that the only way of achieving the well-performing market economy postulated by traditional economics is precisely control becomes quite understandable.

Once he has elucidated control as the key of his proposal, Lowe continues to sketch how an economic science of controlled economic systems might look like, which he names ‘Political Economics’, mentioning and describing its steps: the selection of a final macroeconomic goal, the determination of the suitable macroeconomic paths to achieve the goal starting from the present initial macroeconomic state, the behavioral and motivational patterns required to generate these paths, and the measures of control to stimulate the required motivational patterns. Noteworthy enough, Lowe acknowledges the possibility to choose any possible macroeconomic goal, not only market equilibrium or the equivalent technical efficiency given by the Pareto Optimum.

§6 Methodological assessment of the proposal

Aware of the originality of his proposal, Lowe dedicates some effort to methodologically compare its procedure with the successful procedure of natural sciences. Political Economics would use instrumental analysis, deriving the means required to go from an actual macroeconomic state to a desired macroeconomic goal. Whereas natural sciences would use deductive-nomological analysis, with conclusions logically derived from hypotheses and then empirically tested. Traditional economics would share the latter procedure to conclude equilibrium from assumed motivational and behavioral patterns.

In terms of causes and effects, instrumental analysis would infer causes (paths, behavior, motivations, and control measures) from effects (macroeconomic goal, e.g. equilibrium). Instead, deductive-nomological analysis in traditional economics would infer consequences (equilibrium) from causes (economic background conditions, behavior, and motivations).

Comparing Political Economics with traditional economics, Lowe considers the former to include both theory and practice because theoretical results can only hold after economic reality has been properly transformed. This is why he uses the term ‘knowledge’ in his book instead of ‘theory’. In contrast, traditional economics, following the model of natural sciences, would be a proper (even if necessarily failed) theory since it would not include any practice whatsoever regarding the modification of the subject matter. Again, the alleged

difference between natural sciences and Political Economics would be that the subject matter of the latter must be constructed after rational design. In this sense, traditional economics would be included in Political Economics as the particular case where economic reality does not have to be modified, the case of what Lowe calls ‘spontaneous conformity’.

§7 Ideological influence

Setting his Political Economics at work, with some examples of how it might deal with concrete economic situations, he intentionally chooses only macroeconomic goals compatible with market systems such as full resource utilization and balanced growth. Although he gives certain arguments as a justification, he recognizes the ultimate reason behind his choice to be mainly ideological, his declared preference for political liberalism and capitalism over any other alternative. In this sense, Lowe claims that the macroeconomic objective to be achieved is an adequate provisioning level and the maximum level of individual freedom compatible with it.

To justify his acknowledged lack of justification for his preference, Lowe appeals to scientific value relativism. According to it, science cannot help to justify values or preference systems, so the plea for freedom and a market economy is just a choice that cannot be scientifically justified. The only non-scientific reason that Lowe provides, having the horrors of totalitarianism in mind, is the alleged relative difficulty of such regimes to rise in liberal-capitalist societies in contrast with more authoritarian regimes like planned economies.

As a conclusion, Lowe’s conviction is that control is the key to maintaining liberal capitalist economies.

In contrast, it will be one of the claims of this dissertation that a proper reconsideration of Lowe’s analysis aimed at the foundation of an emergency economic science can be used to conclude precisely the opposite, that a controlled economy properly targeted at achieving social goals is probably more compatible with a planned economy.

3 Lowe's critique of traditional economics

This chapter contains the gist of Lowe's critique of traditional economics. Starting from the statement of a problem regarding the predictive capacity of traditional economics, I present Lowe's conception of economics as a science, focused on its main theoretical construct, the law of supply and demand, to conclude its necessary predictive limitations. After that, I thoroughly assess Lowe's conception of science and propose an alternative that might be more akin to the solution he proposes in the next chapter.

3.1 Economic science and economic activity

In this section, I characterize Lowe's conception of economic science as an elucidation of the predictive failure he observes within traditional economics, which is the key to understanding his critique of traditional economics in the next section. To do that, I firstly introduce his general conception of science within analytic philosophy of science (Section 3.1.1) and, secondly, show how he applies this concept to economic activity, the subject matter of economic science (sections 3.1.2 and 3.1.3). During the process, I make two kinds of additions to Lowe's own presentation: on the one hand, I expand on some of Lowe's concepts both in philosophy of science and economic science which are important for a critical assessment of actual economic science; on the other hand, I more concretely introduce terminological clarifications and propose definitions of important terms as a part of an ortho-language, such as the definition of economic activity, which can be used in the future foundation of an emergency economic science which may arise as a consequence of the update of Lowe's critique as in this dissertation.

3.1.1 An analytic conception of science

§1 The problem: economic forecasting

The problem presented by Lowe at the beginning of *OEK* can be briefly summarized in the following terms: the predictive and explicative power of economics as a science has not improved proportionally to the sophistication of the empirical-econometric testing techniques of its models (Lowe, 1977, p. 5). Whereas Lowe praises this degree of development of statistical tools applied to economic analysis, he claims that the explanation and prediction of events in economics are stuck at an unsatisfactory level.

For the question to be generally comprehensible as a problem, a given conception of science must be specified under which, following the successful model of natural sciences, the ideal procedure to increase knowledge is to develop hypotheses or models which can be empirically tested and thus validated such that explanation and prediction of events are made possible. Lowe's stated problem, within this conception, is that economics has not significantly improved its predictive and explicative results despite the great refinement of

its testing techniques.

To gain a clear understanding of the problem, some terms related to this conception of science as well as other specific terms related to the particularities of economic science must be elucidated.

§2 The concept of science

Lowe's conception of science belongs to the tradition of analytic philosophy of science, concretely to the developments of Ernest Nagel (1901-1985), summarized in his major work *The Structure of Science* (1961), as Lowe shows in his quotations. After Nagel, sciences are empirical except for so-called 'formal' sciences such as mathematics or logic. Indeed, science would be a logically unified system of statements that (1) explain events, (2) are empirically verifiable through systematic observation, measurement, and experimentation, and (3) are aimed at the expansion of knowledge (1961, pp. 3-4). Some of the terms above require clarification.

Firstly, without entering unnecessarily complex logical terms, for a system of statements to be logically unified, some requirements of logical consistency have to be satisfied such as the lack of contradictions among the constituting statements.

Secondly, Nagel's definition of explanation requires a little bit more detail because the terms used are those exactly quoted by Lowe in *OEK*. Explanations would be statements about events that require "distinguishing and isolating certain properties in the subject matter studied and (...) ascertaining the repeatable patterns of dependence in which these properties stand to one another" (1961, p. 4). This rather obscure terminology becomes a little clearer if we understand it as a part of the so-called 'deductive-nomological (DN) model' (Woodward & Ross, 2021). The required "repeatable patterns of dependence" which make explanations possible, refer to regularities, which are often conceptualized as laws (whether strictly deductive or just probabilistic), and 'properties' are in the logical sense no more than abstractions from predicates (Lorenzen, 1987, p. 186), ideally referring to measurable magnitudes. As an example, we would be able to conceptualize free fall with the Galilean law of falling bodies because bodies regularly fall in a certain way. When I use the term '**laws**', a concept which comes from the jargon of natural sciences, I mean Lorenzen's 'laws of motion' (a name often used since Newton's *Principia*), those terminologically precise and verifiable universal statements about events (Lorenzen, 1987, p. 110)³. The relationship between explanations and laws has been largely discussed and one would not be far away from analytic philosophers' of science main stream of thought if the concept of law were considered to be crucial for the concept of scientific explanation. Nagel, with his main focus being the concept of explanation, considers deductive explanation only satisfactory if it includes as a premise a universal law (1961,

³For a constructive introduction of the term 'event', which can be either a process or a state, check p. 42. For the mathematical description of such laws as functions, check pp. 110 and 214.

p. 32). Behind the concept of law lies the paradigm of science as control over so-called ‘nature’ such that, in natural sciences, some event can be successfully predicted starting from another event and a set of so-called ‘natural laws’. **Prediction**, in this sense, refers to the anticipation of states, or so-called ‘laws’ that refer to further states (Verlag J. B. Melzer, 2005c, p. 446) such that the future state can be claimed to occur, whether with complete certainty or with probabilistically measured uncertainty (Forster, 2013, p. 449), given an initial state and a set of (natural) laws.

The concept of explanation is closely related to the concept of causality, both of them coming from physics. After Lorenzen, the concept of causal explanation requires the concept of functional explanation. We say that an event is explained⁴ if it can be delivered as a particular case of a given law, the latter understood as a universal statement, in particular a function. Delivery of the event into the future is called ‘**prediction**’ whereas delivery of the event when it has already happened in the past is called ‘**explanation**’. Experiments try to isolate the past event to be undisturbed, to have laboratory conditions, for the future event to take place according to the law. Using the same example we have used above, Galileo’s law of falling bodies allows delivering the position of a free-falling body at any moment in time as a function of a constant (Newton’s gravitational acceleration at the Earth’s surface, g), the initial position and the squared time taken to reach the new position from the original one. Using this concept of functional explanation, an event is **causally explained** when the difference between an observed event and an expected event based on a certain law (functional explanation) can be ascribed to a certain difference between past states and a proper law delivering states as particular cases (Lorenzen, 1987, p. 215). In this sense, **causality** means the replacement of a non-successful functional explanation by a new successful functional explanation, which can be due to a refinement of the description of past states or a modification of the law or functional relation.

Explanations are understood by Nagel as the answer to the question of why some events occur or some properties are related (1961, pp. 5, 21, 26) and they are considered to be at least suitable to be expressed in terms of the model of deductive explanation in natural sciences. As such, whatever is explained must be logically (or at least probabilistically) derived from the explanatory premises (1961, pp. 21–26, 428, 576). Nagel is indeed well-known in the history of philosophy of science for his not mainstreamly accepted claim to subsume all kinds of explanations within the model of deductive explanation (Verlag J. B. Melzer, 2005b, p. 388). Up to the present day, most authors outside the so-called ‘pragmatic tradition’ of philosophy of science share the concept of explanation in terms of an answer to a why question about the occurrence of concrete or general phenomena (Verlag J. B. Melzer, 2005a; Woodward & Ross, 2021).

Thirdly, ‘**empirical**’ literally means ‘related with experience’. The term is often used

⁴functionally explained’, in Lorenzen’s terms (1987, p. 214).

to characterize the successful methodology of natural sciences, mostly physics, to test or validate its statements through a complex set of instruments that allow precise observation and measurement of events as well as the technical reproduction of events using experiments. We will later expand on the fact that the term in economics lacks the experimental part so characteristic of physics.

Fourthly, that science is aimed at the expansion of knowledge means that the main objective of scientific endeavor is to gain an understanding of the world. Indirectly, as it will be further elucidated later, it also means that science is only secondarily oriented to improve human practices, namely through the technological application of scientific knowledge.

§3 Mainstream definitions of science

Even if the dominant attitude today is to avoid an uncomfortable general definition of science (Newton-Smith, 2017, p. 2), something consistent with the fact that there is no entry to the word ‘Science’ in the otherwise hugely comprehensive *Stanford Encyclopedia of Philosophy*, many of Nagel’s accounts are widely accepted today. For instance, these are some definitions of science:

- Cambridge Dictionary: “(knowledge from) the careful study of the structure and behaviour of the physical world, especially by watching, measuring, and doing experiments, and the development of theories to describe the results of these activities” (Cambridge Dictionary, n.d.).
- British-European Science Council: “the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence” (Science Council, n.d.).
- Routledge Companion to Philosophy of Science: “a cognitive activity that is uniquely capable of yielding justified beliefs about the world” (Curd & Psillos, 2013, p. xxiii).

The underlined words refer to the four items elucidated above, sometimes using exactly the same terms and others, as in the case of ‘justified’ referred to ‘explanation’, a little differently.

3.1.2 Economics and material provisioning

§1 Lowe’s definition of economic activity

After clearing out how Lowe understands science, which is borrowed from Nagel’s analytic philosophy of science, Lowe continues characterizing economic activity before joining the two concepts to define economic science. He defines economic activity as “the provision of material means” (1977, p. 10) to satisfy “genuine substantive goals” (1977, p. 12). Again, intuitive as it may seem, it is important to clarify some terms, particularly in this part

because how the goals or tasks of a given science are characterized is crucial to developing a proper foundation of economic science in the future.

Firstly, **goals** or **ends** can be conceptually introduced as states of affairs which are to be achieved through actions in simple requirements of actions (“act such that a given state of affairs emerges as a result of your action”)⁵. The concept of end and the related concept of means to achieve this end only make sense when a certain technical knowledge of any kind is already practically learned such that it is learned how to achieve certain states of affairs (Lorenzen, 1987, p. 244). Thus, the ‘means and ends’ jargon makes sense within what has been called ‘**techniques-result**’ where the end is the pursued result of a certain technical activity⁶. This characterization of ends and means based on technical knowledge will be important in Section 4.3 when discussing value neutrality concerning economic science.

Secondly, material provisioning or provision of material means refers to the material provisioning of means of living. The term ‘material’ is only indirectly characterized, relating it to production or the so-called ‘basket of goods’ (Lowe, 1977, p. 8). This basket of “finished goods”, physically transformed from “natural resources” through “manipulations” (1977, p. 17), basically corresponds to the term ‘goods’ in the mainstream definition of economic activity as the production and distribution of goods and services (Samuel, 2010, p. 4). ‘Material provisioning’ probably refers to material artifacts (cars, machines, paper rolls...) and resources (stones, rolling water, wind power...) as well as the material dimension of any other artifact, be it symbolic (the hardware of a computer, the pages and cover of a book...), organizational (the buildings of political or court activity...) or biotic (farms, greenhouses...). But also included are probably biotic artifacts (fruits, vegetables, animals) and resources (wildlife). Without entering into unnecessary details for the sake of this dissertation, we can claim **artifacts** to be the result of human activity whereas **resources** might be that which are not⁷.

Contrarily to what may seem because of Lowe’s focus on the basket of goods, Lowe does not leave services out of his definition and adds that an activity is economic whenever it makes use of material resources (1977, p. 10), meaning ‘material’ what we presented above

⁵For a thorough logical and methodical introduction of requirements of actions and the conceptualization of states of affairs as abstractions from events, cf. Lorenzen (1987).

⁶Medina’s concept of technique-result, derived from the concept of technique, cannot be found in published works. For a precise and methodical introduction of the term ‘technique’ as a normed sequence of actions within procedures, forms of action and interaction which are reproducible and suitable of being taught and learned, thus also suitable of being generalizable, oriented to a certain result, only unpublished works are suited such as Medina (2008). Such works were available for a long time in an already inaccessible Moodle named ‘Campus C3Si’ used Medina to teach his graduate courses with the research group Prometheus 21 at the University of Barcelona. The only published works with a summary of these concepts accessible at the moment of writing this dissertation are Medina (1996, 2002).

⁷For a methodical introduction of the term ‘artifact’ as a human construction and the different dimensions of artifacts and techniques, concretely the material, symbolic, organizational and biotic domains, cf. Medina (2002).

as material provisioning, and ‘resources’, also differently from the meaning within this dissertation, anything which is used to achieve something else, a synonym with ‘means’. With this distinction, he wants economic activity to include the use of material or biotic artifacts or resources, not just any activity that requires human “energy and time” (1977, p. 10). For the sake of logical clarity, I intend economic activity to include material artifacts, biotic artifacts, material resources or biotic resources, or any combination of them, i.e. the logical disjunction with its elements being material artifacts, biotic artifacts, material resources, and biotic resources. Material and biotic resources are usually named ‘natural resources’ and I prefer to name them ‘**environmental resources**’. The reason to choose the term ‘environmental’ over ‘natural’ preceding resources is to avoid from the beginning the existing contradiction in the term ‘natural’ as widely used today. Indeed, on the one hand, ‘natural’ is often considered to mean everything which is not the result of human activity, its objects being what we have named above ‘resources’, an antonym of the term ‘cultural’. On the other hand, items such as cows, pigs, cauliflowers, or beans, most of them today being the result of human activities like agriculture or cattle industry, thus having an artefactual dimension, are also considered to be ‘natural’⁸.

Thus, Lowe includes in his definition almost any conceivable service in present societies because the vast majority of services today have at least a material dimension. In standard terms, Lowe’s conception of economic activity includes any good or service that is developed using material or biotic artifacts or resources.

Thirdly, and finally, we need to mention that Lowe’s addition that economic activity consists of material provisioning aimed at satisfying “substantive goals” will be left for Section 4.3, where we will discuss the normative dimension of Lowe’s work. In short, there we will clear out how Lowe considers economic activity to be instrumental with regard to other kinds of activities that have to be politically determined. We will also challenge this view later in Section 5.2.

§2 A mainstream definition of economic activity

Before continuing Lowe’s digression about economic activity, it is important to mention here a criticism of his definition of economic activity and, thus, of economics, which, in a more or less subtle way, is ubiquitous in mainstream economics today (Arrizabalo, 2014, p. 24; Samuelson, 2010, p. 4). Lowe discusses it in *OEK*, and also later in *EMASE* since it comes from earlier authors like economists Lionel Robbins or Ludwig von Mises. The alternative to Lowe’s definition, taken from one criticism to Lowe by well-reputed economist Kenneth E. Boulding in a review for *Scientific American*, turns economics into a “generalized theory of choice” which “arises out of scarcity” (1965). In other words, any decision to be made regarding ends to be reached through scarce means would belong to the subject matter of economic science.

⁸For a thorough discussion about the distinction between the terms ‘cultural’ and ‘natural’, cf. Medina (2002).

What is at stake with this alternative definition of economic activity and economic science is not merely a matter of formal precision but may be considered a matter of political relevance, as we clear out below. Whereas Lowe's definition, with its focus on production, has often been used by Marxian economists to later conclude the need to abolish capitalism, Boulding's definition, with production considered to be only a part, even if an important one, of a more general theory of exchange, has more often been used by mainstream economists, mostly defenders of market economies.

Before going to Boulding's preferred battle horse, the prioritization of exchange theory (price theory) with respect to production theory, where most of his arguments belong, Boulding criticizes Lowe's restriction of economic decisions agents are faced with to the material provisioning of commodities. Instead, after Boulding, the "the demand for leisure or for services" (1965) is as economic as the demand for commodities. His argument, then, would be that the limitation to material commodities leaves too many important economic aspects out of the picture. Before going to Lowe's reply, we can already point to a misunderstanding of Boulding about Lowe's theory. Indeed, even if Lowe does not elucidate it very clearly, as has been pointed out above, he also includes services within his conception of material provisioning.

Regarding leisure, it is standardly considered a variable representing an alternative within an economic decision, whether to work or not to work, to be maximized like consumption. In fact, both consumption and leisure belong to utility functions in many standard models of labor economics. Thus, the conceptualization of leisure this way makes it quite equivalent to any other consumption good, a commodity. Indeed, standard labor macroeconomics claims the price of leisure to be the labor wage because leisure is valued as the opportunity cost of choosing not to work and thus of losing the opportunity to earn a certain amount of money. Hence, leisure is valued as much as the potential consumption foregone as a consequence of a certain wage not being earned. I do not enter the discussion about whether people truly value consumption in such a way. However, it seems uncontroversial to me that once leisure enters a utility function together with consumption, as in labor macroeconomics, it is clear that it does so only as long as it is considered a commodity with its money price. Hence, Boulding's claim suggesting to exclude leisure from commodities does not make sense at least as long as leisure is economically modeled as it actually is.

However, the most important critique Lowe makes of Boulding's definition already in *OEK* is the historical character of scarcity. Basically, "unqualified scarcity cannot be made the criterion of economic activity" (Lowe, 1977, p. 10) because neither all desired ends are intrinsically limitless nor all required means are intrinsically scarce. Whatever exactly may 'intrinsically' mean in precise terms, what Lowe means is that within the domain of provisioning, the economic realm, so-called 'natural' resources are only historically scarce relative to certain historically determined (possibly limitless) ends. In other words, it is possible to conceive an economic system that does not prioritize economic practices such as capital accumulation and permanent growth at the price of unsustainable spoiling of

environmental resources and environmental destruction. A lower rate of both production and consumption is not unimaginable as a way to end present scarcity, at least for many things that we consider now to be scarce. As we will elucidate later, what Lowe does not seriously consider is that maybe his cherished controlled capitalism is not a sustainable alternative to deal with actual scarcity.

§3 The constructive view about definitions

In contrast with Lowe’s view about definitions, which restricts the discussion about definitions to the aim of improving the description of the object to be defined (1977, p. 10), this dissertation is committed to an opposite view about definitions. Again consistently with the constructive tradition, to properly circumscribe the main objective or task of economic activity is crucial to develop an emergency economic science, as we have already mentioned, a well-founded economic science aimed at the resolution of economic emergencies. Thus, arguing about definitions is not merely a matter of theoretical precision but a matter of practical relevance such that the chosen definition is the best-suited to solve economic problems after the theorization of economic activity. Even if the final decision will not be taken in this dissertation, the abovementioned affinity of one definition with market economies and the other definition with non-market economies will probably be a topic to consider when the moment comes.

§4 A constructive definition of economic activity

Lowe’s conception of economic activity is akin to the Marxian tradition of economic thought, where the term ‘means of living’ is usually preferred to ‘goods and services’, and is referred to ‘the material base’ of social reproduction, the latter meaning the survival or perpetuation of a given society (Arrizabalo, 2014, pp. 24, 30). In such a tradition, the term ‘means of living’ is linked with ‘provisioning’ or Lowe’s material provisioning, an activity in which we are engaged even before we start theorizing.

In the constructive sense, ‘provisioning’ is a primitive term, it does not need to be defined because it is intersubjectively controlled by practice, it is controlled by actions and not by theory (Lorenzen, 1987, pp. 20, 283): We are immersed in provisioning all over our life and we understand what it means even before somebody tries out any definition.

Although we can normatively argue whether some of our actual activities are guided by strictly basic or more superficial needs, we consider them to belong to economic activity if they require the use of material or biotic artifacts or resources for them to take place. And we do so whether they are driven by dire need or by the most whimsical craving. In this sense, activities such as aesthetic-driven surgery have an economic dimension of provisioning as much as the search for food, sexual reproduction, protection from enemies, shelter, or clothing.

I propose to characterize, not define, **provisioning**, the subject matter of economic

activity, as the production and reproduction of the living conditions in a given society, which are determined by the means of living of such a society. And **means of living**, that which provides the label of ‘economic’ to an activity, are, on the one hand, those artifacts and techniques that require the use of material or biotic artifacts or resources for them to be respectively produced and executed, and, on the other hand, environmental resources themselves. In almost any known human society with a social division of labor, these means of living have to be produced and circulated among all members of society. So, provisioning can be shortly characterized as the production and circulation of means of living, where ‘**production and circulation**’ mean, following the Marxian tradition, the process beginning with the development of a certain means of living and ending with its use (or consumption) by a member of society (Arrizabalo, 2014, p. 24).

With such a definition, we restrict economic activity, with Lowe, to those goods or services, using the mainstream characterization, which involve at least what Lowe names a ‘material’ dimension. We will later focus on the consequences of such a restriction. But we need to remark on the different sense of the term ‘material’ in this dissertation with respect to both Lowe’s sense and that of the Marxian tradition. Whereas the latter may include biotic artifacts and resources under the label ‘material’, I prefer to leave the domain of human interactions with living beings under the separate label ‘biotic’. Thus, the term ‘material’ in this dissertation is used in a more restricted sense than both in Lowe’s work and the Marxian tradition. As a consequence, and consistently with my characterization of means of living, I would rather speak of a restriction of economic activity to the material and biotic dimensions.

This allows at the same time for (1) the distinction between material and biotic resources (or artifacts) and (2) the inclusion of biotic artifacts and resources within economic activity. Lowe’s sense of ‘material’ only allows for (2), not for (1). The relevance of the distinction presented in (1) cannot be absolutely clear in this dissertation. It can only get clear when, analyzing the interactions of a capitalist economy with the environment, we require terminological precision to distinguish these two domains of human activity. This is why I do not focus on the distinction in this text and accept that Lowe’s concept of material, with regard to the subject of this dissertation, is at this point as valid as the one I propose here.

The distinction presented above is the reason why I prefer to simply speak of provisioning, as the subject of economic activity, instead of material provisioning. This being said, starting from Lowe’s definition of economic activity, I have proposed a definition with some nuances that may be used within the future foundation of an emergency economic science.

The distinction of the economic dimension of human activity from other dimensions such as the political, social, technoscientific, or environmental dimension is only analytic. The only objective of my characterization of economic activity is to link it with the material

and biotic dimensions of human activities. Thus, I can highlight the economic dimension of human activity for analytical purposes, at the same time recognizing that human activities can often be labeled under more than one dimension. As an example, we can think about politics in a given society. Clearly, the most important dimension is the political one, related to the resolution of public problems, but it also has an economic dimension because it makes use of material artifacts (like paper, and ballots. . .) to support organizational techniques like the organization of elections, and it also has a social dimension because the claims of politicians and political institutions affect how people think and act in a given society.

Both Lowe's and my nuanced definition have not truly restricted much economic activity since any activity that we consider to count as economic today, and it would be not exaggerated to say that since the beginning of human history, has made use of material or biotic artifacts or resources. Indeed, even services like massages make use of oils, massage tables, and other artifacts coming from environmental resources, not to speak of the power or the building involved if the massage does not take place in very favorable weather conditions.

But this poses no challenge at all for Lowe. In fact, his declared objective with his definition is not to restrict the domain of economic activity, for example, distinguishing necessary from unnecessary activities, but to restrict it to a means in order to satisfy a certain substantive goal.

§5 Capitalist economies or market economies

Before we can characterize economic activity in a capitalist economy or a market economy, we must clear out what we mean by 'capitalist' and 'economy'. By '**economy**', I mean the economic system of a given community, the set of agents, and their corresponding practices concerning economic activity. The term '**capitalist**' is used in this dissertation as a synonym with '**market economy**' such that production and circulation of means of living are regulated through sales operations in the market, they are the result of interactions between buyers and sellers. How the term 'capitalist' relates to the market through the competence-driven tendency of firms to accumulate capital is well-known to any economist, not only Marxian economists. However, for the future purpose of developing the foundation of economic science, a proper reconstruction of the terms 'value' and 'capital', including a revision of the labor theory of value as in the Marxian tradition, will be required if the term 'capitalist' is to be precisely used as a synonym of 'market economy'. Within this dissertation, a thorough reader can forget the term 'capitalist' in order to be fully methodical and substitute it with its synonym 'market economy'. I have decided to maintain the term here because some observations to Lowe's theory will be made based on the Marxian tradition which, even if still pending on terminological reconstruction of its terms as they are academically used today to ensure methodical order and precision, it can provide valuable insights for the development of an emergency

economic science if its terminology is properly reconstructed.

§6 Terminological reconstruction: ‘Value’ and the labor theory of value

I must add here some considerations to understand what I mean by ‘reconstruction’ of terms coming from the Marxian tradition. I will give an example of it for the crucial term ‘value’.

This word has a technical meaning within Marxian thought, based on Marx’s well-known labor theory of value as conveyed in his *Capital*. The value of a commodity is claimed to be measurable by the labor time that it takes to produce it. Hence, its unit is the time unit. To account for the differences in value among different workers due to varying intensities, qualifications, or experience, Marx proposes, at the very beginning of his *Capital’s* Volume I, to measure value as the socially (or average) labor time taken to produce the commodity (MEGA, 1983, p. 20). However, some authors have recognized that this entails that the value of a commodity cannot be individually measured for a single commodity or worker but only statistically inferred from aggregate measures of commodity production units and hours (Cockshott et al., 2014, p. 118). Leaving aside the possibly solvable difficulties that actual data pose to such aggregate measurements (Cockshott et al., 2014), such a measure of value possibly represents a limitation for the labor theory of value if we compare it with measures in natural sciences.

The quantitative theory of labor, in terms of a theory of measure, does not have the same status as quantitative theories of mass (hylometry), time (chronometry), or space (geometry). The latter are variables that can be instrumentally measured and, once the measuring device is built, its results are intersubjectively controllable, ‘objective’, it is often said, and they do not depend on historical conditions. Value is also objective insofar as it depends on production time and is not just a matter of satisfying individual preferences; it is not merely a matter of subjectivity. However, it depends on historical and cultural conditions. The value of commodities certainly depends on the technological level, among other factors.

We cannot quantitatively and individually measure the value of a commodity in an intersubjectively controllable manner like one measures the mass, volume, or density of a certain body. The reason for this is that we do not want value to only depend on production time but on other variables such as intensity, experience, and even qualification: the value that I add to a commodity if I produce it while I play video games (if this were possible) or I am barely skilled to produce it is not the same as the value added by myself working fully concentrated or by somebody else much more skilled than me to produce the commodity. Even if there are theories willing to count many of these factors into past labor embodied in the labor force because of past training, we can always claim that intensity is a clear determinant of value that does not depend, at least directly, on past labor to gain qualification and experience.

Defined as it actually is, the value of a commodity can only be measured as the quotient between the aggregate amount of units produced during the measuring period and the aggregate amount of hours spent to produce these units. The value of each token of a single commodity of a certain type is thus the same by definition, independently of the number of hours spent to produce that particular token. Giving an unrealistic example in actual conditions, whether I use high technology and work at full intensity to produce something or I build it with my own hands in a more or less relaxed manner, the value of the resulting commodity is the same. This is not the same if we measure, for instance, the mass of bodies. There, the mass of each token can be measured individually utilizing a proper weighing scale.

I said above that this represents a limitation for a quantitative labor theory of value compared with other theories of measure like those which depend on measuring devices. However, after a constructive understanding of science, as we will see in sections 3.3.3 and 4.3.4, it is a limitation only concerning the objective to be achieved using the theory. Still using Marxian terms, we require a quantitative theory of value because we need to relate values and prices and also because we need to prove the existence of surplus value and thus exploitation as the basis of a capitalist economic system. This is politically relevant to prove if capitalism's undisputed strive for profit is sustained by the exploitation of the labor force. Whether these objectives can be achieved or not using the actual version of the labor theory of value will be determined in a future emergency economic science. There, it will also be considered whether it methodically makes sense to define the value of a single commodity before the value of a certain aggregate production during a certain production period if the former is to be computed through the latter.

These considerations belong to what I mean by 'reconstruction' of terms such as those of Marxian origin like 'value' or 'surplus value'.

§7 A constructive definition of economic activity in market economies

In a capitalist economy or a market economy, we can unequivocally claim that economic activity consists of the production and circulation of commodities. By '**commodity**' I mean, after the Marxian tradition, any product of human labor that is produced in order to be sold. It is well-known to this tradition that the human labor force, i.e. human techniques, skills, and capacities to work, is itself also a product of human labor, concretely education in the widest sense possible, and is often produced to be sold in capitalist economies, the most frequent way being waged labor. After this consideration, it is also clear that so-called 'services' in the mainstream definition can also be commodities. Thus, there is no need to modify the definition of 'commodity' to include such ubiquitous economic interactions.

Basically, economic activity in capitalist economies is such that means of living, the general subject matter of economic activity, are produced and circulated as commodities.

3.1.3 Economic activity and ‘empirical’ economic science

§1 Economic activity and motivations

Lowe continues his digression about economic activity considering what he calls its ‘motivations’. Among them, he distinguishes between what he calls ‘purposive factors’, the realm of goals and preference systems, and ‘cognitive factors’, where he locates expectations.

Because preferring and expecting are mental activities, there is an academic controversy about how to deal with them in scientific terms given that the only really observable about them is actual decisions and behavior.

Regarding **preferences**, facing the definition of what it means to prefer something over something else, there are three options, and only two of them were available at Lowe’s time: the introspective conception and the behavioral conception (Medina, 1972, p. 24). Lowe specifically rejects behaviorism, which defends that the only way to properly deal with preferences in scientific terms is through actual decisions revealing the underlying preferences. Against this view, Lowe consistently claims that it leaves the explanation of behavior out of the equation and that it implicitly assumes that individual behavior is time-consistent.

Rejecting behaviorism, Lowe is tacitly defending an introspective conception of preference, like many mainstream economists unconvinced of the well-known theory of revealed preference (as developed and defended by Samuelson) also do. This introspective view of preference consists of describing the introspective individual act that someone experiences whenever she claims to prefer something over something else. We will briefly mention in further sections how this concept of preference is problematic if one pretends to develop a proposal like Lowe’s Political Economics under certain assumptions, and what an alternative conception might be used.

It is worth mentioning that Lowe puts a lot of effort into distinguishing between so-called ‘modal goals’ or ‘action directives’, which “are the source of quantitative decisions”, and ‘final goals’, which include “the qualitative composition of the desired basket of output”. However, the distinction does not seem to be very sound. For instance, final goals can involve quantitative decisions (I want or need x apples instead of y apples), too, so the frontier between modal and final is not very clear. What he intends to do with the distinction is to set the difference between types of preferences that traditional economics can leave unconstrained and those that it cannot. As it will be seen later, whether to maximize receipts and minimize costs cannot be left unconstrained after traditional economics.

Regarding expectations, Lowe provides an informal definition comparing them with scientific “predictions” but being based on common-sense knowledge instead of scientific

knowledge. If we require the use of the term in an emergency economic science, we must provide an intersubjectively controllable concept.

§2 The dimensions of economic activity

Lowe makes a distinction between two dimensions of economic activity: the technological and the social dimension.

Regarding the first dimension, Lowe considers that any society masters some technical processes of production and circulation of means of living, which he characterizes as a relation of humans to nature. The repeatable patterns of dependence that he considers the object of scientific inquiry, in this case, are what he calls ‘rules of engineering’ based on what he calls ‘laws of nature’. As governed by rules of engineering, Lowe considers this dimension to be analogous to Engineering or applied natural sciences. From Lowe’s claim about laws of nature and rules of engineering, it becomes clear that Lowe considers nature as governed by human-independent laws and that the discovery of these laws by humans can lead to the possibility of developing technological and engineering processes. Such a view is hegemonic among scientists and analytic philosophers of science.

Regarding the second dimension, it is equivalent to Marx’s social relations of production (*soziale Produktionsverhältnissen*), how humans interact to achieve production and circulation, which Lowe characterizes as a relation of human to human.

Although Lowe uses the ubiquitous metaphor in economics about Robinson Crusoe’s economy to separate the two dimensions, he acknowledges Crusoe’s example as a “methodological fiction” (1969b, p. 21) since all economic processes involve both the technological and the social dimension.

§3 Individual behavior and social patterns

The social dimension is considered by Lowe as the origin of economics as a science, concretely with the emergence of market economies. Before showing this, Lowe states the task of socialization of the technological core of economic activity as how to stimulate goal-adequate patterns of behavior of all those involved in the production process. To make this clear, we need to clarify what ‘goal-adequate’ and ‘socially patterned’ mean. A social pattern of behavior is **goal-adequate** if it is compatible with the achievement of the state of affairs designed as a goal. Again, the term is clear if we previously understood what a goal is, based on practical experience on technical knowledge. Individual behavior is **socially patterned** if it is not arbitrary, not merely consistent with a private goal but consistent with the attainment of a certain social goal. When we speak of socially patterned behavior, we always mean economic behavior, not any possible kind of behavior whatsoever.

To ensure socially patterned behavior, individual modal and final goals must be “compatible

with” aggregate modal and final goals. This is what a system of communication and sanction tries to achieve in a society (1977, p. 25). As Robert Heilbroner puts it, the repeatable patterns of dependence of economic science in its social dimension are to be achieved through such a system for material provisioning to take place (1966, p. 278). Examples of sanctions given by Lowe, which are understood as institutional arrangements to reward adequate responses and punish inadequate responses, can include legal rewards and penalties as well as profit and loss in market economies.

Lowe considers as the key requirement of socially patterned behavior the underlying motivations, both preference systems and expectations (1977, p. 25).

It is important to note that the distinction between the technological and the social dimensions of economic activity can be relevant since it allows Lowe to compare different modes of production such as capitalism and collectivism above the same technological bedrock.

§4 The historical root of actual economic science

Lowe discovers a historical coincidence of analytic economic science, from which traditional economics as Lowe characterizes it in the 20th century appears, in contrast with the Historical, Institutional, and Functionalist schools of economic thought, with the emergence of market economies (1977, pp. 28–29). In his view, this may help to explain why economic science appeared so recently in history in contrast with other sciences (1977, p. 32).

In his historical analysis, Lowe finds that the idea of the market regulating aggregate provisioning of societies, which he has identified as the main objective of economic activity, puzzled almost any author reflecting on economic matters before the XX century. The intuitive idea beyond this is that it is difficult to grasp how something which has not been developed after rational design can yield the desired result. In Lowe’s terms: “In the absence of any publicly acknowledged macro-goal, with communications and sanctions depersonalized, and without overt social conditioning of action directives [modal goals], aggregate provisioning through the market remains a mystery” (1977, p. 31). Heilbroner expands on this and claims that precisely this “mystery” makes economic research tend to depart “from a taxonomic effort to the status of a genuine ‘explanatory’ science” (1966, p. 279). As we will see later, even authors like economist Friedrich Hayek, who are very critical of rational design applied to economic systems, have to develop sophisticated arguments to provide a satisfactory answer to this puzzle.

This puzzle of aggregate provisioning in an impersonal market induced the first economists, Cantillon and Quesnay, Hume and Smith, to find a “law of coordination and integration in a free economy”. They used the analytical tools available at their time, mainly Newtonian mechanics as the dominating paradigm, but with the problem of having to apply it to spontaneous human decisions instead of insensitive particles (Lowe, 1977, pp. 30–31).

The dominance of Newtonian mechanics in the times of the first economists is also seen by Lowe as a way to explain the similarity of actual economic methods with those of the natural sciences (1977, p. 32).

§5 Econometrics and ‘empirical’ validation

With the characterization of the concepts of science and economic activity, Lowe has proposed a concept of **economics** as the science of economic activity, which I have slightly reformulated in this dissertation. With the two dimensions of economic activity each with its own repeatable patterns of dependence, the technological ones closer to engineering and the social ones properly defining the realm of classic economic thought, now there only remains to talk about the validation of scientific claims.

Here it is where econometrics plays its part. Lowe does not give a thorough definition since it is unanimously accepted that **econometrics** consists of techniques of mathematical statistics applied to the testing of economic models. After the mainstream formulation in the New Palgrave Dictionary of Economics, econometrics “aims to give empirical content to economic relations for testing economic theories, forecasting, decision making, and for *ex-post* decision/policy evaluation” (Geweke et al., 2017, p. 3201).

It is important to note that the “empirical content” ubiquitously claimed for econometrics is different from the empirical character of the validation of scientific theories or models in natural sciences. Basically, the inferences made with help of econometrics do not come from the construction and repetition of experiments under laboratory conditions, but from the collection and analysis of so-called historical ‘data’ such as Gross Domestic Product (GDP), unemployment, consumption, debt, imports, exports, etc. Most, if not all, of these data are themselves statistical aggregates developed using quite different sources of information and statistical techniques (Lequiller et al., 2014). Thus, the testing, the truth validation of statements, is quite different from the empirical testing of theories and models in the natural sciences such as physics or Biology.

As stated before, strictly speaking, ‘empirical’ means ‘related to experience’ and is often used to characterize the experimental methodology used in natural sciences. The term in economics lacks the experimental part so characteristic of physics, so it is dubious and sometimes confusing to use the same term for such quite different procedures.

Given the requirement to provide economics with empirical content to qualify as a proper scientific discipline and the general impossibility of developing experiments in economics like natural sciences do, economics turns to mathematical statistics both to build its ‘data’ and to analyze their correlations, the latter being the focus of econometrics. This way, economics claims to base its theoretical claims on quantitative measurement like the natural sciences (Geweke et al., 2017, p. 3201).

There are other mainstreamly acknowledged limitations of econometrics⁹. However, Lowe’s critique goes far beyond the technical limitations of econometrics as a statistical validation tool.

§6 Economics: ‘empirical’ irrelevance, ideological root

Now we can understand what Lowe means by the lack of empirical relevance of economics despite the refinement of its research econometric techniques (1977, p. 32). Leaving aside the abovementioned reservations, above all the ambiguous meaning of the term ‘empirical’, now we can claim that Lowe’s assertion can be restated as the lack of correspondence between actual data and theoretically predicted data about events as the ‘empirical irrelevance’ to be dealt with.

Lowe claims that an answer to why economics has not become more empirically relevant can be that it conceptualizes free market economies and no real market economy has existed whatsoever, except for a short period of “near laissez faire during the nineteenth century” (1977, p. 32). Broadly speaking, if somebody conceptualizes eggs and only has nuts available, the conceptualization might turn out not to be very satisfactory. To the question of why, then, economists conceptualize free markets, Lowe claims that it has normative significance in Western countries, ideological, we might say, as the economic counterpart of a liberal political regime of “masterless” men whose individual interests are made compatible with the interests of all (1977, pp. 32–33). Here **interests** can be understood as individual preference systems.

Before going to his probably brightest contribution, his critique of traditional economics, he already mentions that the key to assessing any statement about free market economies is to determine what it means to be economically free, what individual freedom of decision making consists of. As it will be further elucidated later, Lowe claims that only freedom of choice of final goals is compatible with well-performing free markets but not freedom of choice of modal goals. This means that it is incompatible to decide one time based on “minimum expenditure”, another time on “minimum physical effort” and another time on “ostentation” (1977, p. 34).

3.2 The limitations of traditional economics

This section presents Lowe’s critique of traditional economics, which is based on a thorough analysis of its main theoretical tool, the law of supply and demand (LSD). From its well-

⁹The two most important ones are: (1) the Duhem-Quine thesis of the general impossibility to link the results of statistical tests with economic theory or instead with auxiliary non-theoretical assumptions “about functional forms, dynamic specifications, latent variables, and so on”; (2) the abovementioned non-experimental character of economic data (Geweke et al., 2017, p. 3231); and (3) the general impossibility to infer a causal relation between economic variables from a statistical correlation between them (D. M. Hausman, 2021).

known behavioral assumptions about the relation between quantities demanded or supplied and prices, Lowe infers as a requirement for this behavior certain motivational assumptions and claims the lack of correspondence of the latter with actual motivations to be the main reason of traditional economics' forecasting failure (Section 3.2.1). Then, from this analysis and the well-known equivalence of market equilibrium and maximum technical efficiency in terms of resource allocation, Lowe reinterprets traditional economics to be a normative theory oriented to the achievement of market equilibrium as an objective (Section 3.2.3). Across this presentation, I mainly make the following additions to Lowe's presentation: firstly, in addition to the definition of more terms for a future ortho-language, I present a logical analysis of Lowe's argument about the LSD and I further restate it with the addition of the concept of laboratory conditions in order to clarify it and thoroughly show its theoretical soundness (Section 3.2.1); secondly, I analyze the main models of actual mainstream macroeconomics as well as some important heterodox proposals and claim them to be subject to Lowe's critique and thus to have a very poor predictive power, with the consequent limitations in terms of its potential regarding economic policy guiding (Section 3.2.2); thirdly, from Lowe's analysis and my analysis of mainstream macroeconomic models, I briefly elucidate what I name the three 'Is' of mainstream macroeconomics, three important limitations, concretely inconsistency, inaccuracy and ideology (Section 3.2.4).

3.2.1 The law of supply and demand (LSD)

§1 Behavioral assumptions

What Lowe names 'traditional economics', the mainstream economic theory of his time, is governed by the ubiquitous **law of supply and demand**, which is, in his words, "the cornerstone of economic theory" such that "all other deductive inferences in traditional Economics (...) are either applications of this general law to special problems or rest on the same basic premises" (1977, pp. 34-35).

Since the law plays a crucial role in Lowe's critique, a little bit more clarifications than those given by Lowe will be made in this dissertation.

Given Lowe's association of traditional economics with the law of supply and demand, traditional economics in Lowe's time can be identified with many branches of mainstream economic analysis today, in particular macroeconomics, which deals with the analysis of economies as a whole and is the most prediction-oriented branch, often used in actual policy development and assessment in many Western countries. This is why very often in this dissertation I extend Lowe's critique of traditional economics into today's mainstream macroeconomics.

Lowe's main claim is to conclude required motivations, both in terms of preferences and expectations, from the behavior that is assumed if the LSD is to take place. First of all,

let us write what any student of economics knows today about the LSD. **To behave according to the LSD** means that (1) given quantity changes in quantities supplied or demanded, prices vary indirectly with increases in quantities supplied and directly with increases in quantities demanded; (2) given price changes, quantities supplied vary directly with the price change and quantities demanded vary indirectly with it (1977, p. 34).

When we take a look at both statements, we already find a problem which neither Lowe nor economist H. D. Henderson (1932), the author Lowe quotes when referring to a classic statement of the law, elucidate. They do not precisely define what they mean by ‘supply’ and ‘demand’ and, more concretely, by ‘quantities demanded’ and ‘quantities supplied’, most probably because they are considered to be so basic and evident that they do not need any further clarification.

Instead, actual economic theory usually refers to quantities supplied as quantities that sellers are willing and able to sell and it refers to quantities demanded as quantities that buyers are willing and able to purchase (Mankiw, 2016, p. 816). In other textbooks, authors refer to the quantity demanded as a ‘demand bundle’ and define it as the quantity ‘desired’ at a given price (and income) level (Varian, 1992, p. 99). Even abstracting from the difference between what is measured in theory and what is econometrically measured (Usher, 1970, pp. 1–6), the examples given in economic textbooks measure quantities demanded and quantities supplied through quantities purchased and quantities sold respectively, thus abstracting from the ‘willingness’ or ‘desire’ which appears in the theoretical statement (Mankiw, 2016, pp. 39–40, 68, 73–74). There, the implication is made that people want and can buy or sell something because they actually buy or sell it. So, the terms ‘supply’ and ‘demand’, while using a mental term such as ‘want’ in its definition, are behavioristically understood: it is the actual behavior of buying or selling that reveals the willingness to buy or sell. This is the same as in Samuelson’s theory of revealed preference concerning the concept of preference¹⁰. Indeed, in today’s most widely used textbook in graduate Microeconomics, whenever the term ‘demand’ appears related to consumer choices or preferences, be it from the choice-based (behaviorist) or the preference-based (introspective) approach, the ‘demand bundle’ simply becomes a ‘commodity bundle’, a set of commodities that, if aimed at representing an individual consumption level, is called ‘consumption bundle’ (Mas-Colell et al., 1995, p. 18). There, the terms ‘willingness’ or ‘desire’ simply disappear leaving only actual behavior to define the quantity demanded (the so-called ‘consumption bundle’) and the ‘demand function’, the quantity’s relationship with price and wealth (Mas-Colell et al., 1995, p. 23), which is later associated with the Law of Demand (Mas-Colell et al., 1995, p. 32). Equivalently, the term ‘supply’ appears related to a commodity vector called ‘production vector’ within the so-called ‘supply-correspondence’, which relates prices with profit-maximizing commodity

¹⁰Samuelson’s preference for behaviorism over introspection is well known among economists who know his application to the concept of preference in the theory of revealed preferences, today still a mainstream way to understand and measure preferences.

quantities (Mas-Colell et al., 1995, p. 136). And in these terms, the law of supply is mathematically formalized (Mas-Colell et al., 1995, p. 138).

This is unproblematic regarding Lowe’s conclusions of motivations from behavior as in the LSD but is nonetheless worth mentioning, especially since Lowe explicitly opposes behaviorism in *OEK*.

Henderson’s formulation of the LSD (1932), quoted by Lowe (1942 and 1965) and summarized in the above behavioral assumptions, may seem a little old-fashioned to actual economists. However, it can be easily translated into the language of present mainstream economics. To avoid the need for reading the quoted papers in order to check my following claims, I quote Henderson’s formulation as quoted by Lowe (1942, pp. 433-434):

- “1. When at the price ruling, demand exceeds supply, the price tends to rise. Conversely when supply exceeds demand, the price tends to fall.
2. A rise in price tends, sooner or later, to decrease demand and to increase supply. Conversely a fall in price tends, sooner or later, to increase demand and to decrease supply.
3. Price tends to the level at which demand is equal to supply.”

Proposition (2) in Henderson’s formulation as quoted by Lowe (1942, p. 433) refers to the Law of Supply and Law of Demand as represented in demand and supply curves in mainstream economics (Mankiw, 2016, pp. 67–73; Samuelson, 2010, pp. 45–53). How quantities demanded or supplied vary with price changes, in Lowe’s formulation.

Proposition (1) in Henderson’s formulation as quoted by Lowe (1942, p. 433), instead, refers to the effects of shifts of demand and supply curves in mainstream economics textbooks, which are usually called ‘changes in demand or supply’ or ‘excess demand’ and ‘excess supply’, in contrast with changes in quantities demanded or supplied (Mankiw, 2016, pp. 69–82). How prices vary with quantity changes such that these changes affect the quantity-price relationship at any given price.

Proposition (3) in Henderson’s formulation simply expresses the equilibrium clause. Actual economic textbooks first explain equilibrium as the equation of demand and supply and then formulate the remaining two propositions.

If we write it more formally, with $P = \text{price of the good}$, $D = \text{quantity demanded}$, $S = \text{quantity supplied}$, and Δ to describe the change in a given magnitude, the two **behavioral assumptions of the LSD** are:

- B_1 : If ΔP , then ΔD has the opposite sign as ΔP and ΔS has the same sign as ΔP .
- B_2 : If $(\Delta D \text{ or } \Delta S)$ at a ruling price, ΔP has the same sign as $(\Delta D - \Delta S)$.

Further formalization using the sign of a magnitude as an operator is unnecessary for this dissertation.

B_1 and B_2 can be combined into composite behavior according to the law such as:

($B_2 \rightarrow B_1$): A seller of a commodity, in front of a change in the quantity demanded (ΔD), will change price according to B_2 . Then, given the price change, she will change the quantity supplied according to B_1 .

For instance, if there is an increase in demand with no change in supply ($\Delta D > 0$ and $\Delta S = 0$ such that $\Delta D - \Delta S > 0$), the seller increases the price ($\Delta P > 0$) according to B_2 . Then, given the price increase, the seller will increase the quantity supplied ($\Delta S > 0$) according to B_1 .

The same law is valid for a buyer. Moreover, it is intended to be valid for any kind of commodity, including the labor force. There, sellers are workers and buyers are contracting companies such that quantities correspond with hours worked and prices correspond with salaries.

In that case, the seller of workforce, in front of a change in the quantity demanded (ΔD), will (try to) change her accepted-salary according to B_2 . Then, given the price change, she will change the quantity supplied according to B_1 .

For instance, if there is an increase in hours demanded with no change in hours supplied ($\Delta D > 0$ and $\Delta S = 0$ such that $\Delta D - \Delta S > 0$), the worker increases the required salary ($\Delta P > 0$) according to B_2 . Then, given the salary increase, the seller will (try to) increase the quantity supplied ($\Delta S > 0$) according to B_1 .

The patterns of behavior of the LSD ($B_1 \wedge B_2$), with $\wedge$ being the logical conjunction as in formal logic, even in economic textbooks, are explained through the motivations of buyers and sellers to have such a kind of behavior.

§2 Motivational assumptions

Lowe links behavior and motivations starting from some examples to show how, for B_1 and B_2 to take place, then buyers must minimize expenditures and sellers must maximize receipts. His claim is the following:

“These examples make clear that there is only one set of modal micro goals or action directives which is compatible with the action patterns formulated by the Law of Supply and Demand and is reinforced by the price movements which this law describes. When acting as sellers, marketers must be inspired by the goal of maximizing money receipts, whereas as buyers their action directive must be minimization of money expenditures. No concern with any final goals, be they prestige based on conspicuous consumption or preference for the status quo of provisioning, or with any other source of satisfaction, may modify these modal goals” (1977, p. 36)¹¹.

¹¹The following footnote is added: “In the interest of logical consistency it must be admitted that the reverse action directives - minimization of receipts and maximization of expenditures would serve equally

We can write:

M_1 : Buyers are expenditure minimizers and sellers are receipt maximizers.

This set of what Lowe calls ‘modal goals’ is named by him “extremum principle” (1977, pp. 36–37). Since we have simply considered modal goals to be a particular type of preference, the extremum principle can be simply understood as the preference for maximization or minimization over alternative possibilities (such as, with Lowe, taken from Kenneth Boulding, ‘homeostatic tendencies’, ostentation... , etc. (1977, p. 47)).

Lowe’s claim about behavior and motivations can be formally stated as (1):

(1) If $(B_1 \wedge B_2)$, then M_1 .

Or:

(1) $(B_1 \wedge B_2) \rightarrow M_1$.

Since Lowe’s “extremum principle” is quite ubiquitous in traditional economics, as it is today in mainstream economics, Lowe examines the principle methodologically, from the classic economists seeing it as a feature of human nature until the XX-century consideration of it as a mere methodological assumption (Friedman) or a so-called ‘heuristic principle’ (Machlup) such that it must not correspond with so-called ‘reality’ but only serve to deduct econometrically testable propositions (Lowe, 1977, p. 43). As will be clear later, this XX-century consideration is an attempt to claim the non-testability of the “extremum principle”. Instead, only its conclusion, economic macroequilibrium, would be suitable for validation or refutation through econometric testing.

It is important to note that the claim is not a biconditional because M_1 by itself does not imply $(B_1 \wedge B_2)$. For that, Lowe claims that it is necessary to add the expectations M_2 and M_3 which, in conjunction, are called by Lowe “stabilizing expectations” (1977, pp. 38–39).

M_2 : Marketers have price expectations with less than unity elasticity.

M_3 : Marketers have quantity expectations with positive elasticity.

Here, ‘marketers’ is just a term which includes both buyers and sellers.

Regarding expectations, Lowe claims the following:

“With these definitions in mind, we can now easily formulate the expectational premises which are implied in the conventional statement of the Law of Supply and Demand. Given the extremum principle as action directive, marketers will act in accord with the law if their quantity expectations have positive elasticity and if their price expectations have less than unit elasticity - a combination which will henceforth be defined as stabilizing expectations” (1977, p. 38).

well. The practical relevance of such charity’ incentives appears negligible”.

The concept of elasticity of expectations is used by Lowe, coming from economist John Hicks. The concept formalizes the following approximate situations: for the behavioral assumptions of the LSD to hold, Lowe claims that buyers and sellers must expect quantity changes to be quite permanent and price changes to be quite temporary.

More precisely, buyers and sellers must have:

- Positive elasticity of expectations regarding quantity changes: quantity changes are expected to increase in the future, whether with a lower rate, the same rate, or a higher rate, but never change direction, such that (1) given a change in demand, one must expect prices to change and accordingly adjust production, increasing or decreasing, to keep maximizing receipts in the future; and (2) given a change in supply, one must expect prices to change and accordingly adjust demand, increasing or decreasing it, to keep minimizing expenditures.
- Less than unit elasticity of expectations regarding price changes: price changes are expected to decrease or change direction in the future such that one must buy or sell now to minimize expenditures and maximize receipts respectively.

In formal terms:

Elasticity of expectations = $\frac{\text{Change in expected prices}}{\text{Change in actual prices}}$ (Hicks, 1946, pp. 205–206). The following table shows Hicks' concept and which are Lowe's conclusions regarding the LSD he is conceptualizing:

Quantitative Elasticity of expectation	<0	0	(0,1)	1	>1
Qualitative Elasticity of expectation		Rigidly inelastic		Unit	More than unit
	Less than unit				
Sign of Elasticity of expectation	Negative	Zero	Positive		
Expected changes are respect to actual changes	Of opposite sign.	Zero	Smaller but with the same sign	Equal	Higher
Price changes are expected to	Change direction: from + to - or from - to +	Be non-existent	Decrease	Be permanent	Increase

Quantity expectations for the LSD to work
Price expectations for the LSD to work

Figure 1: Elasticity of expectations regarding price changes or quantity changes. Source: *Own elaboration from Hicks (1946).*

Sketching Lowe's claim in formal terms:

(2a) Given M_1 , if $(M_2 \wedge M_3)$, then $(B_1 \wedge B_2)$.

Or:

(2a) $M_1 \rightarrow ((M_2 \wedge M_3) \rightarrow (B_1 \wedge B_2))$.

A little bit metaphorically at first sight, Lowe claims: “And the theory of the market itself appears as a deductive argument, in which the extremum principle and stabilizing expectations form the original higher-level hypotheses” (1977, p. 40).

Expressing it formally:

(2b) $(M_1 \wedge M_2 \wedge M_3) \rightarrow (B_1 \wedge B_2)$.

Note that (2a) and (2b) can be shown to be equivalent claims. So, Lowe’s second claim, not evidently equivalent to his first claim, finally appears to be equivalent to it. Hence, it is valid to claim both (2a) and (2b).

Since (2b) is more intuitive as a statement, we adopt Lowe’s claim to be (2b). In words: If the motivational conditions of the LSD hold, then buyers and sellers behave according to the LSD.

If we restate it formally such that:

$B = (B_1 \wedge B_2)$, the behavioral assumptions of the LSD hold, and

$M = (M_1 \wedge M_2 \wedge M_3)$, the motivational assumptions of the LSD hold,

Lowe’s claim is (2b):

(2b) If M , then B (except for practically irrelevant cases).

Or:

(2b) $M \rightarrow B$ (except for practically irrelevant cases).

So, he actually claims that behavior can be predicted if the adequate motivations hold.

Restating the abovementioned claim (1) with these shortenings:

(1) $B \rightarrow M_1$.

§3 The LSD and market equilibrium

The most important claim about the LSD in traditional economics, still maintained today by mainstream economists, is its relationship with market equilibrium. The LSD predicts a final macroeconomic state where quantities demanded are equal to quantities supplied at the lowest price level compatible with production technology (Lowe, 1977, p. 40). This state is called ‘**market equilibrium**’ and a consequence of it is the full utilization of so-called ‘factors of production’, basically capital and labor. It is important to remark that the argument requires an additional assumption. Concretely, the argument is considered

to work in idealized conditions, without the influence of any external influences: it is considered to be a *ceteris paribus* clause. How this is conceptualized by Lowe under Nagel's terminology will be considered in detail later. However, it is enough to say at this point that what is meant above by 'external influences' is equivalent to what in natural sciences, mostly physics, the researcher manages to remove when constructing artificial laboratory conditions.

So, formalizing the claim of traditional economics as presented by Lowe, with this additional assumption:

$$(3) L \rightarrow (B \rightarrow E).$$

Where:

L : There are laboratory conditions (absence of 'external influences').

$B = (B_1 \wedge B_2)$: The behavioral assumptions of LSD hold.

E : Market equilibrium takes place.

Since Lowe does not use the term 'laboratory conditions' but speaks of "extra-systemic influences" disturbing "intra-systemic" processes (1977, p. 49), thus using a terminology akin to Nagel's which will be elucidated later, it is important here to precisely introduce the term. I propose to name '**laboratory conditions**' those relevant states of affairs to achieve a certain end, which Lorenzen calls 'situations' (1987, pp. 43–44). Presenting situations involves decisions about the relevance of certain states of affairs and this means assessing whether the chosen states of affairs are suited to achieve a certain end.

§4 The argument of traditional economics

What Lowe has shown through his analysis of the relation between motivations and behavior in the LSD is that traditional economics has forgotten the role of motivations in its argument about the relation between the LSD and equilibrium. Formally, he has added clause (2b):

$$(2b) M \rightarrow B.$$

Where:

$M = (M_1 \wedge M_2 \wedge M_3)$: The motivational assumptions of the LSD hold.

As Lowe himself claims, after his analysis, traditional economics constructs an argument through the LSD where the "extremum principle" and "stabilizing expectations", i.e. motivations, are the hypotheses and market equilibrium is the ultimate consequence, which occurs after the behavioral assumptions of the LSD (1977, p. 40). What he claims here is that for equilibrium to be predictable to emerge not only laboratory conditions have to hold (something that any reasonable economist would accept) but also the right

motivations have to take place. Thus, converting Lowe's claims into an argument, the following premises must be added:

(4) L

(5) M .

And, stating the complete argument, we have that traditional economics, after Lowe's analysis, truly claims that:

(2b) $M \rightarrow B$

(3) $L \rightarrow (B \rightarrow E)$

(4) L

(5) M

(Conclusion) E .

Note that traditional economics itself, without Lowe's additions, only claims (3) and, after a little reflection, maybe also (4). What Lowe has added is the link between motivations and behavior with two clauses: (2b) and (5). After (2b), if marketers' motivations include the extremum principle and stabilizing expectations, then LSD behavior holds. And, in order to conclude E through (3) and (4) as traditional economics does, considering the added clauses about the relation between LSD motivations and LSD behavior (1) and (2b), LSD-motivations (5) must be added as a premise to the argument.

Although it does not belong to the argument in order to conclude E through LSD behavior and LSD motivations, it is also important to remember Lowe's added clause (1) $B \rightarrow M_1$, which, in words, means that

(1): If LSD behavior holds, then marketers are motivated by the extremum principle. The contrapositive of this clause will allow Lowe to claim that, if marketers are not motivated by the extremum principle, then LSD behavior cannot hold.

The logical validity of the argument is straightforward. If (4) and (5) are true, both B (by (2b)) and E (by (3)) hold and the LSD works as it is supposed to.

§5 The problematic testing of the LSD

However, when economists claim the truth or validity of the LSD, they mean by it that the assumed behavior and consequences correspond with what they call 'reality', which basically means that theoretical behavior and consequences correspond with actual behavior and consequences. This immediately poses the question of how to test the LSD in order to determine why E may not follow. Unfortunately for traditional economics, this non-occurrence of E is too frequent such that a justification for this becomes a requirement.

The question is relevant and this can be easily understood in terms of the argument presented above. According to traditional economics, the argument in Lowe's time as much as in mainstream economics today is that, if equilibrium does not follow from a given set of economic decisions, it is not because the clause $B \rightarrow E$ is false but only because L is false, i.e. premise (4) is false. In plain words, the problem is not the conclusion of equilibrium from behavior as in the LSD. Instead, the problem is only the fact that external influences affect behavior and make it differ from LSD-assumed behavior B such that equilibrium does not necessarily follow: since it is a *ceteris-paribus* clause and all other things do not always remain equal, the consequence may not follow. There rarely are ideal laboratory conditions in economic activity, so deviations from equilibrium can always be imputed to these imperfect external conditions. This way, the theoretical conclusion of E from B can remain immune to most econometric intents of falsifying it.

Instead, Lowe claims that in industrial capitalism (which we will characterize in a few lines), many times equilibrium does not follow from a set of economic decisions, it is due to behavior differing from LSD behavior because motivations differ from LSD motivations. In logical terms, E does not follow as a consequence of (3) not mainly because (4) is false but because (5) is false. Indeed, Lowe uses examples of (4) being "close to true" (historic situations close to laboratory conditions) and equilibrium not holding to show that the missing link is M as in (5). Logically, (5) being false is consistent with any following behavior, not necessarily LSD behavior B , so even if L is true, equilibrium may not hold because it does not necessarily follow from (2b) and (3).

This is why Lowe's addition of LSD motivations M as something testable in addition to LSD-behavior B and theoretically linked with LSD behavior ($M \rightarrow B$) can add valuable insights into the reasons for equilibrium not following from certain sets of economic decisions.

Regarding the testing of the LSD, Lowe distinguishes between direct testing, basically motivations (M) and behavior (B), and indirect testing through the occurrence of equilibrium (E). The distinction is simple: in the traditional statement of the LSD, the inference of E as a conclusion is made through hypotheses regarding M and B as well as its relation with E . Thus, testing of the hypotheses is considered to be direct whereas testing of the consequence is considered to be indirect.

Lowe shows that behavior and motivations are difficult to test because there is no data about them before Lowe's generation.

Considering Lowe's time, existing surveys show different preferences from the "extremum principle". Indeed, instead of maximizing profits, some companies reveal tendencies such as aiming at fixed rates of return or seeking to maintain the value of assets or market shares. Moreover, instead of minimizing costs, some consumers reveal preferences like making customary purchases of branded goods at properly situated stores (1977, p. 47).

These purposive motivations different from M (concretely, different from M_1) already show why E may not hold. As elucidated before, Lowe has shown how LSD behavior B entails the extremum principle as a motivation M_1 . This is indeed the abovementioned clause (1):

(1) $B \rightarrow M_1$.

Thus, from the contrapositive of this clause, if M_1 is false, then B must be false either. Consequently, having both B and M_1 false, the argument does not allow concluding anything about the occurrence of equilibrium.

Regarding expectations, there are no surveys available at Lowe's time and Lowe considers it impossible for a researcher to draw any valid conclusion from them even if they were correctly expressed and formalized. Indeed, expectations are likely to vary continuously with changes in economic variables, so they cannot be taken for granted in industrial capitalism. To understand this, it is important to clarify how Lowe conceives industrial capitalism and how it contrasts with early competitive capitalism.

But before we do that, it is important to note that, excluding surveys, the testing of motivations takes place through behavior. Indeed, whether marketers maximize receipts or minimize expenditures as in the extremum principle as well as whether they have or do not have stabilizing expectations, it is revealed by their actual purchases and sales. However confusing may be to name 'direct testing of motivations' the indirect testing of them through behavior, Lowe's terminology is still sound as elucidated above.

Back to how Lowe conceives industrial capitalism and how it contrasts with early competitive capitalism, he mentions three relevant features of industrial capitalism: large fixed costs, very specific and indivisible capital stock, and long periods of investment and production (1977, p. 47). The relevant difference between industrial capitalism and early competitive capitalism in this respect lies in the period over which marketers maximize profits or minimize expenditures. Whereas the short run was adequately chosen by classic and neoclassic thinkers, the three features above characterizing industrial capitalism make it impossible for the short run to be the time span for maximization within industrial capitalism. Instead, the new time span must be a longer time horizon.

Given the new time horizon over which to maximize or minimize, Lowe concludes that many different behaviors can be justified to reveal extremum purposive motivations. Hence, the testing of purposive motivations through behavior becomes ambiguous.

Adding the abovementioned volatility of expectations, which are continuously changing with changing economic variables, market behavior cannot be precisely predicted given the many likely expectation changes allowed by the longer time horizon. Thus, expectations, even if scientifically expressed and formalized, are useless beyond the very short run because they are continuously changing (1977, pp. 47–49). This challenge is generally acknowledged today in mainstream economics. Indeed, testing the LSD with data including

a temporal dimension (such as time series or panel data), those often considered to provide the closest correlation Econometrics can offer to claim theoretical causation between two variables, is considered to be generally impossible: either the time horizon is too short to have price variation, or it is too long to consider wealth, preferences and demographic variations as fixed (Härdle et al., 1991, p. 1525). Even those mainstreamers who consider it to be possible claim its econometric validity to be weak (Bryant, 2010).

Lowe's claim about indirect testing of motivations and behavior through the occurrence of its theoretically predicted consequence, macro-states of equilibrium, points to a theoretical problem at the root of the issue. He claims that indirect testing through inferences is difficult given that no laboratory experiments can be developed to unequivocally conclude certain effects (macro-equilibria) from certain causes (patterned motivations and behavior as in the LSD). To handle the problem, Lowe considers two possibilities: firstly, to consider historic episodes close enough to laboratory conditions and to go for an imprecise indirect testing; and, secondly, to consider how environmental conditions (and perturbations), those that would ideally be removed in laboratory conditions in order to isolate only certain economic processes, can affect behavioral and motivational patterns of marketers. This second option aims to show if these environmental conditions are such that laboratory conditions must be constructed in economics, thus making indirect testing theoretically inconclusive at its very root (1977, p. 50).

Considering the first possibility, several historical examples point out that the failure of equilibrium-consistent predictions is not due to environmental conditions but to non-patterned behavior, different from the one consistent with the LSD (1977, pp. 51–57). Now, let's rewrite the formal argument we wrote above:

(2b) $M \rightarrow B$

(3) $L \rightarrow (B \rightarrow E)$

(4) L

(5) M

(Conclusion) E .

What Lowe has shown through examples of historic episodes close enough to laboratory conditions is that the justification of traditional economics that equilibrium does not hold is not due to (4) being false, i.e. laboratory conditions not holding. Hence, there only remains the option that equilibrium does not hold because (5) is false, i.e. LSD motivations do not hold.

Considering the second possibility, Lowe gives a thorough justification for why environmental conditions affect motivational and behavioral patterns such that there cannot be non-constructed laboratory conditions in economics (1977, pp. 58–61).

§6 The LSD and maximization problems

There have been many studies trying to econometrically test the LSD from Lowe's time until the present day. However, to summarize them and compare them to Lowe's diagnosis, we need to introduce the operational equivalence between Lowe's object of analysis, the LSD, and today's most widely used terminology: utility maximization. Fortunately, even if utility maximization was not as ubiquitous in Lowe's time as it is today, Lowe also considered it in *OEK*.

Within Section 9 of *OEK*, Lowe relates the utility principle with the law of supply and demand: the LSD, instead of being related to the extremum principle, is derived from the universally valid aim of maximizing utility or satisfaction (1977, p. 201). Like in almost any approach Lowe undertakes, he examines the historical roots of utility theory. The Utility School uses psychological "laws" in its arguments: Gossen's First Law, today known as the principle of diminishing marginal utility, which, in plain words, states that the more you consume something, the less satisfaction you get from each additional unit consumed; and, from this law, another principle is derived, Gossen's Second Law, which states that, given a good like money which can satisfy different wants, maximum utility is obtained if the marginal utilities of all goods acquired tend towards equality. This means that each additional dollar spent adds the same satisfaction or that marginal utilities are proportional to the prices that buyers are willing to pay for the different goods (1977, p. 201).

Even if utility maximization was supposed to be universal, valid for every kind of economic agent, most neoclassical utility theorists abandoned the utility principle for firms and substituted it for the classical principle of profit maximization (1977, p. 203), still used today. By '**profit**' it is meant the difference between a firm's revenues and its costs within the process of production up to the final sale of its commodities. By '**profit maximization**' it is meant that this difference is maximized. In mainstream economic theory, functions of revenues and costs in terms of output produced are assumed such that maximization mathematically occurs for the production level where the derivative of such difference is equal to zero. Leaving aside the mathematical details, the concepts of marginal revenue and marginal cost are introduced such that profit is said to be maximal whenever that difference is zero. However it is understood, profit maximization is just an application of Lowe's extremum principle: the best way to maximize receipts and to minimize expenditures at the same time is to maximize the difference between receipts and costs.

Regarding the utility principle, the fact that utility can be conceived in terms of many different items other than money makes critics claim that the principle is tautological and may be consistent with any kind of behavior (1977, p. 204).

To make the utility principle operational in order to take concrete conclusions from the

utility maximization principle and its relation with the LSD, Lowe examines a buyer's possible responses to a fall in price in terms of utility maximization to compare it with the equivalent responses if the buyer follows the LSD. In addition to LSD behavior, a set of possibilities emerges where demand may decrease like the good being "Veblenesque" or "inferior", or the price fall being interpreted as the beginning of a falling trend; also, demand may remain invariant, the buyer may experience homeostasis concerning the good. Among the whole set of possibilities, only one is consistent with the LSD: raising demand (1977, p. 205).

Acknowledging the problem, the original marginalists specified three conditions to make the principle different from a mere tautology: (1) what is maximized is the purchase of goods and services; (2) the consumer who maximizes utility must be under-satiated¹²; and (3) utility is maximized (and behavior takes place) over a fixed period (1977, pp. 205–206). In a sentence by Lowe, the principle has operational "meaning only in a timeless world of undersatiation" (1977, p. 208), to which it can be added that satisfaction-utility must be conceived as consumption. With these conditions, all the above exceptions are excluded: in the Veblen good case, the consumer maximizes ostentation, not goods' disposal; the inferior good and the homeostasis case entail the consumer's satiation with one particular good; and the interpretation of the price fall as falling trend conflicts with the fixed maximization time period (1977, p. 206).

As a conclusion, the utility principle has operational meaning only when it coincides with the extremum principle, maximizing receipts and minimizing expenditures (1977, p. 207).

Noteworthy enough, Lowe concludes from this, in classic and Marxian terminology, that value in exchange cannot be inferred from value in use or, in other words, "the action directive of a buyer" cannot be inferred from "his scale of preferences" (1977, p. 207). Thus, Lowe seems to exclude action directives from preference systems. However, as stated before, there is no reason why the preference for more goods over fewer goods (a quantitative preference for more apples over fewer apples) cannot belong to a preference system. Thus, his claim can be more precisely re-stated as 'whether somebody maximizes or not receipts (or she minimizes expenditures) cannot be inferred from the rest of her individual preference systems'.

Here, Lowe adds an interesting conjecture. Neoclassical economics considers both the utility principle and the law of supply and demand as almost universal (1977, p. 208) because the involved under-satiation is a psychologically plausible state given the postulated world of scarcity. However, Lowe correctly points out that scarcity of means of living and the consequent tendency towards undersatiation are not natural but cultural constraints (1977, p. 209), meaning that they depend on historical conditions, among them technology and cultural development.

¹²Under-satiation is equivalent to the convexity postulate in contemporary indifference analysis.

§7 Testing the LSD today

Now we are in the position to update the direct testing of the LSD until today through its actual equivalents: utility maximization and profit maximization. After more than fifty years and further refinements of econometric techniques developed to infer conclusions from past data, there is no substantial change in Lowe's claim. In the words of a defender of mainstream economics: "In this regard, we considered available evidence on consumer and producer behaviour, and on market clearing. We also considered the indirect evidence provided by the performance of certain equilibrium based models of the business cycle. A reasonable overall summary of the available evidence would seem to be that the empirical reliability of the Walrasian hypothesis at the microeconomic level is mixed and at the macroeconomic level is tending towards being negative. (...) It seems therefore not to be the case that Walrasian equilibrium holds universally across alternative economic structures, including market economics and for all periods of history" (Bryant, 2010, pp. 422–423). General equilibrium theory is the set of Walrasian consumer theory (utility maximization), producer theory (profit maximization), and market clearing (prices adjusting such that quantities demanded are equal to quantities supplied), the latter being basically the LSD¹³.

A careful reader will have probably recognized in the above quotation a part that does not belong to Lowe's direct testing but to indirect testing. Indeed, the claim is made that "equilibrium based models" are tested as "indirect evidence", with overall negative results at the macroeconomic level. Thus, even before Lowe's analysis, we already know that even some mainstream economists today consider indirect testing to be inconclusive.

§8 Traditional economics as a normative theory

The first conclusion to be taken from the argument above is that, given premises (2b) and (3), the only way to aim unequivocally to E is to add premises (4) and (5), which means to control environmental conditions and motivations. Indeed, this is exactly what Lowe proposes in his Political Economics.

The second conclusion that Lowe draws is that LSD behavior B cannot be spontaneous behavior based on freedom of decision-making, as the theory claims. It cannot be the description of spontaneous behavior as it occurs in real economic decisions. Instead, it is the kind of behavior required for equilibrium to emerge, it is equilibrium-required behavior. We can already claim, with Lowe, that traditional economics is not a descriptive theory. By 'descriptive theory' we mean what is mainstreamly understood as positive theory, whose objective is restricted to representing how things actually are, in contrast with a

¹³Although Bryant's review of the literature is quite extensive and can be enough as support for Lowe's claim, the following papers can be added which also question either profit maximization or utility maximization: Armstrong & Huck (2010); Asplund (2007), Asplund (2018); Ray & Bhadra (1993); Tauer & Stefanides (1997); Zaman & Karacuka (2012); Zereyesus et al. (2021).

normative theory, which is also involved with how things should be, thereby including a goal to be reached and justified through theory. The opposition descriptive-normative or positive-normative concerning theory or science will come again into play later with the pairs naturalistic-constructive (cf. Section 3.3) or liberal-emergency (sections 4.3 and 5.2) science. Thus, although Lowe does not present it this way, traditional economics can be reinterpreted as a normative theory where behavior is oriented to the achievement of equilibrium.

If we combine the two conclusions, we see that LSD behavior cannot be spontaneous behavior but must be constrained behavior for equilibrium to emerge. Before we consider the reasonable question of why a normative theory would be willing to aim at equilibrium instead of other apparently more ‘social’ goals, we will go back to the original problem about Econometrics posed by Lowe at the beginning of *OEK*, now with the tools of his analysis.

3.2.2 Economic forecasting failure: An update

§1 The far-reaching scope of Lowe’s critique

Finally, Lowe has found the main reason why Econometrics fails to both explain and predict events: the reason is the lack of socially patterned behavior. Even twelve years after the 1st edition of *OEK*, in his postscript of 1977, Lowe severely criticizes Econometrics not because of a lack of sophistication, but because its subject matter lacks the order needed for theorization in terms of patterned behavior (1977, p. 330). He even makes fun of econometric forecasts used as business advice which can be radically opposed such that, obviously, they substantially increase their chance of being successful (1977, p. 329).

After this, it is possible to reply to a criticism made by some authors such as economist Henry C. Wallich, who claims that predictability has not decreased in industrial capitalism and that industrial capitalism is not more unstable than former capitalism (1969). Even if Lowe himself in his 1982 Self-critique acknowledges that the term ‘stability’ is imprecise and the term ‘predictability’ is a matter of establishing thresholds (1982, p. 237), thus leaving the door open for his critics to claim that predictability is indeed possible within certain thresholds, the important thing to remark in terms of this dissertation is the actual impossibility in industrial capitalism, not the comparison with earlier forms of capitalism of which there are scarcely sources of data. As Lowe asserts, if the problem with econometric models is due to behavioral equations, progressive sophistication of econometrics cannot offer any solution to the problem.

In *EMASE*, Lowe specifies and expands on the failures of Econometrics, restricting forecasting success to properly predicting what he defines as the “direction” of economic movements (where ‘predict the direction’ means that, given a quantity change in an economic variable, we can be sure of the arithmetic sign of the change in another economic

variable, not necessarily of its magnitude). He quotes the influential Quarterly Econometric Model for the US developed by the US Department of Commerce based on Professor Klein's model. The model failed to predict cyclical turning points in the US economy from 1953 to 1965 more than two quarters ahead although it used past statistical data such that exogenous variables had their actual values (1969b, p. 8).

One might be tempted to think that after more than forty years since the second edition of Lowe's *OEK* in 1977, the progression of Econometrics may have turned Lowe's analysis obsolete. However, a brief update of macroeconomic models until the present day shows how a well-targeted theoretical critique can last over time. In this sense, we present the main predictive tools available today to guide economic policies, mostly based on mainstream macroeconomics. We also present a proposal from so-called 'heterodox economics', critical of mainstream macroeconomics, which nevertheless is also subject to Lowe's critique as expressed in this dissertation.

The point to be made with this revision is that, whatever approach is taken, whenever the model relies on behavioral assumptions, these assumptions must be seriously taken if the model's conclusions are to be followed. However obvious this might sound, it is not satisfied by any model coming from descriptive science, mainstream or not. Indeed, if behavior is to take place in the future like a given model is assuming, it cannot be left unconstrained or, in plain words, dependent on the free will of economic agents. In other words, if actions consistent with consumers maximizing utility, firms maximizing profits and all agents having certain kinds of expectations (in the mainstream jargon: adaptive, rational, boundedly rational...) are assumed, it must be made sure that these actions take place. In Lowe's words, some kind of control, cultural or political, has to be implemented for the actions to actually take place. This means that, if a given model uses behavioral assumptions to derive its conclusions, it also implicitly assumes the required control for the assumed behavior to take place. If the model is to be taken seriously, its assumptions have to be made true. Lowe's critique is not focused on the realism or simplicity of behavioral assumptions but on the fact that models assume a certain behavior and do not propose any future measure of behavioral control to make the assumed behavior come true. His critique applies to any model developed from descriptive (in the mainstream jargon, often named 'positive') economics, even to those heterodox proposals which claim a closer correspondence of their models with what they call economic 'reality'. As we will have occasion to repeat, in contrast with the possible normative justification of equilibrium as a goal within mainstream economic models, which we will present below, it is not evident which equivalent aim can be reinterpreted to be pursued by heterodox models.

§2 Mainstream macroeconomic forecasting and behavioral assumptions

The main macroeconomic forecasting tendencies today are well summarized in a short contribution by economists Andrea Pescatori and Saeed Zaman (Pescatori & Zaman, 2011) which presents the available models to guide monetary policy. We will follow the

classification of this paper and complete it with contributions from authors close to the US Congressional Budget Office (CBO), a non-partisan federal agency of the legislative branch of the US government, which analyzes the US economy to offer assessment for fiscal policy-making. Thus, we do not restrict ourselves to the academic side of economics but consider also the policy-oriented side. Moreover, we consider this political side for the still hegemonic world economy, the US, where many efforts are dedicated to applying economic science to policymaking.

According to the abovementioned paper, there are three main types of macroeconomic models: time-series models, dynamic stochastic general equilibrium (DSGE) models, and large-scale macroeconometric models. The difference between the models allegedly lies in how strong they are rooted in economic theory, which is usually called how ‘structural’ the model is, and also how close the models are to data. This kind of economic theory consists of methodological individualism applied to economics, which is mainstreamly called ‘microeconomic foundations’ or, shortly, ‘microfoundations’. Without expanding on the details, it means to deliver all macroeconomic results of the models as a consequence of individual agents making decisions such as, for example, consumers maximizing utility or firms maximizing profits, assuming certain kind of expectations.

Firstly, time-series models, which reveal statistical correlations between economic variables, are considered to be non-structural since they do not have microfoundations, but they are said to be very close to data. Today, these models have evolved towards the very familiar models to graduate economic students, vector auto-regression models (VARs), and many of its variations. These models extrapolate past correlations of variables into the future, which means assuming that the past behavior of economic agents which was conceptualized under the found correlation will extend into the future.

Secondly, DSGE models start from microfoundations, based on decisions by consumers and firms and deriving macroeconomic relations between variables from microeconomic equations. These models are difficult to solve and thus cannot be as close to data as time-series models. However, they have been widely used for forecasting purposes once it was seen that their derived decision rules can be well approximated by linear rules. In terms of behavioral assumptions, they include quite a lot, too. When they are calibrated, which means assigning constant numerical values named ‘parameters’ to certain economic relations in order to make the model fit the existing data, the parameters of the model are chosen to make the corresponding macroeconomic variables match the targeted economy’s values (method of moments) or to base on microeconomic data instead of direct econometric testing of the model (Fernández-Villaverde & Guerrón-Quintana, 2021, pp. 2–3; Nishiyama, 2015, pp. 119–125; Reichling & Whalen, 2012, p. 17). Behaviorally, this means again to rely on past reactions, those which determined the parameters that made the model fit the economic reality at a certain moment or that emerged from the given microeconomic study at a certain moment, to determine future reactions. Furthermore, as Lowe concluded, any model using utility or profit maximization is operationally equivalent to the usage of

the LSD with its behavioral assumptions, the more so if the so-called ‘market clearing’ condition is added, which, as stated above, is equivalent to the LSD. All these features constrain the possible future reactions of economic agents to be equal to similar past reactions, in order to be computationally convenient or to be the kind of behavior assumed in the LSD, as presented by Lowe.

Thirdly, large-scale macroeconometric models, which are huge systems of behavioral equations derived from correlations between economic variables as well as some theoretical assumptions, are considered to be halfway between structurality and non-structurality. They project all elements of the aggregate demand of an economy (consumption, investment, public expenditure, net exports) based on past data, which again requires a lot of behavioral assumptions. Concretely, the involved relations between variables are mathematically conceptualized through functions, which usually include constants or parameters more or less based on economic assumptions. For example, consumption is assumed to depend on income, wealth, and the interest rate, with parameters to account for a consumer’s risk aversion and her preference for present consumption with respect to future consumption; and investment is assumed to depend on the rental price of capital, the purchase price of capital, the interest rate and the depreciation rate of capital, with a parameter to describe the capital’s share of output. Statistical correlation is used to validate the given functions with past known values of the magnitudes. Moreover, many of these functions and equations are constructed based on supply and demand curves as a theoretical construct. For example, the function relating aggregate demand with the consumption function, the investment function, government spending, and the net exports function (called ‘IS curve’) comes from an equilibrium in the market for goods and services. And other equations assume equilibrium in the money market (so-called ‘LM curve’), or equilibrium in the foreign exchange market. Because of this kind of construction, these equations are subject to Lowe’s critique, they are valid only as long as a certain behavior of economic agents, LSD behavior, is assumed. To this category of model, we must ascribe Lowe’s criticized model based on Professor Klein’s. Today, large econometric models like this are widely used both by public institutions like the CBO and the US Federal Reserve (FED) and by private companies to predict the short-term effects of fiscal and monetary policies and thus guide and assess policymaking.

In addition to the three models presented, which guide monetary policy-making, fiscal-policy advisers use a fourth type of model, the Solow growth model, which may be also considered to include structural as well as non-structural elements. The objective of the model is to compute a projection of the output of an economy. The structural elements of it are agents’ decisions about how much to save and to work, which determine capital and labor as inputs of the model. Instead, the nonstructural element is the so-called ‘total factor productivity’, which includes any influence on output that is not due to capital and labor, such as technological progress, the rate of capital utilization, changes in quality and intensity of labor, institutional changes, etc. When the model is used

to compute an economy’s potential output, as the CBO does, potential values of labor, capital, and total factor productivity are introduced into an aggregate production function which computes output from the different inputs as if there were just a representative firm for the whole economy. Projections of potential inputs (1) require projections of several variables based on past trends extended into the future (like population growth, and fertility rates...) and (2) make use of statistical techniques which include the natural rate of unemployment (NARU) as a variable, a highly controversial concept which is at best a statistical extrapolation of past correlations of variables into the future¹⁴. Moreover, the effects of private saving and the supply of labor on output come from econometric models which determine how workers responded to similar policies in the past, determining so-called ‘elasticities’ (Congressional Budget Office, 2014, pp. 120–124; McClelland & Mok, 2012; Reichling & Whalen, 2012). Thus, behaviorally, the assumption is made that past behavior will extend into the future. As a whole, all outcomes of the model depend on assuming that agents will react in the future as they have reacted in the past.

All the above-mentioned economic models aimed at calculating the effects of economic policies on the economy rely on behavioral assumptions about the decisions of economic agents. Thus, they implicitly assume behavioral control of economic agents if the models’ results are to be realized. The effects of economic policies on the economy can be measured in several ways. Since a very common magnitude used both in the academic literature and in politicians’ claims is the growth of production (measured as GDP growth), some examples below often refer to it.

After the description of all models, we can conclude that there are three types of behavioral assumptions, which entail control of economic agents:

1. Extrapolation of past statistical tendencies of periodically measured magnitudes (so-called ‘trends’) into the future. The past values of certain magnitudes are statistically analyzed to determine if there is a tendency over time around which the values in every period (usually a year or a quarter of a year) fluctuate. If there is such a tendency, it is projected into the future to determine the future values of the magnitude. This is done with magnitudes like population growth, which includes projections of mortality, fertility, immigration and emigration rates, as well as with the level of educational attainment.

¹⁴The NARU is defined to be the minimal sustainable rate of unemployment consistent with stable equilibrium in the labor market, where ‘sustainable’ is not clearly defined other than saying that it excludes fluctuations in demand due to business cycles. This rate is differently estimated by different economists and even differently estimated across periods by the CBO. From 1948 to 2004, it was based on the so-called ‘non-accelerating inflation rate of employment’ (NAIRU), an estimate of the Phillips curve, which relates the inflation rate and the unemployment rate: the NAIRU was said to be the minimum unemployment rate sustainable with stable inflation; and from 2005 onwards, it assumes that the actual rates of unemployment in the US were at their natural rates in 2005 given that US labor markets in 2005 were considered to be at its maximum sustainable level (Shackleton, 2018, p. 45). It is so embedded in mainstream ideology that it is sometimes referred to as ‘full employment’ (Shackleton, 2018, p. 12). This is why the NARU has been criticized to be an ideological assumption to justify the permanent existence of unemployment in capitalist economies.

These kinds of projections assume that the behavior of agents underlying the past trend will extend into the future. Thus, it assumes control of agents' behavior if the model's results are to be realized.

2. Extrapolation of past statistical correlations between magnitudes into the future (econometric studies). For example, if a fiscal policy like a tax cut and a magnitude used to measure economic activity such as GDP growth are found to be statistically correlated at a certain point in time; then, the statistical correlation is used to measure the future expected effect of another tax cut on GDP growth. The correlation can be more or less involved and includes several intermediate steps. For example, to determine the effects of tax cuts on workers' decisions to work (measured in total hours worked): firstly, the effects of tax cuts on personal income are estimated; and then, the effects of income changes on the number of hours worked are determined. The results of this type of correlation are usually introduced in more complex models as parameters (the effects of tax cuts on hours worked are used to determine so-called 'labor supply elasticities'). A more complex version of this type of extrapolation is the development of functions including parameters more or less based on economic assumptions to statistically correlate one or more magnitudes (like the above-mentioned consumption function or the investment function). The theoretical validation of the given function is based again on a past statistical correlation. In the case of the consumption function, the past correlation is often determined as a result of a utility maximization problem (Arnold, 2018, pp. 8–9). This extrapolation of past correlations into the future entails that the past behavior of economic agents which was conceptualized under the found correlation will extend into the future, no matter how involved the correlation was originally obtained. So, the resulting forecasts can only be ensured through the control of economic agents to make them repeat the behavior captured by the past correlation.

3. Assumption of a certain type of economic behavior encompassed in the LSD. Many functions and equations of economic models are constructed assuming equilibrium between supply and demand in certain markets. The above-mentioned IS-curve and LM-curve are examples of it. Because of this kind of construction, these equations are subject to Lowe's critique, they are valid only as long as a certain behavior of economic agents is assumed: concretely, on the one hand, the extremum principle, and, on the other hand, stabilizing expectations. The same kind of behavior is also indirectly assumed, as Lowe already pointed out, in utility maximization problems, profit maximization problems, and most evidently in general equilibrium models with its market clearing condition. In the end, this kind of behavior can only be assured if agents' decisions are controlled.

§3 Heterodox macroeconomic forecasting

A recent incorporation into forecasting models comes from so-called 'agent-based computational economics' (ACE), a self-proclaimed heterodox approach that proposes agent-based models (ABMs). After two of its representatives (Fagiolo & Roventini, 2017), these models

are based, like DSGE models, on microfoundations about the decisions of economic agents, but relax some of their restricting assumptions. Thus, they introduce, among other issues, heterogeneous agents, bounded rationality, and adaptive expectations as behavioral assumptions based on outcomes from behavioral economics and experimental psychology for the models to be more suitable to fit the data. Nevertheless, this comes at the price of being even harder to solve than DSGE models. Whenever behavior is assumed, whether more or less complex and close to data, the implicit assumption is made that past behavior will extend into the future. Thus, Lowe's critique that control must be implemented for this repetition of past behavior to take place in the future applies.

In general, heterodox tendencies are undertaken by economists aware of the limitations of mainstream approaches. Many authors criticize that mainstream economists only very poorly justify their postulates. Many of these critical voices belong to the so-called "critical realist" perspective in philosophy of science (Syll, 2010, p. 45), which at the same time is considered to be Post-Keynesian within economics, in contrast with both New-Keynesian and New-classic Macroeconomics, both of which are considered to be mainstream (Jespersen, 2009, p. 220; King, 2002, p. 197).

After critical realism, the weak correspondence between economic models and economic reality is supposed to be the reason for the failure of economic forecasting (Jespersen, 2009, p. xvi; Syll, 2010, pp. 31, 53).

Realist economists properly identify the irrelevance of mainstream economics when dealing with the actual capitalist economic system. They claim to differ from mainstream economics, which sets the scientific-economic aim in prediction based on deductivist explanation assuming certain economic regularities (Lawson, 2003, p. 143). Instead, they claim to set the scientific economic aim in causal explanation (Lawson, 2003, p. 143). They also claim to accept economic indeterminacy and take it seriously, thus giving necessarily up mainstream economic modeling and its behavioral assumptions, to gain a closer correspondence between their models and economic reality (Jespersen, 2009, pp. 221, 226; Syll, 2010, p. 47; Varoufakis, 2014, p. 342).

To gain this closer relation with economic reality, they propose so-called "open models" (Jespersen, 2009, p. 230) in contrast with mainstream "closed models", where 'open' has a similar sense to Lowe's use of the term as borrowed from Nagel (cf. Section 3.3). The difference between open and closed models is the laboratory-like control of the economic reality entailed by closed models versus the acknowledgement of uncertainty and lack of control in open models (Jespersen, 2009, pp. 135–138). In plain words, they mean to express that accurate models must be adaptable because they represent a continuously changing economic reality. The price paid for a more precise description of the economic reality is the limited validity of results and thus their applicability to guide policy recommendations (Jespersen, 2009, pp. 139, 230).

However, critical realists also recognize the impossibility of proper analysis (aimed at

prediction) with merely open systems (Jespersen, 2009, p. 138). This is why they try to make steps towards reducing uncertainty using “semi-closures” (Jespersen, 2009, pp. 153, 173), meaning analytical control over some economic variables while leaving others endogenously determined (Jespersen, 2009, p. xv). This means using so-called ‘*ceteris paribus* clauses’ (Jespersen, 2009, p. 153) like the behavioral assumptions made in mainstream economics or to achieve the semi-closure through institutional control (Jespersen, 2009, p. 125), close to Lowe’s solution of control. Anyway, the limited role of thus-achieved prediction is recognized (Jespersen, 2009, p. 174). As a conclusion, in the end, either they give up the predictive aim of economics or they have to assume control in order to gain some predictive power. This dichotomy has already been identified before (King, 2002, pp. 200–202).

Once a behavioral assumption is made without any measure of control proposed, Lowe’s critique is applicable.

Thus, not only mainstream models but also many heterodox models are subject to Lowe’s critique of behavioral assumptions. Heterodox economists acknowledge that mainstream models “unrealistically” assume laboratory-like control of the economic reality and, consequently, they propose “more realistic” models that include uncertainty about and lack of control of economic reality. However, they also acknowledge that macroeconomic prediction with such models is impossible and propose hybrid models which, like mainstream ones, entail some kind of control if they are to be taken seriously. In the end, they face the fact that any model designed for economic policy assessment is aimed at predicting future macroeconomic states from present macroeconomic states. Thus, to make behavioral assumptions true entails control of economic agents’ decisions. However, as mentioned above, the reinterpretation of mainstream theory into a normative theory oriented towards equilibrium’s achievement is feasible and Lowe makes the case for it although some remarks will be made when we present it. Instead, the normative reinterpretation of heterodox proposals is still lacking and is not evident. In general, consistently with realist-analytic philosophy of science, the realist critique considers the truth criterion of a theory as the correspondence between scientific descriptions of events and the events themselves, usually characterized shortly as reality (Hartmann & Janich, 1996, p. 46).

As a consequence of the survey of actual macroeconomic tendencies, we can see that all of the above models are subject to Lowe’s critique. We are ready now to introduce the first ‘I’ and the second ‘I’ of the three presented in the introduction. However, since it is the objective of this dissertation to be accessible both to economists and non-economists, a short comment will be made as to why Lowe can treat traditional economics, even if he does not use these words, as a normative theory, which means to conceive the theory as the set of requirements to be satisfied if equilibrium has to be achieved as a goal.

3.2.3 Traditional economics as a normative theory

§1 Equilibrium and Pareto efficiency

The first remark to be made is, with Lowe, that equilibrium is neither a political goal of any state or government nor an individual goal of any marketer, the latter in particular because all individual gains are made in states preceding equilibrium. However, it is considered a goal to be pursued both by most classic and contemporary economists because it is considered to deliver the optimal state of aggregate provisioning such that the particular goals of all marketers are realized as much as possible given the existing labor force, means of production, environmental resources, and technological level, which are usually labeled together under the term ‘factors of production’. In other words, there is no alternative state in which an agent can achieve more satisfaction than she actually does without at the same time reducing the satisfaction of another agent (Lowe, 1977, p. 41). Any reader familiar with economics will recognize here the definition of the so-called ‘Pareto optimum’.

Lowe properly characterizes Pareto optimality as maximum technical efficiency: maximum output with given factors of production. Indeed, the Pareto optimum is considered a measure of technical efficiency in economics since it is the given allocation of output among individuals such that any intent of re-allocation cannot make any individual better off without making at least another individual worse off. Here ‘better-off’ and ‘worse-off’ mean respectively a higher rank and a lower rank within individual preference systems, so it assumes at least consistently ordered individual preference systems. The criterion tries to formalize the idea that an allocation is efficient if it yields the maximum overall degree of satisfaction given the existing set of factors of production. So, to maximize individual preferences, the idea is to maximize the aggregate degree of satisfaction. The criterion does not make any equity considerations about the optimal allocation: it is a well-known example that an economy governed by a dictator owning all existing output and the people in that economy owning nothing at all is a Pareto-efficient allocation.

How to relate the individual allocations resulting from the occurrence of equilibrium with the individual allocations correspondent with a Pareto Optimum to determine their equivalence is the subject of the well-known two fundamental welfare theorems, which belong to mainstream welfare economics, itself a branch of mainstream normative economics. Despite the assumptions required for the equivalence to hold (the perfect state of competition, including price-taking of economic agents and perfect information, the type of preferences, and the production set), the equivalence is often used as a justification of the technical efficiency of capitalism to allocate output among society members.

§2 The assumptions and implications of Pareto efficiency

Lowe identifies three implied assumptions of the concept of efficiency used to define the Pareto optimum: (1) the legitimacy of the actual distribution of means of production; (2)

the consideration of actual preference systems as the only (or at least the most) legitimate ones; (3) the identification of the optimum with the maximum, given by the “extremum principle”, which means the preference for more quantity over less quantity every time an individual can choose between them (1977, p. 41).

The implications of these assumptions are the following. Assumption (1) implies taking private property of the means of production as given and legitimate, which means taking capitalism as given. As stated above, here ‘capitalism’ is used as a synonym of ‘market economy’ without further justification. However, this does not preclude considering private property and, in particular, the private property of the means of production, as a key feature of a market economy or a capitalist economy. Assumption (2) entails accepting preference relativism or value relativism, a liberal postulate, as given. Finally, assumption (3) means to prioritize the practice of maximum provisioning through the preference for more over less quantity, which is highly compatible with consumption, capital accumulation, and economic growth, some features frequently associated with a well-performing capitalist economy. Again, the precise reconstruction of the concept of capital remains out of the scope of this dissertation, and with it its relation with economic growth, to be undertaken in future research.

These assumptions and their implications may not be as neutral as value relativists would like them to be. This is why, in future research, an alternative concept of efficiency should be developed, concretely value-efficiency, meaning the rational foundation of preferences instead of sticking to value relativism. In mainstream terms, it means to include within the very concept of efficiency some equity considerations to make it compatible with the achievement of social goals.

Despite the latter critique, it is clear why Lowe may legitimately reinterpret traditional economics as a normative theory oriented to the achievement of equilibrium as a goal: it is equivalent to the achievement of maximum technical efficiency, which may be reasonably considered to be a social goal. Note that this is the case only if we take preference and normative relativism as given, as it is actually the case, such that no strict foundation of preferences or norms is required or even expected.

3.2.4 An assessment: The three ‘Is’ of mainstream macroeconomics

§1 ‘I’ for inconsistency

Now we can present the first ‘I’ and the second ‘I’ of traditional economics and, as stated, equivalently, mainstream macroeconomics.

We begin with the first ‘I’, presented in the introduction: ‘I’ for ‘inconsistency’. In short: economic decision-making cannot be at the same time constrained and unconstrained. Although not elucidated as in this dissertation, this inconsistency has been identified before at least by economist Mathew Forstater (2000). In the following lines, we will

examine why decision-making is both constrained and unconstrained after traditional economics or present mainstream economics.

On the one hand, it is a main tenet of mainstream economic theory that decisions are free. Indeed, this is precisely what free market economies consist of such that market freedom is what many economists claim to justify free market economies (or capitalist economies) as intimately linked with liberal political regimes. Whether decision-making is more or less constrained, especially if the constraint comes from state intervention in the economy, determines the distinction between two types of political liberalism: ‘classical liberalism’ as conveyed by authors such as John Locke, David Hume, Jeremy Bentham, and Herbert Spencer; and ‘welfare state liberalism’, whose roots may lie in John Stuart Mill and have their contemporary conceptualization in the works of John Rawls (Courtland et al., 2022). Although there may be exceptions, economists close to classical liberalism often defend free market economies with minimal state intervention, whereas economists attached to welfare state liberalism often defend market economies with more state intervention, consistently with the theories of John Maynard Keynes. However, even the latter economists, when defending constraints to economic decision-making, often do it as an exception in an otherwise well-performing market economy (Mankiw, 2016, p. 9; Samuelson, 2010, pp. 160–166). Hence, the **market freedom** of an economic agent, the unconstrained choice of its economic decisions such as how much to consume, how much to save, how much to work, or how much to invest, is endorsed by both types of liberalism and by mainstream economists today.

On the other hand, we have the theory developed by mainstream macroeconomists. We have seen how Lowe has shown that all economic reasoning based on models using the LSD or, equivalently, maximization problems, entails constrained decision-making of economic agents if the results of the model are to take place. In terms of actual macroeconomic models, this affects mostly macroeconometric models, which often appeal in their equations to economic relations based on the LSD, and DSGE models, which consist of maximization problems adding the LSD-equivalent condition of market clearing. These are the most sophisticated and widely used models for large-scale macroeconomic forecasting. However, during the update of macroeconomic models from Lowe’s time, we have argued that any kind of model with behavioral assumptions, from mainstream VARs or the Solow growth model until heterodox ABMs or critical realist models, are also subject to the same critique: if assumed behavior is to take place, decision-making has to be constrained to make actual behavior match assumed behavior. Consequently, the first ‘I’ does not only apply to mainstream macroeconomics but to most heterodox approaches, too. In Lowe’s words regarding traditional economics, Traditional theory does not conceptualize unconstrained decision-making but constrained decision-making, concretely equilibrium-required decision-making, which Lowe describes as a system “of good working order” (1977, p. 132) based on the equivalence between individual allocations after equilibrium and individual allocations in a point of maximal technical efficiency of the economy, the Pareto

optimum. This is why we have proposed to characterize Lowe's finding as a normative reinterpretation of traditional economics, concretely an equilibrium-oriented normative theory.

Obviously, decision-making cannot be at the same time constrained and unconstrained. This means to enter into contradiction, something unacceptable in any sound theoretical system. This is why we characterize traditional economics (based on Lowe) as well as present mainstream macroeconomics (among other macroeconomic tendencies) as theoretically inconsistent. To achieve consistency, one of the two parts of the contradiction has to be rejected. This means to take one of the following options: either to set mechanisms of control of economic decisions in order to make actual behavior match assumed behavior, thus denying the liberal tenet of unconstrained decision-making (this is Lowe's proposal), or to avoid using models with any behavioral assumption whatsoever, thus denying the model-based constrained decision-making, which means to abandon the actual approach to macroeconomics both by mainstream economists as by most of so-called 'heterodox approaches'.

Instead of sticking to one of these options, the macroeconomics profession may simply try to deny the claim that modeling behavioral assumptions requires constraining behavior to make it be as assumed. This kind of attitude is implicit in several methodological positions about macroeconomics: the claim that models are inventions, possibly far from reality but anyway useful to understand economic processes (Lucas, 1988); the claim that the realism of a model's assumptions does not matter as long as the model yields accurate predictive or explicative results (Friedman, 1953); the claim that models may be helpful to understand certain economic processes even if they do not or cannot fit the data (Pescatori & Zaman, 2011), consistent with the claim that models are always wrong but they may be in any way useful (Box, 1976); and the claim that the problem of mainstream models is the lack of realism of their assumptions such that more realistic assumptions can yield more accurate predictive results (Jespersen, 2009; Syll, 2010; Varoufakis, 2014).

As a reply, at this point it can only be added that, in addition to logical soundness or plausibility, the inconsistency claim has as a big argument that it can account for the presently acknowledged forecasting failure of macroeconomics. And the claim will progressively gain strength the longer models continue to fail in their predictions given economic systems with unconstrained decision-making. A more thorough assessment of this critique can come through a digression about scientific methodology, in particular the comparison between social sciences and natural sciences, the latter being the referent of the former and their claims to be given the status of proper sciences. In the next chapter, we will argue how natural sciences, in particular physics, also constrain their subject matter, concretely through laboratory conditions, to make their modeling assumptions true. Furthermore, it will be argued that the predicting success of natural sciences precisely depends on constructing the laboratory conditions for their assumptions to be made true, so Lowe's solution seems to point to the right direction in this respect.

§2 ‘I’ for inaccuracy

The second ‘I’ of traditional economics or mainstream macroeconomics is ‘I’ for ‘Inaccuracy’. It is evidently related to the first ‘I’. Once mainstream theories decide to adopt behavioral assumptions that are far from actual behavior without any intent to control actual behavior, they condemn the theory to be inaccurate. This is exactly the cornerstone of the critical-realist critique of mainstream macroeconomics: economic practice is too far away from economic models for the latter to be adequate pictures of the former. And it is also the reason they claim to be at the root of mainstream macroeconomic forecasting failures.

To this critique, we have already seen some possible replies above, which can be summarized in general as the claim that models do not need to be close descriptions of economic practice for them to be useful. Whether the inaccuracy of economic theory is to count as a shortcoming, as critical realists maintain, or as something irrelevant or unavoidable, as many mainstream theorists hold, is still an open debate. The uncontroversial claim made here is that the inaccuracy of macroeconomic theory, understood as a lack of correspondence between macroeconomic models and actual macroeconomic processes, is a fact that the great majority of the macroeconomics profession can acknowledge.

Lowe’s position in the debate about the relevance of economic theory’s inaccuracy sides with the critical-realist view. However, as we have seen above, Lowe’s critique is more far-reaching since it includes not only actual mainstream macroeconomics or traditional economics, as Lowe originally claimed, but also many models within heterodox positions.

We may see a clearer difference between Lowe’s critique and the critical-realist view if we consider the possible responses to the detected problem of the inaccuracy of mainstream economics. If there is a great difference between theory and practice and we consider that this may be the reason for the theory’s forecasting failure, we have two non-exclusive options: either we modify the theory to make it closer to practice, or we shape practice to match theory. The first option is chosen by critical realists whereas the second option is chosen by Lowe.

To take sides in the open debate with mainstream economists as well as in this potential controversy with critical realists and many other heterodox approaches, it is crucial to understand the reason for economic forecasting failure. Indeed, since all macroeconomic positions coincide regarding the relevance of the predictive aim of macroeconomics, once the reason for forecasting failure is identified, the rational resolution of the debates is clear: if the inaccuracy of economic theory is one big reason for forecasting failure, and if there is something in economic theory which makes it unavoidably inaccurate, Lowe’s way remains the only alternative. Indeed, this is what Lowe tries to show when he claims that behavioral assumptions are the weak point of theory: Traditional economics (and actual mainstream macroeconomics, we claim here) makes inaccurate predictions because its behavioral assumptions are very far from actual behavior; and an improvement of

statistical techniques or a refinement of behavioral assumptions cannot solve the problem that actual unconstrained behavior is always uncertain. In the following lines, we make a conjecture as to why Lowe's choice has possibly had much less impact than it may have had if he had chosen the other option.

§3 'I' for ideology

We are now in a position to reveal the third 'I' of traditional economics, or mainstream macroeconomics: 'I' for ideology. It is crucial to understand that this qualification of traditional economics only holds as long as Lowe's diagnosis of traditional economics is accurate. Let us state it as a conditional statement: if the forecasting failure of traditional economics is due to the necessity of actual behavioral uncertainty of humans contrasting with the modeled behavioral determinacy of humans, it is irrational to deny behavioral control. Since behavioral control clashes with economic freedom and economic freedom is a main flagship in market economies, the only possible justification for this choice is the ideological preference for market economies over possible alternatives.

Three important remarks are in order here. Firstly, I do not claim that there is total economic freedom in market economies. Only the fact that any kind of control one would be willing to add in a given economy has to be properly justified because of the general acceptance of the market as an efficient, well-performing economic mechanism. Secondly, the claim that the preference for market economies is ideological, where I take **'ideological'** as a synonym of unjustified, is conditioned to the acceptance of Lowe's diagnosis, as I do in this dissertation. If somebody argues that the forecasting failure of traditional economics is not due to behavioral assumptions, the claim about the necessarily ideological defense of market economies may not hold. Thirdly, concerning the second claim, as stated above, Lowe considers that human behavior is to some degree always indeterminate such that refining behavioral assumptions cannot significantly improve predicting performance. If this indeterminacy is rejected, as critical realists do, the claim about the necessarily ideological defense of market economies may not hold either.

We will see in Section 4.3 that this ideological defense of market economies is adopted at a certain degree even by Lowe himself despite his criticism.

3.3 An assessment of Lowe's critique

In this section, I assess Lowe's critique of traditional economics from the point of view of philosophy of science. To do that, I examine how Lowe methodologically conceptualizes the fact that non-patterned behavior is the ultimate reason for macroeconomic forecasting failures (Section 3.3.1). After that, I provide two main additions to Lowe's presentation. Firstly, I critically review Lowe's terminology akin to Nagel's analytic philosophy of science and claim it to belong to what the constructive tradition of philosophy of science calls a 'naturalist' conception of science (Section 3.3.2). Secondly, I propose an alternative,

constructive conception of science which I claim to be more akin to Lowe's analysis, suitable to respond most of Nagel's critiques to Lowe, and which allows reaching Lowe's conclusions probably easier than his own conception (Section 3.3.3).

3.3.1 Lowe's methodological assessment of economic forecasting failure

§1 Order

To make his case for control, in other words, Lowe points out that traditional economics cannot be a proper science because it intends to apply the hypothetico-deductive model, following the natural sciences, without satisfying two important requirements about its subject matter: (1) that it has "inherent orderliness" which allows revealing "regularities of state and motion: 'laws' or at least probabilistic generalizations"; (2) that it has "autonomy" such that it is taken for granted "the existence of an outside world, moving independently of man's volition"(1980, p. 229).

Regarding the first point, Lowe claims that in industrial capitalism, economic behavior is not patterned enough to reach the level of order required for scientific theorization. Thus, he claims that the actual disorder must be corrected with economic policies. The problem at which his proposal is aimed is that to guide economic policy, a theory is required which allows for the proper prediction of potential economic policies. Although Lowe makes a distinction between an ordered past capitalism and the unordered present capitalism, it is not relevant for this dissertation since we are considering the applicability of Lowe's model for actual capitalism, which shares many of the features of Lowe's characterized industrial capitalism.

To assess the claim about the lack of order in industrial capitalism, the terms 'order' and 'industrial capitalism' are necessary. Whereas we have already defined 'industrial capitalism', 'order' has not yet been defined. To do it, Lowe establishes two extreme points of a possible interval containing all possible degrees of order and then uses a negative definition to avoid quantitative discussions about order. Concretely, given a set of observations about market behavior, Lowe defines 'perfect order' as 'invariability of structure and motion' and 'perfect disorder' as 'full randomization of events'. This is Lowe's way of linking perfect order with deductive generalization and perfect disorder with probabilistic generalization (1969b, p. 4). Moreover, he considers economic observations to belong to the interval comprised between these two extreme points, which means that economic behavior lies somewhere between perfect determinacy and perfect randomness.

After this, he defines the 'disorder' of market behavior as any situation where the direction of economic change cannot be predicted with certainty. By this, he means that the direct or inverse proportionality between the change of a given magnitude and the consequent change of an allegedly correlated magnitude cannot be predicted. For example, there is disorder if, given a supposed correlation between magnitudes, the same change in an

original economic magnitude, say an increase of it, may, in one situation, generate an increase in the allegedly correlated magnitude (direct proportionality), and, in another situation, generate a decrease in the same correlated magnitude (inverse proportionality). Plenty of examples of it are the situations already analyzed by Lowe before which might arise as a consequence of a change in the price of a given commodity. As Lowe has concluded, order thus understood depends on mutually compatible behavior patterns of buyers and sellers, the latter depending on their respective motivational patterns (1969b, p. 5).

Lowe adds that order is a necessary but not a sufficient condition of a satisfactory predictive economic science. Indeed, Lowe claims that there are conceivable situations where order is adequate for theorization but aggregate provisioning is not secured. Since aggregate provisioning is the main aim of economic theory, a situation where it is not secured cannot be considered to be satisfactory.

Not very precisely, Lowe calls the adequate level of provisioning, at least for “the average member of the economic society” (1969b, p. 6), together with patterned economic behaviors, ‘order’ in an ‘inclusive sense’. Furthermore, taking a close look at the claim, one can easily identify a controversial element: Lowe is linking the success of a theory to the achievement of a certain practical-political end, in this case, aggregate provisioning. The apparently innocent claim is not exempt from polemic, especially taking into account that, as we will see later, Lowe is a defender of the value neutrality of science. Without entering into details now, the value neutrality of science (cf. Section 4.3) means that science does not and cannot enter into disputes about values. Thus, it must remain in the realm of facts, to describe or ‘explain’ reality, and be neutral regarding the realm of values, the normative dimension of thought, which cannot be scientific and deals with the ranking and selection of goals. This is hardly compatible with saying that a given theory is not adequate because it does not help reach a certain practical goal.

This is probably why Lowe introduces a distinction between types of goals, separating ‘order-protecting’ and ‘ameliorative’ goals. The former is linked with the threshold of satisfactory provisioning “as understood by majority opinion” whereas the latter is more radical, aimed at optimum provisioning, and envisaged by “reformers or revolutionaries” (1969a, p. 179). Linking milder or more conservative goals with satisfactory aggregate provisioning while leaving more ambitious goals with optimum provisioning is probably an intent to let satisfactory provisioning remain within the boundaries of science and thus stay out of the critique to be violating the value neutrality of science. The claim makes sense and can be linked with Lowe’s inclusion of satisfactory provisioning within order, even in an inclusive sense, since he has considered order a requisite for scientific theorization. That this can hardly be defended in precise terms will be elucidated in a coming section when discussing a critique made of Lowe by Hans Jonas.

As we will have also occasion to discuss more thoroughly later on, even if we accepted Lowe’s

distinction, once we have defined the economic system to aim at aggregate provisioning, the effectiveness of the system as its capacity to provide aggregate provisioning can be clearly defined as well. Acknowledging that anybody would let a nuclear reactor's efficiency depend on majority opinion, it is hard to understand why the threshold of aggregate provisioning, especially today with emerging sustainability concerns, should depend on majority opinion.

§2 Autonomy and open systems

Whereas classical and neoclassical theories claim that market freedom generates an adequate level of order and provisioning, Lowe claims that market freedom is incompatible with order if there are not adequate social patterns of behavior. However, these patterns of behavior do not generally take place spontaneously but only through control. The reason for this is the lack of Lowe's second requisite, autonomy of the subject matter.

Lowe considers that a subject matter has autonomy in this context if it exists independently of man's volition. This characterization, with the claimed "existence of an outside world", is akin to scientific realism, an academically strong current in analytic philosophy of science today.

How does Lowe relate the lack of order with the lack of autonomy of economics' subject matter? He uses the concept of open system and claims that economic systems are open systems that cannot be closed (guaranteeing ordered behavior) but through control (1969b, pp. 9–10). To make sense of it, we need Lowe's characterization of an open system, which he defines as "a configuration in which the interplay of the intra-systemic forces - the core process cannot be insulated from the impact of extra-systemic or environmental factors" (Lowe, 1969b, p. 9).

§3 Natural sciences and economics

Now we need to understand what Lowe means by 'intra-systemic forces' and 'extra-systemic factors'. Taking physics as an example, where all this terminology comes from, 'the interplay of intra-systemic forces' is understood by Lowe as those processes isolated in laboratory conditions from extra-systemic forces (or factors), the latter being understood as environmental conditions (including perturbations), in order to develop a 'ceteris-paribus' (all other factors remaining equal) clause which relates one intra-systemic force with another. With such jargon, Lowe argues that extra-systemic factors do not influence the interplay of intra-systemic forces in physics: for instance, the effect of wind, an extra-systemic factor, does not alter Galileo's law of falling bodies as applied to the motion of a projectile, the trajectory of which after the law is given by the interplay of intra-systemic forces. Instead, the effects of extra-systemic factors in a given process can be considered in isolation from each other and later conceptualized as adding the effects with each other: the movement of a projectile can be considered in vacuum, then the resistance of air can

be added to the calculus, then deviations due to air movements or the spin of the projectile can be added, etc.

If we consider the free fall of a given body, which is even simpler to analyze, we can express Lowe's claim as:

Under laboratory conditions (including vacuum, the lack of external influences like impacting space bodies...), if a body falls starting from rest from a certain point close to the Earth's surface, then the body experiences an equilibrium of forces given by: $m \cdot a = m \cdot g$. The usual formulae to compute x , t , and v can be easily derived from this equation and some definitions of the magnitudes in terms of differential equations. This is Lowe's interplay of intra-systemic forces in this case.

Under less restricting laboratory conditions (excluding vacuum but still including the lack of external influences like impacting space bodies...), if a body falls starting from rest and a certain point close to the Earth's surface, then the body experiences an equilibrium of forces given by: $m \cdot a = m \cdot g - k \cdot v$, where v is the speed of the body and k is a factor accounting for the resistance of air which depends on items such as its speed, its density, the shape, and the surface of the body. A little more sophisticated formulae to compute x , t , and v can be also derived as above. This is the addition of the effect of an extra-systemic factor, the resistance of wind, to the interplay of intra-systemic forces.

Thus, Lowe can claim that the subject matter of physics is ordered in the sense that the same process always generates the same response of the falling body (whether with more or with less restricting laboratory conditions), which thus becomes predictable.

He can also name it 'autonomous' in the sense that the process is independent of human decisions (once the experimental setup and the expected results are made explicit). Moreover, he can finally claim that systems in physics can be closed through laboratory conditions such that the interplay of intra-systemic forces (the case of vacuum above) can be properly insulated from the effect of extra-systemic factors (the case with resistance of air above) through the adequate laboratory experiments. In the equations of both cases, there is a core which does not change ($m \cdot a = m \cdot g$) and the new extra-systemic factor can be conceptualized as a simple addition in the equation ($-k \cdot v$). And the core itself is not questioned because it has been tested and validated independently.

Lowe claims that, in contrast with natural sciences, the interplay of intra-systemic forces is influenced by extra-systemic factors in economics. To illustrate it, he gives the example of tax cuts, an extra-systemic factor, and their effect on the total flow of spending (which includes business investment and household consumption), whose underlying behaviors under laboratory conditions represent the interplay of intra-systemic forces. If it were equivalent to the example of natural sciences, given the regular flow of spending (like the regular motion of a projectile after Galileo's law), a tax cut (like the effect of wind in the projectile motion) might be counted as an addition to regular spending of an additional

flow equal to the amount of the tax relief minus an amount that might be saved. However, depending on how consumers, businesses, and investors interpret a tax cut, regular flow might increase, as expected, but it may also decrease. Indeed, if interpreted as a measure against a possible coming economic depression, all tax relief might be saved and agents may try to spend even less than regularly so as to be ready for the coming depression. Hence, extra-systemic factors directly interact with intra-systemic processes. Furthermore, preferences and expectations, which determine behavior, the main intra-systemic variable of economic processes, are clearly and continuously influenced by extra-systemic factors such as the actual economic conditions: business climate, political institutions, cultural value systems, etc.

If we try to state the equivalent two claims in economics as we did with the example of free fall, we can express Lowe's claim regarding the tax cut as:

Under laboratory conditions (no tax cuts or increases, stable macroeconomic context, and political institutions, no war, regular health situation...), we have a certain flow of spending $S_1 = C_1 + I_1$ ¹⁵.

Under less restricting laboratory conditions (excluding tax cuts but still including stable macroeconomic context and political institutions, no war, and regular health situation...), we have the abovementioned flow of spending $C + I$, but adding a flow equal to the amount of the tax relief (R) minus an amount that might be saved (s), thus $S_2 = C_1 + I_1 + R - s$.

As we did before, we must remark that we cannot strictly speak about laboratory conditions in economics since there is no way to set them in a laboratory to test them in a technically repeatable way like it is done in natural sciences. However, they are at least implicitly assumed when claims are made which involve the decisions of economic agents.

Comparing the two situations, the new external factor, the tax cut, is dropped from the set of laboratory conditions of the first situation to shape the laboratory conditions of the second situation. As stated above, the tax cut might effectively work as the equation presented. However, it might not work, too. Concretely, all magnitudes on the right-hand side of the equation depend on the behavior of economic agents such as consumers, businesses, or investors. A certain interpretation of the tax cut might generate a flow $S_2 = C_1' + I_1'$, with $R = S$ and both $C_1' < C_1$ and $I_1' < I_1$.

This is where the contrast with natural sciences begins. How each extra-systemic factor influences the preferences and expectations of economic agents determines how they are going to behave. This is what Lowe means when he claims that the subject matter

¹⁵Both C and I are usually expressed through functions correlated with other magnitudes; for instance, consumption depends on disposable income, which is dependent on tax cuts; and a similar reasoning can be made for investment; even if the analysis made below can be also made through such functions, we do not make it here because the important point is to see the comparison with the example of natural sciences.

of economics is not autonomous: each economic process is dependent on the uncertain decisions of economic agents. We can add that this is all the more so in economic systems with relatively unconstrained decision-making. Moreover, this is why the subject matter of economics is not ordered in the sense that the same stimulus might generate two opposite reactions such that not even the direction of the economic change (whether S_2 will be higher or lower than S_1) can be *ex-ante* predicted.

Furthermore, Lowe claims that economic systems are open because each alleged extra-systemic factor can change the interplay of intra-systemic forces, the core processes. In this case, the addition of the tax cut does not necessarily leave an untouched core ($S = C_1 + I_1$) in the two situations (' $R - s$ ' to be added in the second case as a consequence of the tax cut) but can even change the core itself ($S = C_1' + I_1'$, with $C_1' < C_1$ and $I_1' < I_1$). Because of the lack of autonomy of the subject matter of economics, each extra-systemic factor like the tax cut may influence each part of the equation, also the allegedly intra-systemic one ($S = C + I$). Since the core process cannot be isolated in laboratory conditions in economics, it remains doubtful even if it makes sense to distinguish between a core process of intra-systemic forces and the extra-systemic factors (1969b, p. 9). Each setup of intra-systemic forces is dependent on how any allegedly extra-systemic factor influences intra-systemic forces through its impact on economic decisions: even in the first situation ($S = C + I$), C and I depend on all extra-systemic factors which are included as laboratory conditions (macroeconomic context, political context, technical conditions... (1969b, p. 10)).

After his digression, Lowe concludes that the main difference between physics and economics is their respective subject matters, particles that react always equally to the same kind of stimuli, and human beings who only decide and behave after having examined their possibilities in terms of preferences and expectations, thus being able to behave differently in front of the same kind of stimulus (1977, p. 61).

If someone reads only the former paragraph, it seems that there is no need for such a thorough justification and such complex terminology: indeed, it seems reasonable to claim that humans are less predictable than rocks. Hence, economics is more imprecise a science than physics.

After all, Lowe's point ultimately in methodological terms is that the difference between social sciences and natural sciences lies in their respective subject matters, neither ordered nor autonomous in social sciences, in contrast with natural sciences. Whereas we can 'close' a system in physics from external influences making a laboratory experiment, we cannot do it in economics because of human indeterminacy and the continuous influence of the allegedly extra-systemic factors on the allegedly regular intra-systemic processes through this indeterminate human behavior. The only alternative remains to force indeterminate human behavior to be predictable, to control behavior, which is Lowe's proposal.

As an answer to why the dire situation in economics cannot be compared with the one

in meteorology, which has progressed a lot over time in predictive accuracy, Lowe claims that, even if intra-systemic processes in meteorology cannot be isolated in laboratories, like in economics, meteorology has the advantage of each of the single element of its intra-systemic processes having been scientifically tested in laboratories and validated as laws of physics or chemistry.

§4 Nagel's methodological critique

Ernest Nagel, Lowe's main influence regarding methodological claims about both traditional economic science and Political Economics, makes some critical remarks about Lowe's claims in *OEK*. Noteworthy enough, to sustain his claims about Lowe's views, he uses many quotations from the paper written by Gurwitsch about Lowe in *EMASE*. The most relevant critique for the aim of this dissertation refers to the justification of Lowe's methodological proposal, based on Lowe's analysis of traditional economics. In more general terms, Nagel claims that Lowe does not properly justify the need for a different methodology from natural sciences, so his alternative methodology may not be required.

Lowe's methodological analysis is expressed in a language akin to Nagel's analytic philosophy of science. Concretely, the interaction between intra-systemic forces and extra-systemic factors, so Nagel's response is expressed with the same terminology. Nagel considers that Lowe's conception of the methodological key features of natural sciences is too oversimplified. After refining a little this conception, Nagel claims that the difference between natural sciences and social sciences may not be as big as Lowe has drawn it, so the claim for a different methodology in social sciences from the successful way of natural sciences may not be enough justified. Now we will review three main arguments of Nagel about Lowe's insufficient characterization of the interaction between intra-systemic forces and extra-systemic factors in natural sciences, which compares with the case of economics.

The first argument is based on Lowe's example of the extremum principle as an intra-systemic force which was valid in a given situation, early capitalism, and not valid in another situation, modern industrial capitalism. The principle is not applicable in modern industrial capitalism because extra-systemic forces such as the rise in standards of living, the increasing specialization of industrial equipment, the long-term financial commitments, and the longer planning time horizons influence the intra-systemic force¹⁶. Nagel poses the question of why this conceptualization in terms of intra-systemic forces affected by extra-systemic forces cannot simply be reformulated as follows: the effects of extra-systemic factors on the intra-systemic force are simply different in different situations. This may be the case because of interaction with other forces or because of the mere difference between situations. And, if it can be so reformulated, Nagel quotes an example of physics where a force has relevant effects in some situations and not in other situations: Newtonian gravity

¹⁶Nagel considers expectations among extra-systemic forces. However, to consider changed expectations as an extra-systemic force is probably a consequence of Nagel's misreading of Gurwitsch's statement in *EMASE* under Lowe's terms.

is relevant for calculations in the solar system but not in the interior of atoms (1969, pp. 60–61).

The second argument is directed against the alleged additivity of forces in physics in contrast with economics. As a reply, Nagel gives examples where non-additive forces exist and the method of natural sciences is equally applicable: electric charges in a conductor being dependent on the shape of the conductor, not simply consisting of the sum of effects per unit of area; and, after quantum mechanics, the chemical properties of atoms being dependent on the arrangement of elements and forces applicable on them, not simply their vectorial sum (1969, p. 61).

The third argument is directed against the alleged universality of laws in natural sciences in contrast with the context-dependent applicability of economic laws. Even if Nagel acknowledges that the objective of natural scientists is to find such universal applicability, he presents examples of physical and biological theories that are also only applicable in certain situations: the actual gene theory being applicable only to known living systems; and Newton's inertia of bodies being dependent on the actual distribution of masses in universe (1969, p. 62).

The examples above show that Lowe's presentation of the methodology of natural sciences may perhaps be too basic to sustain his claims. Indeed, even if an easy reply, which we will sketch in Section 3.3.3, can be given from a constructive understanding of science, it is hard to contradict them in Lowe's analytic-naturalistic conception. So much so that Lowe accepts the validity of Nagel's critiques and reduces his claim to the fact that the effects of extra-systemic factors on economic motivations (intra-systemic factors) depend on the economic actors' interpretation of extra-systemic factors, in contrast with planets and cells in natural sciences. So, the main difference is again the different subject matter of economics with respect to natural sciences. And to this claim, Lowe sticks to justify his instrumental-deductive methodology of Political Economics.

After all, in Lowe's methodological terms, it seems that it is not enough justified to have a different methodology in economics with respect to natural sciences. His justification remains at the most basic level, again, that humans are more indeterminate than rocks. In the coming sections we will have occasion to see that under a different approach to theory of science, Lowe's proposal is justified also in methodological terms. However, anticipating the claim a little, the reason for it is not that Political Economics has its own methodology very far from the method in natural sciences but, instead, that its methodology is maybe closer to natural sciences if it is properly conceptualized.

3.3.2 Lowe's naturalist understanding of science

§1 Naturalist understanding of science

If we take a look at the above examples, we see that the main claim of Lowe is that physics and economics mainly differ in terms of possibilities of theorization and predictive accuracy because of their very different subject matters. This remark is entailed by a common conception of science which we name, after Janich (1978) and Hartman and Janich (1996), '**naturalism**'. It is important to make clear from the beginning that it is not the mainstream understanding of naturalism, neither in the ontological nor in the methodological sense (Papineau, 2021). Thus, even if a thorough characterization of naturalism is available in the above-mentioned sources, it may be helpful to outline its main features here to distinguish it from mainstreamly understood naturalism and assess if Lowe's position can be ascribed to it.

The naturalist conception of science is primarily a way of understanding natural sciences which is later universalized to any other type of science, thus including social sciences like economics. We say of a conception of natural science that it is **naturalist** if it conceives science as oriented to the discovery of natural laws through careful empirical research and mathematization of natural regularities. It implicitly assumes an ordered, machine-like universe whose mechanism can be discovered (Janich, 1978, pp. 4–5). And it considers nature to be everything that is not human-made (Janich, 1978, p. 23). Scientific theories are considered true pictures of the natural world (Janich, 1978, p. 25) and experiments are developed to find natural laws and formulate such theories (Janich, 1978, p. 18).

Consequently, a naturalist understanding of science entails the mainstream position of scientific realism (Chakravartty, 2017), mostly in the metaphysical sense that there exists a man-independent (structured) reality whose structure may be discovered by the scientist (Hartmann & Janich, 1996, p. 20).

When extrapolated to other kinds of science, naturalism means to understand any event, including human action under historical conditions, like a natural event, thus to be possibly described and explained within the model of the natural sciences, to be subsumed under laws (Hartmann & Janich, 1996, p. 14).

Under the naturalist understanding of sciences, natural sciences owe their predictive accuracy to their human-will-independent reality as subject matter whereas social sciences owe their predictive inaccuracy to their human-will-dependent subject matter. Now the obvious question emerges whether there is any theoretically sound alternative diagnosis. The general answer to that has been given before by methodical constructivism (Lorenzen, 1994) and methodical culturalism (Hartmann & Janich, 1996). To answer it in a relevant way for this dissertation, first, we need to determine the main aspects where Lowe's analysis reveals itself as naturalist-oriented.

§2 Naturalism in Lowe

Firstly, we must mention Lowe's main influence in methodological terms from analytic philosopher of science Ernest Nagel, whose main work *The Structure of Science* (1961) is written from a naturalist-realist perspective. This is apparent in Nagel's conception of science, shared and even quoted by Lowe (cf. Section 3.1.1), with its focus on deductive explanation and the crucial role of laws. The politically liberal character of naturalist science, also present in both Nagel's and Lowe's thought, will be elucidated in Section 4.3.3 in relation to the discussion of the value neutrality of science.

Secondly, when Lowe characterizes economic activity, he distinguishes, within the technological dimension or production technology, rules of engineering from natural laws (cf. Section 3.1.2). Their claims make clear that his conception of nature or reality is such that it is regulated by human-independent laws the determination of which allows the possibility of technological and engineering development. After this view, technological success is only possible because natural laws exist (Janich, 1978, p. 24). This means, in other words, the conception of scientifically discovered laws as a necessary condition of technology and engineering. More generally, the separation of the theoretical and the practical dimensions of science or, more precisely today, technoscience, with the priority given to the theoretical dimension and its natural laws, is another feature of the naturalist conception of science (Medina, 1996, 2002). Even if we will not comment on it in detail when analyzing Lowe's proposal, his understanding of the influence of external conditions on human behavior and motivations as being suitable to conceptualize under laws, even if acknowledging their imprecision, shows Lowe's bias towards naturalistic science.

Thirdly, and most importantly, the whole comparison of economics with natural sciences, as presented in this section, with the utilized terminology, reveals a naturalistic understanding both of natural sciences and social sciences. Several items must be mentioned here. The first one is the characterization of order in a science's subject matter as the suitability to formulate laws of it, whether strictly deductive or probabilistic. The second one is the definition of autonomy of a science's subject matter as the independence from human volition, which entails the existence of a human-independent reality as defended by realism. The third and most important one lies, as stated before, in the distinction between economics and natural sciences regarding forecasting accuracy due to their respective subject matters. Summarizing Lowe's argument, he claims that since the subject matter of economics, economic behavior, is not autonomous, (1) it cannot be expected to be spontaneously ordered; and (2) it cannot be isolated as a part of a core process from external factors through laboratory conditions, thus neither can it be independently validated from external factors. Thus, scientific inference becomes extremely difficult, clearly not the type of traditional economics. The lack of autonomy, which is another way of stating human indeterminacy, is the main premise from which the lack of order and the difficulty of scientific inference, both related to the forecasting failure of economics, are

derived.

Whereas all other items were easily identifiable as naturalist according to the given characterization, this last point is not that straightforward. To establish the link, we must remember the part of the characterization that identifies nature with everything not human-made. This way of understanding nature includes opposition to culture, understood as everything human-made. The lack of soundness of this opposition, its historical roots, and its implications have been thoroughly worked out by Manuel Medina (1985, 1995b, 2002). Regarding this dissertation, it is enough to state, with Hartman and Janich, that given the technologically-mediated experimental method of natural sciences since Galileo, most of the set of objects of natural sciences is itself a cultural product like the objects of social sciences are (Hartmann & Janich, 1996, p. 42). Thus, the traditional opposition of nature to culture belongs to a naturalist understanding of science¹⁷.

§3 Naturalism in actual mainstream macroeconomics

Some authors might criticize that the label ‘naturalist’, one of whose decisive features is the concept of natural law, does not apply to the actual mainstream analytic philosophy of science and, in particular, philosophy of economics, whose academic jargon has mostly shifted from ‘laws’ to ‘models’ (Hausman, 2021). However, this critique would be misdirected because of two main reasons.

On the one hand, even if philosophy of economics does not focus on the concept of law, it has been shown how most mainstream macroeconomic models aimed at policy assessment are based to some extent on the LSD or, equivalently, on utility maximization problems, which are operationally equivalent to the LSD. In this sense, even if philosophers of economics and, in general, philosophers of science, do not mostly speak of laws nowadays, the concept of law has a central role in those macroeconomic models which are the subject matter of the critique made in this dissertation. Maybe by forcing a little in metaphorical speech, we can claim that the emperor is still naked even if people do not say he is.

On the other hand, even if we forget about the central role of the LSD in mainstream economic science, the label ‘naturalist’ applied to the conception of science underlying mainstream macroeconomic thought would still be justifiable. Economic science would not be naturalist solely because it is based on laws to some extent but because of the resemblance of its procedure, methodology, and features with those of the natural sciences. Indeed, in methodological terms, economic analysis, whether mainstream or not, still maintains its focus on the explanation of economic events, even if using models instead of speaking about or even using laws. Furthermore, the validation of the claims of economic science is unanimously considered to have to take place by empirical means, even if in economics this must translate into mathematical-statistical means, econometrics. Both features, explanation of events and empirical validation of claims, are features of how

¹⁷For a thorough justification of this claim, cf. Hartman & Janich, (1996), and Janich (1978).

natural sciences are conceived today. Finally, anticipating the link that will be made between the naturalist conception of science and the liberal conception of science, the latter being the political counterpart of the former, mainstream macroeconomic thought is dominated by the same tenets of liberal science, which will be elucidated in Section 4.3: the aim of scientific endeavor is the expansion of knowledge and science must always remain value-free. In this sense, all these features are shared by natural sciences and mainstream macroeconomic science, so it still makes sense to apply the label ‘naturalist’ to the latter even if we obviate the crucial role played by the LSD within it.

3.3.3 The alternative: A constructive understanding of science

§1 Constructive understanding of science

Now, let us consider what an alternative to the naturalist understanding of science and the conclusions reached from this position might look like. As we did for the characterization of naturalism, even if the constructivist way is thoroughly characterized in several works (Hartmann & Janich, 1996; Janich, 1978; Lorenzen, 1978, 1987, 1994), we are going to shortly sketch its main features to ease the later justification of a constructive alternative to Lowe’s conception in economics. The summary developed is as general as to apply to both methodical constructivism as developed in the Erlangen School by Paul Lorenzen, and methodical culturalism, developed by Lorenzen’s follower Peter Janich and Janich’s followers. The theoretical controversy between these two alternatives does not affect the contents of this dissertation.

The constructive understanding of science can be properly understood as the affirmation of two priorities: the primacy of praxis over theory; and the primacy of politics over technical practices. On the one hand, the **primacy of praxis over theory**, also called the **pragmatic turn of philosophy of science** (Lorenzen, 1987, p. 18), defends that every science is based on a pre-scientific successful practice (at least partially successful), a technical practice, and scientific theories are aimed at the theoretical foundation of these pre-scientific practices. Hence, these successful pre-scientific practices are presupposed by any sound scientific theory such that speaking about natural laws only makes sense if these pre-scientific practices are presupposed. On the other hand, the **primacy of politics over technical practices** defends that any pre-scientific practice presupposes that humans have agreed about certain aims to be reached through the practices, it presupposes certain early forms of political praxis (Lorenzen, 1978, p. 53).

In this sense, constructive philosophy of science, in contrast with analytic philosophy of science, is aimed at the reconstruction of scientific theories such that their pursued objectives or tasks are expressed and then the scientific methodology (within which the requirements of scientific demonstrability are included) is presented as the means to satisfy the pursued objectives. This is the **constructive foundation of sciences**, which can only be reached through an **ortho-language**, a precise, univocal, and unambiguous language

(Lorenzen, 1987, p. 9; 1994, p. 128). From a methodological point of view, this kind of reconstruction takes the **perspective of the participant**, which means that science is analyzed from the perspective of a human being who acts to achieve certain goals by choosing appropriate means (Janich, 1978, p. 14).

In terms of philosophy of science, the constructive understanding of science stands in contrast with analytic philosophy of science, which is the dominating position today, including both the naturalist-oriented and the realist positions, among others.

There are two main contrasts. The first one can be sketched in terms of ‘turns’, as is typical in the philosophical tradition. Analytic philosophy of science analyzes the everyday language and the technical language of sciences to properly express the requirements of scientific demonstrability of scientific statements (Lorenzen, 1987, p. 9). It shares with the constructive understanding of science the so-called ‘linguistic turn’, the careful consideration of language, often with the help of logic, which has its roots in philosopher Gottlob Frege. But they differ because analytic philosophy of science has not taken the ‘pragmatic turn’, which highlights the importance of human action for the constitution of science (Hartmann & Janich, 1996, p. 44).

The second main contrast is the perspective of the analysis. Whereas a constructive understanding of science requires the perspective of the participant, analytic philosophy of sciences takes the perspective of the observer: science is analyzed from the perspective of somebody separated from the studied object who simply registers observations (Janich, 1978, p. 14).

The political implications regarding the constructive and the analytic-naturalist conception of science will be considered in detail in Section 4.3.

§2 Pre-scientific practices

Now, considering the constructive approach, how might Lowe’s observed problem and its roots have been conceptualized? Let us restate the problem once again and outline Lowe’s diagnosis: The observed problem is that there is a grave forecasting problem of traditional economics despite the refinement of econometric validation techniques.

Lowe’s diagnosis about the intrinsic openness of economic systems, the spontaneous disorder, and the lack of autonomy of economics’ subject matter, economic behavior, with respect to the possibly closeable physical systems, the order and the autonomy of physics’ subject matter, particles, is based on the difference between both subject matters: indeterminate human behavior versus determinate particles. Now, if we take a close look at the concept of intra-systemic forces and the processes involved in the interplay of intra-systemic forces if they are to have a scientific meaning, we can see that they correspond with the processes that can be isolated and tested in laboratory conditions. In physics, the law of falling bodies is considered intra-systemic with respect

to, for instance, the resistance of air, because of this, and, in economics, the relationship between tax cuts and the flow of spending cannot be strictly considered intra-systemic equally because of this. In physics, we can test separately intra-systemic processes and extra-systemic influences on them through laboratory experiments whereas in economics we cannot. Thus, from Lowe's analysis, we can also conclude that the main problem of economics is the impossibility of setting technically repeatable laboratory conditions to validate its clauses. Although experimental economics keeps trying to overcome this difficulty through complex settings in order to achieve comparability and repeatability of experiments, the unrepeatability of historic-cultural conditions sets a clear limit to the validity of its experimental conclusions.

Lowe would probably agree with the claim although he would probably say, being naturalistically oriented, that this limitation of economics is due to its problematic subject matter in contrast with physics: there cannot be experiments in economics because human behavior is always uncertain in contrast with the determinable behavior of particles. Obviously, human uncertainty plays a role in the forecasting limitations of economics. However, is that as big a role as both Lowe and most defenders of mainstream macroeconomics claim it is? Even if there is probably no definitive general answer to that question, some reflections might help to add at least another criterion as important as human indeterminacy to the equation.

If we consider from the constructive perspective the contrast between the unanimous acceptance of Galileo's law of falling bodies and, for instance, the often disputed economic LSD, we can see that a main difference between both is their pre-scientific practice from which the respective theories are developed, whereby 'pre-scientific' means 'strictly technical', 'pre-theoretical'. Indeed, in addition to Galileo's undisputed theoretical talent, the point has been made that there was a strong pre-scientific praxis of ballistics coming from Hellenism through the Middle Ages before Galileo's studies. Without the successful technical results of such a practice, Galileo's conceptualization and consequent improvement of ballistics would have been at least enormously more difficult, if not practically impossible. To reply to the possible claim that this might be an isolated case in the history of science, we can state that some historical studies have identified as a requisite of the success of theories in different periods of our civilization the previous existence of pre-scientific technical practices (Medina, 1985).

Now, regarding the LSD and its prediction of market macro-equilibrium, has there ever been even a partially successful pre-scientific praxis? Most probably, a link can be made between the progressive development of capitalism and the several statements of the LSD, first by classical thinkers such as Smith and Ricardo, and then by neoclassical thinkers of the marginalist revolution. Indeed, Lowe claims that the LSD applied to XIX-century competitive capitalism. However, it is hardly justifiable that this represents an equivalent to the case of ballistics before Galileo's conceptualization.

§3 Ends, means and laboratory conditions

To understand why, we need to distinguish between natural sciences and economics concerning its structure of goals and means. The ends in natural sciences, which are technical sciences in the sense that they are dedicated to determining the means suited to achieve certain ends, are restricted to the reproduction of certain technically desired effects so as to make a pre-scientific technical practice more efficient (Lorenzen, 1987, p. 239) and they are often the only responsibility of the researcher. Additionally, in general, the main ends of technological development (through an improvement of efficiency) and knowledge expansion (often understood as a potential future technological development) are almost ubiquitously defended and very rarely disputed. Instead, the ends in economics concern the whole society more directly because it is the level of provisioning and working conditions that is at stake. These are clearly political goals, which are often controversial.

We can say that natural sciences, as technical sciences, can always appeal to efficiency improvement as an uncontroversial goal and thus remain value-free at least for that goal. A thorough discussion about the concept of value-freedom will be undertaken in Section 4.3. At this point, it may be enough to identify **value-freedom** with neutrality concerning political considerations, whose opposite is **value-ladenness**. Instead, economics deals with controversial goals whose valuation depends on often diverse political considerations such that it can be claimed to be value-laden at least for these goals. Given the actual division of labor within economics, this is in particular the case for macroeconomics, which most directly relates to the political goals of a given economy. This is why economics, and especially macroeconomics, are to be rather considered political sciences, goal-oriented, instead of technical sciences, means-oriented¹⁸.

Regarding means, given the existing contrast between ends, there is also a great contrast between natural sciences and economics. In natural sciences, once the end has been decided, all available means are introduced to achieve the pursued end, the only restrictions being the technical possibility of the experimental setup and its price. This is an advantage of having a mostly value-free goal of improving technical efficiency. Thus, for instance, to prove his law of falling bodies, allegedly valid in a vacuum, Galileo imaginatively set up inclined planes to reduce the effect of air resistance and to slow the motion so as to achieve measurable times with the existing technical conditions at his time. Further on, when the vacuum pump was invented, the technical possibility emerged to prove Galileo's claim about constant gravity acceleration on the Earth's surface in a vacuum. Moreover, the progressive sophistication over time of experimental setups to prove scientific claims until the present day has only improved such that it has been claimed that it makes no sense

¹⁸The claim that Economics is value-laden in general with respect to the main ends it pursues should not be confused with the claim that any kind of research in Economics is necessarily value-laden. It is quite obvious that, given the actual division of labor even within the same scientific discipline, there are research activities which are strictly technical. Examples of it are econometric research on labor supply elasticities, demand elasticities, etc.

anymore to distinguish between science and technology: technoscience would be the hybrid practice including both the theoretical and the technological dimensions¹⁹. In natural sciences, at least after Galileo, laboratory conditions are constructed as idealized as possible to experimentally prove scientific claims. Furthermore, it has been claimed before that most so-called ‘natural laws’ are in fact technology-based laws, thus human-made. Even in physics, the queen of natural sciences, most of its branches are not descriptions of a human-independent nature but prescriptions for successful practice (Hartmann & Janich, 1996, pp. 12, 20). Law-like statements in natural sciences are achieved through careful control under human-made laboratory conditions and only work properly in these conditions, as some authors even outside constructivism have already pointed out (Cartwright, 1983; Weizsäcker, 1971). Even when devices are constructed based on such laws, the more complex they are, the more they need to work under the closest situation possible to laboratory conditions if they are to work as predicted through the law. Consider, for instance, the conditions under which a nuclear reactor has to work if atomic fission has to take place without causing a nuclear accident. Precise knowledge about science and technology reveals that the success of natural sciences closely depends on the construction of the laboratory conditions under which their ‘laws’ are valid.

Instead, if we consider economics, laboratory conditions are rarely constructed as thoroughly as in natural sciences. Considering the LSD after Lowe’s analysis, for instance, if the end to be achieved is market equilibrium, all possible means to achieve it should have to be set. Among these means, a certain kind of behavior of economic agents should be made sure which, after Lowe’s analysis, entails certain kinds of preferences and expectations. However, it is rather obvious that preferences, expectations, and behavior are far from being made sure, which would mean for behavior to be constrained. In general, even if a certain level of provisioning was unanimously decided as an end, certain means are simply out of the equation. For instance, the economic system and its type of (unconstrained) decision making is not under discussion. This has to do with the value-laden character of economics (in particular macroeconomics), the fact that ends are controversial and its valuation depends on often diverging preference systems. More often than not, the economist does not pursue a certain level of material provisioning or certain working conditions at whatever cost but normatively, explicitly adds, or implicitly

¹⁹Since at least the XIX century, to distinguish between science and technology as different activities (with a different assigned reputation) is a result of a ‘theorist prejudice’ coming at least from Plato and Aristotle within the conception of science. Today, this kind of concept leaves out of the picture the mutual interaction between technology production and theorization within the cultural development and application of technoscientific discovery. This is why the term ‘technoscience’ as a practice with the activities of technological production of processes, scientific theorization of the technologically produced processes and consequent improvement of these processes as a consequence of theorization, has already been proposed for actual so-called ‘sciences’ such as physics, chemistry and biology, where the edge of discovery always involves a high level of technological development (Medina, 1995a). Behind this concept lies the conception of technoscience as a cultural product, where not only the symbolic dimension is important (as in analytic philosophy of science) but also the social-organizational dimension.

assumes decentralized decision-making as a requirement. For example, one may wish to achieve the highest employment level which is compatible with a market economy, not the highest employment level for any possible economic system²⁰. Indeed, the explicit choice of decentralized decision-making is Lowe's way, which entails giving a mean the status of a goal. In a straightforward sense, this largely limits the possibility of shaping behavior and thus of goal-adequately constructing laboratory conditions.

Hence, in economics, laboratory conditions are not constructed as idealized as they might be. This consideration adds up with the above-mentioned technical impossibility of setting repeatable laboratory experiments in economics due to the changing cultural-historical conditions and results in a straightforward failure of economic-theoretical claims. This is due to the lack of agreement about economic ends and the consequent lack of laboratory conditions to allow for validation of *ceteris-paribus* claims as in natural sciences, both due to avoidable and non-avoidable reasons. The unavoidable ones, which we deliberately do not name 'natural', are those identified by Lowe and the naturalist-oriented analysis related to the different subject matters of economics and the natural sciences: humans versus insensitive particles. The avoidable ones, which might be characterized as cultural, are those left out of the analysis by Lowe and the naturalist-oriented analysis, like the frequent preference for decentralized decision-making over planned economies, which have been presented here from a constructive conception of science.

After presenting the constructive alternative, we are in the position to reinterpret Nagel's critique that Lowe's claim of a different methodology from natural sciences for his Political Economics based on his understanding of natural sciences is not properly justified. As a summary of his arguments (cf. Section 3.3.1), we have that:

- (1) The conceptualization of extra-systemic factors affecting intra-systemic forces in economics, which limits the validity of Lowe's extremum principle to a certain environment of early capitalism, can be substituted by the conceptualization that the effects of extra-systemic factors on intra-systemic forces differ in different situations. As an example, Nagel mentions the example of the differing relevance of gravity in planetary motions versus the interior of atoms.
- (2) Forces can be non-additive in physics, too, as the examples of electric charges in a conductor or quantum mechanics show.
- (3) Laws can have non-universal validity in physics, too, as the examples of the actual gene theory and Newton's inertia of bodies show.

After a constructive interpretation of sciences, we can assess the validity of some of Nagel's claims in terms of the theorization of practices. Indeed, examples (1) and (3) show that

²⁰This is probably one of the reasons of the success of the Pareto Optimum as efficiency standard in economics, which allows claiming market allocations to be efficient and does not make any equity considerations.

natural laws are theorizations of either pre-scientific successful practices (like Galileo's law of falling bodies) or theorizations of pre-existing successful theories based on pre-scientific successful practices (like Newton's gravitation theory being based on Kepler's laws and Galileo's law of falling bodies). This is why they are relevant in some situations, concretely those related to the pre-scientific praxis under laboratory conditions, and not in other situations (1). Moreover, this is why they obviously apply to actual existing practices and not to non-existing practices such as unknown forms of living or parallel universes (3). Instead, the examples of (2) just reveal that Lowe's presentation is too basic to conceptualize how natural sciences work.

Summing up the contrasts between natural sciences and economics, we can say that: on the one hand, natural sciences are based on successful pre-scientific practices, with almost undisputed ends pursued that may characterize them as value-free, and consequently using all available means to achieve these ends, among them the thorough construction of the laboratory conditions that their laws, which conceptualize the pre-scientific practices, require in order to be valid; on the other hand, economics does not base on such a successful pre-scientific practice mainly because its ends are often controversial such that they may be characterized as value-laden and, consequently, ends are not unconditionally pursued but only under certain normative assumptions which entail that not all available means are used and laboratory conditions are not constructed as thoroughly as possible. Thus, without a partially successful pre-scientific practice given by unanimously accepted ends and constructed laboratory conditions to reach them, economic laws lack the foundation to be scientific.

§4 The constructive diagnosis and solution

Now we have an alternative diagnosis to Lowe's. From it, one can rapidly come out with the idea that, if the successful model of natural sciences in terms of forecasting accuracy is to be emulated in economics, specific ends have to be set and pursued, and the conditions to achieve these ends have to be constructed as far as possible. A conjecture of why both ends and means are controversial in economics in contrast with natural sciences will be examined in Section 4.3 concerning to the value neutrality of science. Here, we only want to remark that the constructive solution to Lowe's detected problem of the forecasting failure of economics is in principle very similar to Lowe's and it requires control of economic processes: economic processes have to be shaped in order to be suitable for theorization and thus for prediction.

Lowe's proposal of control does not straightforwardly follow from his diagnosis. Indeed, as we have seen in Section 3.2, so-called critical realism or Post-Keynesianism shares Lowe's view about the invalidity of mainstream macroeconomic behavioral assumptions but proposes a very different alternative. Indeed, the critical-realist proposal is probably more akin to Lowe's naturalist understanding of science than Lowe's proposal is. The fact that 'reality' has to be 'shaped' in order to be suitable for theorization sounds

quite odd for a naturalist-oriented philosopher of science. This might help to understand, among other things, why Lowe receives critiques from Ernest Nagel and Fritz Machlup, and also why to the best of my knowledge, only a single intent has been made to apply Lowe's model in academic terms, Murray's (2011) analysis applied to unemployment in market economies, ever since Lowe wrote his work *OEK*. Lowe's proposal of control is both a strange proposal viewed from the mainstream analytic conception of science and mainstream economic or macroeconomic thinking.

Instead, it is my view that after the constructive diagnosis of the problem, Lowe's solution comes to mind easier than after his own diagnosis such that it is one of the most evident proposals akin to a constructive conception of science.

Now, as a result of the comparison between natural sciences and economics in terms of forecasting accuracy from a constructive perspective, we have shifted the focus from the difference between subject matters in terms of autonomy, order, and openness of its systems. Instead, we have put the focus on theories not coming from equally successful pre-scientific practices, not pursuing equally undisputed goals, and not utilizing all available means to reach its goals, concretely not constructing as thorough laboratory conditions as possible.

4 Lowe's proposal of a Political Economics

Following Lowe's diagnosis about the reason for the predictive failure of traditional economics, this chapter presents Lowe's proposal of Political Economics as an economic science oriented to the behavioral control of economic agents as well as the discussion of certain important points raised by some of Lowe's most relevant critical voices such as the kind of knowledge presupposed by and the discussion about the role of goals in such a proposal.

4.1 Political Economics as a solution

This section presents Lowe's proposal to solve traditional economics' problem of behavioral indeterminacy which has as a consequence the necessary predictive failure of traditional economics. After elucidation of the key concept of control as understood by Lowe (Section 4.1.1), I present the instrumental methodology involved with its characteristic means-ends structure (Section 4.1.2) as well as the steps to be followed as the means to achieve a certain pursued social end (Section 4.1.3). Across the presentation, I focus on some decisive points of Lowe's proposal which I later criticize from a constructive understanding of science in Chapter 5.

4.1.1 Control as the key of Political Economics

After having identified the main problem that generates the forecasting failure of traditional economics despite the advances in Econometrics, Lowe proposes a solution to solve this problem. In short, since the problem is the lack of socially patterned behavior, the solution is to limit spontaneous individual behavior up to the achievement of socially patterned behavior. This is what Lowe's proposal of Political Economics is about: a science to justify controlled economic systems (1977, p. 148). As straightforward as it may sound, this solution clashes with a heavily stabilized economic principle in market economies linked with politically liberal regimes: market freedom, understood as unconstrained economic decision-making. This is why Lowe dedicates a lot of effort to justify the claim that his proposal is the best way to save liberal-capitalist societies from economic disaster. This requires thoroughly describing what is meant by 'control' and what kind of scientific inference can be used to guide controlled economic systems.

Regarding this, Lowe considers control as the tool to transform spontaneous individual behavior, the problematic subject matter of economics, into properly constrained individual behavior (1982, p. 236). The term 'properly' in the last sentence is the key to understanding Lowe's proposal, and by 'properly', Lowe means '**goal-adequate**', understood as suited to achieve a certain macroeconomic goal. As we will further elucidate, to set as an aim the achievement of goal-adequate behavior entails abandoning the traditional hypothetico-deductive reasoning and substituting it by instrumental analysis (1980, p. 231).

But before we come to that, we must elucidate how control is to be understood. The question is important because one could reasonably claim that there are already a great deal of constraints to economic decision-making in market economies. Indeed, conventional measures of fiscal policy such as tax cuts, and monetary policy such as targeting interest rates constrain the range of possibilities among which an economic agent may decide. To make this clear, Lowe introduces a distinction between primary control and secondary control, the latter being the one he names ‘Control’ with a capital ‘C’, which he properly characterizes as control and does not belong to the conventional measures of public policy.

‘Secondary control’ or ‘Control’ is understood as a public policy aimed at the very configuration of behavioral patterns. Instead, ‘primary control’, which includes conventional measures of public policy, takes behavioral patterns for granted and only influences them through the modification of existing transaction opportunities (1969b, p. 33, 1977, p. 337). This configuration of behavioral patterns into goal-adequate patterns can take place through two channels: either directly, influencing action directives (the quantitative preference for more over less in general) and expectations; or indirectly, through modification of the system’s structure through public action (1977, p. 131).

As an example of the latter, not evidently different from a measure of primary control, we could consider public spending aimed at full employment (1977, p. 154). Imagine that the conclusion is drawn that an expected amount of aggregate spending is behaviorally required to reach a certain macroeconomic objective like, for instance, full employment. It might be the case that the direct shaping of action directives does not properly work and consumers, companies, and investors decide not to spend as much as required. If this happens, public policy can compensate for the lack of private spending through a thoroughly advertised public spending program and thus keep aggregate spending at the goal-adequate level. But the mere compensation is not the objective of the measure. Instead, the objective is to shape expectations and thus behavior. Concretely, private uncertainty about the state’s commitment to full employment and the direction of aggregate demand can be reduced. This can turn expectations closer to goal-adequate ones, possibly making private behavior equivalently closer to goal-adequate one. A close example to this in order to illustrate direct and indirect secondary control and compare it with primary control is given by Lowe regarding the well-known Kennedy tax cuts in the 1960s (1969b, p. 34).

To expand on the concept of control, Lowe introduces a further distinction between control by command and control by manipulation. ‘Control by command’ means to set legal limits to private economic decisions of consumers, workers, companies, etc., like for instance price controls, wage controls, and investment control, with the extreme case of full collectivization. Instead, ‘control by manipulation’ means to influence spontaneous private actions without legally limiting economic decisions, like fiscal policy, monetary policy, tariffs, etc. Although Lowe claims that effective controlled systems must use both control by command and control by manipulation, he associates economies focused on command to planned economies, and economies focused on manipulation, to market economies (1977,

pp. 149–150).

Secondary control, Lowe’s specific or non-conventional type of control, can involve both manipulation and command. Direct secondary control through manipulation can target action directives, which is a long-run task of education, and expectations through the reduction of uncertainty of marketers by publicizing the results and objectives of government economic analysis.

To be effective in the short run, direct secondary control through manipulation must be complemented with command control. On the one hand, to effectively shape action directives in the short run is considered an impossible task by Lowe, so conventional measures of primary command control should be used if action directives are not goal-adequate in order to determine behavior. For instance, Keynesian-oriented programs of public spending may be used to compensate for goal-inadequate private action directives and thus keep aggregate spending within target levels (1977, p. 154). On the other hand, to effectively shape expectations in the short run, in addition to the publication of the objectives and results of government economic analysis, the government must have the means to show its commitment to these results. Thus, it must have the possibility to undertake expansions of public spending whenever they are required to keep aggregate spending on target levels (1977, pp. 154–155). Once realized, this kind of measure can also indirectly shape private expectations into goal-adequate ones by reducing uncertainty and improving confidence in the public sector.

Thus, even if a measure like public spending can be considered to be primary control, its mere possibility and its realization can also be considered to be a measure of secondary control.

Manipulative control of individuals to drive individual behavior into goal-adequate behavior through an educational process is called by Lowe in some works ‘spontaneous conformity’ (1937, p. 386). As we will further elucidate in Section 4.3, Lowe proposes to use control to conserve market behavior as much as possible given the restrictions of goal adequacy. Spontaneous conformity then consists of a long-term manipulation of preference systems to include the extremum principle. Whether this manipulation can be considered to be educational or ideological depends if the goal of achieving the extremum principle can be rationally justified or not. About this, more will be said in Section 4.C.

It is worth mentioning here a critique made to Lowe by economist Henry Wallich because it has been frequently defended mostly by defenders of neoliberal policies like Friedrich Hayek or Milton Friedman. Wallich’s critique consists of the claim that the unsatisfactory results of market economies may not be due to the instability caused by the actual state of the market but by the intervention of the public sector in the economy. In short, to improve economic performance, less rather than more control would be the solution (1969, p. 160). Lowe responds very inconclusively in 1969 arguing only that it may be imprudent to have faith in a self-equilibrating market and abolish all controls introduced after the

Great Depression of 1929 (1969a, p. 171). Later on, he considers the problem as subject to value judgments regarding the consequences of either active intervention or inaction towards market economic processes (1982, pp. 245–249).

After clearing out the contents of control, probably the most controversial part of Lowe’s proposal, we introduce his proposal to achieve a scientifically justified controlled economy, Political Economics, through an enumeration of its steps (1977, p. 133):

1. Selection of a macro-goal or defining an economic good-working order.
2. Suitable macro-motions to achieve the selected macro-goal, i.e. goal-adequate macro-motions.
3. Behavioral and motivational patterns that generate these macro-motions, i.e. goal-adequate behavior and motivations.
4. Central regulations or controls to induce goal-adequate motivations.

Whereas behavioral patterns and control have already been defined, there are three more terms to be defined here. Firstly, goal-adequate motivational patterns are understood as the set of motivations that are compatible with goal-adequate behavioral patterns. Secondly, macro-motions towards a macro-goal are the possible successive economic processes to arrive from the initial macroeconomic state until the final macro-goal. Thirdly, ‘**macro-goal**’ shortens ‘**macroeconomic goal**’, which is understood as a state of aggregate provisioning in a given economy; in logical terms, they are states of affairs related to material provisioning.

Since Political Economics consists of setting the means to achieve certain macro-goals, Lowe mentions alternatives to technical (Pareto) efficiency as the optimal allocation criterion: maintaining aggregate output *per capita*, protection of environmental resources by restricting competition or technical progress, etc. How these alternatives are restricted by Lowe’s intention to preserve market economies as much as possible will be discussed in section 4.3.

4.1.2 The methodology of Political Economics

§1 The traditional hypothetico-deductive model

After presenting Lowe’s path of Political Economics up to the justification of controlled economic systems, we need to consider which kind of scientific reasoning is suited to such a proposal. To do that, Lowe compares his proposal with traditional economics and the hypothetico-deductive model, borrowed from natural sciences, as its main flagship. As we have had an opportunity to check when examining the LSD, Lowe claims that traditional economic theory uses the hypothetico-deductive model, where some hypotheses are considered premises of a syllogism from which we can deduce conclusions. After the procedure, these conclusions or observational statements can be claimed to be explained

or predicted (1977, p. 139). Thus, Lowe claims that the reasoning process goes “from antecedents to consequents” or “from causes to effects” (1977, p. 140).

Both couples **antecedents - consequents** and **causes - effects** refer to states of affairs that are related under laboratory conditions through law-like statements. **Causality**, a concept whose actual content comes from the conceptualization of natural sciences, has been defined before in Section 3.1. Although conceptualizing causality can get much more involved, the pair antecedent-consequent can be considered to be the logical structure of a typical causal claim, at least as Lowe understands it under Nagel’s influence. The relation with natural sciences here becomes especially relevant. In contrast with the naturalist understanding of science like Lowe’s, a constructivist view reveals that causality through passive observation of processes is rare even in physics (Janich, 1978). If we accept this claim even for the alleged realm of objectivity, the physical world, it is not surprising that in economics, all of which is about human behavior and constructions, causality with passive observation is even more uncommon. This is precisely what Lowe claims.

Repeating what we mentioned in Section 3.2, traditional economics starts from certain laboratory conditions and an initial macro-state to derive a future macro-state, concretely equilibrium, through the LSD (or utility maximization plus profit maximization). Repeating Lowe’s critique in terms of macro-states, Lowe claims that the inference from an initial macro-state to the final macro-state of equilibrium requires certain individual motivations and behavior to be assumed in order to achieve socially patterned behavior as in the LSD. Hence, both individual motivations and behavior must be shaped together with laboratory conditions for the deductive inference to be valid.

§2 The instrumental-deductive method of Political Economics

Instead, Lowe’s proposal, instrumental analysis or instrumental inference (1977, p. 143), is a case of regressive inference, which proceeds from effects to causes. Concretely, the final macro-state to be achieved, the pursued macro-goal, is considered a *datum* together with the initial macro-state such that the intermediate steps linking them both, the means to achieve the desired macro-goal, are the unknowns to be determined. This is how the order of the steps of Political Economics as summarized above has to be understood: firstly, a macro-goal has to be selected; and, then, the means to achieve it starting from the actual initial macro-state have to be determined, which consist of progressively determining goal-adequate macro-processes, behavior, motivations and control measures.

With this, the instrumental part of Lowe’s proposal is concluded. However, Lowe claims that his proposal has got a deductive part, too. Concretely, he claims that once control measures are applied to shape motivations and behavior, these measures together with the consequent motivational and behavioral patterns can be used in deductive reasoning to derive the intermediate macro-processes and the final macro-state as a conclusion (1977, p. 157).

Thus, Lowe claims that instrumental analysis is not enough by itself to achieve the final macro-goal: only theory cannot drive to the goal. Instead, it is the role of control to shape economic processes such that they become goal-adequate: practice has to be modified to become goal-adequate.

§3 Political Economics, traditional economics and the natural sciences

After elucidating his proposal, Lowe takes some time to compare it with traditional economics. He identifies as common features of both, on the one hand, the theoretical, rather than taxonomic or merely descriptive character, and, on the other hand, the focus on forecasting as a practical aim (1969b, pp. 2–3). Lowe conceptualizes the relationship between Political Economics and traditional economics claiming that the latter is included in the former (1977, p. 312). Concretely, the transformation of the economic reality required by Political Economics to make its claims empirically testable has as a particular case the one where economic reality does not need to be transformed into goal-adequate reality, as it is the case when individual behavior coincides spontaneously with the socially-patterned behavior required by equilibrium or a Pareto optimum: the above-mentioned spontaneous conformity. In *OEK*, Lowe claims this to have happened at some point in the historical development of industrial capitalism. However, in *EMASE*, he relaxes a little his historical claim and considers it not very important (1969a, p. 171), as it is considered in this dissertation.

Lowe also compares his proposal with the procedure in natural sciences. He mentions the following differences, most of which will be relativized later within our constructive reinterpretation of Political Economics:

1. Political Economics' deductive inferences are only valid as long as all conditions of instrumental inference remain intact: macro-goal, macro-motions, behavioral and motivational patterns, and control measures (1977, p. 158). Most critically, Political Economics' conclusions can only be empirically true as long as control succeeds in transforming economic processes into goal-adequate processes, so practice is required before the theory can be tested (1977, pp. 252–253).
2. Political Economics is instrumental-deductive instead of hypothetico-deductive: it starts from a macro-goal, the conclusion in traditional reasoning, to derive the required behavior, the hypothesis in traditional reasoning, and then it goes from shaped behavior to macro-processes and macro-goal. Thus, it does not just go from hypothesis to conclusion and it does not claim for the validity of the hypothesis based on the empirical validity of observations (1977, p. 158).
3. Political Economics is not only a theory in the traditional sense but includes also practice, namely control, to change actual economic processes to make them suitable for theorization. This is why the book is titled “On Economic *Knowledge*” rather than Theory (1977, p. 159).

4. Political Economics, and social sciences in general, differ from natural sciences in their subject matter, respectively created and not created after rational design (1977, p. 160).

After having discussed the main structure and the methodological aspects of Political Economics, comparing it with traditional economics and natural sciences, we still need to enter into a little more detail in the process of Political Economics. As it cannot be otherwise considering that *OEK* is a scholarly work with a limited extension, Lowe acknowledges that any intent to present examples of Political Economics in action will be limited to academic purposes.

4.1.3 The steps of Political Economics

§1 Knowns and unknowns of the process

We consider here a more thorough presentation of the knowns and the unknowns of instrumental analysis. To do that in a most comprehensible manner, we will first introduce the chain of thoughts linking all steps of the process and then distinguish clearly between knowns and unknowns to enter into details.

Political Economics begins with the objective of achieving a certain macro-goal from an initial macro-state. To do that, the first task is to determine the suitable macro-motions, economic processes and intermediate macro-states which can guide from the initial to the final macro-state. Lowe considers this a technological problem of production and distribution, which only requires the knowledge of some laws of nature and, as Lowe conceptualizes it, their derived engineering rules: how to produce and distribute means of living. The second task is to determine the social behavioral patterns required to achieve goal-adequate macro-motions. The third task is to infer from these behavioral patterns the motivational patterns required from economic agents, which kind of action directives and expectations might materialize into goal-adequate behavior. To set the link between motivations and behavior, psychological laws are required such that it is assumed that motivations determine behavior. The fourth task is to infer, from goal-adequate motivations, the measures of control required to convert actual motivations into goal-adequate motivations. To achieve it, only empirical generalizations linking environmental conditions, in particular control, with motivations are required.

Summing all up, the knowns of the process are: the final pursued macro-goal, the initial macro-state, some natural laws, rules of engineering, psychological laws, and empirical generalizations. The unknowns are goal-adequate macro-motions, behavioral patterns, motivations, and control measures. Now we are going to consider each known (K) or (U) unknown with a little more detail.

§2 K1. The final macro-goal

The final macro-goal is a state of aggregate provisioning defined by a set of macroeconomic magnitudes (such as aggregate output, composition of output, employment level, rate of growth...) and certain optimization criteria. These optimization criteria are understood as the criteria for the organization of economic decisions to reach an optimum state of provisioning. It can be both qualitatively and quantitatively specified. Qualitatively, if the optimization criterion is directly specified and the macroeconomic magnitudes are not numerically determined but only their relations with each other are determined through the optimization criterion. Examples of directly stipulated optimization criteria are technical efficiency (Pareto optimum), full resource utilization, or a steady rate of growth (1969b, p. 17). Quantitatively, if macroeconomic magnitudes are numerically specified at certain levels, which entails the indirect specification of optimization criteria. As we will have occasion to comment below, Lowe's examples of Political Economics in action include only full utilization of factors of production and balanced growth, both clearly compatible with market economies.

§3 K2. The initial macro-state

The definition of the initial macro-state has as a main requirement the comparability with the magnitudes set for the final macro-state. Lowe acknowledges that there are some common features measured in all initial states: the actual level of factors of production, the degree of their utilization, the existing technological development within production, and the social relations of production (1977, p. 256). The latter include most importantly how production decisions take place, whether in a more decentralized or centralized manner, if the means of production are private or public, and if the outputs of production are also private or public (1977, p. 257).

§4 U1. Macro-motions

The set of intermediate states to arrive from the initial macro-state until the final macro-goal is often not unique. This is why Lowe uses the term 'suitable' instead of 'required' to characterize these paths. To determine them, Lowe claims that only laws of nature and rules of engineering are required. As stated above, this operation is considered by Lowe a technological problem: What the general level of technology in production and distribution is to generate the successive macro-states that connect the initial macro-state with the final macro-goal. As a justification of the secondary role of human actions in such a technological problem, Lowe mentions the possibility of complete automation in production and distribution (1969b, p. 24).

§5 K3. Laws of nature and rules of engineering

Lowe considers production and distribution to be determined by rules of engineering, whereby he gives examples like agricultural knowledge about the growth of plants or animal breeding or the mechanical knowledge of artisans. We could add almost any example of commodity produced today which, with rare exceptions, is the consequence of the actualization of a certain technique. Indeed, this is how Aron Gurwitsch interprets them when he names them, after philosopher Alfred Schutz, “recipes for action” aimed at a certain result (1969, p. 40). That production and distribution are determined by the actual technological level is rather obvious. However, Lowe adds that these rules are derived from laws of nature, which thus constitute the foundation of any technical knowledge (1969b, p. 21). Again, that this is based on a naturalist understanding of science, as will be further elucidated later, may sound straightforward after the analysis made in the previous section.

§6 U2. Patterns of behavior

Lowe does not expand very much on that point, which is again rather obvious: if goal-adequate paths are to be realized, economic agents have to behave in a certain way. They will be required to buy or sell as required and equally to save or invest, among other possibilities of economic action. Although no example of this is given in general, we could illustrate it with the fact that, if a certain level of growth and distribution of output is to be achieved, at a certain technological level, producers and consumers will have to produce, sell, or buy accordingly. This does not seem to represent any special difficulty or any additional kind of knowledge. Lowe claims that these patterns are necessary both in market economies and in collectivized systems because, even in the latter, plan developers are different from plan executors, and the patterns of behavior of both are important to reach the desired paths.

§7 U3. Patterns of motivations

Given human indeterminacy, we cannot determine social patterns of behavior, never mind taking them for granted as both mainstream and non-mainstream macroeconomic models often do (cf. Section 3.2). Instead, any intent to influence actual behavior takes place through the underlying motivations. In Lowe’s terms, the decisive motivations in economics are action directives (among preference systems), and expectations. Lowe’s claim reduces to the acceptance of the assumption that, given certain motivations and the absence of external constraints, we can determine actual behavior (1969b, p. 25). Restating in other words, Lowe claims that, if an economic actor has a certain (modal) goal in her individual preference system concerning the economic process (the known action directive) and certain expectations inferred from her individual knowledge system about economic processes, her behavior can be predicted.

§8 K4. Psychological laws

Following Lowe, the link between motivations and behavior takes place through psychological laws. These laws simply connect motivations and behavior in the way Lowe connects extremum incentives with behavior as assumed by the LSD.

§9 U4. Measures of control

Motivations cannot be just assumed for behavior to be goal-adequate but stimulated to be shaped as much as possible. This is what Lowe's control intends to do and here the last kind of inference within instrumental analysis takes place. Lowe considers control only for pure market systems or mixed systems since in fully centralized systems there is no room for discrepancy between the plan and the micro-actions. However, when he mentions the different degrees of control of macro-behavior to make it goal-and-path-adequate, the last degree of political control seems the same used in collectivized systems. Hence, control can be considered also for the latter systems.

Indeed, following Lowe, some issues about which kind of control is applied are out of instrumental analysis and economic analysis in general and belong to the political decision about the pursued macro-goal. Indeed, things such as prioritizing decentralized or centralized decision-making can be added as an optimization criterion of the macro-goal (1977, p. 261). As we will discuss in more detail in next section, macro-goals may not be compatible with the existing economic system, so the situation may emerge where it must be decided whether to maintain the existing economic system or to reach the chosen macro-goals (1977, p. 261).

§10 K5. Empirical generalizations linking control and motivations

Finally, Lowe presents the link between control and motivations.

When he speaks of laws of nature allowing for rules of engineering, although questionable as in this dissertation, he feels on safe ground, protected by the strong hegemonic analytic philosophy of science and the consequent naturalist-oriented understanding of science. When he speaks of psychological laws, although in a much less secure position, he still dares to claim the status of laws for these connections between motivations and behavior. Now, when he links control with motivations, he acknowledges being in the weakest possible connection between any two steps of Political Economics (1977, p. 336). He still speaks about laws but always adds that they are mostly "conjectural" (1977, p. 142). A thorough reading of the paragraphs quoted above shows that it is inaccurate to criticize Lowe because of assuming a mechanistic conception of humans similar to the *homo oeconomicus* he is criticizing (Georgescu-Roegen, 1971, p. 347). Additionally, in response to some of his critics, who claim that Lowe hides among these alleged generalizations some laws of positive economics which he has allegedly refuted (1977, p. 334), Lowe claims that they

are more like vague rules of thumb (1969b, p. 29, 1977, p. 335) or empirical generalizations linking any possible stimulus of the environment and its consequence in terms of social response, economic or not, through motivations and thus behavior (1977, p. 336).

4.2 Does Political Economics use laws of traditional economics?

This section focuses on the kind of knowledge presupposed by Political Economics as a science and, more concretely, it presents a critique made to Lowe about the dependence of Political Economics on law-like knowledge allegedly coming from traditional economics as well as Lowe's response to it.

§1 The critique: Political Economics and its dependence on traditional economics

The first main type of critique of Lowe's proposal is directed against the independence of Political Economics from traditional economics. Some authors claim that Lowe's instrumental analysis uses laws of traditional economics within some of its steps. On the one hand, philosophers Hans Jonas and Ernest Nagel claim that these laws are used to determine the consequences of macro-goals, which are important for macro-goal selection. On the other hand, economist Fritz Machlup and again philosopher Ernest Nagel claim that traditional behavioral laws are used during the process of determining macro-motions, behavioral and motivational patterns, or control measures. The authors themselves speak about 'positive economics' instead of traditional economics to distinguish it from 'normative economics', which could also be labeled as 'traditional' but is not considered by Lowe within the targeted traditional economics. Because the discussion about the distinction between positive and normative economics is presented in a future section and since Lowe's characterization of traditional economics belongs to the field of positive economics, not to normative economics, here we simply use the term 'traditional economics' when the authors use the term 'positive economics'. The discussion about the independence of Political Economics from normative economics, the second main type of critique to Lowe's proposal, will be considered in Section 4.3.

§2 The consequences of macro-goals

Regarding the critique about the consequences of macro-goals, Nagel claims that Political Economics uses laws of traditional economics within goal selection both to predict the consequences of the macro-goals selected and to determine the compatibility between pursued macro-goals (1969, p. 65). Instead, Jonas focuses only on the prediction of the consequences of macro-goals though claiming a general predictive impossibility, which we will briefly consider.

Jonas legitimately claims that calculating the consequences of the final macro-goal at least regarding the environment and the state of the human labor force is important to

properly select among different possible macro-goals. Both dimensions are linked with the possibility of future provisioning, which is at the core of Jonas' critique. Whereas environmental considerations are clear enough, considerations about the labor force are not. Indeed, in the case of the required human labor force to assure future provisioning, Jonas introduces notions such as "well-being" or "human substance" (1969, p. 82) to assess the state of the labor force. Unfortunately, these concepts are not defined by him and thus remain at the level of cultured but not technical-precise language. Even if they were defined, it is not clear whether they are relevant for human beings to rationally agree about their future (Lorenzen, 1969). Thus, whether shaping humans to the goals of the system, a quite real possibility in light of contemporary technologies of control, is a "distortion of man" or a "mutilation of the human substance" (Jonas, 1969, p. 83), cannot be properly assessed because of the lack of these definitions.

Jonas considers it an impossible task to carry out such necessary projections about the consequences of macro-goals which entail the usage of laws of traditional economics. As a justification, he states the general impossibility of predicting in social sciences given the impossibility of small-scale experimentation. He further agrees with Lowe that the reason for this is the different subject matter of natural sciences and social sciences in terms of the "insensitivity to circumstances" (1969, p. 84). Hence, it is unclear why he considers this to be "quite apart from the open question of indeterminacy and free will" if the latter is the ultimate reason of the general impossibility to predict in social sciences (1969, pp. 84-85).

Lowe's reply to this critique is the acceptance of the imprecision of long-term planning, with the reservation that, even if imprecise, the progressive introduction of control in a trial and error process within long-term planning is better than the possible consequences of inaction, which may threaten the very possibility of future provisioning (1969a, p. 199).

Since Lowe does not reply to Jonas' claim about predictive impossibility, it might be helpful to add the following considerations. On the one hand, given the technical nature of environmental considerations, predictions in this sense are not different from those of the natural sciences, which are accepted as valid by Jonas. Indeed, the potential consequences of the selection and the achievement of a given macro-goal for the environment can surely be made technically: for instance, the effect of a given growth rate and its potential effect on the ecologic footprint, the water footprint or greenhouse gas emissions are already calculated nowadays in a more or less precise way. On the other hand, the so-called 'human well-being' of the labor force, understood as physical and psychological health conditions, is both culture-dependent and history-dependent. As stated above, it is unclear if the concept of 'well-being' or 'welfare' is relevant to politically dealing with the resolution of emergencies of present societies through rational human beings agreeing about their future.

Extending further his critique, even if the final state and its consequences were predictable,

it would be impossible to project or to plan the economy from the present state due to the immense complexity of the process, a similar reason to the one given by Hayek in his well-known attack to planned economies (Hayek, 1990). Since Lowe does not directly reply to this, we can add that regarding technical production plans, this impossibility has already been refuted (Cockshott & Cottrell, 1993), as we will further comment in Section 4.3.4.

In the end, Lowe does not directly reply to the observation that the prediction of the consequences of macro-goals requires laws of traditional economics other than saying that this does not belong to Political Economics, which deals with means, but with Politics, which deals with goals. However, we may have a hint of how Lowe conceives the prediction of the consequences of the pursued macro-goals in the reply to the critique made to him by Machlup and Nagel.

§3 The response: Instrumental analysis and rules of engineering

Machlup's critique is not strongly sustained in his claim that instrumental analysis requires laws of traditional economics, so it will not be specifically targeted and we will focus on Nagel's argument.

The latter consists of claiming that regressive analysis in geometry and instrumental analysis in Political Economics share the usage of a set of axioms, in geometry properties of the figure to be constructed, in economics behavioral laws. The example of regressive analysis in geometry, proposed by Lowe and Gurwitsch, consists of going from the assumed solution of a given problem to its required construction steps using a set of axioms conceptualizing the geometrical properties of the figure to be constructed. Nagel sets the equivalence between these geometrical properties of the figure in geometry and the behavioral laws in traditional economics (1969, p. 64).

To answer that, Lowe replies in his own terms that the assumptions are not behavioral laws but rules of engineering to transform the initial state into the final state. An engineering rule consists of technical knowledge, not behavioral rules. For instance, investment is a means to increase employment because 'investment' means 'building more working places' and this offers the opportunity to employ more people. It is not of the form "If behavior A - a rise in investment occurs, another behavior C will follow-namely, more workers will be hired" (1969a, p. 183). Hence, no laws of traditional economics are used. In this sense, we may answer that the projections of the consequence of macro-goals may be considered to be technical, governed by rules of engineering, not behavioral laws.

In the end, it seems that Lowe's justified reply to the alleged use of laws of traditional economics within Political Economics is to deny the use of behavioral laws and, instead, claim the use of rules of engineering. In other words, it would be technical knowledge, not economic-behavioral knowledge.

4.3 Ends in Political Economics

This section presents how ends are related to Lowe's proposal, concretely, how Political Economics, the science of controlled economies, only deals with the economic means set up to satisfy certain politically decided ends about whose decision Political Economics has nothing to say. Firstly, I present Lowe's political thought which guides his restriction of Political Economics to controlled market economies, excluding both free-market economies and planned economies (Section 4.3.1). Secondly, I present Lowe's real justification for his choice in terms of the liberal tenet of value-relativism, which excludes value and normative questions from scientific endeavor, and present the concept of liberal science (Section 4.3.2). Thirdly, I use a sharp critique by Hans Jonas to Lowe in order to question whether Lowe's proposal is truly a liberal science (Section 4.3.3). And, fourthly, I use another bright critique by Fritz Machlup to Lowe in order to question whether Lowe's proposal can exclude normative questions if it is to achieve social ends (Section 4.3.4). Here I bring two main additions to Lowe's presentation: on the one hand, the identification of the problematics of Lowe's defense of (controlled) market economies, a concept of freedom with a material dimension and liberal science; on the other hand, the reformulations of Jonas' and Machlup's critiques to Lowe in terms of arguments employing terms from an ortho-language which allows for unambiguous discussion of the questions at hand.

4.3.1 Lowe's case for market economies

§1 The undisputed goal of economic systems

We will see below that Lowe admits that, at least in some cases, the achievement of macro-goals through instrumental analysis seems to be easier with planned economies than with capitalist economies. However, Lowe does not consider planned economies a serious alternative to market economies for the implementation of Political Economics. In this section, we examine possible reasons for it and draw some conclusions.

In the last section of *OEK*, Lowe presents his view about the selection of goals within his proposal of Political Economics. Before making his case for market economies as in this work, it might be useful to reproduce what he considers to be the undisputed goal of economic systems in his 1992 self-portrait:

“There is no dissent, about the ultimate goal towards which the socioeconomic process should tend; namely, a level of provision acceptable to all members of society combined with the maximum degree of personal freedom that is compatible with the viability of the system” (2001, p. 374).

In this quotation, we see that Lowe mentions freedom but also a certain universal threshold of material provisioning and the viability of the system. As will be repeated below, it is unclear if universal material provisioning and environmental sustainability are compatible

with a market economy, especially because Lowe admits that the goal has to be reached through “balanced growth” (2001, p. 374), which is a moderation of his claims of *OEK* in 1965, which he already moderated in his 1977 Postscript.

§2 The concept of freedom

How does Lowe understand the concept of freedom? It is well-known that terms like ‘freedom’ are often controversial because they usually hide a certain ideological position under apparently technical words. If no definition is given, there exists the danger of sticking to already ideologically created concepts that are not precise enough to allow for rational discussion. Aware of this danger, in his last book about freedom, Lowe tries a definition of freedom as a “power to self-determination”, which does not add much concretion to the concept: “freedom is the power of self-determination over the range open to human decision making” (1988, p. 5). Indeed, intuitive as it may seem, it only shifts the clarification from ‘freedom’ to ‘self-determination’, which is not less complex. Among other things, there is the classical controversy about the possibility of such self-determination, the traditional problem of free will, which is not discussed by Lowe.

To give a little concretion to his concept, Lowe considers a requirement of this kind of freedom the universal access to means of living, which, in his view, is hampered by class inequality, unemployment, and race and gender discrimination (1988, p. 5). Thus, Lowe’s idea of freedom is close to what Isaiah Berlin famously named ‘positive freedom’ (1969). In this sense, Lowe continues, control would be legitimate if it were directed towards the elimination of such obstacles to universal access to means of living.

The lack of precision of the concept is by no means a merely academic matter. Indeed, as defined above, the concept of freedom may be compatible with the exploitation of the labor force in the Marxian sense. If the well-known Marxian critique is sound, exploitation is incompatible with universal access to means of living. Indeed, it is a Marxian claim that the exploitation of the labor force in capitalist economic systems is one of the main reasons for the recurrent crises experienced by such systems (Arrizabalo, 2014, pp. 115–116; Astarita, 2013, pp. 12–21; Gill, 1996, p. 78), which make universal access to means of living impossible at least during their occurrence, if not further on. Not to speak of the capitalist tendency, again from the Marxian point of view, to keep unemployment above certain thresholds for capitalists to be able to increase the exploitation of the labor force (MEGA, 1983, pp. 392, 507, 515–ff). What is normally labeled under Marx’s and Engel’s ‘industrial reserve army’.

Hence, if Marxian claims are sound, freedom would require universal access to means of living and be compatible with a practice that makes this universal access impossible. This clearly constitutes an operational contradiction. However, since we have not precisely introduced concepts such as value and surplus value, which are required for the precise definition of ‘exploitation’, we will leave the precise assessment of this consideration for

further research.

§3 Lowe's preferred goal of economic systems

After stating the undisputed goal, according to Lowe, we can express Lowe's preference for a certain goal, a not-so-undisputed restriction of the abovementioned overall goal. He explicitly claims that he prefers to assign to individual freedom, here characterized as "micro-autonomy", the rank of a political goal itself: "We must restrict the choice of our substantive goals to such states and processes as can be brought to agreement with the strivings of the large majority of micro-units" (1977, p. 318). In other words, he prefers manipulative controls over command controls or, plainly, he prefers avoiding behavior enforcement (1977, p. 318, 1982, p. 239). Here, the power of self-determination turns into economic freedom (1977, p. 231), understood as a lack of political coercion in economic decision-making.

Comparing it with the undisputed goal of economic systems presented above, it seems that Lowe claims that freedom as he defines it must be equally ranked to material provisioning, not lower as in the undisputed goal. There, indeed, freedom had to be made compatible with universal material provisioning. Here, instead, the door is open to legitimately choose a situation with a higher level of freedom and inadequate material provisioning over another situation with a lower level of freedom and adequate material provisioning.

However, Lowe does not seriously consider this possibility other than in his theoretical presentation of Political Economics, where he claims that there may emerge a situation where one has to choose between a certain selected goal and the existing economic order (1977, p. 261, p. 318). Most importantly, he does not consider the dilemma in the terms presented above, which directly points to the choice between a market economy with inadequate material provisioning and a planned economy with adequate material provisioning.

Indeed, all his arguments assume that his preference for market economies over planned economies is such that the former can be compatible with the main goal of adequate universal access to material provisioning. The only exceptions to this assumption which he mentions concern poor countries without a tradition of decentralized decision-making and without the economic structure required for growth (1977, pp. 320–321)²¹. In such terms, Lowe explicitly states his preference for market economies over planned economies because the former allegedly allow reaching social goals and at the same time conserving individual freedom (1977, pp. 311–ff). The justification of the possibility of a viable market economy that secures provisioning and at the same time considers individual freedom a goal itself has been claimed to be the task of Lowe's life (Forstater, 2000, p. 228).

To avoid the choice between maintaining a market economy and achieving a certain

²¹We have already mentioned a challenge to this assumption from Marxian Economics, which we cannot deal within this dissertation (cf. above).

macro-goal out of reach within this market economy, Lowe simply proposes to restrict macro-goals to those which are compatible with the preferences of a large majority of citizens, to limit the choice of goals to the compatibility with micro-autonomy in the population. This is what it means to set micro-autonomy as a goal: to maintain market economies even at the price of abandoning certain possible macro-goals. The dimension of this abdication, whether it compromises only slightly material provisioning or it threatens it to fall below the subsistence level, is the difference between Lowe's consideration of the problem and what we have argued above.

§4 Why not unrestricted micro-autonomy?

Now, on the one hand, we have Lowe's critique of traditional economics that behavior cannot be assumed but it has to be generally controlled. And, on the other hand, we have his preference that control has to be the least possible, assuming it to be compatible with stable provisioning (1982, p. 239). If controls have to be the least possible to respect individual freedom as a political goal, one might ask whether it would not be easier to avoid control altogether in order to guarantee the maximal degree possible of micro-autonomy. Indeed, this is the view of many well-known economists who defend neoliberal policies like Milton Friedman (1980) or Friedrich Hayek (2008).

To argue why a certain degree of control is necessary, Lowe has something very clear in mind: the threat of authoritarianism if the provisioning level falls beyond certain limits (1977, p. 322). His experience as a fugitive from the Nazi regime and his long exile in the US probably play a role in such a thought. Regarding this, thorough readers of Lowe have claimed that his proposal of control makes Lowe (1) the real guardian of free societies, for which control may be the only way to survive (Heilbroner, 1966, pp. 293–294), and (2) a 'true liberal' against his conservative liberal critics because his work aims at maintaining through an adequate welfare state the required macroeconomic order to guarantee the maximum level of individual freedom compatible with overall stability, thereby meaning absence of revolutions or politically autocratic tendencies (Hagemann & Kurz, 1990, p. 753).

Understandably, Lowe's way of comprehending freedom as requiring universal access to means of living together with the priority he assigns to individual freedom as a goal has been compared with John Rawls' views (Hagemann, 2019). These can be found in his well-known *A Theory of Justice* but, above all, in his *Political Liberalism* (Rawls, 2005). Indeed, Rawls defends the need for measures of social and economic regulation but always subsidiarily to political and civil rights.

The proximity of Lowe's views to Rawls makes Lowe a so-called 'new liberal' or 'welfare state liberal', a tradition rooted in John Stuart Mill's *On Liberty*, against so-called 'classical liberalism', which comes from John Locke and Jeremy Bentham up to Hayek and Friedman in the XX century. Whereas the main common feature between the two traditions is the

promotion of civil and personal liberties, the main difference between them lies in the importance assigned to private property, defended with less intensity by new liberals than by classical liberals (Courtland et al., 2022).

§5 Why controlled economic freedom as a goal?

Now, how does Lowe justify controlled micro-autonomy as a goal? His strategy is to consider it a way to promote “political freedom” (1977, p. 319), which he considers a priority over the choice of the economic system. Here, political freedom is understood as the exercise of self-determination to reach the “well-understood interest” of economic agents. So, economic freedom would promote political freedom because it allows agents to fulfill their true interests. Making use of Rousseau’s terminology, economic freedom would guarantee respect for the will of all, at least for a majority of the population. Noteworthy enough, “well-understood” interests would not simply be spontaneous individual preference systems but the properly modified preference systems resulting from manipulative controls to achieve patterned behavior so as to be goal-adequate (1977, p. 320).

It is worth repeating here, as Lowe himself acknowledges over his work, that even if it seems that he considers the manipulation of both preference systems (action directives) and expectations, his examples of instrumental inference clearly stand on the side of interventionist capitalism when they explicitly assume the extremum principle as action directive and thus as a socially prioritized preference. The examples only focus on shaping expectations to make them goal-adequate. In the end, the idea is to shape individual preference and knowledge systems to make them goal-adequate only to capitalism-compatible goals, compatible with decentralized decision-making as in market economies. So, theoretically, all possibilities are open to choose even among economic systems but practically only the option of market economies is considered.

The idea of improving preference systems and expectations to make them goal-adequate may be justifiable as long as the goal to be reached is properly justified. Even if, as we will elucidate in the following lines, Lowe would not admit the possibility of rationally justifying goals, he is ready to admit that Political Economics is compatible both with planned and market economies (1977, p. 343). However, the restriction of manipulation to goals that are compatible with market economies seems at this point arbitrary. The only justification up to now for micro-autonomy, although controlled, is the fear of totalitarianism if adequate material provisioning is not properly guaranteed. Whether it promotes or not political freedom through the true interests of economic agents may be another justification but it is not if these interests are simply restricted without further justification to capitalist-compatible goals.

These arguments are rather weak compared with his strong case for the core of Political Economics. However, even this is justified in Lowe’s view because, as we will clear out later when discussing the value-neutrality of science, no one can allegedly ask for a rational

justification of ends, which is what we are asking him if we inquire into the reasons of his preference for controlled micro-autonomy as a goal.

When Lowe claims that some decentralized decision-making must be granted, he is assuming actual individuals with arbitrary preferences, very often incompatible with each other. Clearly, given the liberally-influenced individuals of any Western society (and even many non-Western societies today), the more so the higher the degree of globalization, this minimum of decentralized decision-making is likely to be indisputable if a social conflict is to be avoided. Note for instance how people have protested even against health-based confinement measures during the Covid-19 pandemic in liberal terms.

§6 An argument against planned economies

The question is relevant because it is Lowe's intent of justification, even if necessarily unscientific in his view because of being value-laden, of his preference for market economies over planned economies. When arguing against planned economies, Lowe claims that totally centralized decision-making is ineffective. He asserts that, when pursuing macro-goals, no government can pursue a certain goal on behalf of all citizens if no citizen agrees with that goal. He even claims this to belong to the instrumental part of Political Economics because its violation puts the very achievement of any imaginable macro-goal at risk (1977, p. 313).

However, the limit does not apply in general to planned economies but only to existent planned economies at his time. Instead, it limits centralized decision-making as implemented by economies such as the USSR or China in his days, as he mentions at some point before (1977, p. 309), with a unique political party and a bureaucracy set up around the party, where individual decisions are not consulted at any point through something like an election or a collective decision-making process. As we will further elucidate later, this is no limit to centralized decision-making if it is made by agreement of the citizens based on general free consensus (check if I mention the concept later).

4.3.2 Lowe's scientific value-relativism and liberal science

§1 Market economies, scientific value relativism and value neutrality of science

As we already mentioned before, after all the discussion above, one is faced with the fact that, in contrast with other claims defended by Lowe, his preference for market economies seems to be only weakly justified. However, this lack of a proper justification is consistent with Lowe's view about the possibility of justifying goals in a rational-scientific manner: basically, that it is impossible. Thus, he pretends to give a justification for his lack of justification for his preference for capitalism and ('new') liberalism.

Lowe claims to be on the side of scientific value relativism, which he links with Max Weber

and considers to be well-founded in Arnold Brecht's *Political Theory* (1959) when he asserts that "value judgments and norms" are "difficult if not impossible to argue cogently" about (1977, p. 314). To argue for freedom or micro-autonomy means "to join a debate which must lead to a point where argument ends and faith has the final say" (1977, p. 322).

Scientific value relativism means that it is impossible to justify values rationally-scientifically. This claim, since Weber, is usually included within the concept of scientific value neutrality or value freedom (*Wertfreiheit*), i.e. that science must be value-neutral or value-free. To the almost unanimously accepted claim that scientific statements cannot be based on value judgments to determine their truth or falsity, the ideal of objectivity, shared even by the opponents of value-freedom, a value-free science means that science must remain within the realm of what is, out of any practical considerations at the level of norms, values or worldviews (Weber, 1988)²². The latter claim is clearly not as uncontroversial as the former one.

The key to assessing the tenet of value-relativism is the term 'value' and what it means to justify something in rational-scientific terms. Let us briefly examine Brecht's arguments, which Lowe takes as valid in his own arguments.

Brecht asserts in the preface to his work that political systems have goals but science cannot by itself set these goals (1967, p. 121). About the value assessment of goals, he considers the term 'valuable' scientifically applicable in two senses (1967, p. 117): (1) being useful as a means to achieve something else, such that something is valuable if it is useful to achieve a given goal; (2) being whatever it is taken to mean within a group where the term 'valuable' has a (precise, not specified by Brecht) given meaning, such that something is valuable if there is a specific meaning of the term 'valuable' which applies to valuable things. From that, he concludes that it is impossible to determine scientifically which goals are valuable except: (1) as a means to achieve further goals, or (2) under a given value system about further or ultimate goals. In other words, scientific value relativism claims that science is incapable of determining whether a pursued goal is "good or bad, right or wrong, just or unjust" or whether it is more or less valuable than another possible goal (1967, p. 124).

Why science can only qualify a purpose as valuable in relative terms, respect to another (unscientifically) given purpose, is based on the so-called logical leap between Is and Ought (1967, p. 125), as in the tradition from Hume to G.E. Moore: we cannot logically infer that something ought to be only from the fact that something is. Since science only deals

²²There has been a lot of controversy over the meaning of 'Wertfreiheit' for Weber. For a discussion of the issue within its historical context, cf. Hennis et al. (1994) and Sharlin (1974). Even if not the focus of this dissertation, it must be cleared out from the beginning that for science to be value-free does not mean to deny that scientists choose their research objects and even their methodologies basing on their own value systems, which is something that Weber and his followers admit and consider something legitimate (Weber, 1988; Machlup, 1969, pp. 113–118; cf. Verlag J. B. Metzler (1995, p. 666)).

with what is, it cannot be scientifically inferred from it anything about what ought to be. This is something Max Weber, Brecht's and Lowe's theoretical referent, completely endorses (Weber, 1988). About that, we will have occasion to examine the opposition of the terms 'positive' (what is) and 'normative' in Section 4.3.4.

Notwithstanding the enormous literature about values and the many different conceptions about the term 'value' and its relation with the term 'good' (Schroeder, 2021), the relevant sense of 'value' for this dissertation is that which allows us to classify values and compare them with each other in a compatible preference system: whether something is good or not only matters if it is to be politically pursued with priority over something else. Thus, Brecht's conception, which takes 'value' to be related to 'end', something to be pursued, is still a good starting point for contemporary criticism as in this dissertation.

Scientific value relativism, in other words, means that rational scientific analysis is only possible for the determination of means to achieve ends, not for the determination of ends themselves. In more traditional terms, that there is only technical reason but not political reason in scientific-theoretical endeavors. If there are preference systems that are incompatible with each other, the possible determination and demonstration of intersubjective norms cannot be undertaken rationally-scientifically (1969a, p. 193).

§2 A liberal economic science

Having this conception in mind, Lowe claims in *OEK* that the discussion about economic goals belongs to "the realm of value judgments - a region in which discursive thinking, and thus scientific inquiry as the modern mind understands it, cannot by themselves offer final answers" (1969b, p. 18).

His instrumental analysis may help to determine goals once it is determined that such goals may be suitable to achieve another superior goal, when they are considered inferior goals, acquiring the rank of a mean with respect to the superior goal.

However, in the hierarchies of goals that both societies and individuals have, there is at least one goal, the highest one, often identified with "summum bonum - the good life", which is not suitable to be determined through instrumental analysis (1977, pp. 316–317).

This is why Lowe claims that Political Economics has a mainly instrumental character: since its object is economic activity, which is "goal-neutral", it deals with the means to achieve certain politically externally determined ends. The determination of ends does not concern the economist. To clarify his view, he poses the claim in such radical terms:

"If Hitler had decided in 1945 to bring about the final *Götterdämmerung*, the complete destruction of the German people and land, then the task of the economist qua economist, unmoved by extrinsic considerations, would have been to help in doing so most efficiently" (1969a, p. 196).

Lowe's view of the economist's role as similar to that of an engineer still belongs to the mainstream view the positive economist has of itself, where 'positive' here means, as will be further elucidated in Section 4.3.4, the opposite of 'normative' in the sense that its subject matter does not include any value judgment but only statements about facts. Indeed, the comparison with the engineer to describe the role of the economist can be found in a work as recent as 2017, where Hausmann et al. (2017) claim the importance of ethics for economics.

As a consequence for Lowe's proposal and for his declared preference for market economies over planned economies, we have that there can be no rational-scientific justification for this preference. Hence, whether Lowe's arguments are weak or not is not an issue that may be rationally-scientifically discussed.

We can classify Lowe's views into what has been named '**liberal science**', the political dimension of his naturalist conception of science.

The idea of liberal science is that science is aimed at the expansion of knowledge, often following the curiosity of researchers (Janich, 1978, p. 8). The usual reasons to endorse such a position are that (1) knowledge is a value in itself, (2) fundamental research of today will translate into applied science of tomorrow (Janich, 1978, p. 26), and (3) science must be value-neutral such that its applications or the moral and political discussion about its goals do not concern the scientist and cannot be made a criterion to assess projects within fundamental research (Janich, 1978, pp. 7–8).

After liberal science, any normative discussion about goals must remain outside science because it cannot be methodically undertaken (Lorenzen, 1987, p. 14). Finally, liberal science can also be called 'free science', unconstrained by the requirement to solve social problems (Lorenzen, 1994, p. 129).

Lowe's view of science belongs to liberal science. Indeed, the aim of science being the expansion of knowledge is implicit in the fact that economists only deal with the determination of means to satisfy politically determined goals. Thus, practical questions, in Weber's words (1988), remain outside the scientific endeavor.

In terms of the items mentioned above, Lowe's views match the third item as sketched in this section and, as we will further discuss in the next section out of a controversy with Hans Jonas, also the first item, because it restricts the task of the political economist to whatever the politician may dictate, whether it is politically relevant or not.

However, as we will also mention in detail, the focus of science set on the mere expansion of knowledge is matched by Lowe's concept of economic science only partially because he crosses a critical borderline of liberal science with his proposal when he sets as a requirement of economic science, in its very definition, the securing of a certain minimum of material provisioning.

As a result of this section, we see that Lowe criticizes what we named the two first ‘I’s of traditional economics, inconsistency, and inaccuracy, but ultimately shares the third one, ideology, despite his case for constrained economic behavior, because his preference for market economies over planned economies remains mainly unjustified. Lowe would probably accept the claim since, in his view, the justification of goals is impossible because of scientific value relativism, which he endorses.

4.3.3 Political Economics as a liberal science? On Hans Jonas’ critique

§1 The question

The liberal character of Lowe’s Political Economics has been identified above. Now we take a critique by Hans Jonas to such a view in order to discuss the possibility of Political Economics to be a truly liberal science. Hence, the question that we will try to answer here is whether Political Economics, as presented by Lowe, actually is a liberal science and, if not, whether it can be turned into a liberal science or not. We will see that this means to discuss about the political relevance of economics.

§2 The ‘inherent goal’ of economic activity

In a gist, Jonas’ critique of Lowe is that, since the goal of economic activity is material provisioning, the chosen macro-goals cannot but fit this end. Furthermore, because modern technology extends the impact of human decisions far into the future, future material provisioning has to be ensured and so the macro-goals must fit this end, too.

The first point made is that the economist cannot give up the task of goal selection because economics deals with the economic system (or economic activity) and the economic system is about a society’s material provisioning. Jonas claims that material provisioning is the end of economics, and here ‘end’ is understood rather vaguely as “the inherent goal” of economics, where ‘goal’ is just a synonym with ‘end’ and ‘inherent’ is not unambiguous, as we will elucidate in the following lines. Even if the distinction is not in the text, I assume Jonas to mean that material provisioning is the end of the economic system, “an instituted system of human activities”, not just economics, which is the scientific study of economic systems, since the comparison he uses to elucidate it is the end of a court of law (not of the study of law) being justice administration (1969, p. 74).

Jonas extends the goal of economics from merely present material provisioning to future material provisioning. Assuming the economic requirements of provisioning and the possibility of future provisioning, and the potentially destructive effects of modern technology, especially on the environment, Jonas proposes what he calls, using Kantian words, an “a priori (...) unconditional economic imperative”, understood as a “moral stance” and “normative authority” which embodies “the principle of responsibility”: “Act so that the effects of your action are not destructive of the possibility of economic life in the future”, or

“Do not compromise the conditions for an indefinite continuation of some viable economy” (Jonas, 1969, p. 79)²³.

§3 A definition of ‘end’

To elucidate what it means for something to have an inherent goal, Jonas begins a digression about the meaning of the terms ‘end’, a synonym with ‘goal’, and ‘value judgment’. His objective is to show that there are some value judgments that not only can enter scientific inquiry but must enter it, and they do not violate the well-understood value-neutrality of science. These value judgments are those which refer to what he calls ‘objective values’, which consist of ‘inherent’ or ‘intrinsic’ goals or ends.

To begin with, he characterizes an end as “that for whose sake a thing exists and for whose production or preservation a process takes place or an action is undertaken” (1969, p. 71). He tries to illustrate his definition with examples such as a hammer, which exists “for hammering”, a digestive tract, which exists “for digesting”, walking, which “is done to go somewhere”, and a court of law, which “sits to administer justice” (1969, p. 71). The examples show that very different issues are included under the same definition:

1. The intentionally assigned role of an artifact (a hammer) in a certain material technique (hammering), where **‘intention’** here is understood, with Lorenzen, as the intention to bring about a certain state of affairs, which involves rational deliberation in contrast with the mere desire or volition²⁴. Indeed, the role is intentional insofar as the hammer has been specifically produced to execute the hammering technique.
2. The biotic function (digesting) of an internal human organ (the digestive tract). Here **‘function’** is understood as an internal body process that the organ is known to execute under regular health conditions in order to satisfy a certain biotic process such as nutrition. Two remarks are useful here. Firstly, the fact that the organ

²³The foundation of such an imperative is quite difficult in moral terms as Jonas’. It is certainly not like the foundation of Kant’s imperatives, as Jonas himself recognizes (Jonas, 1969, p. 79, 1973, pp. 44–45). Moreover, even Kant’s imperative can be claimed to have a foundation gap (Lorenzen, 1987, p. 243). This way, Jonas enters the foundation of economic goals, which is a particular case of the foundation of norms and preference systems. The decisive point is that Jonas calls on ethics, in the actual absence of religion, to include future generations in moral decisions, instead of appealing firstly to politics (1973, pp. 52–53). Like Kant, he considers humans acting individually to build an aggregate political power that represents them, although he regrets the limitation that future generations are simply not represented in such a system. He considers politics to be founded on ethics. Instead, it can be shown that a precise and intersubjectively controllable sense of the terms ‘rational’, ‘deliberation’, and ‘decision’ as used for individual decision-making is grounded on the existence of communities of humans who collectively deliberate and make decisions. The very meaning of the terms involved in ethical reasoning like ‘intention’, ‘will’, ‘end’, ‘good’, or ‘bad’, which Jonas uses often uncritically, can only be properly grounded on situations of collective deliberation if they are to be precisely understood and intersubjectively adopted (Lorenzen, 1969).

²⁴For a methodical introduction of the term ‘intention’, in contrast with ‘desire’ and ‘volition’, cf. Lorenzen, 1969, pp. 76–78.

has an assigned function is knowledge gained using of accumulated operational knowledge and scientific inquiry. Secondly, the execution here is unintentional, without participation of rational deliberation, in contrast with the example of the hammer. It even lacks conscious human or animal action.

3. The volition (going somewhere) of a human to undertake a certain action (such as to walk), where ‘**volition**’ here is understood as the desire to bring about a certain state of affairs without any kind of deliberation, in contrast with ‘intention’. This example is probably not the best choice Jonas could make. Indeed, other possible volitions compatible with the same action could be to do exercise, to disconnect from a certain annoying situation, or even to think, as Aristotelians were known to do and therefore called ‘peripatetic’. Therefore, one could say that the end of a certain action depends on the concrete situation where the action takes place and at the same time claim that end to be objective, which sounds rather strange if not directly contradictory.
4. And the objective or expected - we can also say after Lorenzen ‘intentionally designed’ - result of a certain organizational technique-result (cf. Section 3.1.2) such as the formation of a court of law to administer justice.

Examples 1 and 4, the intentionally designed role of an artifact in a material technique and the intentionally designed result of a certain organizational technique-result certainly share as a common feature the rational deliberation involved in the development and stabilization of the technique: the hammer and the court of law are human creations which require rational design. Instead, in examples 2 and 3, the biotic function of an internal organ in a biotic process and the possible human volition to undertake a certain action certainly differ from the other two in the lack of this requirement of rational deliberation: you can want to do something without rationally deliberating, and certainly the digestive tract does not require rational deliberation to begin digesting food. Furthermore, examples 2 and 3 also differ from each other in being or not being the result of a human volition.

These examples show why the definition is such that it has at least two separated parts, each of which applies to some examples and not to others: (A) that for whose sake a thing exists and (B) that for whose production or preservation a process takes place or an action is undertaken. This shows that the definition of Jonas is conceptualizing rather different issues that might not be useful to be conceptualized together. Indeed, (A) does not match example 3, the walking-going-somewhere case. Instead, (B) does not match example 1, the hammer-hammering case (the hammer is clearly not a process). Moreover, the disjunction in (B) joints together the rather different results of an unintentional biotic process (the digestive tract-digestion case) of example 2 and an obviously intentional organizational technique (the court of law-administer justice case) of example 4.

§4 Scientific value-freedom and value judgments

The objective of this definition of end is to distinguish, among value judgments, between subjective value judgments and objective value judgments. His point is that ends can be defined without referring to what he calls ‘subjective value judgments’ (1969, pp. 71–72), which he characterizes as “my own preferences” about the object (1969, p. 73), individual preference systems.

He continues his digression linking ends with what he calls ‘objective value judgments’, which he characterizes as a kind of judgment that does not depend on individual subjective considerations. Instead, he claims that they are based on the object about which we express the value judgment and our understanding of it. In this sense, we can claim what is good for the object according to its “immanent standards” (1969, p. 73) because its end belongs “to the nature of the things themselves” (1969, p. 72). What he understands as “immanent standards” or “the nature of the things themselves” is not precisely expressed and he tries to elucidate it through Aristotelian teleological jargon.

After that, Jonas defines ‘value free’, which is used in his opinion in two senses, one referring to subjective value judgments and another referring to objective value judgments.

In the first sense, he considers that science is ‘value-free’ if the scientist does not let her own values affect her scientific claims, if his claims are not affected by subjective value judgments. He considers uncontroversial, like I have claimed in Section 4.3.2 regarding our characterization of Weber’s *Wertfreiheit*, that science must be value-free in this sense (1969, p. 74). Here, he is using the meaning of ‘value’ that he characterized before as subjective, related to one’s individual preference systems. Examples of value-free statements in this sense would be all the examples given in the beginning, from the hammer to the court of law. Indeed, as an example, the preference system regarding whether, for instance, one likes or dislikes a digestive tract suited for a carnivorous diet is left out of the statement that a digestive tract has digestion as an end. Noteworthy enough, he does not provide a precise definition of ‘value’ or ‘preference system’ but takes them for granted.

The second sense of ‘value-free’ is more confusing, depending as it does on Jonas’ notions of end and objective value. He claims that ‘value-free’ “may also express a theoretical proposition concerning the nature of things or what is knowable about things”. In this version, ‘value free’ means free of objective value-judgments, that the scientist cannot expect any “value-information from the subject matter”, either because there are no such objective values or because they cannot be scientifically grasped (1969, p. 74).

Jonas criticizes this sense of ‘value-free’ because objective values may enter the very definition of the object or process itself. The clearest case is that human institutions are rationally designed to achieve certain ends such that whether they are good or not is not a matter of subjective values but of objective values, which enter the very definition of the given human institution.

This last point is crucial to Jonas' discussion with Lowe. From all the above, Jonas claims that economics belongs to the field of 'objective value judgments' and 'ends' like the court of law-administering justice case, a human institution. Here, the subjective goal that originated and motivates the institution is an "inherent goal" that must be accepted and taken into consideration to assess whether the institution works well or not in order to achieve this goal (1969, pp. 74–75).

After the whole digression about ends and value judgments, regarding economics and the economic system, Jonas claims that there are certain ends-results, which he characterizes as belonging to objective value judgments, that bind the economist to involve in the normative choice and justification of goals, not only in the instrumental reasoning to achieve them once they are politically decided. He coincides with Lowe that economic activity deals with material provisioning (1969, p. 75). Moreover, he further claims in this sense that provisioning is a "tacit premise of economic theory (...) without which there would be no economic life" (1969, p. 76).

§5 Terminological suggestions

Now I will argue that there is a possibility to clarify a little Jonas' critique through some terminological suggestions.

The first step is to use an alternative definition of end. As we claimed before, the concept of end comes from the practice of technical knowledge. Here, we can add that an **end** is the intended result of a technique-result, where 'intended' (cf. this section above), 'result', and 'technique-result' are all precise terms (cf. Section 3.1.2)²⁵. Let us examine Jonas' provided examples under this definition.

Firstly, in the case of the hammer, any element involved in the technique-result, such as the hammer itself, can be said to have as an end the act of hammering, only as long as the hammering technique is conceptualized. Indeed, we can also use a hammer to extract nails from given surfaces such as a piece of wood, or even use it for strictly aesthetic purposes.

Secondly, the case of the court of law is probably the clearest one: law administration can non-controversially be said to be the end of it. If there is corruption, we say that the court of law is defective because it does not achieve its intended result.

Thirdly, digestion, an unintentional process, is not the end of the digestive tract. However, in a few lines, we will extend the concept of end to unintended results of biotic processes in a methodologically precise manner.

Fourthly, going somewhere (the aim of walking), as a mere volition not necessarily involving rational deliberation, is not the end of walking under our definition. However, as we

²⁵The term 'intended' is linked with the term 'intention' defined above: a result is intended if somebody has the intention to bring it about as a state of affairs.

already claimed before, probably this example is not a very good choice by Jonas and may generate a contradiction even with Jonas' definition.

We can see that our definition matches at least two of the examples and, if we are right below, also a third example.

Looking at these examples, the second terminological suggestion we make is to express Jonas' idea of good according to "immanent standards" or "the nature of the things themselves" with the concept of effectiveness.

On the one hand, he is conceptualizing under the term 'good' the effectiveness of techniques-result or some elements of them, where '**effectiveness**' means the achievement of the intended result. Thus, a good hammer allows hammering, and a good court of law allows law administration. If a hammer is made of plasticine or a judiciary institution is corrupt, we say that they are bad or defective or, as we alternatively suggest, that they make the techniques-result of hammering or law administration ineffective.

On the other hand, he includes within the term 'good' the adequate health condition of an organ to execute a biotic process (a good digestive tract). Here we can extend the concept of the effectiveness of a technique to measure the capacity of a certain organ to successfully achieve a certain biotic process that we humans have been able to (operationally/ scientifically) identify as related to the organ. Here, to reconstruct the term we can appeal to the techno-scientific practice of drug development. Indeed, medical science develops drugs or medicines to alter the results of certain biotic processes with certain criteria. For instance, medicines are available that facilitate digestion reducing symptoms of poor digestion like heartburn, bloating, or flatulence. These symptoms are taken as criteria of poor digestion and words like 'effectiveness' of a certain medicine to reduce a given symptom of poor digestion are used (Bombardier & Maetzel, 1999; Marston et al., 2014; Revicki & Frank, 1999; Sandhu & Fass, 2018). The effectiveness of a certain medicine to allow proper digestion (the intentional result of a certain technique-result), where 'effectiveness' here means the absence of symptoms like the above mentioned, can be extended to the case where no medicine is used and the biotic process is considered to take place without the symptoms of poor digestion, i.e. the unintentional result of a certain biotic process.

Leaving out the probably not well-chosen walking-going somewhere case, it seems that Jonas is trying to say that 'intrinsic ends', those derived from the 'being of the objects themselves' or belonging 'to their nature' are those which allow for objective value judgments. If we reinterpret intrinsic ends as intended results of techniques or unintended (but scientifically inferred) results of biotic processes, Jonas' claim seems to turn into a value-free claim about the effectiveness of techniques-result: an economic system is effective as long as it achieves its intended result, after Jonas or Lowe, material provisioning.

§6 Effectiveness of techniques-result and value-freedom

However, this is the case only if the result of the technique is properly conceptualized such that all those who know the technique agree about its result. We have already seen that this is not the case for the economic practice, economic activity, about whose definition there is already a great deal of controversy. Moreover, we have conjectured that this disagreement is in part a consequence of the political character of economic goals (cf. Section 3.3.3). In plain words: if we all agree that an economic system is aimed at providing universal and unrestricted access to means of living and it does not provide them, then the economic system is ineffective. So, the case is made for the amendment or even replacement of the actual economic system by potentially effective alternatives. If there is no such agreement about the goal of an economic system, we cannot conclude anything about its effectiveness.

In the light of our suggested terminology of ends, techniques-result, and effectiveness, we can properly characterize both strictly technical practices or techniques-result, such as those often involved in natural sciences, as well as those practices that are not strictly technical, such as those which are often the object of social sciences. We have already seen that the main difference between them lies in the degree of controversy about their respective ends, close to value-neutral in natural sciences and clearly value-laden in social sciences like economics (cf. Section 3.3.3): whether to improve the efficiency of computers generates scarce controversy whereas to raise oil taxes is a much more delicate issue.

Reinterpreted after this terminology, Jonas' claim about the possibility of objective value judgments may be probably accepted with scarce controversy in technical activities (such as the hammer-hammering case) but it would find more resistance in activities that are not strictly technical. In his terms, objective value judgments may be mostly accepted in natural sciences but mostly not in social sciences²⁶. As we will see below, this is indeed what happens with Lowe's reply to Jonas when Lowe claims material provisioning to be a relative threshold to the political views in a given society. Assessing the effectiveness of a strictly technical practice scarcely involves any value judgment whereas assessing the efficiency of other practices certainly entails value judgments.

As a consequence for Jonas' discussion with Lowe, using our suggested terminology, Jonas claims that the economic system (not economics) is a set of intentionally developed techniques whose effectiveness can be conceptualized in terms of a given result. The effectiveness of an economic system can be checked in terms of its end, of material provisioning. Hence, the politically chosen macro-goals concern the economist because the economy has provisioning as its intentionally pursued result and economists conceptualize the economy.

²⁶The 'mostly' added here corresponds to the remark made above that neither natural sciences are strictly technical nor social sciences are strictly non-technical (cf. Section 3.3.3).

§7 A restatement of Jonas' argument and Lowe's reply

After this digression, we can reformulate Jonas' statement with the following argument:

P1: Economic science is the scientific study of economic systems.

P2: An economic system is a set of intentionally developed techniques whose effectiveness is measured in terms of a given result: material provisioning of societies.

P3: To determine the effectiveness of a technique is a task of the theoretical study of the technique.

C: The effectiveness of the economic system in terms of its result of material provisioning is a task of economic science.

The fact that the economist has to take into account the possibility of future provisioning does not require any additional clause. Solving the emergencies related to material provisioning, which is what makes economics relevant and not a mere intellectual *divertimento*, entails securing future material provisioning. Although the opposite view, forgetting or discounting the value assigned to future provisioning, is often defended, if we want a proper solution, it makes no sense to secure actual provisioning at the price of future provisioning. Otherwise, problems are not solved but merely arranged such that they will bring future problems sooner or later.

Lowe's response to Jonas' argument is to question material provisioning as the aim of economic systems. He ranks his claim about the instrumental or goal-neutral character of economic activity (cf. Section 4.3.2) higher than his claim that the subject matter economic activity is material provisioning (cf. Section 3.1.2). In Lowe's terms, material provisioning may be an "overall purpose" (1969a, p. 195) of economic activity but it lacks any concrete content until a certain goal requiring a certain level of material provisioning is politically determined. In other words, he claims that the concept of material provisioning is only a relative threshold; relative to the political goal towards which material provisioning is aimed (1969a, pp. 195–196).

Thus, in relation to the argument above, Lowe's response means to modify P2 and C as follows:

P2': An economic system is a set of intentionally developed techniques whose effectiveness is measured in terms of a given result: material provisioning of societies, *whose concrete determination depends on externally decided political goals*.

C': The effectiveness of the economic system in terms of its result of material provisioning, *the latter being determined externally through concrete political goals*, is a task of economic science.

Instead of material provisioning understood in terms of satisfaction of specifically material needs or wants, Lowe claims that economic activity is a technique that allocates "scarce

human and natural resources” to satisfy any wants as efficiently as possible (1969a, p. 195) where ‘natural resources’ here can be understood as environmental resources. Although these terms seem dangerously close to Boulding’s definition of economics as a generalized theory of choice arising out of scarcity, which Lowe has criticized pointing out the historical character of scarcity (cf. Section 3.1.2), we can add that Lowe means allocation of environmental resources, those related with the provision of material means, within the proper economic realm, not in relation with other spheres of human activity. In my view, he only means to remark on the subsidiary role of economic activity with respect to other human activities.

This subsidiary role of economic activity is based on the distinction between what Lowe considers to be substantive goals and those that are non-substantive goals. This distinction is linked with that of ‘intrinsic’ goals to a certain activity against those goals which are ‘not intrinsic’ to an activity. Economic activity is considered by Lowe to be a science with one ‘intrinsic end’, material provisioning, which is considered to be non-substantive (“merely intermediary and provisional” (1977, p. 12)), only a means to achieve substantive goals, the latter being, Lowe would say, ‘extrinsic’ to economic activity. Instead, other activities such as “love and charity, the striving for power and the concern for the common good, the search for truth and the contemplation of the beauty and the holy, and even (...) the acts of consuming material goods” (1977, p. 12) have an intrinsic end which is substantive.

The words ‘intrinsic’ and ‘substantive’ here are used by Lowe without a precise definition. As it can be inferred from his claims, an end would be ‘substantive’ if it is not pursued to reach a further end; and an activity would have a substantive intrinsic end if its desired result is a substantive end. Lowe links substantive goals with those leading to “the humanistic aspect of man’s well-being” (1969a, p. 197) or a “good life” (1977, p. 317). Therefore, he can make use of ethical systems such as Aristotle’s virtue ethics or Mill’s utilitarianism, just to mention two well-known examples, in order to justify what is substantive or not in terms of its relation with human happiness.

§8 The exception to liberal economic instrumentality

Until now, we have that economic activity is subsidiary to other activities in Lowe’s view: it only determines the means related to material provisioning so as to achieve other politically determined goals. Even future provisioning can be left out of economic goals if it is politically decided (1969a, p. 196). However, Lowe mentions an important exception to this, namely, that it applies only to societies that have reached their subsistence level (1969a, p. 197).

But even this is only a nuanced exception because “affirmation of life” and “interest in being” are only an “option” among other possibilities (1969a, p. 195). Clearly, to see survival as a genuine option is a radically liberal view, probably more compatible with

classical liberals like Hayek, Friedman, or Nozick than with ‘new liberals’ like Rawls, to whose views Lowe seems to be closer. After such a classical liberal tenet, there is always the option of starving (Nozick, 1974).

This liberal view of science is hardly compatible with setting practical limits to science, which is a knowledge-oriented activity, whether they are related to material provisioning or not. This is something endorsed by Max Weber (1988), one of Lowe’s theoretical referents regarding value relativism. And it is probably the reason why Lowe included in his position paper in *EMASE* a certain threshold of material provisioning which is satisfactory at least for the “average member of the economic society” as a part of order, a requisite of scientific theorization (cf. Section 3.3.1). To include it as a requisite for theorization seems a theoretical decision instead of a practical decision. However, it is a practical one since, as Lowe himself admits, there exists the possibility of having complete predictability without an adequate level of material provisioning. Even if later on, in his final paper in *EMASE*, as we have claimed above, he goes closer to classic liberal views considering even adequate material provisioning to be an option, the requirement for theory to include a certain level of adequate provisioning clearly crosses the borderline of liberal science being oriented to the expansion of knowledge: whether one’s value system agrees or not with an unsatisfactory level of provisioning should not be an obstacle to scientific reasoning. It is one thing to claim (1) that material provisioning at whatever level is the object of economics, which might be considered acceptable from the point of view of liberal science. And it is a different thing to claim (2) that a certain threshold of material provisioning such as universal access to means of living or subsistence level is a requisite of economic science, which is not acceptable from a purely liberal conception of science. Moreover, the same can be claimed concerning Lowe’s distinction between ‘order-protecting’ and ‘ameliorative’ goals, the former linked with an (undisputable) averagely perceived threshold of material provisioning and the latter linked with an (optional) optimum level of provisioning (cf. Section 3.3.1): whether a certain level of material provisioning is perceived or not as adequate by the researcher or the affected population should not be an obstacle to scientific reasoning, either, from a liberal conception of science.

We see that the above discussion originates when considering the choice of goals of an economic system. The question is whether economics as the study of economic activity must have political relevance or not, and, related to it, whether its main goal of material provisioning can be justified or not.

In precise terms, the discussion between Jonas and Lowe focuses on the relevance of economics as a science, and, related to it, on the distinction between liberal sciences and emergency sciences, the latter to be presented in Section 4.3.4. If considered in Lowe’s terms, economics is a liberal science and can be simply politically irrelevant because the objective of science is to expand knowledge and to search for truth (McGucken, 1978, pp. 69–70). In economics, this translates into finding means to achieve ends that are decided outside economic reasoning. Indeed, this makes the economist a servant of the

politician whatever the latter's decisions are. We have already mentioned that this role Lowe ascribes to the economist, similar to the tasks of an engineer, who designs something he has not chosen in the most efficient way possible, is still standard when assessing the role of the economist.

Lowe's well-known disciple Robert Heilbroner enters the debate about the irrelevance of economics, understanding relevance in the political sense as the explicit orientation of economic science towards social problem-solving. He joins Lowe's position that the economist "has no more claim to priority or expertise [in goal selection] than any other educated member of the polity" (1970, p. 19), thereby leaving goal selection out of economics, even of Political Economics.

In terms of liberal science, scientific value relativism is a main tenet. In front of today's plural societies with extremely diverse and often conflicting value systems, these tenets in liberal political systems make the best alternative to avoid social conflict the acceptance of majority opinion as emerged from democratic elections. After these liberal tenets, only liberal science, often characterized as 'free science', is acceptable whereas other alternatives are simply against the true scientific ideals and some have even claimed them to reveal a totalitarian bias (Polanyi, 1941, p. 429).

§9 The answer: On the political relevance of economic science

Now we can go back to the question posed in the beginning: Is Political Economics a truly liberal science? As we have seen, Lowe's proposal is not completely a liberal, knowledge-oriented science since it lets practical aims enter the very definition of a given science, here economics. To make a certain threshold of material provisioning an undisputable end of economic science is certainly a political option. However, as Lowe recognizes, making again a case for the relevance of economics, it hardly makes sense to consider economic science successful if it properly predicts events without an adequate level of material provisioning (1969b, p. 6).

Why does Lowe renounce to build a completely liberal proposal and instead introduces an obstacle to goal-neutral scientific reasoning? There is probably no definitive answer to that question and the following considerations remain at the level of mere conjecture.

In my view, it might have to do with the fact that Political Economics has an objective the determination of economic means to achieve social ends, the title of the symposium where Lowe's work *OEK* was discussed. When we say 'social' ends, even if the word 'social' does not have such a meaning *sensu stricto*, we are immediately directed to thinking of a kind of social welfare, public good, or an equivalent category that has not merely a theoretical interest but a practical one. Some authors of the tradition of 'welfare state liberalism' defend a political system where freedom understood as lack of external coercion is complemented with a certain level of publicly guaranteed material provisioning. We have already seen that Lowe's concept of freedom is close to this tradition.

His proposal is about science, concretely about economic science, but it also has a certain idea of society in mind. Thus, despite being liberally oriented, he cannot escape contradicting the ideal of liberal science oriented to knowledge expansion if he pretends to implement the kind of freedom and the kind of political system he has in mind: one of a representative democracy with a powerful welfare state which guarantees no regression to authoritarian or even totalitarian regimes.

In the end, Lowe's proposal has to choose between abandoning a truly liberal science and risking failing to guarantee the kind of system that he considers the only option to protect his cherished freedom.

Concluding the section, as an answer to the question posed in the beginning, Political Economics could certainly be a truly liberal science but it is not. If it has to be made liberal, it cannot set politically controversial goals such as a concrete threshold of material provisioning as an end.

Now we can ask ourselves if it makes sense to defend a truly liberal economic science or if, as Lowe suggests, this hardly makes sense without at least a certain degree of material provisioning. We can state the question as follows: can Political Economics be politically irrelevant? The answer depends on how we understand the sense of 'political' in its two appearances in the question. The first appearance of the term, accompanying the term 'economics' to characterize Lowe's proposal, is clearly compatible with its meaning as 'Realpolitik', the satisfaction of whatever ends that may have been decided by whoever is in government. However, the second appearance together with the term 'irrelevant' cannot. If **political relevance** is properly understood, it has to do with the resolution of emergencies in a given community. These emergencies surround us; we are immersed in them before any theorization activity can even begin. This is the idea behind emergency sciences. So, it makes no sense to understand 'political relevance' as whatever is relevant to a certain government.

Finally replying to the question, the answer is 'no' if 'political' is taken to mean 'politically justified', where '**politically justified**' means aimed at solving economic emergencies. The rational justification of goals and how it relates to emergency solving will be elucidated in Section 4.3.4, where we sketch the constructive alternative of Political Economics. We will see that emergency solving is a consequence of rational justification of ends in terms of the concept of trans-subjectivity.

4.3.4 Political Economics and normative analysis: On Fritz Machlup's critique

§1 The question

This section is aimed at examining another important critique related to goal selection in Political Economics, namely that Political Economics uses normative analysis, a piece

of traditional economics, to rank possible macro-goals and macro-motions according to certain value systems (Machlup, 1969, p. 126). Hence, the question we seek to answer in this section is whether Political Economics should or should not involve normative analysis. Fritz Machlup sets the critique referring to normative analysis as in traditional economics but the question will be extended here into the involvement of any normative analysis whatsoever.

§2 Normative economic analysis in Machlup

Machlup's critique points to the same interesting direction taken by Jonas when the latter states that goal selection and its consequences must be among the tasks of the economist. To that aim, Machlup defines the term 'normative', as opposed to the term 'positive', and his path leads in between to the discussion of scientific value relativism and value neutrality of science.

Regarding these two tenets, Machlup endorses value relativism, considering only the problematic aggregation of individual preferences into a social welfare function and thereby excluding the possibility of rationally agreeing about ends (1969, pp. 111, 114, 120, 122). Moreover, he defends the value neutrality of science with the argument that value judgments cannot be tested and therefore cannot be admitted into positive science (1969, pp. 111–113).

Normative economic analysis is understood as the “justification of values (preferences)” (1969, p. 127) which is used to rank alternative goals and paths according to preference systems.

This characterization of normative economics comes close to the end of his paper, so one may think that Machlup has properly conceptualized values or preferences before. However, he does so only incidentally when talking about the preferences of economic actors, which, Machlup claims, the economist conceptualizes through the “subjective-value theory” (1969, p. 115). In a few lines, we will claim that the justification of values through such a theory might not avoid the possibility of undesirable results.

Before we reach that point, how is the justification of values to be understood? The main idea of mainstream normative economics, which includes welfare economics and social choice theory, is to compare the aggregate welfare of society provided by different possible social states. The most usual ways are the aggregation of individual preference systems into a consistent social welfare function and the definition of points of optimality based on Pareto efficiency (Fleurbaey, 2022). In any way, the idea is to take individual preference systems as given and to rank alternative social states according to how much they respect these individual preference systems on aggregate. In a piece of mainstream normative economics, cost-benefit analysis (CBA), quite standardized today as a tool to evaluate public policy decisions, a monetary value is assigned to several items, including not only preferences of consumers but also pollution or greenhouse gas emissions, to quantify the

impact of a given decision. That such money value assignments are “more or less arbitrary” (1969, p. 124) is recognized even by its defenders like Machlup. However, they often consider it, like Machlup, “making choices on the basis of rational consideration” and better than “choosing blindly” among existing choices (1969, p. 124).

In general, starting from Medina (1972), we will later challenge the claim that the justification of a given social goal is possible with such a concept of preference and the assumption of individual preferences taken as given.

Why Machlup defines the term ‘normative’, when referring to economic analysis, through values, without any explicit reference to norms, which is the root of the word ‘normative’, becomes clear when he discusses the senses of the term ‘normative’. In a sense completely stabilized in normative philosophy, usually meant to include Ethics and Politics, Machlup uses the term ‘normative’ as a synonym with ‘evaluative’, understood as the ranking of alternatives according to some standard of goodness (1969, pp. 103–104). This standard of goodness is expressed through words like ‘good’, ‘right’, ‘the best’, or ‘ought to’, in contrast with the terms ‘bad’ or ‘wrong’ (1969, pp. 103–105). He tries to give a form to normative sentences: “B is good; that is, you ought to get (strive for) B” (1969, p. 104). One problem here is that all these terms are used like in the natural language, which is a source of terminological imprecision and is not suitable for precise and methodical discussion. Indeed, it is unclear what it means to be ‘good’ or to ‘ought to’ do something other than the usual and imprecise meanings of the words in the natural language, which are often differently used by different authors. Furthermore, except with the help of a normative ethical theory, such as virtue ethics, utilitarianism, or deontologist ethics, which Machlup does not present or claim to endorse at least in the analyzed contribution, it is unclear even in the natural language why the fact that something is good entails that one ought to get it. The link will be later made that this uncritical usage of the natural language within a rigorous discussion may have to do with the analytical approach to theory of science in contrast with the constructive approach.

How the term ‘normative’ refers to norms can be inferred from the above-mentioned form which Machlup claims for normative sentences: a practical if-then clause (without the strength of the link between the antecedent and the consequent present in theoretical if-then clauses), where the first part belongs to the realm of values or preferences and the second part belongs to the realm of norms. He understands norms as “rules of conduct” and he wants his concept of norm to include both individual-ethical rules and social-legal rules (1969, p. 108). Further, he wants normative statements to refer to “norms or value judgments”, so this is why his concept of normative statement links the preference and the norm to include both preference rankings and prescriptions for action. This becomes apparent from his chosen economic examples including both structures like ‘more important than’, ‘desirable, but not at the price of’, to be ‘a fair price of’, or ‘is worth’ in order to compare two alternative economic results of given practices which may be mutually incompatible (so standard theory often says) like unemployment reduction and

reduction of the deficit in foreign payments, and also structures like ‘ought to’ to indicate the policy advice or “rule of action” (1969, pp. 109–110). The words he uses reveal that he is simply comparing economic results according to some preference systems. It seems that normative statements include these comparisons, like ‘A is ranked higher than B in a given preference system’, as well as the consequent prescriptions, ‘A should be set as a goal’.

As a matter of terminological precision, one clarification must be made. Machlup includes both ‘values’ and ‘norms’ within normative statements. Both the rule of action (X ‘ought to be’ set as a goal) and the underlying preference system (X is ‘good’ or ‘better than’ alternative results in a certain preference system), when stated, are considered to be normative. This may lead to confusion between the rule of action, which is properly a norm, and the underlying preference system (A is preferred to other alternative results in a certain preference system). Indeed, a normative sentence or a norm is a hypothetical imperative, which does not appeal at all to value judgments in its formulation: ‘In situation X, A is requested’, where ‘situation’ means a ‘system of relevant states of affairs X_i ’ (with $i \in \mathbb{N}$) and for a state of affairs X_i to be ‘relevant’ means that it is required to achieve a certain result or solve a certain problem to whose conceptualization the situation X is described (Lorenzen, 1987, p. 44); and A presents a state of affairs which is requested to bring about to everybody to which the norm is intended to apply. Its logical form is $X \rightarrow !A$. In other words, when somebody finds himself in conditions that can be presented through X, he must set A as his end or goal (Lorenzen, 1987, p. 119). This may lead to confusing the logical form of the norm itself with its possible justification in terms of what Machlup calls ‘value judgments’.

§3 The limitations of traditional normative analysis

Now, having cleared out what Machlup understands by ‘normative economic analysis’, we can state his critique as follows: the choice of economic goals before instrumental analysis and the choice of paths within instrumental analysis require the normative analysis regarding the justification of goals or paths according to preference systems, and cannot be just left to philosophers or politicians. Plus, normative analysis belongs to the allegedly eliminated traditional economics.

Thus stated, the claim faces the problem that it considers traditional normative economics, today we would say welfare economics or social choice theory, as a proper way to justify goals. However, as we pointed out before, there is a general concern among mainstream economists that normative analysis may not be enough to justify goals, which is shared by Lowe (1969a, p. 198). He does not offer any alternative way of justification though, basically because he is convinced that this kind of justification is not possible.

Now we will briefly elucidate why traditional normative analysis may be unsuitable to justify goals and, after that, we will reformulate Machlup’s claim in a way that it

does not assume traditional normative analysis as a means of goal justification, thus extending Machlup's critique beyond the author's scope. We will examine three important consequences regarding the mainstream tenet that preferences, assuming the liberal tenet of value relativism, are to be taken as given.

After mainstream normative theory, consistently with value relativism, individual preferences are undisputable, so the only way to properly respect them is to take them as given and try to merge them into a consistent aggregate or to consider a certain definition of social optimality based on individual utility functions (related with individual preferences), often taking Pareto optimum as a first reference. This is what the most important branches of normative economics, welfare economics or social choice theory, do in its several forms. Whereas welfare economics has often been used to justify the efficiency of market economies concerning the allocation of output (as in the well-known two welfare theorems), social choice theory has examined the possibilities of obtaining social welfare, focusing on the possibility of reaching aggregate rational results assuming individually rational results, often through voting mechanisms (Feldman & Serrano, 2006, pp. 1–7), where the notion of rationality is based on formal assumptions that vary among different authors²⁷.

These procedures of traditional normative economics entail at least three important consequences.

Firstly, general social agreement about certain goals is not required even if these goals may be shown to be rationally undisputable like, for instance, universal access to means of living or environmental sustainability. The proper justification of goals will be elucidated in Section 5.2. Here we leave the statement as a conditional where the antecedent assumes the possibility to rationally or methodically justify goals, against the liberal tenet of scientific value relativism. Indeed, if preferences are taken as given, the general agreement about a certain goal, even if it can be shown to be methodically justifiable, becomes extremely unlikely, an exceptional case in actual pluralist societies with so many heterogeneous preference systems.

Secondly, related to the first point, it is not allowed to shape preferences in order for a certain important goal, such as the avoidance of irrational outcomes in conflict situations, to become achievable. Even if most branches of normative economics make assumptions about individual preference systems (rationality, local non-satiation...) in order to prove their claims, none of them considers the possibility of rationally shaping these preference systems to reach a certain societal goal. Instead, research has focused on what optimal social outcomes can be made out of the existing individual preference systems, even if assuming for them certain features like completeness, transitivity, or local non-satiation, some of them claimed to account for individual rationality. In other words, assumptions about preferences, even if used in branches of normative economics, are not understood within a normative theory as a required means to achieve social ends.

²⁷For a brief summary about the different branches of normative economics, cf. Fleurbaey, (2022).

Thirdly, in a similar way to the second item, preferences are private and it is not allowed to require them to be made public for the rest of individuals to be aware of them and to be able to act consistently. Even when preferences have been assumed to be somehow public, such as the usual assumptions of complete information or even perfect information in game theory, they have been used in descriptive game theory to determine possible outcomes of a certain game where these features are the case, but only rarely in the normative sense as requirements to achieve a certain goal (Medina, 1972).

The three consequences presented above respond to the fact that preferences are not allowed, under actual conditions, to be shaped in order to achieve a certain social goal. When I say ‘shape’ here, I mean the possible change in an individual preference system to orient towards the achievement of a certain social goal. Hence, certain social goals may simply not be reached because they clash with actual individual preference systems. If we can show certain goals to be rational, this is clearly a problem. In that case, we need to determine conditions of possibility for such goals to become achievable.

§4 Social goals and political systems

Among the existing range of conditions of possibility, both in democratic and non-democratic forms of government, one under democratic conditions is the collective deliberation of all members of the community where a certain goal is to be pursued. **Collective deliberation** is understood as the previous process to collective decision-making and its methodical introduction precedes that of individual decision-making if it has to be intersubjectively controllable²⁸. There are certainly other possibilities, still present in some actual countries, none of them, however, without its pitfalls. On the one hand, in autocratic forms of government, a social goal might be pursued despite clashing individual preference systems by setting penalties for goal-inadequate behavior, legally enforcing goal-adequate behavior: that would be a case of Lowe’s command control. However, it is well-known that under such forms of government, it is quite easy for the governor to deviate from pursuing social goals to pursuing merely her own interests. On the other hand, in democratic forms of government, such as actual representative democracies, a social goal might be pursued if the right techniques for changing individual preference systems into goal-adequate preference systems are utilized: this would be Lowe’s control by manipulation (or, in the long term, education, he claims, cf. Section 4.1.1) This kind of technique is being successfully used in actual capitalist democracies, where control technologies are progressively more sophisticated, ubiquitous, and thus effective (Bellamy Foster & McChesney, 2014). Nevertheless, as Lowe acknowledges, the effectiveness of such techniques can be limited in the short run and the urgency to reach a certain social goal might not allow for waiting for long-term manipulation or education. Another important point to remark is that, after the actual tenet of value relativism, representative democra-

²⁸For a precise terminology regarding collective deliberation and decision-making processes, cf. Lorenzen (1987)

cies do not assume political representatives to pursue justified social goals but only those goals desired by their own voters. Thus, even if a goal might be rationally justified, it will only be pursued if it is desired, not necessarily on a rational basis, by a majority of the population.

Of course, the option of collective deliberation of all members of a certain community has its pitfalls, too. Firstly, it is not clear what the size of such a community may be but it hardly fits the enormous dimensions of actual states, except perhaps if adding some conditions on the actual process of decision-making as will be sketched in Section 5.2. And, secondly, it requires for individuals a capacity to rationally participate in policy decisions as well as their actual participation, which is quite far from the actual average individual in Western societies. However, in contrast with the other two options, it does not suffer from the problematic practice of oppression: political decisions must be rationally agreed upon by all those involved, not just by a single dictator, a group of experts, or a majority of the population, always leaving a share of the population without political decision power. Indeed, if social goals have to be justified, as will be claimed in the next section, there is no justification for them to be arbitrarily imposed on either a majority (in autocratic governments) or a minority (in the best cases of representative democracies) of the population.

§5 Normative analysis and collective deliberation

We have seen that traditional normative analysis does not require collective deliberation of all members of the community where a certain goal is to be pursued²⁹. Indeed, if preferences are taken as given, there is no room for possible collective rational deliberation and agreement about certain undisputable goals, nor for the normative requirement of preferences to satisfy certain features that might be required as means to achieve such undisputable goals. Instead, if collective deliberation is required, then voluntary, rational shaping of individual preferences to achieve any possible agreed social goal becomes possible: it is the citizen in the deliberation process who agrees about it under rational free consent.

The main claim we make here is that it is unclear if the justification of goals (based on preferences) can be successful without requiring collective deliberation, ideally of all those whose community is going to pursue the goal. Indeed, the justification of preferences without collective deliberation might be defective because it may not exclude undesirable results. Firstly, it has been shown that even without assuming the need for a unified and

²⁹At most, with economist Amartya Sen, it includes public discussion of the ranking of economic goals so as to allow for an enlightened public opinion. Sen claims that measures are decided by experts and them publicly scrutinized rather than collectively deliberated and decided (Sen, 1999, p. 80). Indeed, he focuses on value formation through public discussion, taken from Knight (1947) and Buchanan (1954), as a feature of representative democracies which makes democratic societies more enlightened so as to avoid grave problems such as famines (Sen, 1995, p. 16).

agreed social preference system, the failure of individual preferences to satisfy requirements like the axioms of preference (rational preferences) or individual preferences being public information delivers the impossibility to exclude irrational outcomes of conflict situations even in the simplest conflict situations possible with only two opponents, being individual or collective subjects (Medina, 1972). Secondly, and most importantly, the lack of agreement about an important social goal, even if it may be rationally justified as such, can render the goal unachieved, with fatal societal consequences. Among the existing possibilities to achieve social goals, we have claimed collective deliberation and decision-making as in participative democracies as the most suited one. We have actual examples of failures to address important emergencies in contemporary economies, such as the environmental emergencies that threaten all world economies, or the existing poverty and precariousness even in the wealthiest nations.

Contrary to what the first impression about this claim may be, this kind of justification of goals does not require that individuals systematically prefer or even think the same. It only requires a methodically undertaken process of collective deliberation where goals can be rationally justified, which will be sketched in Section 4.3.4.

§6 The answer: On the role of normative analysis

Now we are in the position to extend Machlup's critique, substituting the term 'normative analysis' with 'non-traditional normative economic analysis', the latter understood as a collective deliberation process, and substituting the term 'preference systems', which assumes that individual preference systems are simply given, by 'rationally agreed preference systems', which leaves the door open to the possible rational shaping of individual preference systems to solve economic problems and deal with possible situations of conflict. Machlup's claim restated becomes the following, with the substituted terms in italics: "The choice of economic goals before instrumental analysis and the choice of paths within instrumental analysis requires *non-traditional normative analysis* regarding the justification of goals according to *rationally agreed preference systems*, and cannot be just left to philosophers or politicians".

We have thus overcome the critique regarding the illegitimate use of traditional normative economics, a part of traditional economics, for Lowe's instrumental analysis. However, we still have the critique that economists must be involved in the justification of goals, which cannot just be left to philosophers or politicians. This kind of critique indeed makes sense and points in the same interesting direction as Jonas' critique that economics does not fit the model of liberal sciences, let alone Political Economics.

Answering the initial question of this section, extended to non-traditional normative analysis, whether Political Economics must involve normative analysis or not, in particular for macroeconomic goal and path selection, we find ourselves in the same discussion Lowe has had with Jonas. Even if Lowe does not directly answer it because he is skeptical about

the possibility of justifying goals with traditional normative analysis, we would not probably be very off the road if we state his potential answer as follows: whenever instrumental analysis requires the selection of goals or even paths which must be ranked using some criteria, the economist must step aside and leave the philosopher or the politician do his job. Clearly, the task requires normative analysis, the controversy only emerges when we must decide whether such analysis can be rationally-methodically undertaken or not, and which kind of expertise is required to carry it out. Lowe's option is to suspect the possibility of rational-methodical justification of norms, leaving this task to philosophers or politicians, whereas Machlup's view is to acknowledge the non-scientific character of normative analysis, however acknowledging its role as the least bad option, with such task to be undertaken by economists.

Both of them deny the possibility of properly justifying goals, consistently with value relativism, only differing in the assessment of the practical importance of normative analysis and the kind of expertise required for such analysis. However, as we have mentioned before, there is a third option, which considers the possibility of properly justifying goals and an alternative concept of science, not naturalist and liberal but constructive and emergency-oriented. Although this possibility will not be presented further than as a sketch in the next section, the kind of expertise required will probably include skills from both the economic-technical and the philosophical-normative dimensions.

5 A constructive alternative to Political Economics

This final chapter presents a modified version of Lowe's Political Economics from a constructive understanding of science as an alternative to reach the objective of achieving social ends. The means-ends structure of such a proposal is outlined, elucidating some aspects of how the determination of ends and means could be to provide a pre-scientific sketch of an emergency economic science.

5.1 A constructive reinterpretation of Political Economics

This section makes a reinterpretation of Lowe's Political Economics from a constructive conception of science, thus being a genuine contribution of this dissertation. To do that, I do not start from Lowe's naturalist-oriented diagnosis that social sciences' predictive failure differs from natural sciences' predictive success because of their respective subject matter, non-autonomous and unordered human behavior versus autonomous and ordered matter. Instead, I start from the constructive diagnosis of a successful pre-scientific practice being based on both uncontroversial goals and all available means employed to achieve the goals, both requirements present in natural sciences and lacking in social sciences. The analysis of ends and means for such a pre-scientific practice comes in the next two sections.

§1 Naturalist VS constructive approaches

In this section, Lowe's Political Economics will be reconsidered from a constructive understanding of science. To do that, we will take Lowe's claims in order to propose a constructive reinterpretation of Political Economics, which might be useful in the future for a proper constructive foundation of economic science. Since Lowe's naturalist understanding of science has been already presented in Section 3.3.1, not many more details about it will be given here.

As a summary and reminder of what we have already elucidated about naturalism, we say that a conception of natural sciences is naturalist if (1) the aim of science is considered to be the discovery of natural laws through mathematization of natural regularities, where 'nature' is a synonym with 'not human-made'; and (2) scientific theories are considered true pictures of a man-independent reality whose ordered structure may be discovered. If extrapolated to other types of science, naturalism consists of understanding any event, including human action under historical conditions, as a natural event, thus suitable to be conceptualized and explained through laws. Under this conception, the difference between the forecasting success of natural sciences and the failure of social sciences lies in their different subject matters, independent of and dependent on human will respectively. Let us recall that the latter is precisely the core of Lowe's diagnosis of the predictive failure of traditional economics with respect to the forecasting success of natural sciences: non-patterned behavior due to human indeterminacy.

As a consequence of our constructive understanding of science, we have abandoned the analysis based on the different subject matters of natural sciences and economics in terms of autonomy, order, and openness of its systems as presented in Section 3.3. Instead, we have highlighted the importance of pre-scientific practices for successful theorization and the difference in the unanimity of pursued goals and the utilization of all required means to reach these goals, most importantly regarding the construction of laboratory conditions as refined as possible. We have made the case for economics being more a political science, clearly goal-oriented, instead of being a technical science, the latter being aimed at determining the means to achieve the uncontroversial goal of efficiency improvement. Thus, economics would be mainly value-laden in contrast with mainly value-free technical sciences³⁰.

If we were to consider how to solve the problem of traditional economics after our diagnosis from a constructive understanding of science, we would target the pre-scientific practice, the choice of goals, and the selection of means to achieve these goals. With a little more detail, we would consider how to construct a well-defined practice suitable to theorization. We would target the justified choice of goals to be achieved through this practice. We would also ponder how to select the most appropriate means to achieve these goals and how to make sure that these means are employed. In case the practice was properly constructed, and only whenever this would be the case, theorization should take place so as to improve it, always considering that theoretical results only work properly under refined laboratory conditions. So, these conditions would have to be constructed, too, in order for the theory to work successfully. It will not be a surprise for a careful reader that this is practically what Lowe proposes.

From Lowe's point of view, natural sciences have an advantage over social sciences and, in particular, over economics, because of its subject matter. As we have already had occasioned to express, particles (and partially, also cells) react mostly equally to the same stimulus at different points in time: in Lowe's words, they are 'ordered' because they are 'autonomous' and the systems in natural sciences can be 'closed' through laboratory conditions isolating 'intra-systemic processes' from the effects of 'extra-systemic factors'. Instead, humans can behave differently in front of apparently the same stimulus on different occasions because their action is conditioned by their interpretation of the stimulus: human behavior is 'unordered' because it is not 'autonomous' and the systems in economic sciences are always 'open' and cannot be so easily 'closed'. Indeed, human behavior as an 'intra-systemic force' cannot be easily isolated from 'extra-systemic factors' because the human interpretation of 'extra-systemic factors' always influences behavior as an 'intra-systemic force'.

Since the problem detected by Lowe is this competitive disadvantage which generates

³⁰The 'mainly' corresponds to the fact that the main goals of Economics are political and the main goals of sciences are technical, not to the fact that technical sciences only deal with means and political sciences only deal with goals.

non-patterned social behavior, his solution is directed towards the shaping of patterned behavior. Lowe claims that behavior cannot be left unconstrained and this is why he proposes control: economic processes have to be constructed, and shaped, in order for them to be suitable for theorization. Concretely, the proper motivations have to be stimulated through control for the required behavior to emerge so as to reach a specific goal like market macro-equilibrium. He prescribes this as an effective recipe for the aim of traditional economics, market macro-equilibrium, to be realized, and he generalizes this procedure to be suitable to achieve any possible goal. Economic processes are spontaneously disordered because human behavior is spontaneously indeterminate; the idea is to make them artificially ordered through artificial modification of human behavior.

Since Lowe considers this to be far from the successful procedure of natural sciences, he invests a lot of effort to justify instrumental analysis as akin to social sciences like economics and as a methodology which he considers opposed to the methodology of natural sciences (cf. Section 3.3.1). However, a constructive understanding of science reveals that the difference is not that big (cf. Section 3.3.3): they both require a partially successful pre-scientific practice for theorization to take place, where this practice has a structure of ends and means in both cases. Natural sciences also have certain goals to achieve such as technological development or the increase of knowledge or understanding of a given process. Under the constructivist lens, the main difference lies in that economic goals are political, thus controversial, and make economics mainly value-laden. In contrast, goals in natural sciences can often be reduced to improving technical efficiency such that natural sciences can be claimed to be mainly value-free. To achieve these ends in natural sciences, often through achieving a desired technical effect, laboratory experiments are constructed. As it has been already claimed before, it has been acknowledged even outside the constructivist tradition that it is only under these laboratory conditions that most laws of natural sciences are valid. Hence, Lowe's claims that his Political Economics differs from natural sciences because it is not strictly 'theory' but 'knowledge' in the sense that includes also a part of practice, is inaccurate after a constructive understanding of science.

Here we find a contrast between analytic and constructive philosophy of science. On the one hand, analytic philosophy of science aims at the precise formulation of the requirements of scientific demonstrability of scientific statements (Lorenzen, 1987, p. 9), it focuses on the setup of laboratory conditions and the validation of statements, often forgetting about the whole structure of goals and means which underlies it. On the other hand, as we claimed in Section 3.3.3, constructive theory of science reveals the whole structure of goals and means to set the constructive foundation of a given science. It makes the pursued objectives explicit and presents the scientific methodology, under which the scientific demonstrability of statements is included, as the means to achieve the pursued goals.

Now we are getting closer to the objective of leveling the ground for a future foundation of an emergency economic science. As stated in Section 1, such a foundation has as a requirement the development of an ortho-language, a univocal and precisely normed

language undertaken from the perspective of the participant. As also stated before, in actual economies, this requires the introduction of terms such as ‘value’ and ‘capital’ as well as a methodical reconsideration of Marx’s labor theory of value if capitalist economies are to be properly reconstructed and conceptualized in order to solve their emergencies. However, even without such terminology, we can sketch some of the main steps of a constructive theory of the economy, the concrete contents of which will have to be determined in such a future foundation.

§2 The constructive assessment of Lowe’s observed problem and proposal

Let us restate the problem once more, starting from Lowe’s setup and generalizing it into a constructive undertaking. Lowe observes the forecasting failure of traditional economics despite the wide improvement of econometric validation techniques. After a thorough analysis of traditional economics through its cornerstone, the LSD, he claims that the problem is due to non-patterned social behavior, different from the assumed behavior conceptualized in the LSD. Moreover, this non-patterned behavior is due to the indeterminacy of spontaneous individual behavior. The contrast with the successful forecasting of natural sciences lies precisely in the contrast between indeterminate humans and determinate particles. Hence, Lowe’s proposal consists of artificially shaping individual behavior to make it socially patterned: this is again what control is about. In a constructive foundation, we would first have to justify the political relevance of Lowe’s observed problem. This is indeed an easy task but let us here just stick to Lowe’s setting in order to maintain comparability of Lowe’s proposal and a constructive proposal.

Again from Lowe’s analysis of traditional economics, he concludes that behavior and motivations conceptualized in the LSD are not a description of actual motivations and behavior in contemporary industrial capitalism. Instead, they can be reinterpreted as a prescription if the result of the LSD, market macro-equilibrium, is to be achieved. From this fact, he conceives his Political Economics as a scientific undertaking that is aimed at determining the required means in order to satisfy certain goals. This is where the instrumental part of his proposal plays a major role.

Since the achievement of goals in macroeconomic systems depends on human behavior, he presents his proposal as the science of controlled economic systems, where the object to be controlled is human behavior through its underlying motivations, and these through measures of control.

Before we go to the constructive understanding of science, a remark is in place here. After a shallow analysis of Lowe’s proposal, one can get the idea that he might be defending a planned economy. I hope that after the preceding lines, the reader is already aware of how far that is from Lowe’s intention. However, the defense of a planned economy is not that far from Lowe’s Political Economics. To support this claim, I can mention at least three considerations. Firstly, despite Lowe’s huge effort to restrict Political Economics

to capitalist-compatible macro-goals, we have his claim that it is also compatible with planned economies and that some goals may even be easier to reach in such economies. Secondly, if Political Economics is an instrument to achieve social goals through behavioral shaping and control, this is not far from some practices developed under real historical communist-oriented governments, even if social goals have not been properly justified, as I want to outline in this dissertation, under any of such governments. Thirdly, if one considers direct democracy as a feature of a justified economic science, one can identify Political Economics, properly stripped from the attachment to liberal value relativism, as a candidate to develop a directly democratic planned economy. The last point is one of the motivations of this dissertation and will be developed with some detail in the next sections.

Now let us go back to the constructive structure of scientific undertakings. If we want to theorize about something, we must do it from a proper pre-scientific practice, with a clear goal or set of goals and the required means to achieve the goals. As it has been claimed in Section 3.3.3, this is how natural sciences proceed and this is one of the main reasons for its predictive success. To guarantee such a successful practice, we need to determine, firstly, its main goal or set of goals, and, secondly, all the means required to achieve these goals. This is the subject matter of the next two sections.

5.2 Determination of ends

This section approaches the consideration of ends in constructive Political Economics, the most distant part of the constructive alternative from Lowe's original proposal. As a crucial part of a successful pre-scientific practice, it is considered whether it is possible to justify economic goals and what this justification might look like. Firstly, the general constructive critique to the liberal tenet of value relativism, which Lowe shares, is presented, opening the way for a scientific foundation of economic goals through what we call 'trans-subjective' thinking (Section 5.2.1). Secondly, the proposal of constructive philosopher Friedrich Kambartel to provide a foundation of economic science is presented, where the normative choice of goals guided by trans-subjective thinking is set as a requirement of such a science (Section 5.2.2). Thirdly, from such a proposal and other considerations, it is argued that a scientifically founded economic system may probably be a planned economy politically based on a direct democracy (Section 5.2.3). Acknowledging that the demonstration of the latter claim requires the development of a thorough ortho-language including a precise introduction of specific economic terms, the consideration of a planned economy politically based on a direct democracy is claimed to be legitimate even if merely considered from the liberal point of view of extending Lowe's proposal to some limits he did not directly explore. Fourthly, based on such legitimacy and trusting the future demonstration of its relevance, two preliminary considerations are made: On the one hand, after critically reviewing the attacks on planned economies by economist Friedrich Hayek (Section 5.2.4),

the most brilliant proposal of a feasible planned economy, that by economists William Paul Cockshott and Allin Cottrell (1993), is presented (Section 5.2.5); on the other hand, a constructive example of a procedure to justify goals for concrete situations, that by Manuel Medina (1972), from which the procedure and requirements to be implemented in a direct democracy for goal justification are shown (Section 5.2.6). My main contribution here is the critical review of different sources to reckon that a scientifically founded economic system may probably combine a planned economy with direct democracy, setting the requirements for the claim to be demonstrated in the future and taking some preliminary steps in this direction.

5.2.1 The constructive reply to value relativism

§1 The question: Justifying economic goals?

The question addressed in this section is: Is it possible to rationally justify economic goals methodically? This question is the restriction to economics of an old one: Is it possible to rationally justify goals methodically? We can extend it a little to include science in the claim: Is it possible to rationally justify goals methodically, *in an equivalent way to how means are rationally justified through science?* The hegemonic answer to this claim is, after Weber's position at the beginning of the XX century, a categorical 'no'. Indeed, this is what the liberal tenet of scientific value relativism amounts to. As we have examined before, this is precisely Lowe's position and also that of some of its critics such as Fritz Machlup.

In contrast with it, this is not the kind of answer I would like to provide in this dissertation. Two clarifications may be helpful at this point.

The first clarification in order here is that we are not dealing with the general procedure to justify goals and, consequently, preferences and norms. This belongs to a more general undertaking, that of justifying the possibility of political reason and of presenting how it looks like. As such, this procedure does not strictly belong to an emergency economic science but to an emergency political science, which does not belong to the scope of this dissertation. Instead, we will more modestly restrict to the possibility of justifying economic goals.

A second important clarification is just a reminder of what has been stated in the introductory section of this chapter: This is not a thorough foundation of an emergency economic science but only a preliminary study about its possibility and its potential features. Some terms that have not been methodically introduced, we consequently do not have a precise ortho-language and we cannot provide a precise answer about the possibility to rationally justify economic goals. The way to do that is to develop such an emergency science and show how it may justify ends in a rational-methodical way.

However, we, fortunately, have the constructive tradition to argue in general about the

possibility of justifying goals as well as some isolated intents from constructive authors to show how goal justification might look in economic matters. Hence, I will use these two sources to introduce some remarks that may guide the future task of a proper foundation of an emergency science. I will begin with the former and we will continue with the latter.

§2 The constructive answer: Political rationality and emergency sciences

The general constructive answer to the liberal tenet of scientific value relativism is based on the constructive understanding of science, not restricted to its technical dimension. Science begins with practical considerations about which ends have to be pursued. These considerations materialize into technical practices which, if successfully theorized, give rise to scientific theories. These are the constructive primacies of (1) politics over technical practices and (2) practice over theory. After the constructive position, the lack of consideration of these two primacies has as a consequence the defense of value relativism, which means arbitrarily abstracting from the existing normative dimension of science.

This entails at least two problems. Firstly, if the normative dimension of science, the one regarding the selection of ends, is forgotten by the theorist of science ('philosopher of science' is often said these days) or even by the scientist, this does not mean that it does not exist at all: the decision about what to research about will not be justified but it will be taken anyway if research has to begin. If, as suggested by defenders of value relativism and value-neutrality of science, the selection and justification of goals must remain out of the proper scientific enterprise, this leaves the door open for particular economic interests and ideology to indirectly guide this selection. Secondly, there is a methodical gap in the case of scientific value relativism. To say that it is irrational to scientifically justify values assumes a preexisting concept of rationality based on the suitability to reach certain pursued ends (Lorenzen, 1987, p. 240). So, the main claim of scientific value relativism presupposes a certain practice aimed at certain pursued ends to determine what is to be considered rational and what is not. So, the very claim would be "impure" because of presupposing value judgments regarding the ends pursued and the consequent concept of rationality.

As an answer to Arnold Brecht's arguments with his digression about the two possible senses of the term 'valuable', which reduces to the fact that the term only applies relative to certain ends (cf. Section 4.3.2), it only proves that it is impossible to justify ends in the technical sense. Indeed, a justification in technical terms takes place once something is identified as a means to achieve something else. Brecht's arguments simply account for the fact that this 'something else', the end which we would like to justify, is the unjustified part of the sentence. The constructive tradition does not deny this claim. Instead, it criticizes the restriction of the term 'justification' to technical justification as presented above (Verlag J. B. Metzler, 1995, pp. 666-667), which excludes the possibility of a methodical and intersubjective procedure for non-technical justification of ends. The inclusion of such a procedure within the scientific enterprise means to properly consider

the normative dimension of science in addition to its strictly technical dimension.

Lowe's restriction of Political Economics to the determination of the means to achieve certain politically decided goals is an attempt to emulate natural sciences. Because the justification of ends is impossible in technical terms (if they are not means to reach further ends), it is considered to be technically irrational to justify ends. However, goals in economics are political, thus often controversial, so scientific value-neutrality cannot be claimed here, in contrast with the end of efficiency improvement in natural-technical sciences. Moreover, as some authors have already claimed, even in technical problems, among the sometimes infinite range of possible solutions, the selection of the final range of options entails value considerations (D. Hausman et al., 2016). This will be further elaborated later when we claim an even thinner frontier between natural sciences and social sciences than the constructive tradition usually admits.

Regarding the possibility of non-technical justification of ends, Lorenzen made an excellent introductory speech in 1978: After the still actual concepts of science and policy, the scientist determines the means to achieve certain politically decided ends, it restricts to technical, value-free assessment. As a result, we have the actual powerlessness of science to guide policies, which often use whatever technical assessment matches their ideological objectives. When presenting an alternative to justify policies, i.e. justifying norms, he offers the key criterion of trans-subjectivity (1978, p. 157), but always after the use of an ortho-language. '**Trans-subjectivity**' basically means the possibility to transcend subjective interests in the decisions about norms, arguing without consideration of individual interests, which he makes the criterion of political rationality. He even characterizes actual representative democracies, which assume actual value relativism as a main tenet in front of the dogmatism of the communist world, as only a historical emergency solution that should not blind us to search for better solutions (1978, p. 162).

Taking into consideration the two constructive primacies means to understand sciences as emergency sciences, not as liberal or free sciences. In its classical formulation, an emergency science is oriented to solve social problems (Janich, 1978, pp. 3, 26; Lorenzen, 1994, p. 129), sometimes restricted to dealing with war and poverty. After a terminology coined by Medina, these social problems can be conceptualized under the term '**emergencies**', to be later subdivided into the different types of possible emergencies (2016). We experience emergencies before any theorization takes place, so science must be aimed at solving emergencies. In emergency sciences, science begins with practical-political considerations about the problems to be solved, it entails value judgments about priority and selection of the problems. Moreover, it aims at yielding compatible solutions to different emergencies, it entails value judgments as to the priority of different emergencies.

5.2.2 A well-founded quantitative economics? On Kambartel's critique

§1 The economic pre-scientific practice

Now we will review the only proposal that, to the best of my knowledge, has been made from the constructive tradition to try a foundation of economic science, which comes from the unorthodox constructivist philosopher Friedrich Kambartel (1975, 1989). To be fair, Kambartel presents more a critique of existing proposals in economic science than a proposal of how a justified economic science might look in detail. However, consistently with the constructive tradition in this proposal, he presents a certain pre-scientific practice with a means-ends structure using an ortho-language to justify his claim that economic science cannot be justified without normative considerations. In other words, closer to those used in this dissertation, he simply shows why economics cannot be justified as a technical science but, as a political science, is necessarily subject to value considerations, which need to be considered if economics has to be properly justified.

The pre-scientific practice he presents is “estimating costs and utility in the production and exchange of goods” (1989, p. 244) and the main task of a justified economic science is that of rationally dealing with “economically relevant problem situations” (1989, p. 247), where the latter are scarcity situations which involve, in one way or another, the production of goods as means to satisfy *justified* needs, which is what the adjective ‘relevant’ stands for³¹. The key to his analysis is what it means for a need to be justified, where his answer is that it requires “reasonable deliberations undertaken by society as a whole” (1989, p. 249).

§2 A proto-economics?

After the constructive tradition, the link between the pre-scientific practice and the task of a certain science depends on the type of science, whether it is a natural science or not. For natural sciences, the link necessarily goes through the development of a protoscience (Lorenzen, 1987). Hence, to deal with economically relevant problem situations in an empirical-quantitative way following the model of physics, like many economists would like to, a proto-economics must be developed as a requirement. The same way physics is based on proto-physics, where standards for construction and use of measuring devices are developed which allow having objective measures of physical magnitudes; empirical-quantitative economics must be based on proto-economics, where standards must be given how to measure costs or utility within production and exchange in an objective way.

However, and this is Kambartel's main critique, such proto-economics is impossible for a justified economic science without normative considerations. Taking the model of physics,

³¹Production is involved in any of the cases which Kambartel characterizes as ‘economic’, i.e. non reducible to moral and political criticism: either because producing goods involves labor which clashes with the desire to develop other types of activities; or because there are goods which are limited in contrast versus the potentially limitless demand for them.

measurement, and experimentation are a refinement of the pre-scientific comparison of forms (geometry) or movements (mechanics) and thus depend on the aims and organization rules of such pre-scientific practices, such as the proper materials to build measurement artifacts. Then, quantitative-empirical economics, following the model of physics, must be based on the aims and organization rules of its pre-scientific practice, too. However, these aims and organization rules have a normative dimension in economics where it has to be decided whether a certain need is justified or not. There is no way of setting a universal scale of values like that of mass, length, or time with which one can objectively measure the values of different goods in their diverse situations of need satisfaction (1989, pp. 254–255). Whereas physics can be justified as a technical science, economics cannot because it requires a normative-political justification.

To show that, Kambartel analyses two of the main tendencies in measuring utility and costs. On the one hand, the critique of mainstream demand-oriented instead of need-oriented economics is based on the fact that demand-oriented economics is often based on subjective considerations of utility, only intended to be objectivized through actual demand behavior, instead of the objectively determinable considerations of needs and justified interests. The former would not allow for intersubjectively valid claims whereas the latter allegedly would. Thus, demand-based or utility-based economics cannot lead to proto-economics as an intersubjectively controllable measure theory (1989, pp. 247–249).

On the other hand, the critique of Marxian economics and other intents of having an objective measure of the value of a good (Kambartel says ‘cost’ instead of ‘value’) as labor time, is that even if such a measure can be provided, it can give no justified measure because it does not distinguish between labor dedicated to justified needs and other types of labor (1989, pp. 249–250). The idea is that for value to be justified, it must first be normatively determined (through trans-subjective deliberation) which goods correspond to justified needs and which ones do not. Thus, no proto-economics with an objective measure like the one for ideal forms in proto-physics can be developed under strictly technical criteria because it must involve normative considerations.

§3 An assessment of Kambartel’s critique

Kambartel’s critique is sharp and suggestive. However, it remains unclear to me whether the concept of satisfying a need is clear enough, even if it is necessary. Concretely, ‘satisfying a need’ as something done “for its own sake” and, correspondingly, a need as an end in itself (1989, p. 245) is probably too close to some kinds of ethical jargon. As such, it may invite non-thorough readers to criticize the concept after ethical theories such as Aristotelian-based virtue ethics or utilitarianism because only happiness or its parts can be such an end. We must be careful not to enter into discussion with such arguments because the intended concept of need has to remain a primitive one, as immediately based on the actual practice of survival as possible, instead of being possibly dependent on theories about what it means for something to be an end in itself. Accordingly, as a suggestion

to avoid such jargon, we can even question if the concept of need is at all a requirement for justified economics. Indeed, we may equivalently speak of the production of means of living in a justified way without using the concept of need in the technical sense as a part of an ortho-language.

Assessing Kambartel's view, I agree with the claim that economics has an important normative dimension that makes it different from natural sciences. Once again, shortly: economics is a value-laden political science, with politically controversial goals, not a mainly value-free, technical science, with often uncontroversial goals. If economics has to be justified, this normative dimension must be properly tackled. This is where I find a second coincidence, probably coming from our common constructive root: the proposal of a process of direct deliberation by all those involved in the economy to determine economic goals within this normative dimension.

5.2.3 A well-founded economy?

§1 The potential candidate

In this section, I have claimed that goal justification goes through trans-subjective thinking. Moreover, in former sections (cf. Section 4.3.4), I have also claimed how a process of collective deliberation and decision, that of participative democracy, is probably the most suited alternative to achieve such goals, especially over autocratic governments and representative democracies: it is harder for it to degenerate into the search of particular goals (of majorities, in representative democracies; and of single individuals, in autocratic governments) instead of social goals. Also, I have presented the limitations faced by any intent of rationally justifying goals without collective deliberation: the impossibility of excluding irrational outcomes in conflict situations as well as the potential impossibility of reaching rationally justifiable social goals.

Here I add the potential reasons why most probably only a planned economy is well-suited to rationally justify social goals. I prudently say 'potential' because the two main objections to capitalism, its exploitative basis which ends up in contradictions and recurrent crises, as in the Marxian tradition, and its predatory character concerning the environment, as in eco-socialism, require a demonstration using an ortho-language. In particular, this demonstration must go through the concepts of value, surplus value, profit, and, additionally, the concept of sustainability, to show why capitalism cannot avoid or solve neither certain economic emergencies such as hunger, poverty, or environmental emergencies. In this assessment, we slightly differ from Kambartel who, although he was critical of capitalism, to the best of my knowledge, never defended a planned economy or something similar to it on such grounds as the ones presented in this dissertation.

Speaking about these matters, to be fair to Lowe, we must acknowledge that he was not totally blind to the existence of such problems for a market economy, especially to the

problem of growth, on which he worked a lot during his life. No additional claims will be made about the problem of growth because, like the abovementioned problems, it requires an ortho-language which I have not undertaken in this dissertation, but remains an object for further research.

However, although Lowe recognized the theoretical possibility of goals being incompatible with a certain economic system and thus the eventually required choice between a certain goal and the existing economic system, he always believed that controlled market economies could overcome these difficulties. We have already claimed how ideology is one of the important reasons for Lowe to stick to controlled market economies instead of proposing a shift towards a planned economy.

If the demonstrations mentioned above turn out to be feasible, as many Marxian economists and eco-socialists already claim, the kind of process of collective deliberation and decision-making to rationally set the goals to be pursued in an economy is hardly compatible with a market economy, even a controlled market economy. Indeed, the outcome of such a deliberation process may precisely be the need for abandoning market economies due to their problems. However, for the sake of scientific honesty, I still hold it to be possible for a controlled market economy, as proposed by Lowe, to be compatible with my proposed process of collective deliberation and decision-making. Indeed, even if it may seem a little awkward to rationally justify production and circulation to be privately determined, not being the scope of a publicly determined economic objective, without the above-mentioned demonstrations, the possibility exists that such a result may emerge from our proposed process of collective deliberation and decision.

§2 Why still an unjustified candidate

Admitted to the latter, I will present a probably better candidate for an economy to be feasible under a participative deliberation process: a planned economy. Thus, I complete Lowe's picture of controlled economic systems with the part Lowe did not elaborate on because of ideological reasons. I am aware that I cannot completely escape the possible charge of ideologically choosing an economic system without providing the required demonstrations. However, I have two reasons to go on as proposed: on the one hand, it can be simply considered that I am liberally widening the scope of Lowe's proposal to outline how it would look like in conditions not thoroughly developed by himself, such as those of a planned economy under a participative democracy; on the other hand, even without the above-mentioned demonstrations, it is already possible to outline a response to some well-known ideological attacks to planned economies to leveling the field for the future foundation of economic science.

5.2.4 Against planned economies: On Hayek's critiques

§1 Hayek's liberal concept of constructivism

Thus, we will continue examining one of the most well-known critiques of planned economies, the attacks of Friedrich Hayek, mostly in his writings against what he calls 'constructivism', a different meaning of the word as the one elucidated in this dissertation, although they share some features in common.

To begin with, Hayek liberally characterizes constructivism, using a formula that he claims to have heard the first time in a lecture by W.C. Mitchell in 1923: "Since man has himself created the institutions of society and civilisation, he must also be able to alter them at will so as to satisfy his desires or wishes" (1990, p. 3). If this is how he understands constructivism, it is necessary to remark that he attacks a kind of liberal constructivism which would defend that a new system must be created "to offer individuals improved prospects of achieving their different and often conflicting goals" (1990, p. 13), as if any given individual preference system, and not just the rationally compatible ones, were suitable to be justified. This is not the kind of constructivism defended in this dissertation, where it is claimed that preference systems have to be rationally justified such that arising conflicts might be rationally solved. However, this is not the main core of Hayek's critique, which we examine below.

Hayek's real aim in attacking constructivism is to criticize centrally planned economies and to justify a competitive market order. He criticizes economic planning to be both technically impossible and disastrous for civilization.

§2 The impossibility argument and the socialist calculation debate

To support his claim that economic planning is impossible, he briefly mentions the well-known argument that there is too much information needed to achieve the required level of explanation or prediction and that science will most probably never yield that possibility (1990, pp. 12–13): his position within the so-called 'socialist calculation' debate. From that technical impossibility of planning economies, he concludes that the substitution of a whole social order for a brand new one is also impossible. If this claim is true, the discussion of whether we should or not plan an economy becomes irrelevant. However, this technical impossibility has already been challenged long ago by Cockshott and Cottrell (1993), whose brilliant proposal we will briefly summarize and comment on to provide some details about a constructive selection of macroeconomic ends as proposed in this dissertation. I mention this proposal because, despite being almost thirty years old, to the best of my knowledge, it is the best attempt made to develop a technically feasible planned economy as an alternative to actual capitalist states. Indeed, a lot of elements from that proposal may be useful for the future undertaking of a constructive theory of the economy. This is why I briefly outline some of its elements and how they might be

used to shape such an emergency economic science in the next section.

§3 The calamity argument against rational planning

Before that, we will also provide some insights to respond to Hayek's argument concluding that, aside from being impossible, the substitution of an existing social order by a new, completely rationally justified one, would be disastrous for civilization: I call it the 'calamity argument'. This argument, contained in his lecture text "The errors of constructivism", collected in his *New studies in philosophy, politics, economics, and the history of ideas*, which further refers to his former *Studies in philosophy, politics and economics*, almost all references classified by him as philosophical studies, may be stated as follows:

P1: Actual complex modern societies and their institutions have not emerged exclusively out of rationally planned behavior based on the understanding of "connections between cause and effect" or "means and (...) ends" (1990, pp. 6–7).

P2: Instead, human actions are not only based on such rational cause-effect or means-ends understanding but guided by rules that acting humans "are rarely aware" of and "certainly have not consciously invented" (1990, p. 7).

P3: It is impossible to rationally or scientifically justify all existing values, but only to assess single values against the remaining values of a society, i.e. to decide about the compatibility of existing values (1990, pp. 19–22).

C: The conscious intent to substitute all existing values with a totally new set of values will end in disastrous consequences for society, namely "the destruction of our civilisation" and "extreme misery and starvation" (1990, p. 19).

In short: since humans follow rules whose function in the social order they did not rationally design and they often do not know, among them the set of existing values, which is impossible to justify scientifically, this set of values should not be completely changed because of the dire consequences it may generate. Even more concretely aimed at his target: since humans did not rationally design and are often unaware of the whole set of existing values, which are impossible to justify scientifically, this set should not be completely changed.

To justify this claim, he elucidates such rules, gives examples of them, and tries to show why we can and even should change some of them but not all of them at the same time.

We will follow Hayek's train of thought, being critical of some of its claims to show why, even if some of these claims might challenge the possibility of rational planning, his conclusion does not. The picture changes if Hayek's conclusion is taken to mean that we should not change important subsets of the whole sets of values, such as his cherished respect for private property and contract enforcement within capitalism, as is suggested in some others of his writings. However, firstly, it does not seem to follow from his argument,

at least as it is presented here following the structure of his introductory text in his *New Studies*, an argument which should be independent of that related to the socialist calculation debate. Thus, we will have to modify Hayek's argument to account for the possible change in the conclusion. And, secondly, even this changed conclusion can be challenged, as has already been done by economist Amartya Sen, here with a methodology developed by Medina to reconstruct and solve emergencies.

Before engaging in the critical discussion of Hayek, we must clarify a little confusion that Hayek's words may originate but which a thorough analysis rules out. Hayek obviously does not mean that rules were not created with some individual or small-group purpose. Instead, he only claims that this purpose is not the final "function" at the level of social order that the rule has as an outcome (1990, p. 11). The use of the word 'purpose' both for the individual (1990, p. 7) and the social level (Hayek, 1990, p. 10) may lead to such confusion. The question is clarified when we notice that he uses 'purpose' (under quotation marks) for the social purpose or function of a rule, whereas he uses 'purpose' (without quotation marks) for the individual purpose behind the creation of any rule. Each rule would have been developed with some particular purpose different from the final function of the rule within the group that adopted it and which made the group more efficient than other competitors. Indeed, to reveal this often hidden function would be a task of scientific endeavor (1967, pp. 68–70, 1990, pp. 7, 8–10).

§4 Social rules and rational design

To justify his claim, Hayek expands on what he means by rules whose function in the social order is not rationally designed but the result of a process of survival of the best-fitted orders against the remaining ones. Basing on David Hume among other authors, he tries to present social orders and their rules as subject to a process similar to natural selection in Darwinian evolutionary theory (1990, p. 9): which rule will give a competitive advantage to a certain group over its competitors and why this is so is mostly unknown to the group when developing the rule.

To defend such a counterintuitive view, he mentions examples of such rules. As an introductory step, he first mentions rules that we follow without stating them or even being aware of it. His chosen example here is "skills, from the command of language to the mastery of handicrafts or games" (1990, p. 7), rules which humans follow without knowing them, where 'knowing' is understood, with Ludwig Wittgenstein, in the sense that we can "describe" or "verbalize" them (1967, p. 44). Regarding language, he mentions the "feeling for language", understood as "our capacity to follow yet unformulated rules" (1967, p. 44), and suggests to include also the "sense of justice" (1990, p. 8), understood as "a capacity to follow rules which we do not know in the sense that we can state them" (1967, p. 44).

In the example of language, Hayek claims that we learn how to speak often without knowing the precise rules of grammar we use: we first know how to speak and then maybe,

at some point, we get to know the rules of speech, we get a conscious understanding of the rules of grammar (1967, pp. 43–45).

After a critical analysis, the remark must be made that it is an oversimplification to claim, if Hayek really means it, that skills are just based on following rules that are not verbalized. Indeed, since the occurrence of language, almost any technical knowledge is learned and taught through some kind of verbalization. There is a point where the master would say “This is how you do it”, and the verbal teaching would leave a place for the practice. But there are a lot of steps in almost any operational knowledge that involve at least a primitive description of the process involved or the intermediate pursued result. Consider only, with Hayek (1967, p. 43), the instances where the ‘maestro’ had to correct and guide the apprentices on how the carving process had to be successfully completed; or, taking an actual example, the number of times a skillful soccer player has to be taught not only the technical aspects, but also the tactical and physical aspects of the game.

However, let us concede to Hayek that there are rules which can be followed without being precisely stated. Ironically for an attack against constructivism, even if we are aware that Hayek was not targeting exactly the kind of constructivism presented in this dissertation, these are simply instances of the constructive primacy of practice over theory, or, in other words, closer to Hayek’s, of the ‘know-how’ over the ‘know’, which guide the methodical-constructive focus on practice as the key to develop ortho-languages without falling into circularity or regression to infinity (Lorenzen, 1987).

Although he uses skills as an introductory example, his focus is what he calls ‘values’, meaning **prioritized practices** within certain social systems, those practices which are chosen against their alternatives because there is a positive social response behind their choice. Here, he mentions as examples morals and the rule of law, expanding mostly over the latter and basing again on the work of David Hume. Regarding this, he claims that “rules of justice” are not “the product of deliberate invention or design”: “Law is not only much older than legislation or even an organized state”, it “pre-supposes pre-existing conceptions of justice” (1967, pp. 101–102). An important distinction is made here without which the sentence may hardly make sense: that between what he calls ‘law’ or ‘rule of justice’ and what he calls ‘legislation’. After Hayek, the former would be pre-political rules determining what it means for actions to be just or fair, developed with some particular purposes by certain individuals or groups. Instead, the latter would mean the conscious act of legislation, a result of rational design, which consolidates pre-existing laws or rules of justice. Thus, rules of justice are not the result of the conscious act of legislation but the act of legislation is the result of pre-existing rules of justice. Such rules of justice are examples of what Hayek calls ‘knowledge of the world’ or ‘wisdom of our ancestors’ (1990, p. 10), which we are often not aware of and which guide the conscious act of legislation. Hence, the rational act of legislation is only a partial and necessarily incomplete expression of such pre-existing rules.

Again, ironical as it may sound if we accept the terminological distinction between law and legislation, such a conception is consistent with the methodical constructive interpretation of legal systems as human organizational artifacts based on pre-political forms of organization. Understanding organizational artifacts as the results of organizational techniques (which also belong to the set of possible techniques like, for instance, material techniques), is an instance of the constructive primacy of politics over technical knowledge: any technical knowledge presupposes the existence of at least a pre-political practice which determines which ends are to be pursued (and which ones are not) through the development of certain techniques.

Now we may ask, even if we accept Hayek's view about laws and legislation, whether this represents a challenge to rational planning. Even if the act of legislation or the whole legal system as an organizational artifact presuppose a preexisting, at least pre-political agreement about certain ends and norms, even if these norms may not be verbalized, does this mean that rational planning should not take place? In other words: just because we do not possess all the practical knowledge involved behind a certain piece of legislation, does this mean that we should not change such a piece of legislation? Or, more concretely, even if despite all our ignorance, we have enough knowledge to show that a certain piece of legislation is the origin of a certain social problem (or 'emergency', as we have called social problems up to this point), should not we change this piece of legislation by a new one which does not originate the social problem, at least in a theoretically demonstrable way? These questions make us go right into the core of Hayek's criticism, and he is very cautious to extract such a strong conclusion. Indeed, after all his examples, his answer is not at all clear and we may find different versions of it in different texts.

But before going to this general conclusion, let us examine how he goes from this general analysis of norms as in skills or legal systems to the kind of prioritized practices he is interested in as an economist. We find them spread all over many of his texts, sometimes directly quoted from Hume's *A Treatise of Human Nature* ("stability of possession", "its transference by consent" (1967, p. 113)), sometimes directly expressed by himself ("respect for private property and for the keeping of private contracts" (1990, p. 8)).

His main point here is that such rules as we have them today were not designed to represent the social role that they finally play in the social order which makes them of general utility, and that they could not have been so designed either. To justify this, he appeals to the "weakness of men's minds" (1967, p. 115), the alleged general human incapacity of sticking to a strictly rational design without succumbing to the temptation of pursuing one's interests if the individual is allowed to act on behalf of a community. In words closer to this dissertation, this means to rule out the possibility of rational planning because of the human incapacity to act trans-subjectively. Instead, the best alternative would be to set fixed rules that should not be changed either for individual purposes or social purposes (1967, p. 114).

One of his clearest examples is his claim to protect property and contracts as practices which have as a result “the extensive division of labor, specialization and the establishment of markets (...)” which nobody could have predicted (1990, p. 11). Instead, for example, “the extensive division of labor (...) could only have been brought about by spontaneous ordering forces and not by design” (1967, p. 100). About this, no historical considerations are given, only the above methodological considerations based on his anthropological point of view.

Now there only remains to examine that part where Hayek makes the case for scientific value relativism, with a different strategy from the mainstream version as defended by Lowe, Machlup, and Brecht, all following Weber’s original argument. He claims that the whole system of values of a civilization cannot be rationally or scientifically assessed because rationality itself is a part of civilization just like the system of values it must assess. He even makes it a part of a generalization of Gödel’s theorems about arithmetical systems, and presents it stating that “all we can talk about and probably all we can consciously think about presupposes the existence of a framework which determines its meaning, i.e. a system of rules which operate us but which we can neither state nor form an image of and which we can merely evoke in others in so far as they already possess them” (1967, p. 62).

Although I confess having serious doubts about its validity, I will not assess the resemblance claim of Hayek’s statement with Gödel’s incompleteness theorems, basically because the lack of formalization of Hayek’s words makes the task a matter of interpretation which is irrelevant in this dissertation. All that matters here is if it is impossible to justify a whole set of values with a reasoning capacity which is itself a part of the culture it is aimed at assessing. The question has already been treated before and I will not enter into many details about it: In a few words, there is no logical flaw in considering the possibility of building a rational language to justify technical as well as political sciences as long as the foundation of such language is constructively assigned to human practice (Lorenzen, 1987). Very shortly, there are primitive terms of such a rational language that are not intersubjectively controlled by other terms but by commonly shared human practice, which each individual can reconstruct to be methodically sure about the sense of the term.

§5 Hayek’s conclusions: An assessment

What Hayek claims is that it is only possible to assess single values against the entire body of remaining existing values to determine their compatibility and explore possibilities for improvement (1990, pp. 19–21).

After all this digression, we have Hayek’s conclusion that a whole set of existing values should not be entirely changed because of the negative consequences it may entail.

An assessment of Hayek’s argument can be properly carried out starting from a methodology

developed by Manuel Medina which he did not publish nor thoroughly redact other than in outlines shared with the participants of a Seminar at the Universitat de Barcelona (UB) like myself. However, some of the terms used can be found in many of his published works, some of which are quoted below once the terms are employed. Although the terms introduced are precisely defined and can be methodologically reconstructed, a thorough definition of them is not strictly necessary for the considerations below, which are only aimed at showing a general idea of how Hayek's view can be challenged, which is a task of the foundation of a constructive emergency science.

Rephrasing Hayek's argument, what he is saying is that one has to acknowledge that cultural innovations, especially regarding norms and values, always lead to unexpected impacts on the existing culture³². This is Hayek's warning about humans not being aware of the practical knowledge embodied in many of the existing values and norms. We concede to Hayek that impacts are sometimes unavoidable. However, as Sen observes, this is no reason against rational economic planning (1999, p. 257).

On the one hand, these unexpected impacts may not only be negative, generating emergencies such as crises, conflicts, controversies or confrontations, but also positive, constituting possible developments and opportunities, depending on the compatibility of the innovation with the existing culture³³. It does not seem very consequent with Hayek's view of the unexpectedness of impacts that he only considers the negative part of them.

On the other hand, rational economic planning is precisely the intent to minimize the occurrence of emergencies and stand on the side of positive impacts. Indeed, it is aimed at producing cultural innovations that help solve the actual emergencies of the existing cultural system without generating new emergencies and possibly generating developments and opportunities with those elements of the actual cultural systems that are not involved in the occurrence of actual emergencies. The only argument in addition to the unexpectedness of impacts based on our ignorance of the practical wisdom embodied in existing values and norms, which we have challenged above, is Hayek's anthropological assumption based on Hume, the assumption that humans cannot possibly act trans-subjectively. However, this is just an anthropological assumption which cannot be tested. Those who have claimed it can always be faced with Rousseau's critique in his *Discourse on the Origin and Basis of Inequality Among Men* that philosophers have used the term 'human nature' to describe observed behavior of humans in society³⁴.

³²For a thorough definition of culture and innovation, cf. Medina (2002, 2008).

³³Precise definitions of 'crisis', 'conflict', 'controversy' or 'confrontation' have been coined by Medina (2016). The document is unpublished and not available online at the moment of writing this dissertation. Only as a short introduction: crises are destabilizations of existing cultural systems, where the concept of cultural system as agents executing practices can be found in Medina (2002); controversies are debates and disputes between opposed knowledge systems; conflicts are the result of opposed, often incompatible preference systems; and confrontations emerge from opposed normative systems.

³⁴All of them, in fine, constantly harping on wants, avidity, oppression, desires and pride, have transferred to the state of nature ideas picked up in the bosom of society. In speaking of savages they

It is certainly daring to deny the possibility of rationally planning certain practices and thus maybe minimizing negative impacts and maximizing the positive ones just because of an anthropological assumption. The mere opinion that we should leave the system of values (at least basically) untouched because of the possible negative impacts of our actions and an alleged human incapacity may be harmless and irrelevant if the actual state of societies were lacking in emergencies. In plain words, one might not be willing to risk what we have if it is not that bad. However, I do not share neither Hayek's negative assessment of human nature nor his view of a reasonably comfortable situation which both underlie his conservative attitude, contemporary societies being as full of emergencies as they are (Bellamy Foster, 2019). Moreover, here is where Sen's argument enters the discussion: like he claims, the only thing that matters is if planning can improve the no-planning situation, not if we can or will generate negative impacts.

Now let us closely look at Hayek's conclusion. As he expresses it in his *New Studies*, it dictates that we should not change at the same time a whole system of values. In this work, he explicitly does not rule out the possibility of changing concrete values if the whole system is to remain basically unchanged. Instead, he makes the case for such small-scale changes. In contrast, in other works, he seems to extend his claim to the negative assessment of changing not only the whole system of values but also what he considers important single values of it, such as respect for private property and contract enforcement³⁵.

However, the conclusion looks like, it is based on his premise (P3) that values cannot be scientifically justified, which has already been challenged above in this section. If they were justifiable, which we have considered to be possible and Hayek denies, the case can be easily made for changes if a new set of values might improve the actual set of existing values.

Now we will assess Hayek's two possible conclusions. Regarding the first one, we concede to Hayek that all existing values, understood as prioritized practices and embodied norms, should not be changed at the same time. As he acknowledges, such a change is factually impossible (1990, p. 19): even if we begin to rationally plan, we do not at the same time begin to speak or to live and there is a lot of learned behavior present simply in the way we speak and interact with others. And it does not make any sense to prescribe something impossible. Even if one may consider the need to change the entire system of values, this change can only be gradually made over time and not all at once. Taking this to be the conclusion of his argument, even if some parts of the argument that may be

described citizens" (2004, p. 2).

³⁵A claim in this direction is the following: "It is therefore an order which we cannot improve upon but only disturb by attempting to change by deliberate arrangement *any part of it*. The only way in which we can effectively improve it is by improving the abstract rules which guide individuals. This, however, is of necessity a slow and difficult task, because most of the rules which do govern existing society are not the result of our deliberate making, and in consequence we often understand only very imperfectly what depends on them" (1967, p. 92, the italics are mine).

used against rational planning can be challenged, as we already have, we may accept the conclusion. I must make the important remark here that I do not mean that important values may not be abruptly changed if the situation makes this alternative better than inaction. Instead, I am only talking about a hypothetical situation where we found it necessary to change everything, from the way we speak to the way we relate with each other and our environment.

Now let us go to the second possible version of his conclusion, which is closer to his claim that economies should not be planned. Comparing it with the first version, the fact that a complete change of values is impossible should not be confused with the fact that some radical changes are also impossible or even undesired. The first remark to make is that this conclusion does not follow from the argument as expressed in his *New Studies*, especially Hayek's claim about scientific value relativism which refers to whole systems of values. There, indeed, the possibility is contemplated that single values are changed. However, Hayek may be also interpreted to mean that important values should not be changed only sticking to his premises P1 and P2 mentioned above, that we have not designed the functions of existing values and norms in the social order and that we are often unaware of the practical knowledge embodied in such values and norms. Even if we accept this modification of the argument, we have already challenged that these premises constitute a charge against rational planning. In short: The fact that innovation leads to unexpected negative impacts can be improved through rational planning if we forget the alleged human incapacity to act trans-subjectively.

5.2.5 For planned economies: On Cockshott and Cottrell's proposal

§1 Three objections and its solutions

What kind of a planned economy is proposed in this work and what can we use in this dissertation as a hint for a future foundation of an emergency economic science?

We will not enter into detail about the way the authors propose practical solutions to all the objections usually raised against planned economies, mainly the lack of incentives to work hard, the difficulty for a plan to adjust to people's specific desires, and the dictatorial character of political decisions, among them the production plan being developed without asking the population. However, a general outline of them will be provided to select what is feasible to be adopted within a constructive theory of the economy and what are possible suggestions for improvement.

The first problem the authors deal with is related to working incentives: How a planned economy stimulates hard and high-quality work if a worker's outcome is neither owned by her nor motivated through a sufficient monetary reward. His solution to this has three main features: firstly, to substitute proper currency-measured money by a sort of labor-time based "money" ('tokens', the authors prefer to say), which basically means

to substitute money-priced commodities by labor-time-valued goods (1993, pp. 24–29) and thus the elimination of money and commodities as we characterize them since Marx; secondly, to equalize the value of labor time for any socially required working activity, including the education or training for those jobs which require it (1993, pp. 29–30), and considering exceptions for valuable activities which might otherwise not be voluntarily done (1993, pp. 31–32); thirdly, to institute a general system for labor grading within sectors such that more than average productive workers receive more than one labor-time token per hour whereas less than average workers receive less than one labor-time token per hour (1993, p. 34), which basically means that people may legitimately prefer to work more and consume more or to work less and consume less, without the possibility to accumulate capital.

The second problem handled is matching centrally-planned production with people's individual strivings. To do that, CC distinguish different levels of the production plan which we do not need to elucidate here for our present purposes. Their idea is that producer goods are centrally allocated, there are no markets of factors of production (1993, p. 109), whereas consumption goods enter a labor-token-based market such that people can decide what they consume among the existing alternative goods depending on their working effort, which determines their available labor-tokens, and the value of the goods (1993, pp. 69–72). They propose a solution to two of several challenges that can be made to this method: firstly, the problem of determining the value of environmental resources and environmental protection (1993, pp. 65–66), which they propose to assess non-quantitatively; secondly, the problem of adjusting supply and demand to avoid queues and wasting of products, which they propose to solve by imitation of market prices, starting initially for each good with its labor-time value and increasing or decreasing this amount depending on people's demand of it to shift production from socially undesired to socially desired goods (1993, p. 104). Starting from an initially more equitable distribution of output, may improve market societies where market prices clearly favor those who can pay for the marketed goods.

The third problem is how to democratically decide about an extremely arduous task such as a production plan in all its details. CC make two interesting proposals based on classic Athenian-type democracy: (1) a direct, non-parliamentary democracy, suggestively arguing that 'parliamentary democracy' is a contradictory term since the masses of poor people being represented, whether through meritocracy or birth aristocracy, means that they do not have political power (1993, pp. 57–59); and (2) the choice of political functions by lot instead of elections to avoid the domination of politics by elites and to stimulate people's engagement in politics.

To justify their suggestions as applicable today, they provide some interesting arguments (1993, pp. 163–165): (1) there is no specific technical knowledge to engage in politics, but only the political technique which, after Protagoras in Plato's famous dialogue, can be learned by everyone with adequate training (*Protagoras*, 320c–328d); (2) Athenian

democracy was not slavery-based, most of the people who engaged in policy were peasants and artisans who had to work and owned no slaves³⁶; and (3) the size of actual states is not an obstacle to direct democracy because TV-based or phone-based voting after visioning of public debates can be done without requiring everybody to gather in the *agora*.

To enter into detail of the decision-making processes, their distinction between production levels becomes more important. Without entering into unnecessary details for our purpose, the main idea is that some kinds of decisions cannot be deliberated from the onset by the whole population. Not because it is technically impossible, which they have claimed it is not, but because the average citizen lacks the required expertise to successfully participate in the deliberation. An example of a topic which is difficult to be collectively decided is the strategic planning of investment in new technologies that have not been developed elsewhere such that they cannot simply be transferred and imitated by a community from another. Indeed, the knowledge involved in making such decisions may be limited to high research facilities and thus be out of the reach of most of the population. Their proposal to keep this process democratic is to make a group of experts select a certain range of possibilities for action and then let the population vote for their preferred option after a process of public debate about the advantages and disadvantages of each option. Thus, different types of production plans should have their own group of experts for the selection of the available range of options to be voted on later by the population.

§2 An assessment: collective deliberation and voting

If we assess CC's proposal related to the claims of this dissertation, we need to remark here that it is not incompatible with the process of collective deliberation and decision-making envisaged in this dissertation if a range of feasible options is selected by experts on a given field and then collective deliberation and decision is limited to this range of options. Of course, this indirect kind of democracy in some aspects has its dangers in terms of the possible deviations of the initially chosen range of options from an ideal range selected by the whole community if everybody has the knowledge to do so. However, without the capitalist incentive of profit-making, these deviations are likely to be more limited than they are in actual capitalist economies, where a lot of strategic decisions come from the economic power of some sectors to influence political decisions.

Now we must introduce two important caveats to CC's proposal if it is to be adapted so as to shape a possible proposal of emergency economic science.

The first important remark to be made is that, to consider this proposal not merely an alternative system which we may choose or not against the actual one, it must be shown,

³⁶Indeed, this fact probably motivated the Plato-Aristotelian critique of democracy based on the aristocratic-oriented reckoning that only people who had *skholé* were suitable to properly make policy (*Politics*, 1277 b).

with Marx, that capitalism necessarily leads to economic exploitation and progressive precariousness and poverty of the working class, among other things through the occurrence of recurrent crises. This is something the authors do not discuss in this work but take for granted based on the Marxian conceptual *apparatus*, mainly his labor theory of value, which they defend both theoretically and empirically in several other works (1997a, 1997b, 2004), and, as mentioned above (Section 3.1.2), must be subject to a methodical revision. Furthermore, it has to be also shown that capitalism necessarily leads to environmental impairment, too, which means developing a clear concept of sustainability to prove that it is impossible within capitalism. There are plenty of works that try to justify this, most of them ascribed to what today we call ‘eco-socialism’. However, to the best of my knowledge, no author has achieved to do it reconstructing Marx’s concept of value as socially necessary labor time, with the methodological problems it entails³⁷.

The second remark to be made is that, although the proposal is made that public servants who make political decisions, whether at the state or the local level, be chosen by lot and only temporarily, the final mechanism to achieve a decision consists of voting instead of collectively deliberating and agreeing about a decision (1993, pp. 163–169). Although CC’s proposal has an anti-liberal structure, they share one of the least criticized points of liberal regimes: decision-making by voting. Indeed, the fact that after a deliberation process, a voting mechanism has to necessarily take place entails that there can be no rationally agreed measure that might reach a unanimous agreement even by those who initially did not agree with it. In other words, the assumption is made that rational free consensus cannot emerge as a result of a deliberation process, which entails at least one of the following situations: (1) that the deliberating individuals cannot transcend their individual purposes to decide something which constitutes a public good even if it may not be beneficial for them, which is close to Hayek’s and Hume’s anthropological view as we have presented it above; (2) that individuals can act trans-subjectively but most probably many or at least quite a few will not do it, which I would bet to be the closest to CC’s position among these options; (3) or that there is not such a public good which may be unanimously reached because everything depends on the individual preference systems (or small-group preference systems), which is basically value relativism as we have presented it here through the views of Lowe, Machlup and Brecht, all basing on Weber’s arguments.

I concede to CC that some decisions might not be subject to such a process where a unanimously rational decision might be reached. Among them, we can consider for instance those decisions related to aesthetic purposes such as whether to choose a certain color or another to paint the outer walls of public buildings, where the justification of a preference over the alternatives can ultimately be a matter of taste and not subject to the

³⁷Among the many already classical authors labelled under ‘eco-socialism’, it is worth mentioning the recent and remarkable work by agricultural engineer Daniel Tanuro, *Green capitalism: why it can't work*, which may be an optimal starting point for the above mentioned demonstration after a proper revision and reconstruction of Marxian labor theory of value.

possibility of trans-subjective thinking. Even minor political decisions such as whether to first produce a certain kind of good instead of another substitute of it may not need unanimous decisions. However, and this is my critique, the most relevant decisions such as whether to centrally plan or not the allocation of consumption goods, or even the choice of measures of environmental protection, should be agreed upon through unanimous decision as a result of a rational deliberation process where non-trans-subjective thinking is simply left aside. If they are not, we would be more exposed to the possibility of a social goal not being reached because it is ranked low in individual preference systems, as mentioned above. There we mentioned the risk of prioritizing particular preference systems (the dictator, in dictatorships; or the potential voters of a certain political party as well the members of the given party, in representative democracies) over justified preference systems, in case we might consider the latter to be possible. Even if we set up a direct democracy with CC, once it entails voting, it may share the problem of non-justified prioritization of preferences of autocracies and representative democracies. Indeed, it might be the case that the result of voting does not point to the rational solution but to the option preferred by a majority, which might be wrong in assessing the different options. The rational deliberation process has to extend until a unanimous agreement is reached, at least in those issues where a rational decision can be justified, if the above problem is to be avoided.

It is unclear to me right now if voting should be envisaged only for such decisions at the state level in big states or if such big states should be avoided altogether as soon as collective agreement about decisions without voting becomes impossible. Anyway, if the former option should be chosen and voting is allowed, it should be neither secret voting nor could it be simple majority voting. Instead, since preferences are required to be made public for a rational deliberation process to take place, all objections materializing into a negative vote for a measure should be properly countered by the defenders of the positive vote for this measure until a unanimous agreement or a situation close to it (clearly not 51% agreement, not even 66% agreement) could be reached.

After assessing CC's proposal, we must determine whether it is subject or not to Kambartel's critique about the impossibility of an empirical-quantitative economy following the model of natural sciences. The intent to make a quantitative economic science based on normative considerations is not subject to Kambartel's critique and may be probably applauded by him. Therefore, the already classic proposal made by Cockshott and Cottrell (1993) to develop a democratic planned economy is not affected by Kambartel's critique.

5.2.6 Collective rational deliberation: Medina's proposal

§1 A game-theoretical approach for a particular case

All over this digression about the selection of macroeconomic ends in an emergency economic science, we have made clear that our proposal, even if still at the pre-theoretical

level, without the consistency of having a properly developed, complete ortho-language, consists of a planned economy combined with a direct democracy. Whereas we have outlined how such a planned economy might look like, starting from CC's proposal and highlighting its potential shortcomings, we have not said much about how such a rational deliberation process might look. The most explicit thing said other than characterizing it as trans-subjective is that it should ideally contain no voting process to reach a final selection, at least for the most important goals, whose justification might be characterized as rational. Now we will turn to how this process can be developed, starting from a constructive-oriented game-theoretical approach by Manuel Medina (1972) which justifies why, to solve conflict situations, there are certain requirements to be met, independently of the concrete rank of individual preferences of the contending parts. The important remark to be made here is that we will speak only about rationality principles to justify a certain goal. Instead, the technical implementation details how the deliberation process should look, how do we make people deliberate with each other and what is the size of a community where this procedure is technically feasible, will not be given here. The reason to do it is again that we are still at the pre-theoretical level and it makes no sense to make detailed technical considerations if our proposal has not still been shown to be properly founded. If we have done it at the economic level, it is because we already had a lot of work done by CC and even there we have warned several times that it lacks the proper scientific foundation if everything said has to strictly make sense and not merely count as a feasible alternative against other options such as actual capitalist systems.

As Medina warns in his work, we should not enter into a discussion about any topic before having developed a specific terminology as a part of an ortho-language to carry out the discussion in proper theoretical terms (1972, p. 18). Otherwise, we might be falling into what the German language names 'Scheinprobleme', only apparent problems which get automatically solved as soon as the terms used are methodically introduced and precisely used. Therefore, in this sense, most of what we have done in this dissertation, including considerations about value neutrality, remains at the pre-scientific level, what we have labeled as 'protreptic' following Paul Lorenzen in the introduction.

Medina's approach is to take a particular kind of situation where a conflict can emerge between two contending subjects (which might be both individual and collective subjects), which we would like to rationally solve. In this sense, Medina shows in a certain setup how a normative approach to economics, in this case, a game-theoretical approach, can deliver justified actions to reach certain ends that are considered to be rational. The concept of rationality used is Pareto dominance. In plain words: A strategy, with its attached result, is collectively optimal if it Pareto-dominates all other alternative strategies, each of them with its attached result. This means for the dominating strategy-result that both subjects either prefer or are indifferent to this result over the remaining alternatives and at least one subject strictly prefers this result. The general collective rationality principle states that the contending subjects must choose a collectively optimal strategy even if this strategy is

not the optimal answer to the opponent's strategy. In other words, collective rationality must prevail over individual rationality (1972, pp. 66–74). The sophistication of the formalization should not blind the reader from the fact that such a rationality principle is nothing else than trans-subjective decision-making applied to Medina's particular case study: it offers a possible outcome for conflict situations that can be achieved through methodically normed discussion oriented to a decision which might be inter-subjectively agreed through general free consensus.

§2 The requirements

To reach such a solution, Medina first introduces in a methodical-constructive manner all terminology regarding preference theory without appealing to pre-scientific intuitions, as mainstream preference theory does (1972). During the process, he reveals some criteria to be met by a process of rational collective deliberation of goals as in this dissertation. Some of them have already been indirectly considered when assessing the validity of the mainstream tenet of undisputable preference systems. More succinctly: they are: (1) a normed language or ortho-language, (2) the revelation of everybody's individual preference systems, (3) the consistency of individual preference systems (after so-called 'axioms of preference': completeness and transitivity) (1973, p. 108). However, Medina shows an even more important point: constructive conceptualization is the best-suited alternative if his analyzed conflict situations have to be solved without foundation gaps (1972)³⁸. The main idea is that to reach any social goal rationally, the best alternative is to use constructive terminology. Indeed, if the theory is aimed at collective rational deliberation of goals, as proposed here, then the concept of constructive preference is the best suited (1973, p. 109).

Applying this result to this dissertation means that many of the terms Lowe uses to describe the process of Political Economics, which we consider in detail in the next section, should be methodically introduced in a constructive manner if Lowe's objective to reach social goals has to be reached in a methodical way. Among them, of course, we have the above-mentioned concepts of preference and expectations, which will be thus introduced within a future emergency economic science³⁹.

³⁸For instance, regarding the concept of preference, the subjective-value (often named 'utility') theory assumes one of two possible types of definition: the introspective or the behaviorist. Medina shows that these two types of definition are not very well-suited to achieve the objective of a rational resolution of conflict situations even in the simplest conflict situations for two players (1972, pp. 26–27 and pp. 75–76). Very succinctly, in addition to other less important critiques, Medina's strong claim is that, as a part of a descriptive theory, the observer and the observed do not share a common ortho-language and there is no translation from the language of the former to the language of the latter. Since the observer does not take part in the action of the observed other than through observation, both may have very different interpretations of the same situation. Without this common language, the deliberation process cannot properly take place.

³⁹The concept of preference can be directly taken from Medina (1972). Instead, the concept of expectation has still not been constructively developed. As a first sketch of it, to make it intersubjectively

5.3 Determination of means

Some guidelines have been presented on how the justified determination of ends should look in an emergency economic science, without entering into many details but stating some requirements of the process. Now we turn to the determination of means, the part which Lowe considers to be the only one belonging to Political Economics. This is why, in this section, I mainly stick to Lowe's outline of Political Economics, introducing remarks and suggestions, even further terms from an ortho-language, where I think they might be useful and improve Lowe's proposal.

§1 The pre-scientific practice of market economies

The first step of an emergency economic science is to make clear what the main pre-scientific practice is whose theorization through Political Economics might improve this practice. Since we are dealing with market economies, we can consider in general material provisioning through the production and circulation of commodities as the main pre-scientific practice. The selection of goals within this practice has been already outlined in the previous section.

Within the practice of production and circulation of commodities, among all its possible ends, for academic purposes, we choose a macro-goal that allows us two things: on the one hand, comparing the procedure of a constructive theory of the economy (or Political Economics) with the procedure of mainstream macroeconomics; on the other hand, clarifying all steps of a constructive theory of the economy regarding the means to satisfy the chosen goal. Concretely, we select Lowe's analyzed macro-goal of market macro-equilibrium, the main setup of most mainstream macroeconomic models. Furthermore, with the same justification of clarifying a constructive theory of the economy, among different possibilities, we choose an initial macro-state of disequilibrium, such that the case studied corresponds with Lowe's 'stabilization' (1977, pp. 275-ff). As we have already elucidated before, the goal of market macro-equilibrium is pursued in macro-economic models with the justification that, under certain (laboratory) conditions, the resulting allocation of output is equivalent to a maximum of technical efficiency, the Pareto Optimum. Disregarding the critiques to the Pareto Optimum, and only for academic purposes, we can use the equivalence between full and technically optimal use of available factors of production (including human labor, means of production, and among the latter, and environmental resources) and market equilibrium under the lens of efficiency in allocation (1977, p. 267). It is worth noting that, if I am right in the chosen candidate for a well-founded economy as sketched in the previous section, a planned economy, the goal

controllable, we can appeal to a situation of collective deliberation about planning future actions. There, 'expectation' is a mental term to denote the volition to assent to a certain descriptive sentence about the future, a synonym with Lorenzen's 'belief' (Lorenzen, 1969, p. 80), based on individual knowledge systems.

of market macro-equilibrium will never be pursued and the rest of this section is only useful for academic purposes, its justification being only the comparability of its steps with mainstream economics and Lowe's proposal.

Having specified the pre-scientific practice with a certain pursued goal within it, such that we can name it **'practice-result'**, we only need to take the next step of the process: determining the required means to satisfy these ends. Note that, until now, we find ourselves in an ideal situation close to natural sciences where the pursued goal is clear and uncontroversial, which we have anticipated is far from what happens in economics. Even if one may agree with the main goal as outlined here, how it is concretely implemented, for example, what is the concrete threshold to be considered the minimum required material provisioning for each citizen, is a subject of controversy.

Let us consider now how to determine the means required achieving the selected goal assuming that the goal is clear and non-controversially set as an objective. In this process, Lowe's Political Economics is quite helpful.

§2 Goal-adequate macro-motions

Firstly, Lowe's step of determining goal-adequate macro-motions from the initial macro-state is a required one for a constructive theory of the economy. Partially agreeing with Lowe, this procedure is a technological one: the selection of procedures within the existing technology in the production and circulation of commodities to reach the pursued goal. I say only 'partially' because I do not share Lowe's naturalist understanding of science and I consequently do not speak of natural laws underlying engineering rules⁴⁰. Instead, I consider the technoscientific level regarding the production and circulation of commodities as a known of the process. I do not strictly separate theoretical knowledge from operational knowledge because they are so intertwined in practice that the distinction only makes sense in analytical terms. The kind of reasoning that takes place here has the structure "If the goal G has to be achieved, we are in the initial situation I and we can produce and circulate commodities at level T, the technological processes P are suited to do it". As Lowe correctly points out, there may be more than one possible way to achieve the final macro-goal, so the technological processes may not be in general required but only suited to achieve the goal. Let us see how that looks in our example of stabilization.

To elucidate it as general as possible, Lowe distinguishes the solution for a collectivized economy from that of a pure market economy. Strictly speaking, the decision between a planned economy and a market economy belongs to the means to be used to achieve a pursued goal: it is a choice to be taken once the goal has been decided. Indeed, without

⁴⁰As it has been claimed before (cf. Section 3.3.3), not only technology but also science and its laws are cultural products. If technology fails due to regularities (not laws), this implies that there is a preexisting criterion for technical success or failure. This criterion is history-dependent and as such, it is cultural, not "natural" in the sense of man-independent. Therefore, knowledge about nature in technological parts of science (most of them today) is cultural, not "natural".

entering into theoretical considerations, we can aim at material provisioning as a goal both through a planned economy and through a market economy. Thus, for instance, if we want to achieve Pareto efficiency, we may examine the possibilities to achieve it both from a planned economy and a market economy and finally choose the most suitable option. It belongs to theory to justify whether any goal is suitable to be achieved in any economic system⁴¹. However, we have already mentioned that the order of decision-making is considered more often than not among the goals of the process and thus it is secured from the potential critique from a technical point of view.

Now we need to remember that the allocations of market equilibrium and Pareto Optimum are equivalent (under certain conditions) and that the latter are technically optimal and entail full utilization of factors of production, with factors of production understood by Lowe as labor, means of production, and, among the latter, environmental resources. If we do that, we can consider idle factors of production as a deviation from both market equilibrium and a Pareto Optimum. Assuming that the system has some idle factors of production and that we pursue the full utilization of available factors of production, we can determine the patterns of behavior required to achieve the pursued goal both in a planned economy and a market economy, as Lowe does.

To justify macro-motions and all the following steps of his Political Economics, Lowe uses as a model a 3-sector-economy: a sector dedicated to producing the final good, another one aimed at producing secondary equipment specific to the final good, and a third one targeting primary equipment which produces secondary equipment. Although illuminating from the technical point of view, we do not examine the details because they do not belong to the objective of this dissertation⁴².

⁴¹Two remarks are to be made here. On the one hand, Marxian economic theory has surely some to say about the suitability of capitalist economies to provide an adequate and stable level of material provisioning to a given community. However, as I have repeatedly claimed, since I have not still developed an ortho-language to set the constructive foundation of Economics, including Marxian terms such as ‘value’ and ‘capital’, I am not in the position to say anything justified about the issue yet. On the other hand, it is quite clear that, whatever the results of theory may be, in practical terms, the initial macro-state, whose features include the type of the actual economic system, mostly determines the choices to be taken. Indeed, history has taught us that it is certainly a remote possibility to shift from one economic system to another, especially if it is from a market economy to a planned economy, without some kind of violent struggle in between. However, this is not something that makes the theoretical analysis irrelevant but only an additional aspect that has to be taken into account if a justified theory has to be implemented.

⁴²As a simple introductory remark, Lowe claims that if permanent production of consumer goods must be ensured, more sectors need to be added to the analysis and Lowe introduces the example of an economy producing bread as the only consumer good. There, three production sectors are required (1977, pp. 268-271): one to produce the final consumer good, bread; a second one to produce the secondary equipment, involved in bread production from wheat-seeds (plows, flour mills, baking ovens. . .); and a third one to produce primary equipment (extraction machinery of iron ores, blast furnaces, steel mills, machine tools. . .), involved both in the production of secondary equipment and primary equipment itself (some machines are used to produce other machines but almost all of them are iron-made and thus require extraction, furnaces, etc.). After that, three simple equations describe the required outputs of each production sector (1977, p. 272).

§3 Goal-adequate patterns of behavior

Secondly, Lowe's step of determining goal-adequate patterns of behavior is equally required in a constructive theory of the economy. Every economic action involves human behavior: even in the most automatized process one can come up with, somebody has to turn on the switch, somebody has to program the machines, and, most generally, somebody owns the machines and decides whether and how they are used. Whether we consider a planned economy or a market economy, deciding how patterned behavior must look still belongs to the technological part of economics. Whether the idle factors of production are human labor, capital, or environmental resources, how to reach their full utilization is a matter of computing what and how many commodities have to be produced to dedicate all available factors of production. Depending on the economic sector with idle factors of production, the patterned behavior will be different but it will still be a technological problem to shape behavior according to the suitable macro-motions. Briefly alluding to the proposal of a planned economy by CC as presented in the previous section, this would belong to the production plan they propose.

§4 Goal-adequate patterns of motivations

The decisive step in Lowe's analysis is the determination of motivational patterns, in Lowe's words starting from psychological laws, and there he finds a substantial difference between planned economies and market economies. In a planned economy, behavior is assured once the suitable path is determined, with the minor caveat that the incentive must be given to the directives and the executants of the collective plan for them to induce suitable action directives (instead of promoting individual interests). Instead, in a market economy, some additional assumptions must be made for the example to be presentable as an academic case. Although, as justified before, we do not enter into details, Lowe includes among these assumptions the validity of the extremum principle and the consideration of the economy as a closed system (1977, p. 265). He does so, although he has harshly criticized the extremum principle, because he wants to show how expectations have to be shaped in order to achieve a certain goal even if preferences are goal-adequate.

Whereas the other steps are required as a means to achieve whatever goal, here we must introduce some refinement regarding the two situations that Lowe has in mind when he clarifies the steps of Political Economics. When he distinguishes between planned economies and market economies, he does so thinking about huge modern industrial states, whether governed through a representative democracy or a state bureaucracy chosen by a unique political party. The big size of the state is important because the implicit assumption is always made that within such a community, direct deliberation and decision about economic matters is impossible for all members of the community. This is precisely the assumption that we want to reconsider at least in theoretical terms, leaving the possibility open for communities where all members deliberate and decide about economic

matters. Although this may be qualified as arbitrary, ideological, or unrealistic, I have already mentioned above that I am not sure whether simple voting should be eliminated or not as a selection mechanism and thus which is the size of a state where collective rational deliberation and decision can actually take place (cf. Section 5.2).

If we accept the assumption of big industrial states and representative democracies, it may be only partially consistent with a constructive understanding of social science. Indeed, this entails that social sciences, among them economics, must try to predict actual behavior from actual motivations as a consequence of a political measure that the citizen has not directly deliberated and decided. If we stick to this option, we find ourselves in a kind of semi-descriptive science. We cannot speak, with Lowe, of psychological laws in the same sense that we speak of natural laws, which are understood as laws of motion. Lorenzen considers the prediction of behavior from motivations (he calls them ‘sense contents’) possible and, even limiting it to qualitative possibilities instead of numerical probabilities, he considers that economics may be useful to justify better **chances** for policies to achieve certain goals and to develop **laws as tendencies** (1987, pp. 290–292). However, laws are not to be conceived as laws of motion like in physics, which are impossible even for life sciences. Indeed, even in Biology, bacteria can develop resistance to antibiotics and thus change their regular behavior making technical repeatability of initial conditions of an experiment impossible. Social sciences in this sense would be **semi-descriptive** and require statistical knowledge about the actual motivations of the citizens and also about the actual reactions which may follow the sense contents or not, i.e. whether citizens will rationally behave according to their motivations or not.

However, as we have commented going over Medina’s work in the previous section, if we aim at the achievement of a given social end, which is Lowe’s declared objective, this kind of semi-descriptive science is probably not the most suitable way (1973). Instead, another kind of science is required, which we call ‘**normative economic analysis**’, to be distinguished from the usual sense of the term ‘normative’ as a subjective or non-scientifically justified recommendation. Medina’s proposal is an example of the utilization of normative economic analysis restricted to a particular setup, a work where some ends are to be pursued and some means are determined as requisites to achieve this end.

If we abandon the assumption about the size of actual states and consider the possibility that decisions are collectively deliberated and taken, the underlying motivations, i.e. preferences and expectations, are explicitly specified as a requirement in the deliberation process and there is no need to infer them from behavior so as to later stimulate them through control. It is not a semi-descriptive science about the effects of policies on agents who have not decided on them. Instead, it is a constructive science about the rationally agreed economic processes, including agreed social behavior, which are suitable to achieve a certain end.

§5 Goal-adequate measures of control

Finally, we have Lowe's proposed measure of control as a decisive step also in a constructive theory of the economy. For social behavior to be patterned, measures of political control of behavior have to be envisaged. They can be classified, again with Lowe, into two main types: either a soft form of control, Lowe's 'manipulation', being simply an intent to reinforce or stimulate goal-adequate behavior through motivations; or a hard form of control, Lowe's 'command', setting legal limits to goal-inadequate patterns. Whether control decisions are decided representatively as in a big modern state or collectively agreed, they have the same structure and aim: to shape goal-adequate behavioral patterns. In a big planned economy, regarding stabilization, control has a small role in shaping adequate motivations within plan developers and executors. Indeed, as Lowe recognizes, such a system can only be destabilized by a defective plan, a defective implementation, or an external perturbation of the system (1977, p. 275). Except for the latter case, which is unpredictable, the other two are solved by better plan development, which belongs to the determination of macro-motions, and more supervision of the implementation. This supervision belongs to command control. Instead, considering market economies, to achieve equilibrium, all required measures have to be taken for non-patterned social behavior to become patterned, which means achieving goal-adequate motivational patterns. There, still including the assumptions of a closed economy and the extremum principle within preferences, Lowe infers a variety of measures suitable to be taken, from simple enhancement of information to achieve goal-adequate expectations until the utilization of public spending as an effective means to shape the expectations of consumers and businesses.

In a community governed through rational deliberation and decision-making by all members of the community, again, control does not shape behavior through motivations but directly through behavior. This does not mean that only Lowe's command control is important such that whenever behavior is not goal-adequate, decisions have to be legally limited to be goal-adequate. Of course, this mechanism will play an important role but not necessarily a bigger one than in actual big modern states. Instead, when elucidating the justification of goals, if the process is successful, Lowe's manipulative control becomes unnecessary or converts at most into the enlightenment of economic agents through the rational deliberation process. This is how Lowe characterizes manipulative control in the long run to shape preferences. However, without the missing step of goal justification, as we have outlined in the previous section, it is difficult to distinguish ideological manipulation from proper education.

To open such a possibility as collective deliberation denies the potential accusation that a constructive proposal as presented here may entail some kind of social engineering as commonly understood (Georgescu-Roegen, 1971, pp. 347-ff).

§6 The modified pre-scientific practice

Now we have enumerated and briefly elucidated the means required to achieve the pursued macro-goal of achieving equilibrium from an initial state of disequilibrium or, equivalently, the pursued goal of achieving full utilization of available factors of production from an initial state of only partial utilization of available factors of production. What we see in this example is that its achievement in a planned economy requires an easier process. Indeed, as Lowe shows in *OEK*, in a market economy, even assuming among other things the extremum principle, the set of controls to achieve goal-adequate motivations, behavior, and path may be certainly complex.

Moreover, Lowe has shown that the extremum principle is indeed far from universally belonging to preference systems in actual economies. On the one hand, we have that goal-adequate behavior is required and, on the other hand, we have that the extremum principle as a goal-adequate motivation does not correspond with actual economic motivations. Thus, we need to shape the extremum principle through control. However, Lowe has acknowledged that the effective shaping of action directives is a long-run task. Consequently, goal-adequate behavior consistent with the extremum principle in the short run has to be enforced. Again, it is controversial whether this is feasible in actual market economies. However, in the terms of this dissertation, it is uncontroversial that not all required means to achieve the goal are used: if we consider equilibrium, the most frequent result of mainstream macroeconomic models, as such a goal, we see that the shaping of behavior according to the extremum principle is missing. Hence, the successful pre-scientific praxis from which theorization must start is also missing.

After our constructive analysis of the situation, we find that if Lowe's analysis is sound and non-patterned behavior is the problem of traditional economics, the solution is to shape it so as to be goal-adequate. In this case, this means, among other things, to be consistent with the extremum principle to reach full utilization of factors of production. But, in general, it means to be consistent with a certain set of motivations to reach a certain macro-goal from a certain initial macro-state. Moreover, we see that this shaping process, at least in this case, does not actually take place, and it is not set as a recommendation by mainstream macroeconomists. Therefore, not all means required to achieve the pursued goal are employed, which entails that the pre-scientific practice that must exist before theorization is not even partially successful.

We can ask ourselves why that is so. Most obviously, it is because actual economic policies are not determined through Political Economics but through mainstream macroeconomics. As Lowe correctly points out, macro-equilibrium is rarely pursued as a goal, neither individually nor politically (cf. Section 3.2.3). Instead, it is presented by mainstream macroeconomics as a result that achieves maximal technical efficiency. Noteworthy enough, seeking equilibrium as a goal is compatible with the generally acknowledged goal of a successful marketer in market economies: to earn the maximum profit possible in a market

system. Note that we do not simply say that earning maximum profit is a universal action directive since this would contradict Lowe's claims about equilibrium, updated in this dissertation up to the present day. Instead, we say that profit maximization is the acknowledged goal of a successful marketer and, concretely, of a successful enterprise. Seeing this compatibility, it should not come as a surprise that mainstream macroeconomics originated and won acclaim mostly in countries with a market economy to justify and possibly improve existing market economies. Taking the latter into consideration, the problem may lie in the fact that some of the required means may affect issues considered to be politically untouchable like the order of economic decision-making or the property of means of production. As such, we enter here the realm of political ideology, which we have already discussed in the previous section.

§7 Theorization of a successful pre-scientific practice

Now, we still need to introduce a further step within the means to achieve a pursued goal in a constructive theory of the economy. If and only if we have a successful pre-scientific practice, with a clear set of pursued goals and a set of employed means to achieve the goals, we can theorize about this practice to achieve theoretical results and claims. We can then make claims with the structure "Under conditions C, if we set the means M, we achieve the goal G". Why should we do that if the practice is already at least partially successful? Basically, to improve the existing practice after theorization to potentially guide economic policies in similar situations in the future.

This type of claim is equivalent to claims in natural sciences like physics, chemistry, or biology, the technical sciences. The results of Political Economics are not like those of natural sciences, basically due to the non-repeatability of laboratory conditions to develop experiments. Moreover, we have seen that economics is more of a political science in the sense that it is mainly concerned with political goals, in contrast with more value-neutral natural sciences. As it is understood today, it would be at best a 'social-technical science' (Lorenzen, 1987, pp. 231-ff.), a semi-descriptive science with tendencies and chances, but not a strictly technical science like natural sciences.

Here a clarification is in order. The classic distinction in the constructivist tradition between technical sciences as means-oriented and political sciences as goal-oriented does not mean that technical sciences do not deal with goals whereas political sciences do not deal with means. On the one hand, the constructivist tradition has properly found that technical sciences are goal-oriented, too. Even if the goals of technical sciences are considered to be the improvement of efficiency (Lorenzen, 1987, p. 239) or the reproduction of desired technical effects (Janich, 1978), the pursuit of a certain desired technical effect instead of another entails decisions about goals. This is Lorenzen's primacy of politics over techniques. Indeed, as an example, whether to investigate or not about illnesses that affect only poor populations has a political dimension. That this political dimension is often obviated in actual liberal sciences does not mean that there is not a political dimension in

technical sciences. On the other hand, a constructive theory of the economy, as sketched above, cannot only deal with goals but also with the means to achieve these goals. In fact, it is Lowe's view, which we have already discussed, that economics only deals with means to achieve certain goals whose decision does not belong to economics but to other disciplines such as politics. Thus, in the end, both natural (technical) sciences and social or human (political) sciences deal with goals and means, which have to be revealed for their constructive foundation as emergency sciences.

§8 Political Economics as an emergency science

Hence, if economics cannot be a proper natural science or a technical science, it can still be an emergency science in the constructive sense elucidated above. But it can only do so if all required means, including the closest situation possible to laboratory conditions, are employed to achieve the pursued goal, as is the case in natural sciences. If they are, claims with the abovementioned structure can be made which will have a more limited validity than equivalent claims in natural sciences but can nevertheless guide future economic policies potentially better than actual mainstream economics.

Now, let us briefly come back to a remark within Lowe's presentation of the differences between Political Economics and natural sciences to examine them from our constructive lens. Concretely, consider when Lowe claims that Political Economics is such that the practice of shaping economic processes (ultimately through control) is required before the theory can be tested, so Political Economics would not be theory in the traditional sense separated from practice. Indeed, there is not such a big difference with natural sciences if we consider them, constructively, as theorizations of pre-existing practices which only work properly under highly controlled laboratory conditions.

We can say that Lowe's intent with Political Economics is to emulate the practical success of natural sciences. His proposal is compatible with actual procedures in natural sciences as presented by a constructive understanding of science: careful control of laboratory conditions has to take place before any theory can be developed, and theory is only strictly valid under such laboratory conditions. However, his naturalist understanding of natural sciences makes him over-justify that the so-called 'reality' has to be controlled as if in natural sciences this would not be the case.

6 Conclusions: Towards a constructive theory of the economy

To close this dissertation, I would like to offer a brief reminder of the results achieved to pave the way for a future foundation of an emergency economic science.

All over the text, I have combined the use of protreptic speech, aimed at showing the need for an ortho-language, as well as the introduction of certain terms of an ortho-language, which is a requirement for a future foundation of an emergency economic science. I have proposed both general terms of philosophy of science, mostly based on the constructive tradition, and economic terms, some of them coming from the same tradition and some others developed after careful reflection about Lowe's work for the purpose of this dissertation. Following the structure of the text, I can distinguish three types of contributions provided: those related to my assessment of Lowe's critique of traditional economics, those regarding my assessment of Lowe's proposal of Political Economics, and those of a constructive alternative to Lowe's Political Economics.

§1 About Lowe's critique

Regarding the first group of contributions, a critical presentation has been made of Lowe's critique of traditional economics, set equivalent to actual mainstream macroeconomics, to justify his proposal to overcome the limitations of traditional economics. Two results have been obtained which show the actual relevance of analyzing Lowe's critique:

- 1.1 On the one hand, the present hegemony of Lowe's analytic conception of science has been highlighted and elucidated (Section 3.1.1).
- 1.2 On the other hand, I have claimed that the definition of economics is a decisive step with political relevance, showing that Lowe's definition offers advantages over existing alternatives, and provides a constructive definition of economic activity (Section 3.1.2).

Within my analysis of Lowe's critique, I have made three main contributions.

Firstly, under Lowe's conception of science, I have examined the core of his critique, his analysis of the LSD as it is still understood in economics today, obtaining three results:

- 1.3 I have clarified Lowe's argument in terms of basic propositional logic, adding the concept of laboratory conditions, to achieve two aims. On the one hand, reinforce his conclusion that the forecasting failure of traditional economics is due to the unordered social patterns of behavior caused by heterogeneous motivational patterns. Both motivations and behavior differ from the homogeneity dictated by the extremum principle and stabilizing expectations, both of which are assumed by the LSD if the latter is to hold (Section 3.2.1). On the other hand, show the cogency of Lowe's

reinterpretation of traditional economics based on the LSD as a normative theory oriented towards the achievement of equilibrium, assuming the technical efficiency of market allocations in terms of a Pareto optimum (Section 3.2.3).

- 1.4 I have updated the scope of his critique and his conclusions to actual macroeconomics (Section 3.2.2), showing two points. On the one hand, presently mainstream modeling techniques like VARs, DSGE models, large-scale macroeconometric models, and the Solow growth model have certain behavioral assumptions that make them subject to Lowe's critique. On the other hand, even heterodox proposals like ABMs or critical-realist post-Keynesian models do not escape Lowe's critique either.
- 1.5 I have identified three main features of mainstream macroeconomics, which I have named 'the three Is' of mainstream economics (Section 3.2.4): inconsistency, inaccuracy, and ideology. Inconsistency in its theoretical construct between alleged economic freedom and model-entailed constrained decision-making. Inaccuracy of economic theory to match economic practice, with the consequent forecasting failure of economic models. And ideology concerning the choice of conserving mainstream economic theory and practice after the acceptance of the two first Is. Indeed, not seriously considering the alternative of a planned economy most probably responds to ideological reasons much more than rational arguments. I have claimed that Lowe saw the first two Is through his sharp critique despite his analytic approach to philosophy of science, even if they follow much easier from a constructive theory of science. However, he could not escape ideology and this is why I claim that he does not reach all the possibilities of his proposal, which this dissertation has examined to prepare the future foundation of economic science.

Secondly, I have justified why Lowe's conception of science can be characterized as naturalist in a non-mainstream sense. To do that, I have characterized the naturalist conception of science, following the constructive tradition of Paul Lorenzen and Peter Janich, as an understanding of science as an activity oriented to the discovery of laws following the model of natural sciences (Section 3.3.2). From this perspective, science would be a theoretical and value-free undertaking aimed at the expansion of knowledge. Its procedure would be the explanation of events through a logically consistent system of statements including natural laws, to be validated through empirical research. Based on this, I have obtained two results:

- 1.6 Starting from a thorough methodological analysis of how Lowe claims the forecasting failure of traditional economics to lie on the subject matter of economics being unordered and non-autonomous (Section 3.3.1), and making economic systems a particularly problematic type of open systems, I have identified three key features of Lowe's naturalism (Section 3.3.2): (1) his focus on deductive explanation and the role of laws within scientific endeavor; (2) his not merely analytic separation of the theoretical and the practical dimensions of science, apparent in his distinction between

natural laws and rules of engineering, with the priority given to the theoretical dimension of the former; and (3) his distinction between natural sciences and social sciences lying on the different subject matters of each of them, ordered and human-independent particles building natural reality versus unordered and human-dependent human behavior of social sciences, in particular economic science.

- 1.7 Since the present jargon in philosophy of science has shifted from laws to models, I have added two observations to justify why the label of ‘naturalism’ still applies to Lowe’s conception of science: Firstly, despite this ubiquitous change, most macroeconomic models today are based to some extent on the well-known LSD, so laws are still of capital importance in present economic science even if the actual philosophy of economics does not focus on them; secondly, even if the shift were completely made from laws to models, the remaining aspects of the conception of science such as its aim being the expansion of knowledge, its correlated value-free character, its focus on explaining events (even if through models instead of laws) and its empirical procedure, all following the paradigm of how natural sciences are conceived, make it still justifiable to name such conception ‘naturalist’.

And, thirdly, I have offered an alternative, constructive conception of science, which I have claimed to be more akin to Lowe’s proposal (Section 3.3.3). Building on the constructive tradition, I have claimed sound scientific endeavor to be necessarily based on a successful pre-scientific praxis preceding it and constituting the foundation of scientific theory. In this sense, starting from the constructive primacies of praxis over theory and of politics over technical practice, I have claimed the constructive foundation of sciences to lie on the explicit statement of the means-ends structure of scientific endeavor using a precise and methodical ortho-language developed from the perspective of the participant. Hence, the tasks and objectives of science must be stated towards which all means, including scientific methodology, are directed. In this sense, I have obtained one main result:

- 1.8 I have claimed that the difference between natural and social sciences lies more in their pre-scientific practice, concretely in the difference between the type of goals and the amount and intensity of means employed to achieve such goals than in the obvious difference between subject matters. Natural, aimed at improving efficiency within certain processes, can be claimed to be close to value-free for that goal. Hence, the goal is uncontroversial and all required means are dedicated to achieving it, including the construction of laboratory conditions for the processes to take place as they are theorized. Instead, social sciences, in particular economics and above all macroeconomics, aimed at political goals, are strongly value-laden. Thus, goals are controversial, and very often not all available means are employed to achieve them. In particular, in addition to the technical impossibility of constructing laboratory conditions in economics due to their cultural-historical character, the intent to tend towards constructed laboratory conditions as closely as possible is rarely made. This is probably due to ideological reasons insofar as the order of decision-making, and

as such the type of economic system, is never seriously questioned. Acknowledging this in economics makes it quite straightforward to identify the need for control of economic behavior, which is the key to Lowe's proposal of Political Economics, as a potentially effective solution for the problems of traditional economics.

§2 About Lowe's proposal

A critical presentation has been made of Lowe's proposal of Political Economics (Section 4.1), including the consideration of important critiques (sections 4.2, 4.3.3 and 4.3.4), some of them requiring a thorough assessment of Lowe's liberal acceptance of value-relativism (Section 4.3.2). Here I have made two main contributions.

Firstly, I have elaborated a critical assessment of Lowe's mostly ideological defense of market economies and liberal science. Concerning this, I have obtained two results:

- 2.1 The potentially problematic defense by Lowe, of both market economies, even if controlled, and a concept of freedom that requires universal access to means of living (Section 4.3.1). Indeed, if Marxian-based critiques of market economies are valid, this reveals an ideological bias of Lowe's case for controlled market economies.
- 2.2 The actually problematic defense by Lowe of such a material threshold regarding means of living within his concept of freedom as the goal of any economic system, thus of economic science, and his otherwise liberal conception of science (Section 4.3.2).

Secondly, I have provided an assessment of the critiques to Lowe through logical and terminological clarifications as well as the extension of some of them to show weak spots of Lowe's proposal which may be improved by a constructive alternative to Political Economics. Regarding this, I have reached three results about Lowe's Political Economics:

- 2.3 It does not presuppose any positive laws of traditional economics despite the claims by Lowe's critical voices.
- 2.4 It is not a liberal science, the latter understood as a theoretical value-free undertaking aimed at the expansion of knowledge, probably because Lowe prioritizes a certain political-economic system close to welfare states - or new liberalism - with which a liberal science may be incompatible.
- 2.5 It requires normative economic analysis regarding goal and path selection, even if not a standard one, if social goals are to be reached, although Lowe prefers to leave it outside Political Economics as a non-scientific undertaking.

§3 About a constructive theory of the economy

Finally, an alternative to Lowe's Political Economics based on a constructive understanding of science has been sketched to pave the way for a future foundation of an emergency

economic science aimed at achieving social ends (Section 5). My main contribution here has been to identify, among heterogeneous sources, those elements that might belong to the future foundation of such a science such that I have reckoned a plausible candidate for a scientifically founded economic system and, most importantly, I have identified how I need to proceed so as to methodically justify this candidacy. My main results achieved here are three.

- 3.1 I have identified trans-subjective thinking, understood as transcending subjective interests in the decisions about norms, a constructive rationality criterion introduced by Paul Lorenzen and used by Friedrich Kambartel, as the key to methodically justify the normative selection of macroeconomic goals and thus overcome the liberal tenet of value relativism, which dominates the actual scientific panorama, including Lowe's proposal.
- 3.2 I have justified why the rational justification of goals most likely politically materializes into a process of collective deliberation and decision as in direct democracies and economically translates into a planned economy.
- 3.3 I have acknowledged the temporariness of this claim unless two critical claims are methodically justified using an ortho-language including concepts such as value, surplus value and sustainability: (a) the Marxian claim regarding the exploitative base of capitalism and its consequent contradictions and recurrent crises; (b) the eco-socialist claim about the necessary unsustainability of capitalism. Even if claim 3.2 is provisory, it can be justified from a liberal perspective as an extension of Lowe's proposal into possibilities he did not thoroughly consider.

§4 Concluding reflection

After all this analysis, it seems justified to me to claim that the main objectives of this dissertation have been achieved. Not only the limitations of actual approaches to macroeconomics have been highlighted and an alternative approach has been outlined. In addition to that, the conditions have been shown when this alternative approach, with its correlated political and economic system, can be claimed not to be a mere alternative to the actual system but a true requirement if emergencies of the contemporary world such as crises and environmental damage are to be solved.

At the end of the trip, I hope that it is quite clear what we have advanced and what is still missing for the constructive foundation of an emergency economic science. In a gist, we will need to be able to determine what is the main economic pre-scientific practice and what are its main objectives or tasks, which involves a precise definition of economic activity and consequently of production and circulation of means of living, as has been sketched in this dissertation. How actual economic theory conceptualizes such practice and what concepts are used will also have to be considered in order to assess why the actual pre-scientific practice is not meaningfully improved by mainstream theorization

and to offer a possible alternative. Here, Lowe's critique as updated in this dissertation as well as our proposed candidate system in political-economic terms will most probably play a role, the latter if only we succeed in precisely showing through an ortho-language that the present system is necessarily failed. A lot has already been done by the Marxian and the eco-socialist traditions but, since a methodical and precise ortho-language is still missing in some decisive steps, there is still work to do. However, the relevance of the issue at hand, the possibility of scientifically guiding economic policies to solve and avoid economic emergencies, makes the theoretical effort surely worthy.

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