Economic complexity and corporate governance

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Abstract

Using dynamic panel data techniques, we find that a country's corporate governance practices have a positive effect on the sophistication of its exported products. We also find that higher dispersion of governance across firms leads to lower economic complexity.

Keywords: economic complexity, corporate governance, panel data, cross-country analysis.

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1 Introduction

Traditional growth theories suggest that development materializes through the economic complexity that emerges from the interaction of agents operating in an economy (Romer, 1990; Grossman and Helpman, 1991). One of the expressions of such complexity is the degree of product diversity and sophistication embedded in a country's productive structure. While least developed countries produce a small quantity of goods, developed nations have higher aggregate production and a more diverse set of products (Hidalgo et al., 2007). Therefore, government policies aiming to fight market failures have a potentially important positive role to play in shaping a country's production structure (Hausmann et al., 2007).

One example of such market failure is generated by the existence of asymmetric information inside companies, exacerbating conflicts of interests between individuals working in the same firm. Those agency problems (Fama and Jensen, 1983) hinder a country's development and, therefore, may work as barriers to economic complexity. In this environment, corporate governance principles and laws act to mitigate these negative effects through the improvement of rules and procedures governing decision making in corporate affairs.

In this paper, we study empirically the relationship between corporate governance and economic complexity. To do so, we merge cross-country panel data containing information on both variables and use dynamic panel data techniques to mitigate endogeneity issues. We find that superior corporate governance practices lead to higher economic sophistication, whereas a larger inequality of governance across firms has a negative effect on economic complexity. The results suggest that countries with weak governance practices may reap considerable benefits in economic sophistication through policies that improve decision making within companies.

This paper is the first to bring together the economic complexity literature (Hidalgo et al., 2007; Hidalgo and Hausmann, 2009; Albeaik et al., 2017; Hartmann et al., 2017; Lapatinas, 2019) and the corporate governance studies (Bloom and Van Reenen, 2007; Claessens and Yurtoglu, 2013). We contribute to the literature by showing the existence of a significant and robust empirical association between measures studied by both groups of papers.

2 Data and Method

We consider two measures of economic complexity, both provided by MIT's Observatory of Economic Complexity. First, the Economic Complexity Indicator (ECI) combines the product diversity of a country's exports (as a proxy for this country's available capabilities) with the ubiquity of a product in the set of exported goods across countries (as a proxy for the

capabilities required by a product to be made). In a nutshell, countries have more economic sophistication if they export more complex products (Hidalgo and Hausmann, 2009). As a second measure we consider the ECI+ developed by Albeaik et al. (2017), which works similarly to the ECI, but that also considers the export value of each product in a given country.

We build corporate governance indexes at the country level using two different datasets. First, we consider the data used by Albuquerque et al. (2019), which contains corporate governance indexes for many companies based on 16 governance attributes, covering 64 countries over the 2005-2014 period.[1] We also use the data by Aggarwal et al. (2011), who calculate governance indicators based on 41 firm-level governance attributes, covering the 2002-2009 period and 23 developed countries.[2] The number of covered firms varies within country, year and dataset. We define a country's corporate governance index as the mean governance across firms, and we use the within-country coefficient of variation of corporate governance indexes across firms as the dispersion of governance practices of a given country.[3] We only keep countries with more than three years of observations in order to estimate our dynamic panel model.

We follow Hausmann et al. (2007) and Lapatinas (2019) to select a set of control variables. We use population density, the logarithm of GDP per capita, an indicator for the rule of law (Kaufmann et al., 2010), the mean years of schooling as a proxy for human capital, and the share of the population using the internet. We obtain these data from the World Bank and the UNESCO Institute for Statistics.

Lapatinas (2019) brings evidence that economic complexity presents a persistence over time. We build on this finding and define our benchmark dynamic panel specification as

$$Complex_{i,t} = \alpha Complex_{i,t-1} + \beta Gover_{i,t} + \mathbf{X}'_{i,t}\theta + \gamma_i + \delta_t + \varepsilon_{i,t}, \tag{1}$$

where $Complex_{i,t}$ represents an indicator of economic complexity in country $i = 1, \ldots, N$ at time $t = 1, \ldots, T_i$, $Gover_{i,t}$ denotes an index of corporate governance, and $\mathbf{X}'_{i,t}$ is a row vector comprising the control variables. We add the first lag of $Complex_{i,t}$ in the right hand side of (1) to specify the economic complexity formation as a dynamic process, allowing

[1]The dataset is available at https://novafinance.pt/mferreira. This corporate governance index is computed using Bloomberg's Environmental, Social and Governance (ESG) data and covers 9,612 companies globally.

[2]The corporate governance index presented in Aggarwal et al. (2011) is computed using RiskMetrics data and covers 11,890 companies, with 8,314 of them located in the US.

[3]The results do not change qualitatively if we measure a country's corporate governance as the median governance, or if we quantify governance dispersion using the standard deviation of governance across firms. These results, along with an additional description of our data, are in the supplementary material available at https://sites.google.com/site/luizbrotherhood/.

for non-instantaneous adjustments. We include country fixed effects, γ_i, year fixed effects, δ_t, and $\varepsilon_{i,t}$ is a zero-mean idiosyncratic component which is independent of all explanatory variables other than $Complex_{i,t-1}$. To estimate the parameters in equation (1), we use the Least Squares Dummy Variables Corrected (LSDVC) method extended to unbalanced data (Bruno, 2005a,b).

3 Results

Table 1 shows our empirical results. The first two columns use data from Albuquerque et al. (2019), and the remaining columns use data from Aggarwal et al. (2011). We use two specifications. In the first, our main explanatory variable is the mean corporate governance of a given country, whereas in the second specification we also consider the coefficient of variation of corporate governance across firms in a given country to disentangle the effect between the overall governance level and its within-country dispersion.

In all specifications, we find a positive and statistically significant effect of mean governance on economic complexity, with coefficient estimates ranging from 0.30 to 1.75. See Claessens and Yurtoglu (2013) for a discussion of candidate mechanisms through which governance may affect complexity.

To further understand the effect of corporate governance on economic complexity, we study the role of the dispersion of governance across firms, within country. To measure dispersion, we use the coefficient of variation of corporate governance obtained from the dataset by Aggarwal et al. (2011). Although the dataset by Albuquerque et al. (2019) has more observations, the number of surveyed firms in a given country is considerably lower, precluding the investigation on dispersion. In fact, 12% of the observations in the latter dataset are associated with only one surveyed firm, whereas in the former there are only two observations that fit this case.

Economic complexity is built through a network of corporations whose outputs are used as inputs by other firms. Weak corporate governance practices in a given firm may generate productivity losses and low-quality products that negatively affect the output of other firms, potentially yielding adverse aggregate effects (Jones, 2011). Thus, economic complexity may be determined not only by the overall level of corporate governance in a given country, but also by its dispersion across firms. Consistent with this, the estimates in columns four and six show that corporate governance dispersion is negatively associated to economic sophistication after controlling for mean governance, with estimates equal to -1.43 (ECI) and -6.56 (ECI+).

Table 1: The effect of corporate governance on economic complexity

	(1) ECI	(2) ECI+	(3) ECI	(4) ECI	(5) ECI+	(6) ECI+
ECI (lag)	1.05***		4.75***	5.03***		
	(0.044)		(0.00037)	(0.00024)		
ECI+ (lag)		1.15***			15.8***	20.8***
		(0.033)			(3.4e-07)	(6.7e-08)
Mean of C. Governance	0.33*	0.30*	1.15***	0.87***	1.75***	1.26***
	(0.18)	(0.17)	(0.22)	(0.22)	(0.076)	(0.078)
CV of C. Governance				-1.43***		-6.56***
				(0.25)		(0.089)
Log of GDP per capita	-0.10	-0.18**	-1.16***	-1.24***	-3.02***	-3.97***
	(0.092)	(0.080)	(0.20)	(0.20)	(0.070)	(0.070)
Internet	-0.16	0.078	-1.04***	-1.17***	-1.64***	-2.47***
	(0.14)	(0.13)	(0.17)	(0.17)	(0.060)	(0.061)
Population density	0.011	0.0046	-0.020***	-0.014**	-0.042***	-0.025***
	(0.0073)	(0.0061)	(0.0065)	(0.0066)	(0.0023)	(0.0023)
Years of schooling	-0.026	-0.024	-0.0067	0.011	-0.12***	-0.057***
	(0.027)	(0.025)	(0.024)	(0.025)	(0.0086)	(0.0088)
Rule of law	0.020	0.0096	0.55***	0.57***	1.26***	1.63***
	(0.076)	(0.072)	(0.095)	(0.095)	(0.033)	(0.034)
Observations	372	372	112	112	112	112
Number of countries	51	51	22	22	22	22
Avarage number of periods	7.29	7.29	5.09	5.09	5.09	5.09
Period	2005-2014	2005-2014	2002-2009	2002-2009	2002-2009	2002-2009
Significance of Model (χ^2)	19.9	14.1	379	2053	4904	145189
p-value	0.0029	0.029	0.0000	0.0000	0.0000	0.0000

Notes. Bootstrapped standard errors based on 500 replications reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The *significance of the model* refers to the chi-squared values for the Wald tests of joint significance of the explanatory variable coefficients, excluding the lagged dependent variable. The initialization is based on the Blundell and Bond (1998) system GMM estimator. Variables: ECI and ECI+ = Economic complexity indexes; Mean/CV of C. Governance = country's mean/coefficient of variation of firm-level corporate governance index; Log of GDP per capita = logarithm of real per capita GDP; Internet = fraction of population with internet access; Population density = people per square km of land area; Years of schooling = average total years of schooling for adult population; Rule of Law = rule of law index of Kaufmann et al. (2010).

4 Conclusion

We document a positive effect of corporate governance practices on economic sophistication, and a negative association between within-country governance inequality across firms and economic complexity. These findings suggest that a country's degree of product sophistication accelerates through policies that improve the overall governance level and/or that alleviate the inequality of governance practices across companies.

Future research could advance in two directions. First, exploring the mechanisms behind the relationship between economic complexity and corporate governance could generate new insightful policy recommendations. Second, one could evaluate the robustness of the association between corporate governance and economic complexity by using other datasets that contain corporate governance information, such as Thomson Reuters' ASSET4 ESG data (Cheng et al., 2014; Duong et al., 2016).

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