

When sophistication matters: productive competitiveness and capital market development

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Abstract

Purpose – This study aims to examine the role of productive competitiveness in capital market development, emphasizing its importance in countries with weaker institutional environments. Productive competitiveness is defined as a country's capability to produce a diverse range of complex products, measured through the economic fitness index (EFI).

Design/methodology/approach – Using panel data for 98 countries during 1997–2022, the analysis applies fixed-effect instrumental variable regressions to assess the effect of EFI on capital market development and tests the interaction between EFI and institutional quality. The economic complexity index is used as a robustness check.

Findings – Results show that productive competitiveness is a key driver of financial deepening. The interaction term indicates that the effect of the EFI becomes more important in countries with weaker institutional quality, suggesting that productive sophistication plays a comparatively stronger role in explaining capital market development when institutional conditions are less favorable.

Practical implications – EFI can guide firm-level diversification strategies and serve as an information-signaling metric for investors by revealing the sophistication and scalability of firms' productive capabilities. For policymakers, EFI enables the prioritization of high-complexity sectors and helps attract long-term capital, broadening market participation and strengthening financial system resilience. These strategies should be coordinated with institutional improvements, given the interaction between EFI and institutional quality.

Originality/value – This study suggests that productive competitiveness, measured through the EFI, is a significant driver of capital market development and becomes more important where institutional quality is weak. These results are grounded in the evolutionary and sequential view of financial development, in which productive sophistication precedes financial sophistication.

Keywords Capital market development, Economic fitness index (EFI), Economic complexity index (ECI), Institutional quality

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1. Introduction

The capital market constitutes an essential mechanism for channeling private funds into diverse economic sectors, including corporations, small and medium-sized enterprises and governments. Empirical evidence underscores its crucial role in financing innovation and technology and, more broadly, long-term projects involving high risk, particularly for firms unable to obtain financing through traditional banking systems (Demir, 2025; Demirgüç-Kunt and Maksimovic, 2002; Gupta and Gregoriou, 2018; Guru and Yadav, 2019; Ngong *et al.*, 2024; Omar *et al.*, 2022). These dynamics foster a close bidirectional relationship between the capital market and economic growth.

Recent studies also highlight the importance of the capital market for financial stability. This research shows that after a recession, economic recovery and investment are greater in

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countries with a deeper capital market than the credit market. Similarly, systems that are more dependent on the banking system tend to have a higher systematic financial risk (Bats and Houben, 2020; Grjebine *et al.*, 2018; Narayan *et al.*, 2023).

Given their critical importance, the literature has extensively investigated the determinants of capital market development. However, certain gaps persist, particularly with regard to the role of productive structures in fostering capital market development. This is especially important, as it is challenging for a country to develop its capital market if it relies solely on firms producing a narrow range of low-value-added goods that can be easily replicated elsewhere. Against this backdrop, this research explores the relationship between the competitiveness of national productive systems and the advancement of the capital market.

Competitiveness is framed as a function of productive system complexity and diversification. A “complex” product is defined as one that is difficult to replicate (exhibiting low ubiquity) and predominantly manufactured in locations capable of producing a wide array of other products (characteristic of highly diversified economies). This conceptual framework originated with Hidalgo and Hausmann (2009), who introduced the Economic Complexity Index (ECI). Subsequently, Tacchella *et al.* (2012) refined this framework by introducing the Economic Fitness Index (EFI), which more accurately captures the embedded productive capabilities and diversification potential of national economies. In simple terms, the fitness of a country is the sum of how many products it can produce competitively, weighted by how complex those products are. Similarly, the most complex products are those that are produced by the countries with the highest fitness. Additionally, the EFI overcomes some conceptual, mathematical and economic shortcomings of the ECI, as explained in detail in Tacchella *et al.* (2012) and Cristelli *et al.* (2013).

Building on this theoretical foundation, this study proposes the hypothesis that countries whose firms are capable of producing a wide array of complex goods competitively are more likely to develop an advanced capital market. From the issuers’ perspective, as companies become more complex, they tend to have to finance more sophisticated, risky and longer-term projects that could not be adequately covered with traditional bank financing (Allen and Gale, 1999; Didier *et al.*, 2020; Gupta and Gregoriou, 2018; Hsu *et al.*, 2014). For investors, the productive complexity of a company is associated with attributes demanded by them in the capital market: higher productivity, profits and size, as well as greater stability in production and demand (Felipe *et al.*, 2012; Guan and Cheng, 2020; Maggioni *et al.*, 2016). Additionally, it is hypothesized that in countries with weaker institutional frameworks, productive sophistication and diversification become more crucial to compensate for these institutional shortcomings.

2. Literature review

2.1 Determinants of capital market development

The determinants of capital market development have been extensively studied. The first stream emphasizes macroeconomic stability as a prerequisite for market deepening. In a cross-country assessment, Laeven (2014) shows that countries with low inflation and credible fiscal-monetary frameworks exhibit deeper markets and stresses that macro stabilization should be sequenced before market development reforms. Using South African data, Ho (2019) finds that banking sector development and real economic growth foster stock market capitalization, whereas inflation and the real interest rate hinder it; Ho and Odhiambo (2020) report comparable results for Hong Kong. Beyond domestic fundamentals, Jena *et al.* (2026) highlight that equity markets display persistent medium-to long-run comovement with USA monetary policy, implying that improvements in domestic macro indicators alone have been insufficient to mitigate external vulnerability, thereby reinforcing the need for complementary institutional strengthening.

A second stream examines how banking systems and security markets evolve jointly. Yartey (2008) documents a non-monotonic relationship: banking intermediation initially

facilitates capital market development, but as both segments expand, banking dominance can begin to compete with and constrain market deepening. [Demirgüç-Kunt et al. \(2013\)](#) indicate instead that at the aggregate level, banks and capital markets evolve sequentially and are complementary, with securities markets gaining importance as economies become more financially sophisticated. [Otinga et al. \(2024\)](#) add that broader financial participation, through financial inclusion and openness, reinforces capital market development by expanding access to the formal financial system and increasing market liquidity.

A third stream identifies institutional quality as a key driver of capital market development. Strong legal protection and credible enforcement reduce contracting frictions and increase investor confidence. [La Porta et al. \(1997\)](#) show that better shareholder protection is associated with deeper financial markets. Subsequent evidence confirms this mechanism: [Billmeier and Massa \(2009\)](#) find that institutional quality predicts higher stock market capitalization in emerging markets, even after controlling for macroeconomic shocks, while [Bayar \(2016\)](#) documents similar results for European Union transition economies using indicators of rule of law, regulatory quality and control of corruption. [Dima et al. \(2018\)](#) further suggest that the rule of law reduces uncertainty and transaction risks. Beyond domestic institutions, [Yan et al. \(2025\)](#) report that the effect of stock market liberalization depends on institutional strength, with global investors reinforcing market development only where regulatory and normative frameworks are robust. Together, these studies show that strong institutions expand the investor base, reduce informational asymmetries and enable price discovery and efficient capital allocation.

Additionally, institutional investors, in particular pension funds, act as catalytic players in capital market development. By accumulating long-term assets and operating as strategic, informed investors, they expand the demand for securities and stimulate new issuance. Pension fund accumulation increases market liquidity, financial innovation and market capitalization, reinforcing market depth ([Babalos and Stavroyiannis, 2020](#); [Dibal et al., 2024](#); [Enache et al., 2015](#); [Sanusi and Dickason-Koekemoer, 2025](#)).

In summary, existing studies rely primarily on institutional quality, banking development and macroeconomic stability, leaving a gap in the analysis of how the structure and sophistication of national production shape capital markets. This study contributes by evaluating the relationship between productive competitiveness, measured through the EFI, and capital market development and by testing whether its effect becomes more decisive in weaker institutional environments.

2.2 Sequencing in capital market development

The literature emphasizes a sequential process in which foundational elements precede the emergence of complex financial markets. Initially, markets favor simple and low-risk instruments with easily monitored contracts ([De la Torre and Schmukler, 2007](#); [Karacadag et al., 2003](#); [Laeven, 2014](#); [Luengnaruemitchai and Ong, 2005](#)). As firms accumulate internal capabilities, specialized knowledge and technological sophistication, they undertake more complex and longer-term projects whose financing needs exceed what basic instruments can provide. Empirical research confirms this sequencing ([Demirgüç-Kunt et al., 2013](#); [Bhattacharyay, 2011](#); [Yartey, 2008](#); [Ho, 2019](#)).

This business evolution is consistent with the evolutionary theories developed by [Nelson and Winter \(1982\)](#) and expanded by [Dosi \(1988, 2023\)](#), who argue that economic growth is grounded in the internal accumulation of knowledge, organizational routines and specialized micro-capabilities. As firms develop these capabilities, they transition toward increasingly sophisticated productive activities.

In line with this evolutionary view, the theory of economic complexity and fitness ([Hidalgo and Hausmann, 2009](#); [Tacchella et al., 2012](#)) provides an empirical measurement framework to capture how the accumulation and recombination of productive capabilities enable an economy to diversify its output toward increasingly complex products. This recombination

process drives virtuous dynamics in which new combinations of existing knowledge and capabilities give rise to sophisticated products. In this context, financing requirements tend to become more complex, suggesting a demand for financial instruments beyond those offered by traditional financing channels.

Consistent with this evolutionary view, financial market investors also adapt to increasing productivity complexity. As firms introduce more sophisticated projects and products, investors learn, update heuristics and develop more advanced evaluation strategies, consistent with the adaptive behavior highlighted by [Lo \(2004\)](#) and [Farmer and Lo \(1999\)](#).

Altogether, these perspectives suggest that productive sophistication precedes financial sophistication, providing the theoretical basis for examining whether productive competitiveness (EFI) enables capital markets to deepen.

3. Method

3.1 Data

The study period spans from 1997 to 2022 for a sample of 98 countries. The choice of the sample and the study period are dictated by the availability of information, resulting in an unbalanced panel.

The dependent variable is capital market development, measured by market capitalization as a proportion of gross domestic product (GDP). The variable of interest, on which the research hypothesis is built, is the complexity level of the productive system of the countries measured by the EFI ([Tacchella et al., 2012](#)). For robustness purposes, the hypothesis for the ECI proposed by [Hidalgo and Hausmann \(2009\)](#) will also be tested.

The control variables used are those found in the literature: the development of the banking system, the level of institutionality and macroeconomic stability. [Table 1](#) provides the definitions and data sources for the variables used in the estimation, while [Table 2](#) summarizes the descriptive statistics.

Table 1. Data sources and variable definition

Variable	Definition	Source
Stock market capitalization	Stock market capitalization as a percentage of GDP, in logs	WB, WFE, FIAB, National
Economic Complexity Index (ECI)	Measure of the relative production sophistication of an economy	OECD
Economic Fitness Index (EFI)	Measure of a country's economic competitiveness by analyzing its capacity to diversify and adapt to producing more complex goods	Tacchella et al. (2012)
Private credit	Domestic private credit to the real sector by deposit money banks as a percentage of GDP, in logs	WB
Government expenditure	Government expenditure as a percentage of GDP, in logs	IMF
Commercial openness	Ratio of the sum of exports and imports divided by GDP (constant 2015 USD), in logs	WB
Institutions	Average of the World Governance Indicators	WB
Uncertainty	World Uncertainty Index	Ahir et al. (2022)
Country class	Classification of countries into standalone, frontier, emerging, and developed countries	MSCI

Source(s): WB: World Bank; WFE: World Federation of Exchanges; FIAB: Federación Iberoamericana de Bolsas; OEC: Observatory of Economic Complexity; IMF: International Monetary Fund; MSCI: MSCI Inc

Table 2. Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Stock market capitalization	2,230	52.35	51.99	0.05	330.82
Economic Complexity Index (ECI)	2,117	0.30	0.93	−2.41	2.24
Economic Fitness Index (EFI)	2,548	1.57	1.80	0	13.06
Private credit	2,452	59.69	42.84	0.19	304.58
Government expenditure	2,499	32.81	11.54	8.66	66.52
Commercial openness	2,168	0.84	0.57	0.15	3.85
Institutions	2,548	0.29	0.87	−1.86	1.95
Uncertainty	2,262	0.19	0.16	0	1.34

3.2 Estimation method

To find the relationship between the economic complexity of a country and the development of its capital market, the following panel regression is proposed:

$$CM_{it} = \alpha + \beta C_{it-1} + W_{it-1}\varphi + d_t + \theta_i + \varepsilon_{it} \quad (1)$$

CM_{it} is the development of the capital market. This variable was proxied by the market capitalization (%GDP). C_{it-1} measures the complexity level of the productive system of the countries and the variable of interest and is approximated by the EFI. In the robustness check section, EFI will be substituted with ECI. W_{it-1} contains the control variables: the development of the banking system measured by private credit (%GDP), the level of institutionality and macroeconomic variables such as commercial openness, government expenditure and the World Uncertainty Index. To model unobservable heterogeneity, the variable θ_i (fixed effect by country i) is included. A time-fixed effect d_t is introduced to capture shocks to the dependent variable that simultaneously affect all countries in the sample. i indexes countries; t indexes time periods (years) and ε_{it} represents the error term.

The estimation of the parameter of interest β can be affected by the presence of endogeneity in the regressor. This biases the estimated coefficients positively or negatively depending on the correlation between the endogenous variable and the error term, making the estimated effects uncertain. For this reason, [Equation \(1\)](#) will be estimated using fixed-effects instrumental variables (FE-IV) panel model. These variables include the number of patent applications, years of schooling and population density, as well as lags of the variable of interest. In addition, for comparative purposes, the results of fixed-effects ordinary least squares (FE-OLS) with lagged variables will also be presented. [Appendix A](#) provides a detailed explanation of each of the instrumental variables used, along with the associated statistical measures. The definitions and sources are reported in [Appendix A, Table A.1](#), while the descriptive statistics are summarized in [Appendix A, Table A.2](#).

4. Results

4.1 Main findings

4.1.1 Impact of economic fitness on capital market development. [Table 3](#) presents the estimation results obtained from the FE-IV panel model and the FE-OLS panel model with lagged variables. Models 5 and 6 evaluate the impact of the EFI on capital market development while incorporating control variables in the FE-IV framework. In both models, the EFI has a positive and statistically significant effect on capital market development, with coefficients close to 0.2, slightly higher than the 0.17 coefficient obtained in the FE-OLS model (Model 4). These results support the main hypothesis of this study. The difference between Models 5 and 6 lies in the set of instrumental variables used in the first stage. Model 5 uses the second lag of the

Table 3. Results from fixed-effect instrumental variables, interaction effects and ordinary least squares models (with lagged variables): economic fitness as the main study variable

Variables	FE-OLS Model 1	Model 2	Model 3	Model 4	FE-IV Model 5	Model 6	Model 7
Economic fitness	0.0937*** (0.0301)			0.175*** (0.0460)	0.199*** (0.0553)	0.194 *** (0.0534)	0.302*** (0.0856)
Private credit		0.189** (0.0766)		0.155** (0.0821)	0.188** (0.0915)	0.183* (0.0904)	0.198** (0.0935)
Institutions			0.594*** (0.191)	0.431* (0.222)	0.497* (0.256)	0.474* (0.261)	0.698** (0.282)
Economic fitness × institutions							−0.119** (0.0595)
Commercial openness				0.379* (0.214)	0.490** (0.222)	0.500** (0.225)	0.521** (0.220)
Government expenditure				0.0703 (0.194)	0.0658 (0.226)	0.0387 (0.236)	0.141 (0.229)
World Uncertainty Index				−0.0279 (0.0956)	−0.0546 (0.107)	−0.0390 (0.108)	−0.0495 (0.109)
Year dummies	YES	YES	YES	YES	YES	YES	YES
Observations	2,230	2,160	2,230	1,645	1,372	1,337	1,372
Countries	98	98	98	82	81	77	81
R-squared	0.187	0.201	0.204	0.272	0.286	0.299	0.279
F-statistic Wald chi2-statistic	21.58	20.59	19.82	19.80	739.9	1,180	739.3
Weak identification test							
Kleibergen–Paap rk Wald F statistic					74.8	66.3	27.898
Overidentification test							
Sargan–Hansen (p-value)					0.2572	0.4653	0.2968

Note(s): External instruments:
Models 5 and 7: Economic fitness (t-2), patent applications (t-1), dummy PBIPC (t-1), years of schooling (t-1) and years of schooling × dummy PBIPC (t-1)
Model 6: Economic fitness (t-2), patent applications (t-1, t-2), population density (t-1, t-2) and years of schooling (t-1)
Robust standard errors in parentheses: ****p* < 0.01, ***p* < 0.05 and **p* < 0.1
All variables were lagged by one period except the World Uncertainty Index

EFI, the first lag of the number of patents and years of schooling as external instruments. In the latter, the analysis controls for a possible non-linear relationship associated with income measured by GDP per capita. As a result, schooling is relevant for determining productive complexity for countries with below-average incomes, while the opposite is true for patents. In Model 6, the second lag of the EFI, the first and second lags of number of patents and population density, as well as the first lag of years of schooling are used as external instruments. To enhance transparency, the main diagnostic statistics supporting instrument validity are reported. The Kleibergen–Paap rk Wald F statistics are well above conventional thresholds (e.g. 74.8, 66.3 and 27.9 in Table 3), rejecting the null hypothesis of weak instruments. Furthermore, the Sargan–Hansen tests yield *p*-values (e.g. 0.257, 0.465 and 0.297), which fail to reject the null hypothesis of valid overidentifying restrictions. Together, these diagnostics provide strong evidence of instrument relevance and validity within the FE-IV framework.

Consistent with the existing literature, the findings also indicate that the financial system has a positive and significant impact on capital market development, with coefficients of approximately 0.18 in the FE-IV models (Models 5 and 6) and 0.155 in the FE-OLS model (Model 4). Similarly, institutional quality exerts a positive and significant influence, with coefficients of around 0.47 in the FE-IV models and 0.43 in the FE-OLS model. Among the institutional variables, regulatory quality emerged as the most significant factor (see [Appendix B, Tables B.1 to B.6](#) for detailed results). Models 1 through 3 present the results for economic fitness, private credit and institutions individually (including only time dummies as controls). All three variables are statistically significant and exhibit the expected signs.

4.1.2 Interaction of economic fitness and institutional quality in capital market development. A relevant question that arises from these results is how institutions interact with competitiveness and productive complexity. Therefore, this interaction term is incorporated into Model 7. As a result, the economic fitness parameters increase from 0.194 in Model 6 without interaction to 0.302, while maintaining high statistical significance (p -value of 1%). Similarly, the effect of institutions rises from 0.474 to 0.698 and becomes more statistically significant (from p -value of 10%–5%). The rest of the variables maintain similar parameters to the case without interaction, since the increase in the parameters of economic fitness and institutions gives room for an interaction of -0.119 that is statistically significant (p -value of 5%). The intuition behind this result is that when countries exhibit low institutional quality (negative values of the variable), the importance of developing productively competitive firms is greater. To gain further insight into the role of institutional quality, the institutional variable is decomposed into its main components. The results ([Appendix B, Table B.3](#)) show that regulatory quality emerges as the most influential individual component, followed by the rule of law. In both cases, the interaction terms remain statistically significant (-0.102 and -0.0917 , respectively).

This analysis highlights the importance of economic fitness, financial system development and institutional quality in fostering capital market growth, providing valuable insights for policymakers and researchers alike.

4.2 Robustness checks

To assess the robustness of the results, the analysis is replicated using the ECI as an alternative measure of productive sophistication. [Table 4](#), analogous to [Table 3](#), presents the estimation results obtained from the FE-IV panel model and the FE-OLS panel model with lagged variables. In the case of FE-IV, the impact of the ECI is positive and significant at the 10% level, with a magnitude of approximately 0.31 (average of Models 5 and 6), which is greater than the 0.197 observed in FE-OLS (Model 4). The instruments used are similar to those employed in the panel with instrumental variables for EFI ([Table 3](#)). The only difference, compared to the EFI regression, is that trade openness is not significant as a control variable. However, it is positive and significant in the first stage as an external instrument. In all three models, the Kleibergen–Paap rk Wald F-statistics indicates that the instruments are rejected as weak. The Sargan–Hansen test suggests that the model is not over-identified. The development of the financial system and institutions exhibits statistically significant parameters of very similar magnitude to those observed when EFI was used as the variable under study. In the FE-IV model, the impact of the financial system is approximately 0.18, while that of institutions is 0.49. Meanwhile, in the FE-OLS model, the parameters are 0.139 and 0.411, respectively.

As in the case of EFI, in Model 7, the interaction between institutions and productive complexity is studied using the ECI. As a result, the parameters of economic complexity increase from 0.306 in the model without interaction to 0.463, although its statistical significance increases (p -value decreases from 10% to 1%). Likewise, the effect of institutions rises from 0.487 to 0.645 with a higher significance (p -value decreases from 5% to 1%). The rest of the variables maintain similar parameters to the case without interaction, since the

Table 4. Results from fixed-effect instrumental variables, interaction effects, and ordinary least squares models (with lagged variables): economic complexity as the main study variable

Variables	FE-OLS				FE-IV		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Economic complexity	0.233** (0.107)			0.197* (0.104)	0.311* (0.171)	0.306* (0.171)	0.463*** (0.171)
Private credit		0.189** (0.0766)		0.136* (0.0736)	0.179** (0.0884)	0.179** (0.0884)	0.167* (0.0860)
Institutions			0.594*** (0.191)	0.411** (0.198)	0.487** (0.239)	0.487** (0.239)	0.645*** (0.248)
Economic complexity × institutions							−0.348** (0.158)
Government expenditure				0.0498 (0.146)	−0.0235 (0.233)	−0.0249 (0.233)	−0.0600 (0.233)
World Uncertainty Index				−0.0802 (0.0904)	−0.0681 (0.102)	−0.0690 (0.102)	−0.0303 (0.0984)
Year dummies	YES	YES	YES	YES	YES	YES	YES
Observations	1,828	2,160	2,230	1,747	1,280	1,280	1,280
Countries	88	98	98	87	80	80	80
R-squared	0.192	0.201	0.204	0.225	0.291	0.291	0.308
F-statistic Wald chi2- statistic	25.82	20.59	19.82	25.13	743.2	746.4	818.5
Weak identification test							
Kleibergen–Paap rk					594.5	793.0	607.9
Wald F statistic							
Overidentification test							
Sargan–Hansen (p-value)					0.3063	0.2976	0.3358
Note(s): External instruments:							
Models 5 and 7: Economic complexity (t-2), patent applications (t-1), dummy PBIPC (t-1), years of schooling (t-1), years of schooling × dummy PBIPC (t-1) and commercial openness (t-1)							
Model 6: Economic complexity (t-2), patent applications (t-1), years of schooling (t-1) and commercial openness (t-1)							
Robust standard errors in parentheses: *** <i>p</i> < 0.01, ** <i>p</i> < 0.05, * <i>p</i> < 0.1							
All variables were lagged by one period except the World Uncertainty Index							

increase in the parameters of economic complexity and institutions leads to a statistically significant interaction of −0.348 (*p*-value of 5%). As in the case of EFI, this result also underscores the fact that, when the level of institutionalization is low, the importance of developing complex companies increases. When institutions are disaggregated ([Appendix B, Table B.6](#)), regulatory quality remains the most important individually, followed by rule of law, control of corruption and political stability. In all cases, the interactions are significant.

5. Discussion

The findings provide robust evidence supporting the hypothesis that a country’s productive competitiveness, as measured by the EFI, plays a significant role in capital market development. Crucially, the analysis reveals that this relationship is not isolated: it interacts significantly with institutional quality, particularly in environments where institutional frameworks are weak. In such contexts, productive complexity assumes a compensatory role by mitigating structural limitations and enhancing financial signaling, thereby facilitating capital market expansion and resilience. This effect can be understood as follows: more sophisticated firms rely less critically on the quality of the institutional environment – including regulatory frameworks and

enforcement – than less sophisticated firms, as their internal capabilities allow them to better sustain complex production. In addition, as discussed above, they tend to be more highly valued by investors due to attributes such as greater transparency, productivity and demand stability. These characteristics can support a positive investor assessment even in weaker institutional contexts, thereby partially offsetting the constraints imposed by those environments.

These results extend prior research that has traditionally emphasized institutional quality and financial system development as primary drivers of market deepening. By integrating the EFI into the analytical framework, the study highlights the relevance of embedded productive capabilities in shaping financial architecture. Robustness checks using the ECI confirm the consistency of these findings. Moreover, the disaggregation of institutional components reveals that regulatory quality exerts the strongest individual influence on capital market development and exhibits the most significant interaction with productive competitiveness, particularly in low-institutional environments. While the aggregate variable institutions is statistically significant and captures the combined effect of all institutional dimensions, the lower statistical significance of the remaining components does not imply that they are less important, as their contribution is already reflected in the aggregate institutions measure. As such, separating the components may not fully capture the broader interplay through which institutional factors jointly influence capital market development, and this remains an important avenue for future research.

These findings carry distinct implications for both corporate strategy and public policy. Firms can use the EFI as a strategic diagnostic tool to locate their position in the national and global network of productive capabilities and to design product diversification roadmaps aligned with their current capability set. Importantly, disclosure should communicate both the baseline fitness position and, where strategically appropriate, the forward trajectory. The baseline fitness position should include the firm's current EFI score and rank, its relative domestic and international standing, its distance from the relevant frontier and to peer benchmarks and revenue and profit generation by fitness tier, including the share of revenues and earnings attributable to higher fitness activities and their recent growth. The forward trajectory should specify adjacency opportunities, milestones and plans and budgets to close capability gaps. Taken together, this information and standardized fitness-based key performance indicators (KPIs) provide clear signals for investors, reduce information asymmetries, align expectations with productive fundamentals and can support performance linked financing tied to fitness milestones. In this line, [Loughran and McDonald \(2024\)](#) show that firm complexity makes valuation more difficult and complicates the interpretation of information by market participants, underscoring the importance of conveying clear signals to auditors, analysts and investors. Complementing this view, [Ashraf et al. \(2024\)](#) find that complex firms may actually enhance price forecasting efficiency when disclosure practices and monitoring mechanisms are sufficiently robust, indicating that complexity does not necessarily imply persistent opacity in market pricing. Although these studies operate at the firm level, they provide micro-foundations for the mechanisms – disclosure, monitoring and information processing – through which productive complexity can scale up to shape capital market development at the aggregate level, which is the focus of the empirical analysis.

From a policymaker standpoint, the results motivate the adoption of industrial and capital market promotion frameworks that objectively prioritize sectors with the capacity to scale fitness, as a means to broaden market participation and reinforce systemic resilience.

6. Conclusions

The development of the capital market is an important factor for economic growth and financial stability. However, fostering such development is particularly challenging in countries where firms are concentrated in a narrow range of low-value-added goods that are easily replicated. This study proposes that the competitiveness of a country's productive system is a key determinant of capital market development. Competitiveness is proxied by the

EFI (Tacchella *et al.*, 2012), which captures both the diversity and complexity of a country's output as an expression of its embedded productive know-how, that is, its intangible capabilities. Within this framework, complex products are defined as those that are difficult to imitate (low ubiquity) and are typically produced highly diversified economies. For robustness, the ECI (Hidalgo and Hausmann, 2009) is used as an alternative proxy for productive complexity.

The hypothesis is supported by two factors. From the perspective of issuers, as a firm becomes more complex, it tends to require financing for more sophisticated, risky and long-term projects that can no longer be adequately covered by traditional bank financing. From the perspective of investors, a firm's productive complexity is associated with attributes that are highly valued in capital markets: high productivity, profitability and size, as well as stability in production and demand.

The analysis reveals that a country's economic fitness, as anticipated, exerts a positive and statistically significant influence on capital market development. This relationship persists even when accounting for other well-established determinants identified in the literature, such as banking sector development and institutional quality, both of which retain statistical significance and align with their expected signs (positive). Additionally, the EFI outweighs these factors in terms of statistical significance. Furthermore, this conclusion remains robust when substituting EFI with the ECI as an alternative measure of economic complexity. When institutions are disaggregated, regulatory quality emerges as the most statistically significant factor. In a final estimation, the relationship between economic fitness and institutional quality was analyzed. The findings indicate that, in countries with low institutional quality, the need to foster the development of complex and productively competitive firms becomes increasingly critical.

The findings, which highlight the pivotal role of economic fitness in capital market development, suggest actionable implications for both firms and policymakers. The former may use the EFI as a strategic diagnostic tool to assess their position within the global network of productive capabilities and to design diversification paths that enhance technological sophistication. This trajectory not only strengthens their profile as issuers but can also be strategically communicated to reduce information asymmetries and improve financing terms. Incorporating fitness metrics into corporate reporting would enable a more precise articulation of firms' evolutionary potential, aligning investor expectations with productive fundamentals. In parallel, economic authorities could embed these indicators into industrial and capital market promotion frameworks, objectively prioritizing sectors with the capacity to scale in fitness as a means to broaden market participation and reinforce systemic resilience.

Notwithstanding these findings, this study has some limitations. Data availability results in an unbalanced panel, and although fixed-effect control for unobserved heterogeneity, primarily capturing time-invariant factors, some time-varying factors may remain unaccounted for. In addition, results from a cross-country sample may not fully generalize to specific institutional contexts. These limitations suggest caution in interpretation and motivate further research using more granular data.

Finally, while this study has been conducted at the country level, future research should explore more granular mechanisms linking productive competitiveness and capital market development. Firms operate under sharper resource constraints and typically expand through coherent specialization within related product and technology clusters. In particular, an important avenue is the use of firm-level data to examine how the EFI translates into differential access to capital markets, financing conditions, and investor participation. Additionally, further research could investigate the specific channels through which institutional quality, especially regulatory quality, interacts with productive competitiveness to shape financial development outcomes. Exploring these micro-level and institutional mechanisms would provide a deeper understanding of how productive sophistication leads to capital market expansion.

Supplementary material

The supplementary material for this article can be found online.

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