Multidimensional Economic Complexity and Fiscal Crises

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Abstract

In the last two decades, numerous fiscal crises have profoundly affected the trajectories of many nations. Yet, the susceptibility to such crises has not been uniform across countries: with many reaching different levels of severity and frequency of fiscal disruptions (Medas et al., 2018; Petrova et al., 2011).

Understanding the varied factors that contribute to fiscal resilience is crucial for guiding policy interventions. In this context, a growing body of research suggests that the economic complexity of a country plays an important role in its stability and resilience. Economic complexity, assessed through methods that analyze the geographic distribution of economic activities, serves as an indicator of a nation's productive structure (Balland et al., 2022; Hausmann et al., 2014; Hidalgo, 2021; Hidalgo and Hausmann, 2009). This structure captures multiple economic, social, and environmental factors that should be critical for an economy's stability and its ability to withstand fiscal shocks. Indeed, countries with higher complexities have been found to be less fragile to fiscal crises (Gomez-Gonzalez et al., 2023b), have lower volatility in economic growth (Güneri and Yalta, 2021; Maggioni et al., 2016), have lower inflation (Al Marhubi, 2021), and lower sovereign yield spread (Gomez-Gonzalez et al., 2023a; Özmen, 2019).

But all the research on the ability of economic complexity to explain fiscal outcomes comes from using international trade data (Hausmann et al., 2014). While trade data has been the standard in international comparisons of productive structure, a more recent approach suggests a multidimensional method to economic complexity (Stojkoski et al., 2023). The idea behind this approach is that relying solely on trade data can obscure vital aspects of an economy's structure, particularly in innovative activities such as technological production and research output. By

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integrating data on these activities, the multidimensional approach captures a fuller spectrum of activities, thereby providing a more accurate assessment of the complexity of a country and its impact on economic outcomes.

Here, we explore the role of multidimensional economic complexity, captured through two dimension: trade and research[1], on the likelihood of a country to mitigate a fiscal crisis. By utilizing hazard duration analysis and a comprehensive dataset covering 131 countries and over 230 fiscal crisis episodes from 1995 to 2021, we find evidence that multidimensional economic complexity significantly reduces the probability of experiencing a financial crisis. Namely, our analysis suggests that the individual dimensions of trade and research alone are not robustly related with the likelihood of a country to experience a fiscal crisis (see Table 1, columns 1-3, 6-8). In contrast, it is their interaction that has the largest explanatory power: countries that score highly in both the trade and research dimension have the lowest chance to have a fiscal crisis (Table 1, columns 4-5). Interestingly, we also find that having a developed economy in one dimension actually has a positive impact on the chance for a fiscal crisis. This could be potentially a result of neglecting other dimensions – a robust economy should be complex in multiple dimensions. These results are statistically robust when including additional controls that may affect the chance of a fiscal crisis: the regulatory quality of the country, the interest expenses as a % of GDP, the real GDP growth, and the rule of law.

Our findings underscore the importance of the multidimensional approach to economic complexity in structural resilience and safeguarding against fiscal instability.

[1] The technology dimension calculated using patent data has also been part of the multidimensional approach. Though, in our case, it greatly reduces the number of observations. Therefore, we do not use it in the analysis.

Table 1

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Predictors	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect	Effect
ECI (trade)	-3.28 *** (-4.32 – -2.23)		-2.94 *** (-4.25 – -1.64)	2.62 (-0.92 – 6.16)		-1.87 * (-3.38 – -0.37)		-1.97 * (-3.55 – -0.39)	2.78 (-0.86 – 6.41)	
ECI (research)		-2.42 *** (-3.43 – -1.40)	-0.56 (-1.87 – 0.74)	4.14 ** (0.99 – 7.28)			-0.28 (-1.59 – 1.04)	0.28 (-1.12 – 1.67)	4.38 ** (1.16 – 7.60)	
ECI (trade) x ECI (research)				-10.04 ** (-16.17 – -3.91)	-3.73 *** (-4.94 – -2.52)				-9.27 ** (-15.77 – -2.77)	-2.33 * (-4.14 – -0.51)
Regulatory quality						-0.07 (-0.63 – 0.48)	-0.28 (-0.80 – 0.24)	-0.06 (-0.62 – 0.50)	-0.10 (-0.66 – 0.46)	-0.17 (-0.70 – 0.36)
Interest expenses as % GDP						0.16 *** (0.08 – 0.24)	0.15 *** (0.07 – 0.23)	0.16 *** (0.07 – 0.24)	0.16 *** (0.08 – 0.25)	0.16 *** (0.08 – 0.25)
Real GDP growth						-0.03 (-0.10 – 0.04)	-0.02 (-0.09 – 0.05)	-0.03 (-0.10 – 0.04)	-0.04 (-0.11 – 0.03)	-0.03 (-0.10 – 0.04)
Rule of law						-0.74 ** (-1.26 – -0.21)	-0.80 ** (-1.35 – -0.25)	-0.77 ** (-1.33 – -0.22)	-0.62 * (-1.19 – -0.05)	-0.58 * (-1.13 – -0.02)
Observations	221	221	221	221	221	221	221	221	221	221
AIC	728.636	748.019	729.918	719.946	723.732	704.061	710.034	705.911	699.174	703.464
log-Likelihood	-363.318	-373.010	-362.959	-356.973	-360.866	-347.031	-350.017	-346.956	-342.587	-346.732

* p<0.05 ** p<0.01 *** p<0.001

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