What determines economic instability? Linking complexity, growth and volatility

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Abstract

Faster growing economies are more stable, but the more they grow, the less this effects holds. Therefore, our results support the version of "Slow and Steady" growth. Also, more complex economies are more unstable. Hence, our findings serve as a word of caution, because complexity shows this positive impact on volatility only after controlling for endogeneity through GMM-System, the opposite of what current literature usually finds. Moreover, financial, external and domestic policy variables are not significant in most specifications and, when so, can't convene clear policy guidance. Future research should focus on more rigorous specifications and robustness checks.

Key-Words: Complexity, Volatility, Growth, Instability.

Thematic Area: 1.Economics.

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Contents

1 Introduction

Stability and Growth have long been related. Common sense advocates that more stable economies grow faster. Or framed it differently, more volatile economies have troubles to grow. Due to to irreversibility or credit market imperfections, recessions can constraint investment (Badinger, 2010) that otherwise would have been carried. That is, some rigidity of the economic system makes it too fragile to deal with ups and downs such as to breaks if exposed to too much instability.

However, volatility can also enhance growth. As Badinger (2010, p.1) points out: "(…) due to a Schumpeterian 'cleansing effect' of recessions (Caballero and Hammour, 1991), because of lower opportunity costs of productivity-enhancing reorganizations during recessions (Hall, 1991), or because volatile sectors command high investment rates following optimal portfolio theory (Imbs, 2007)". In other words, such circumstances are opportunities to change the prevailing economic structure, in a kind of natural economic selection where only the most competitive survive.

Arguably, both effects can happen at the same time, in such a way to compensate each other, leaving a neutral net result of volatility on growth. During a recession, inefficient firms go bankrupt, however some long-term investments are abandoned. These investments could be carried on during some stable era, but in that case the less competitive firms will be able to survive. Defining which effect is preponderant is an empirical matter.

While how growth and volatility are related can be empirically tested, it is not clear on which direction causality runs. For instance, economic growth may be the determinant by providing more opportunities to capital, thus diminishing incentives to speculation and, by that, reducing output volatility. Even if we knew the arrow of causality, many other factors may be more relevant to determine output volatility, such as institutional variables (Acemoglu et al., 2003).

However, assuming that stable economies grow faster, would that mean that poorer economies are more unstable? Underdeveloped economies are also those more economic reliant on very few products. As a consequence, variations in these products markets have a very strong effect on the economy of those countries. Indeed, export diversification and output volatility seem to be related (Haddad et al., 2013; Krishna and Levchenko, 2013), such as more diverse countries should be less volatile. In this

sense, product diversification may skew countries differentiating the interaction between growth and volatility accordingly – *e.g.* less diversified economies may enjoy a greater benefit in stabilizing.

Recently, Hidalgo and Hausmann (2009) proposes an index that takes into account not only diversification, but also product "ubiquity"[1]. Less ubiquitous products are harder to find, hence, they should have a more inelastic demand, leaving them less volatile. Therefore, economic complexity adds another important layer to explain volatility. Some papers have already explored this relationship (*e.g.* Guneri and Yalta, 2020; Avom et al., 2021), our paper provides a robustness check by proposing different regressors leading us to a different time and country samples than previous research, due to data availability. In fact, what we get is different from what the literature usually finds. After controlling for endogeneity, we find that more complex economies are more unstable.

The rest of this paper is structured as follows. Section 2 reviews the literature, section 3 discuss methodology and data, section 4 examines the results and section 5 concludes.

2 Literature Review

Current evidence indicate that more stable economies grow faster. Ramey and Ramey (1995) finds that volatility has strong negative link with growth, even when controlling for a number of variables and fixed country and time effects. They reject the idea previously cited that volatility may bring a " "Schumpterian cleansing effect" because they found that the negative effect on growth comes especially from volatility in innovations, which indicates uncertainty. On that matter Fogli and Perri (2015) shows that this uncertainty also drives capital away from the country, reinforcing that negative aspect of volatility.

Volatility depends more than merely growth, it depends on the development of its financial markets. Easterly et al. (2000) shows that, for developing countries, facilitated access to credit helps to smooth the impact of crisis, with the caveat that, while financial penetration is important, a heavily credit dependent economy may suffer more from downturns. A common recommendation to diversify investments, and in theory also risk

[1] *i.e.* that is present everywhere.

diversification, is to open capital accounts, however, Easterly et al. (2000) results show no clear strategy on *when* this is appropriate, since economic fluctuation may be more harmful in pro-cyclical scenarios. In consonance with these findings, Raddatz (2008) compares Latin America to OECD members, and finds that the responses from volatility were driven primarily from their exposure to financial markets. This argument is corroborated by Denizer et al. (2000) where using an extensive database they found that countries with better developed financial institutions are less volatile when it comes to output, consumption and investment growth.

Often, financial institutions have to deal with external disturbances. However, while being more open to international markets increase the chances to be affected by external shocks, it can too be a safety valve to resort in case some internal supplier can't meet its demands. In that sense, economic openness has an *a priori* ambiguous effect on volatility. This ambiguity is captured by Balavac and Pugh (2016) that finds product diversification to reduce volatility only for countries with a low degree of diversification, but not for those that are already diversified. Not only the results are ambiguous regarding the level of diversification but also at how this diversification happens, as in countries that diversify among existing products (intensive margin), openness alleviates volatility and countries that diversify among new products (extensive margin) openness may increase volatility. At the industry level, Giovanni and Levchenko (2009) finds similar results and also adds that sectors of the economy that are more open to external markets may be less volatile because they are not as correlated with the rest of the economy.

Finally, adding to the decentralized capability to deal with variances in economic production (financial markets) and the impact of external disturbances (international markets), the level of economic volatility depends on internal determinants. Fatás and Mihov (2001) finds a strong negative correlation between government size and volatility for the Organisation for Economic Co-operation and Development (OECD) countries and United States of America (USA) States. After controlling for possible endogeneity, the results keep significant and are even larger. The same effect is observed for States with a larger taxes to GDP ratio.

Inflation is commonly associated with economic instability (*e.g.* Acemoglu et al., 2003). On one hand, it can proxy government capability, since there is usually aversion to inflation and failing to control it shows incompetence. On the other hand, inflation it-

self may be correlated with unstable markets[2]. However, analysing this relationship can be tricky, given that variations in the short-run away from the target rate[3] induce counter policies, creating a trade-off between inflation and volatility. Cecchetti and Ehrmann (1999) uses a structural Vector Autoregression (VAR), thus controlling for endogeneity, to find that countries that have an explicit inflation targeting policy show a greater aversion to inflation, thus allowing for greater output volatility. In short, it suggests a negative impact of inflation on volatility. Therefore, the impact of inflation on volatility seems from this standpoint ambiguous, although relevant, at explaining volatility.

When observing specifically for trade and exports, Haddad et al. (2013, p.18) finds that: "(…) the link between openness and growth volatility is indeed conditioned by the extent to which a country has diversified its export base. The results suggest that product diversification plays an important role in shielding an economy against the detrimental impact of idiosyncratic global shocks on volatility (…)". In other words, product diversification determines output volatility.

In fact, commodity dependency, *i.e.* lack of economic diversification, may be one of the reasons why underdeveloped economies are more prone to instability. Krishna and Levchenko (2013) proposes a theoretical model arguing that less developed economies are specialized in less complex products, defined by the number of inputs needed for production, which are also those more volatile. Less complex products are much more dependent on specific inputs, therefore leaving it fragile to shocks on its supply. Hidalgo and Hausmann (2009) proposes a new measure of economic complexity, defined not only by the number of inputs used in production, its diversity, as in Krishna and Levchenko (2013), but also by their ubiquity. Less ubiquitous products are probably more complex because they are harder to make, so, by pondering economic diversity by the (non) ubiquity of products, we get the economic complexity index, which is highly associated with levels of per capita income (Hidalgo and Hausmann, 2009). In other words, it can serve us as index of development, with the clear advantage of accounting for product rarity (or non ubiquity), which we expect to be more inelastic simply because of lack of alternative suppliers. If you can't get chips with South Korea or Taiwan, there is not many options left to you.

[2]For example, some capital flight may trigger an exchange devaluation, which could pressure the monetary authority to print more domestic currency in order to keep with its foreign liabilities.

[3]Assuming one and that there is an active monetary authority

Are less *complex* economies more unstable? The literature usually finds that, yes, they are (Guneri and Yalta, 2020; Canh and Thanh, 2020; Breitenbach et al., 2021; Avom et al., 2021). Guneri and Yalta (2020) find that, for developing economies, being more complex economies are less volatile. Canh and Thanh (2020) uses global data to show the same results, using different measures of growth cycles, however, when sub-sampling by income groups, only high-income countries show this pattern, whereas low-income economies have the inverse relationship. This finding may reflect an inverse U-shaped curve, where "transitioning" economies are more volatile relatively to poorer and richer nations. On the other hand, Breitenbach et al. (2021) use simple regressions and lagged regressors to show that in the short run more complex economies are more volatile, but in the long-run economic complexity is associated with less output volatility. Their results are not always significant and also vary in regions. Hinging on the endogeneity issue, Avom et al. (2021) run regressions with economic complexity as the dependent variable finding that more volatile economies are less complex.

There is also evidence for Mexico that regions with similar levels of complexity co-move during their business cycle (Gómez-Zaldívar and Llanos-Guerrero, 2021), suggesting that these regions have similar capabilities to deal with economic shocks. These findings are in line with the argument that, in similar fashion to portfolio theory, more complex products can spread the risk of having the supplies of one of its inputs disturbed, leaving them in overall more stable. However, it could be also that more complex products are actually *less* stable if we assumed a somehow Leontief, or fixed proportions, production function, because in that case we would have an exponential risk of halting production as the number of inputs increase. As it will be shown, this hypothesis is relevant to our study.

3 Methodology

3.1 Data

Our data consists of 88 countries for the period of 2003-2017, which we then divide into five subperiods of three years each. Data source can be found at Table 1. Table 4 describes all countries included.

In deciding what to screen in our data, we tried to establish a balance between keep-

ing as much countries/year and variables as we could. That meant changing domestic credit to domestic credit *to the private sector by banks*, for example. But it also meant leaving two noteworthy countries, Canada and Argentina, for which there was no data for inflation in our period and 2009 forward (inclusive) for the domestic credit variable, respectively.

There are countries that did not even exist before 1990. As such, we have almost all Union of Soviet Socialist Republics (USSR) former members and everything that encompass the extinct Yugoslavia territory. For instance, in the world bank data, there is no observations from the "Russian Federation" for many variables until 1989. We could have used an unbalanced panel, however: (i) there are factors determining missing values that correlate with variable values – *e.g.* war, political crisis –, adding bias to our estimates; (ii) it would make analysis harder, and one of the goals of this paper is to establish the relationship of output volatility and economic complexity as simple as possible.

We also realized that there was an overlap of countries with missing data that were defined as "Low Income" by the World Bank. Therefore, we concluded that, for those who had information, data in this group may be noisy, consequently, worsening our results or deceive its interpretation. The only exception is Venezuela, for who there is no classification. Given its political context, as we done for Afghanistan, Chad, Iraq and Macao, for which there is no reliable data (Hausmann and Hidalgo, 2014)[4], it was removed.

That left us with a period ranging from 2001-2017[5]. In order to make periods equal in (time) size, we restricted to 2003-2017. Moreover, five periods of three years allow us to make auto-correlation tests for residuals in GMM estimates, while not affecting our dependent variable, calculated as the standard deviation.

There was only one tiny modification of the original data. Uruguay had missing two observations, 2016-2017, for the variable government consumption. Although we don't know the reason behind this gap, it is hard to suppose it to be indicative of some bias. Therefore, we calibrated our data taking the simple average for the period 2013-2015 and used it to fill 2016-2017. The value is: 13.6848775931742.

[4] At least for ECI.

[5] In particular, ECI had data only until 2017. Therefore, we couldn't estimate a panel of three of 6 or six of 3 years.

3.2 Model

We estimate three different models suited for panel data sets for strictly exogenous regressors: Pooled Ordinary Least Squares (POLS), Fixed Effects (FE) and Random Effects (RE). In order to account for possible endogenous variables, we use Generalized Method of Moments System (GMM-Sys)[6]. Results and further details in section 4.

Our full model to be estimated can be described as:

$$\begin{aligned} Vol_{it} = \quad & \beta_0 + \phi Vol_{i,t-1} + \beta_1 ECI_{it} \quad + \\ & \beta_2 GDPg_{it} \quad + \beta_3 GDPg_{it}^2 \quad + \\ & \beta_4 FinQua_{it} \quad + \beta_5 CredDom_{it} + \\ & \beta_6 ExtVol_{it} \quad + \beta_7 Openness_{it} + \\ & \beta_8 GovConsp_{it} + \beta_9 Inflation_{it} + \\ & z_i + \alpha_t + \epsilon_{it} \end{aligned} \tag{1}$$

Where z_i is individual effects, α_t time-effects, ϵ_{it} an error term and the rest of the variables will be explained bellow (check Table 1 for variables summary). As can be concluded by the inclusion of time-effects, we estimate a Two-ways specification, because, as explained in subsection 3.1, time periods are not random, rather are theoretically bounded.

The autorregressive term, $Vol_{i,t-1}$, captures volatility persistence. We expect that a period of high volatility is associated with more instability in the subsequent periods, that is, we would expect $\phi > 0$. It is not included for models with strictly exogenous regressors – POLS, FE and RE – because it introduces biases to our estimates. However, this is precisely the problem that GMM-Sys allows us to solve.

We suppose Output Volatility (**Vol**) to be the dependent variable. The literature varies as to how to define it, as there are usually many ways to measure any economic variable. We decided to take the natural logarithmic[7] of the standard deviation of the GDP growth, not only as a matter of simplicity but also because other approaches may involve aspects and variables not relevant to us.

[6] For details see Greene (2003); Pesaran (2015).

[7] For means of interpretation (and because is *natural*). Hitherto, same justification follows and by logarithm we will mean natural logarithm.

The Economic Complexity Index (**ECI**)[8] is used for complexity. The ECI is a measure of a country accumulated know-how, their capacity to produce and develop goods. It can be calculated at various ways, the one we use is obtained utilizing figures of international trade. Through it, we can see how many products a country export, its "diversity", and how common is to export a certain product, its "ubiquity". The main idea is that complex economies have a more diversified production and produce products that are less common. Said it differently, more complex economies are those who produce less ubiquitous (not everyone can do it) and diverse products.

The only leap of faith is to suppose that exports can proxy the information about the production structure of the economy. In particular, we assume that a country has the capability to produce something if it has a Revealed Comparative Advantage (RCA), that is, if its exports are greater than the world average (of exports as percentage of GDP) (Balassa, 1969). Once leapt, this index can provide us insight about the economic structure of a country, which is particularly interesting in our context, for our hypothesis is that countries that have more complex economies suffer less from volatility.

The other independent variable is the growth of Gross Domestic Product (GDP) per capita (**GDPg**). Economies that grow faster tend to be less volatile (see section 2). However, too much growth may lead to more volatility, therefore we add the square of this variable (**GDPg2**).

We use several controls taken as relevant from the literature. Next, we briefly discuss each and their motivation.

We use the Chinn-Ito Index (*kaopen*) as a variable to indicate the Financial Quality (**FinQua**) of a country. This variable is established in Chinn and Ito (2006) and considers the transactions on the International Monetary Fund (IMF) Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) to measure trade openness and financial development, based on transnational capital transactions.

Additionally, we use Domestic Credit (**CredDom**) to private sector by banks as a percentage of GDP to indicate financial development. The rationale is that economies that lend more tend to have (or need) a greater financial development to do so. Since the effect of credit is not instantaneous, we use its initial value. While total credit might be an alternative, it might be skewed in countries with high income concentration, adding

[8] See Hausmann and Hidalgo (2014) for a detailed introduction.

bias to our estimates. Furthermore, as compared with other variables of domestic credit, data availability on this one is better. Having a better developed financial market should lead to less volatility, however too much lending may end in irresponsible indebtedness. Therefore, it is not clear which effect we can expect from this variable.

Two variables serve us as control to external markets impact. Similarly as for the dependent variable, the logarithmic of the standard deviation of net barter terms of trade growth is used to indicate External Trade Volatility (**ExtVol**). Additionally, we control for Trade Openness (**Openness**), defining it as the simple sum of Exports and Imports relative to GDP. While is clear that the former should be positively correlated with volatility, this is not the case for the former.

Oz-Yalamam et al. (2019) investigate a greater sample of countries and find a negative relationship between Government Size and Volatility. Inspired by them, we use two variables to control for government policy. To evaluate the fiscal policy, we use Government Size as a proxy, calculating it as government consumption relative to GDP (**GovConsp**). **Inflation** is defined as the annual variation of a consumer price index provided by the World Bank. It has the advantage of being a uniform measure through time and space making it possible monetary policy comparability, however abstracting for differences in methodology between countries.

Table 1: Variables Description

Variable	Description	Source	Expected Effect
Volatility	Logarithmic of Standard Deviation of GDP growth	World Bank	
Economic Complexity	Economic Complexity Index	Atlas of Economic Complexity	−
Economic Growth	Average GDP per capita growth	World Bank	−
Financial Quality	Kaopen	Chinn and Ito (2006)	−
Financial Development	Domestic Credit to private sector by banks as % of GDP	World Bank	?
Trade Volatility	Standard Deviation of growth of the net barter terms	World Bank	+
Trade Openness	Initial subperiod Imports + Exports as % of GDP	World Bank	?
Government Size	Government Consumption as % of the GDP	World Bank	+
Inflation	Variation of consumer prices	World Bank	?

Source: authors own elaboration.

4 Empirical Findings

Table 3 summarises our estimations results. We use three panel models for strictly exogenous regressors – POLS, FE and RE – and GMM-System to account for endogeneity between variables. The first three models are divided into three specifications, where we include economic complexity, growth and controls, respectively in cascade, and GMM-Sys is estimated with the full specification.

Table 2 provides a correlation matrix between all variables used. We see that POLS doesn't provide much more insight than it: variables sign are the same of simple correlation with volatility. Some variables are highly correlated, which may explain their poor performance, such as the Government Consumption and Inflation, or even ECI and financial variabales ($FinQua$ and $CredDom$).

The lag structure chose for GMM-System is with all possible instruments, that means we use all lagged variables until the third lag, because GMM-Sys take variables first difference, we have a lagged regressor and there is only five subperiods. Coefficient signs are robust to different specifications, however this one[9] allows us to not reject the null hypothesis of valid instruments under Hansen Test[10], while for other specifications that left some variables (like ECI) insignificant, we reject the null hypothesis. Residuals autocorrelation is also rejected. In short, GMM-Sys seems to be well specified as much as econometric tests can tell us.

Economic growth is the only variable that has a significant impact on volatility whatever is the specification. It has the expected negative sign, suggesting that economies that grow faster are more stable, while too much growth may lead to more volatility, as suggested by the positive sign of the square of economic growth.

Economic complexity has the expected sign until we try to control for endogeneity, when we get the inverse relationship and start to have a significant coefficient! In other words, *when controlled for endogeneity*, more complex economies are *more* volatile. This finding is in odds with the literature (*e.g.* Krishna and Levchenko, 2013; Guneri and Yalta, 2020; Nguyen and Su, 2021). The reason may be problems in specification,

[9] or others very close to it, with also similar results, in sign and significance

[10] P-value of 25%. Note, since this test do not have much power, high p-values are taken as more instruments than advisable. As a rule of thumb, something like 30% is considered as acceptable – a result we get.

Table 2: Correlation Matrix

	Vol	ECI	GDPg	GDPg2	FinQua	CredDom	ExtVol	Openness	GovConsp	Inflation
Vol	1	−0.042	−0.089	0.117	0.031	−0.091	0.199	0.154	0.146	0.129
ECI	−0.042	1	−0.103	−0.120	0.475	0.634	−0.524	0.211	0.495	−0.367
GDPg	−0.089	−0.103	1	0.744	−0.209	−0.241	0.028	0.100	−0.397	0.215
GDPg2	0.117	−0.120	0.744	1	−0.160	−0.172	0.097	0.088	−0.218	0.189
FinQua	0.031	0.475	−0.209	−0.160	1	0.410	−0.178	0.164	0.372	−0.349
CredDom	−0.091	0.634	−0.241	−0.172	0.410	1	−0.299	0.187	0.470	−0.409
ExtVol	0.199	−0.524	0.028	0.097	−0.178	−0.299	1	−0.130	−0.247	0.222
Openness	0.154	0.211	0.100	0.088	0.164	0.187	−0.130	1	0.046	−0.044
GovConsp	0.146	0.495	−0.397	−0.218	0.372	0.470	−0.247	0.046	1	−0.300
Inflation	0.129	−0.367	0.215	0.189	−0.349	−0.409	0.222	−0.044	−0.300	1

Source: authors own elaboration.

for example, volatility calculated as GDP growth standard deviation might not be appropriate, or maybe there was not enough time for the effect of economic complexity on volatility to manifest itself. However, it can be that the economy production function follows a Leontief, or fixed proportions, function. If, by these findings, we can't say that more complex economies are more unstable, at least there is a need for more robustness checks to evaluate whether and how complexity can determine countries economic instability.

Regarding control variables, in POLS, excluded Financial Quality, all show significant coefficients. External volatility as well as Government consumption and inflation showed the expected positive signs, but only the first is robust to endogeneity. However, since Openness, although positive, is not significant for GMM-Sys[11], we are left with no clear policy guidance. Because in that case opening more the economy has no (significant) impact on volatility, therefore we can't – or doing so would have no effect – shield

[11] Openness shows these results maybe because of what we see in complexity. As described in section 2, the effect of openness on economic volatility depends on the level of economic diversification (Haddad et al., 2013), which we try to capture through ECI.

the economy from external instability by facilitating international trade. Moreover, even if ignore the endogeneity issue, FE usually did not offer significant coefficients, suggesting that, if exogenous, all control variables don't have any effect once accounted for individual effects.

Interestingly, financial development as measured by domestic credit as a percentage of GDP has a negative impact on volatility. That is, the more a country lends, relative to total production, the less unstable it is. Nevertheless, effects are rather small: more 1% of credit as a % of GDP has an impact 13 times smaller than more 1% of GDP growth!

Finally, more unstable previous periods, lead to more volatility, as suggested by the positive coefficient on the autorregressive term.

In short, main results can be summarised as follows. Economies that grow faster are less unstable, but it has a diminishing effect. One out of two: complexity does not have an impact on volatility or it is related to *more* output instability. Finally, more volatile now means more volatile then, that is, volatility is significant and positively autocorrelated.

5 Conclusion

This paper present results on three different panel data set models for a dataset of 88 countries in the period 2003-2017, which is divided into five subperiods of three years each. Three models assume strictly exogenous regressors, POLS, FE and RE, and for to account for endogeneity, GMM-System.

Empirical results communicate a clear message, robust to different specifications: **faster growing economies are less volatile**. However going too fast, increases chances of stumbling. In that sense, results are supportive of a "Slow and Steady" version of economic development: damned if you do and damned if you don't (grow)! Countries that grow too fast are more prone to instability, which in turn seems to be a self-feeding process. Since causality may run on the other direction, concentrated growth can eventually lead to less growth!

Moreover, more complex economies can have no advantage from less complex ones, they can even be worse off!: When controlled for endogeneity, we find a positive coefficient. This result is in odds with the literature, and many reasons may be behind it, for example bad specification. But it could be also that more complex economies are

more dependent on multiple inputs and having the supply of one (or some relatively small number) of them disrupted may lead to shutdown. In other words, the economy production function would be more like a Leontief, or fixed proportions, function.

Finally, control variables usually do not offer significant coefficients, and, when so, don't provide clear policy guidance. External volatility has a positive impact on volatility, however, since opening the economy do not lead to significant impacts, it is not clear whether and how is possible to shield the economy from external disturbances. Domestic credit negatively impacts volatility, but it has a small effect, leaving questionable stabilizing policies that uses it as a tool. Neither government consumption nor inflation have a significant impact, making it even harder to decide what to do.

Our paper contributes to the literature by proposing a different specification to estimate the link between economic complexity and output volatility, while also controlling for possible endogenous variables. In that sense, it has a specific contribution to the literature of volatility, by exploring an unusual variable in this literature. Of utmost relevance, it finds that *more complex economies are more unstable*, different from what is usually found (see section 2). Therefore, future research should focus on more rigorous specifications and robustness checks to see whether these findings are substantial or spurious.

Table 3: Regression Results

	Dependent Variable: Volatility									
	POLS	POLS	POLS	FE	FE	FE	RE	RE	RE	GMM-Sys
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
L.Vol										0.237***
										(0.083)
ECI	−0.043	−0.035	0.100	−0.517	−0.513*	−0.473	−0.066	−0.057	0.005	0.244*
	(0.059)	(0.052)	(0.077)	(0.316)	(0.302)	(0.289)	(0.055)	(0.051)	(0.077)	(0.129)
GDPg		−0.132***	−0.115***		−0.065***	−0.065***		−0.092***	−0.086***	−0.082***
		(0.025)	(0.024)		(0.022)	(0.023)		(0.020)	(0.020)	(0.026)
GDPg2		0.012***	0.010***		0.006***	0.005***		0.008***	0.008***	0.007***
		(0.002)	(0.002)		(0.002)	(0.002)		(0.001)	(0.001)	(0.001)
FinQua			0.015			−0.118			0.006	−0.049
			(0.042)			(0.098)			(0.040)	(0.050)
CredDom			−0.005***			0.0003			−0.004**	−0.005**
			(0.002)			(0.005)			(0.002)	(0.003)
ExtVol			0.162***			0.070			0.089**	0.089*
			(0.043)			(0.063)			(0.041)	(0.051)
Openness			0.004***			0.003			0.004***	−0.002
			(0.001)			(0.004)			(0.001)	(0.003)
GovConsp			0.041***			0.007			0.042***	0.020
			(0.012)			(0.033)			(0.013)	(0.023)
Inflation			0.023**			0.010			0.015	−0.016
			(0.011)			(0.015)			(0.010)	(0.023)
Constant	0.287***	0.440***	−0.637***				0.291	0.407**	−0.543*	
	(0.070)	(0.060)	(0.246)				(0.204)	(0.188)	(0.306)	
Observations	440	440	440	440	440	440	440	440	440	440

*p < .1; **p < .05; ***p < .01. Heteroskedasticity-robust standard errors in parentheses.

Source: authors own elaboration.

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Appendix

Table 4: Countries

	Country	Region	Income Group
1	Albania	Europe and Central Asia	Upper middle income
2	Algeria	Middle East and North Africa	Lower middle income
3	Angola	Sub-Saharan Africa	Lower middle income
4	Armenia	Europe and Central Asia	Upper middle income
5	Australia	East Asia and Pacific	High income
6	Austria	Europe and Central Asia	High income
7	Azerbaijan	Europe and Central Asia	Upper middle income
8	Bangladesh	South Asia	Lower middle income
9	Belarus	Europe and Central Asia	Upper middle income
10	Belgium	Europe and Central Asia	High income
11	Bolivia	Latin America and Caribbean	Lower middle income
12	Botswana	Sub-Saharan Africa	Upper middle income
13	Brazil	Latin America and Caribbean	Upper middle income
14	Bulgaria	Europe and Central Asia	Upper middle income
15	Cambodia	East Asia and Pacific	Lower middle income
16	Cameroon	Sub-Saharan Africa	Lower middle income
17	Chile	Latin America and Caribbean	High income
18	China	East Asia and Pacific	Upper middle income
19	Colombia	Latin America and Caribbean	Upper middle income
20	Congo, Rep.	Sub-Saharan Africa	Lower middle income
21	Costa Rica	Latin America and Caribbean	Upper middle income
22	Croatia	Europe and Central Asia	High income
23	Czech Republic	Europe and Central Asia	High income
24	Denmark	Europe and Central Asia	High income
25	Dominican Republic	Latin America and Caribbean	Upper middle income
26	Ecuador	Latin America and Caribbean	Upper middle income
27	Egypt, Arab Rep.	Middle East and North Africa	Lower middle income

	Country	Region	Income Group
28	El Salvador	Latin America and Caribbean	Lower middle income
29	Finland	Europe and Central Asia	High income
30	France	Europe and Central Asia	High income
31	Gabon	Sub-Saharan Africa	Upper middle income
32	Georgia	Europe and Central Asia	Upper middle income
33	Germany	Europe and Central Asia	High income
34	Ghana	Sub-Saharan Africa	Lower middle income
35	Greece	Europe and Central Asia	High income
36	Guatemala	Latin America and Caribbean	Upper middle income
37	Honduras	Latin America and Caribbean	Lower middle income
38	Hungary	Europe and Central Asia	High income
39	India	South Asia	Lower middle income
40	Indonesia	East Asia and Pacific	Lower middle income
41	Ireland	Europe and Central Asia	High income
42	Israel	Middle East and North Africa	High income
43	Italy	Europe and Central Asia	High income
44	Jamaica	Latin America and Caribbean	Upper middle income
45	Japan	East Asia and Pacific	High income
46	Jordan	Middle East and North Africa	Upper middle income
47	Kazakhstan	Europe and Central Asia	Upper middle income
48	Kenya	Sub-Saharan Africa	Lower middle income
49	Korea, Rep.	East Asia and Pacific	High income
50	Kuwait	Middle East and North Africa	High income
51	Kyrgyz Republic	Europe and Central Asia	Lower middle income
52	Malaysia	East Asia and Pacific	Upper middle income
53	Mauritius	Sub-Saharan Africa	Upper middle income
54	Mexico	Latin America and Caribbean	Upper middle income
55	Moldova	Europe and Central Asia	Upper middle income
56	Mongolia	East Asia and Pacific	Lower middle income
57	Morocco	Middle East and North Africa	Lower middle income

	Country	Region	Income Group
58	Netherlands	Europe and Central Asia	High income
59	Nicaragua	Latin America and Caribbean	Lower middle income
60	Nigeria	Sub-Saharan Africa	Lower middle income
61	North Macedonia	Europe and Central Asia	Upper middle income
62	Norway	Europe and Central Asia	High income
63	Oman	Middle East and North Africa	High income
64	Pakistan	South Asia	Lower middle income
65	Panama	Latin America and Caribbean	Upper middle income
66	Paraguay	Latin America and Caribbean	Upper middle income
67	Peru	Latin America and Caribbean	Upper middle income
68	Philippines	East Asia and Pacific	Lower middle income
69	Poland	Europe and Central Asia	High income
70	Portugal	Europe and Central Asia	High income
71	Qatar	Middle East and North Africa	High income
72	Russian Federation	Europe and Central Asia	Upper middle income
73	Saudi Arabia	Middle East and North Africa	High income
74	Senegal	Sub-Saharan Africa	Lower middle income
75	Singapore	East Asia and Pacific	High income
76	South Africa	Sub-Saharan Africa	Upper middle income
77	Spain	Europe and Central Asia	High income
78	Sri Lanka	South Asia	Lower middle income
79	Sweden	Europe and Central Asia	High income
80	Tanzania	Sub-Saharan Africa	Lower middle income
81	Thailand	East Asia and Pacific	Upper middle income
82	Tunisia	Middle East and North Africa	Lower middle income
83	Turkey	Europe and Central Asia	Upper middle income
84	Ukraine	Europe and Central Asia	Lower middle income
85	United Kingdom	Europe and Central Asia	High income
86	United States	North America	High income
87	Uruguay	Latin America and Caribbean	High income

	Country	Region	Income Group
88	Vietnam	East Asia and Pacific	Lower middle income

Note: names follow World Bank convention.

Source: authors own elaboration.