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Financial integration, globalization, and real activity☆

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ABSTRACT

Using data for 48 advanced and emerging market economies during 1985–2008, this paper examines the impact of measures of financial integration and globalization on several dimensions of real activity. We find that both advances in financial integration and globalization are associated with higher growth, lower growth volatility, and lower probabilities of severe declines in real activity, with the positive impact of financial integration on macroeconomic stability enhanced by improvements in corporate governance. Thus, we find no evidence of a trade-off between advances in financial integration, globalization, and growth and macroeconomic stability.

1. Introduction

A vast empirical literature surveyed by Kose et al. (2009) has analyzed empirically the impact of financial openness and financial liberalization on growth, offering contrasting results. More recently, the 2007–2008 financial crisis and the attendant historically sharp drop in real activity have raised the question of whether financial integration and unfettered globalization can be sources of macroeconomic instability (see, e.g. Stiglitz, 2010).

Obstfeld (2009, p. 63) observed that "there is strikingly little convincing documentation of direct positive impacts of financial opening on the economic welfare levels or growth rates of developing countries." Broner and Ventura (2010) observed that the absence of a consensus regarding the real effects of financial liberalization policies is in part due to the difficulty in separating the effects of such policies from other policies. In particular, it is difficult to disentangle the potentially different effects captured by *de-jure* and *de-facto* liberalization measures. Additionally, work by Quinn and Toyoda (2008) indicates that some of the inconclusive results of the literature may be due to problems of measurement of financial openness following liberalization, although some recent studies (e.g. Bonfiglioli, 2008; Bekaert et al., 2009) find a positive impact of financial openness on productivity growth, a key driver of long-term growth.

With regard to macroeconomic and financial stability, Kose et al. (2009) observed that "there is little formal empirical evidence to support the oft-cited claim that financial globalization in and of itself is responsible for the spate of financial crises that the world has seen over the last three decades" (op. cit., 2009, p. 28). On the one hand, few studies have examined empirically the relationship between financial openness and growth volatility. Buch et al. (2005) do not find a significant impact of financial openness on growth volatility, while studies that use sectoral or firm level data find the reverse (see e.g. Levchenko et al., 2009; Kalemi-Ozcam et al., 2010; Popov, 2011). On the other hand, those few studies that have focused on the impact of financial openness on financial crises find contrasting results as well. Bekaert et al. (2009) examine the impact of measures of financial openness on a binary indicator of "banking crisis", and find no significant relationship between financial openness and the probability of a "banking crisis". Boyd et al. (2010) find some evidence of a positive relationship between financial openness and indicators of systemic bank shocks for country level data, but no relationship between financial openness and

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the probability of systemic bank failures in Logit regressions based on firm-level data. By contrast, Popov (2011) finds that measures of levels of financial openness and financial liberalization are followed by an increase in the skewness of output growth, which is taken as a measure of downside risks to real growth, as in Rancière et al. (2008).

With regard to financial integration, the finance literature has focused on the impact of measures of equity market integration and liberalization on growth, finding a positive impact (Bekaert et al., 2005, 2006, 2007, 2011). To our knowledge, however, no study has examined empirically the *joint* impact of financial integration and *globalization* – here defined as advances in financial openness – on several dimension of real activity. Examining financial integration and globalization as distinct phenomena is important, since globalization may be necessary for financial integration to occur, but it may not be sufficient to guarantee that a country's financial system is integrated with world markets in ways that foster an efficient allocation of capital (see, e.g. Abiad et al., 2008). Considering globalization as advances in financial openness allows us to capture developments that may not be exclusively driven by financial liberalization, which, in itself, is necessary but not sufficient to prompt financial openness, possibly because of underdevelopment of the institutional environment (see e.g. Stultz, 2005). For these reasons, empirical specifications that do not include measures of financial integration as distinct from measures of globalization may be potentially affected by an omitted variable problem. Moreover, many papers in the literature do not employ empirical specifications that control for the persistence of growth or growth volatility.

This paper contributes to the literature by providing new evidence on the joint impact of financial integration and globalization on aggregate growth, growth volatility and measures of real tail risks. Our study is most closely related to Popov (2011), who considers the impact of measures of levels of financial openness and financial liberalization on industry output growth, as well as volatility and the skewness of output growth. In contrast to our analysis, however, he does not analyze financial integration and globalization as a change in financial openness simultaneously. Importantly, his empirical specification does not take into account the persistence of output growth and growth volatility.[1]

Using a dataset that includes data for 48 countries during the period 1985–2008, this paper empirically examines the impact of *de-facto* measures of financial integration and globalization on growth, growth volatility, and the probability of a severe decline in real activity, Financial integration is captured by a simple *distance* measure of a country's excess returns from the group average at each date, which tracks the movement toward equality of discount factors used to price traded assets, as dictated by standard finance theory. Financial globalization is measured by the *growth rate* of a metric of financial openness. We also construct two measures of capital flow volatility to gauge their real effects jointly with financial integration and globalization.

We find that advances in financial integration and globalization are both associated with higher growth and lower growth volatility, whereas the volatility of capital flows does not have significant impact on both variables. Importantly, we also find that advances in financial integration and globalization, as well as capital flow volatility, significantly predict *lower* probabilities of severe declines in real activity, thereby enhancing macroeconomic stability. Moreover, the positive impact of financial integration on macroeconomic stability is stronger when a country improves corporate governance and the quality of institutions. Thus, our evidence is at odds with the view that financial integration and globalization in and of themselves are detrimental to country real prospects. On the contrary, our results suggest that financial integration and globalization appear to yield *benefits* in the form of enhanced countries' growth, lower growth volatility, and lower probability of severe declines in real activity.

The remainder of the paper consists of three sections. Section 2 presents our measures of financial integration and globalization used in the subsequent regression analysis, and describes statistics of the data used in our investigation. Section 3 presents the analysis of the relationship between financial integration, globalization and capital flow volatility for growth, growth volatility, and measures of systemic real risk. Section 4 concludes. The Appendix details data sources and measurements of all variables used.

2. Measurement and data

2.1. A simple proxy measure of financial integration

As financial markets become more integrated, the cost of capital for assets bearing similar risks should converge. As stressed by Stulz (1999), such convergence would allow investors to achieve better diversification, as they would be able to allocate investments to a more diversified market portfolio.

Following Bekaert and Harvey (1995), the simple measure of financial integration used in our empirical analysis is motivated as follows. Consider N countries, and denote with $E_t R^i_{t+1}$ the expected conditional market excess return in country $i \in N$. Suppose that the CAPM holds and there is no exchange rate risk. Under full integration, for each $i \in N$, $E_t R^i_{t+1}$ satisfies:

$$E_t R^i_{t+1} = \lambda_t cov\ (R^i_{t+1}, R^N_{t+1}) \tag{1}$$

where R^N_{t+1} is the return on a value-weighted region portfolio, and λ_t is the expected world price of (covariance) risk. By contrast, in a fully segmented market

$$E_t R^i_{t+1} = \lambda^i_t var(R^i_{t+1}) \tag{2}$$

where λ^i_t is the expected *local* price of risk. In a partially integrated country, expected excess returns can be proxied by:

$$E_t R^i_{t+1} = \alpha^i_t \lambda_t cov(R^i_{t+1}, R^W_{t+1}) + (1 - \alpha^i_t)\lambda^i_t var(R^i_{t+1}). \tag{3}$$

where $\alpha^i_t \in [0, 1]$ is an estimate of the likelihood that a market is integrated. Eq. (3) cannot be viewed as a restriction on expected returns implied by an explicit asset pricing model. However, Bekaert and Harvey (1995) show that it can be useful to obtain a proxy measure of financial integration. If the term α^i_t converges toward unity, then convergence in expected excess returns can be interpreted as a result of increased integration. Adjaouté and Danthine (2004) also use such a convergence-type measure as a simple proxy of advances in financial integration. Thus, we gauge advances in financial integration by the *distance* of the market excess returns of a country from a measure of central tendency of the cross-country distribution of market excess returns. Specifically, for country j in year t and a sample of N countries, this measure, called *ISPEED*, is given by

$$ISPEED_{jt} = \left(R^j_t - \frac{1}{N} \sum\nolimits_{i=1}^{N} R^j_t \right)^2, \tag{4}$$

[1] Differing from our work and many others', Popov (2011) carries out an examination of the joint impact of financial openness on growth, growth volatility and growth risk via estimation of a system of equations, finding results that differ from those obtained with individual estimations. However, in Popov's specifications the persistence of growth and growth volatility are not taken into account: this makes it difficult to interpret these different results.

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In essence, *ISPEED* records the position of the market excess return of a country relative to an equally weighted market excess return. The higher is the level of financial integration, the smaller should be the (quadratic) distance of a country's excess returns from an equally weighted market excess return.

Our simple financial integration measure is germane to measures that associate integration with a higher fraction of the variance of excess returns explained by global factors. Pukthuanthong and Roll (2009) present a comprehensive review of measures of financial integration proposed in the literature, and derive one such measure based on multi-variate estimates of global factors. They point out that some of the limitations of their measure arise from the uncertainty in the estimation of global factors and excess return variances, but argue that it can nonetheless be useful in providing a *ranking* of degrees of financial integration. Our measure is formulated in the same spirit: perhaps one of its potential advantages relative to measures based on estimates of global factors and return variances is that it does not require such estimates.[2] The *ISPEED* measure was computed at a monthly frequency and averaged for each year (see the Appendix for variables and sources).[3]

2.2. Descriptive statistics

Our sample includes time series of annual data for 48 countries, classified as advanced and emerging, covering the period 1985–2008.[4] Computations of excess returns necessary to construct our proxy measure of financial integration *ISPEED*, GDP growth (*GDPG*), and financial globalization (*FGLOB*) are standard, and are detailed in the Data Appendix.

Our *de-facto* measure of globalization is based on data on external assets and liabilities constructed by Lane and Milesi-Ferretti (2007) at annual frequency, updated to 2008. Globalization, called *FGLOB*, is the *growth rate of financial openness*, defined as the growth rate of the ratio of the sum of external assets and liabilities to GDP, with this ratio denoted by *FOPEN*. For each country, GDP growth volatility (*GDPGV*) is proxied by the absolute value of the difference between GDP growth and its historical mean.

As noted, we also examine the impact of capital flow volatility on real activity. To this end, we construct two proxy measures of capital flows volatility: volatility of capital *outflows*, called *COFV*, computed for each country as the absolute value of the difference between the growth rate of the ratio of external assets to GDP and its sample average; and volatility of capital *inflows*, called *CIFV*, computed for each country as the absolute value of the difference between the growth rate of the ratio of external liabilities to GDP and its sample average.

Table 1 reports summary statistics of the main variables for the entire sample (pooled), as well as for advanced and emerging market economies. Three facts are worth mentioning. First, there is a wide cross-country variation in all variables in the whole sample and the two subsamples as well, as witnessed by the relevant standard deviations. Second – as it might be expected – GDP growth as well as the volatility of GDP growth and capital flows are higher in emerging market economies. Third, the *ISPEED* and *FGLOB* measures indicate on average higher levels of financial integration, globalization, and financial openness in advanced economies relative to emerging market economies.

Moreover, the financial integration and globalization variables exhibit significant time variations and cross-country heterogeneity. Fig. 1 reports *t*-statistics of estimated time trend coefficients of simple regressions with *ISPEED* as the dependent variable. It is apparent that advances in financial integration during 1985–2008 have occurred in most countries, but the most significant advances are witnessed in emerging market countries. Fig. 2 reports *t*-statistics of estimated time trend coefficients of simple regressions with *FGLOB* as the dependent variable. Advances of globalization during 1985–2008 are widespread, but the most significant advances are witnessed mainly in advanced countries.

Lastly, Table 2 reports the correlation matrix for all variables. Note first that GDP growth is negatively correlated with *ISPEED*, indicating a positive unconditional correlation between financial integration and GDP growth, and is also negatively correlated with *FGLOB* and the measures of capital flow volatility, while it is unrelated to the level of financial openness. Moreover, GDP growth volatility is positively correlated with *ISPEED*, indicating a negative correlation between financial integration and GDP growth volatility, and is positively correlated with *FGLOB* and the measures of volatility of capital flows, while it is negatively correlated with the level of financial openness. Finally, there is a positive and significant negative correlation between our measure of financial integration (*ISPEED*) and financial openness (*FOPEN*), indicating that openness and integration are positively related: yet, this correlation is fairly small, suggesting that the empirical practice of using measures of financial openness as measures of financial integration common to many papers in the literature may lead to a significant loss of information.

Overall, these unconditional correlations are consistent with some of the results of the literature just reviewed. However, as shown next, some of these relationships change when we consider *conditional* correlations in the context of simple models of the dynamics of real activity.

3. The impact of integration and globalization on real activity

3.1. Growth

We estimate dynamic panel models of the following form:

$$GDPG_{jt} = \alpha_{1j} + \alpha_{2t} + \alpha_3 t + \beta ISPEED_{jt} + \gamma FGLOB_{jt-1} + \delta CFV_{jt-1} + \rho GDPG_{jt-1} + \varepsilon_{jt} \quad (5)$$

GDP growth in country j at date t, denoted by $GDPG_{jt}$, is set to depend on: country fixed effects (α_{1j}), time fixed effects α_{1t}, a time trend $\alpha_3 t$; the current (date t) level of the financial integration variable for country j $ISPEED_{jt}$, the financial globalization variable $FGLOB_{jt-1}$, where we assume that the real impact of changes in financial openness dispel their real effects with a lag, and one of the

[2] In De Nicolò and Juvenal (2012), we assess convergence of excess market returns modeled with a factor model with time varying variances using a metric germane to that used to gauge growth convergence in the growth literature (see Barro and Sala-i-Martin, 2003). We find strong evidence of advances in financial integration in the form of a declining trend in the cross-country dispersion of excess returns worldwide, consistent with the findings of Pukthuanthong and Roll (2009).

[3] We also computed *ISPEED* with excess returns in dollar terms to account for possible biases in exchange rate developments. The results we present in the sequel are virtually identical to those obtained using this exchange rate-adjusted *ISPEED* measure.

[4] The countries included grouped by regions are as follows: *Developed Europe* includes the following sixteen countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. *Emerging Europe* includes the following fourteen countries: Czech Republic, Hungary, Poland, Rumania, Russia, Turkey, Bulgaria, Croatia, Estonia, Latvia, Lithuania, Slovakia, and Slovenia. *Developed America* includes the United States and Canada. *Emerging America (Latin America)* includes the following six countries: Mexico, Argentina, Brazil, Chile, Colombia and Peru. *Emerging Asia* includes the following eight countries: China, India, Indonesia, Malaysia, Pakistan, Philippines, Taiwan Republic of China, and Thailand. *Developed Asia* includes Hong Kong, Korea, Singapore, Japan, Australia and New Zealand.

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Table 1
Descriptive statistics.

Samples		*GDPG*	*GDPGV*	*ISPEED*	*FGLOB*	*COFV*	*CIFV*	FOPEN
Pooled	Mean	3.32	2.62	188.43	4.63	11.27	10.31	2.28
	Std. dev.	4.44	3.11	1255.67	14.49	11.37	10.86	2.89
Advanced	Mean	3.04	1.57	33.88	5.86	8.97	8.98	3.38
	Std. dev.	2.54	1.60	38.83	11.19	7.27	7.84	3.59
Emerging	Mean	3.58	3.63	381.25	3.24	13.88	11.82	1.06
	Std. dev.	5.71	3.81	1865.34	17.39	14.26	13.32	0.63

GDPG is GDP growth, *GDPGV* is the proxy measure of GDP growth volatility, *ISPEED* is the financial integration measure, *FGLOB* is the financial globalization measure, *COFV* and *CIFV* denote the proxy measures of volatility of capital outflows and inflows respectively, and *FOPEN* is financial openness.

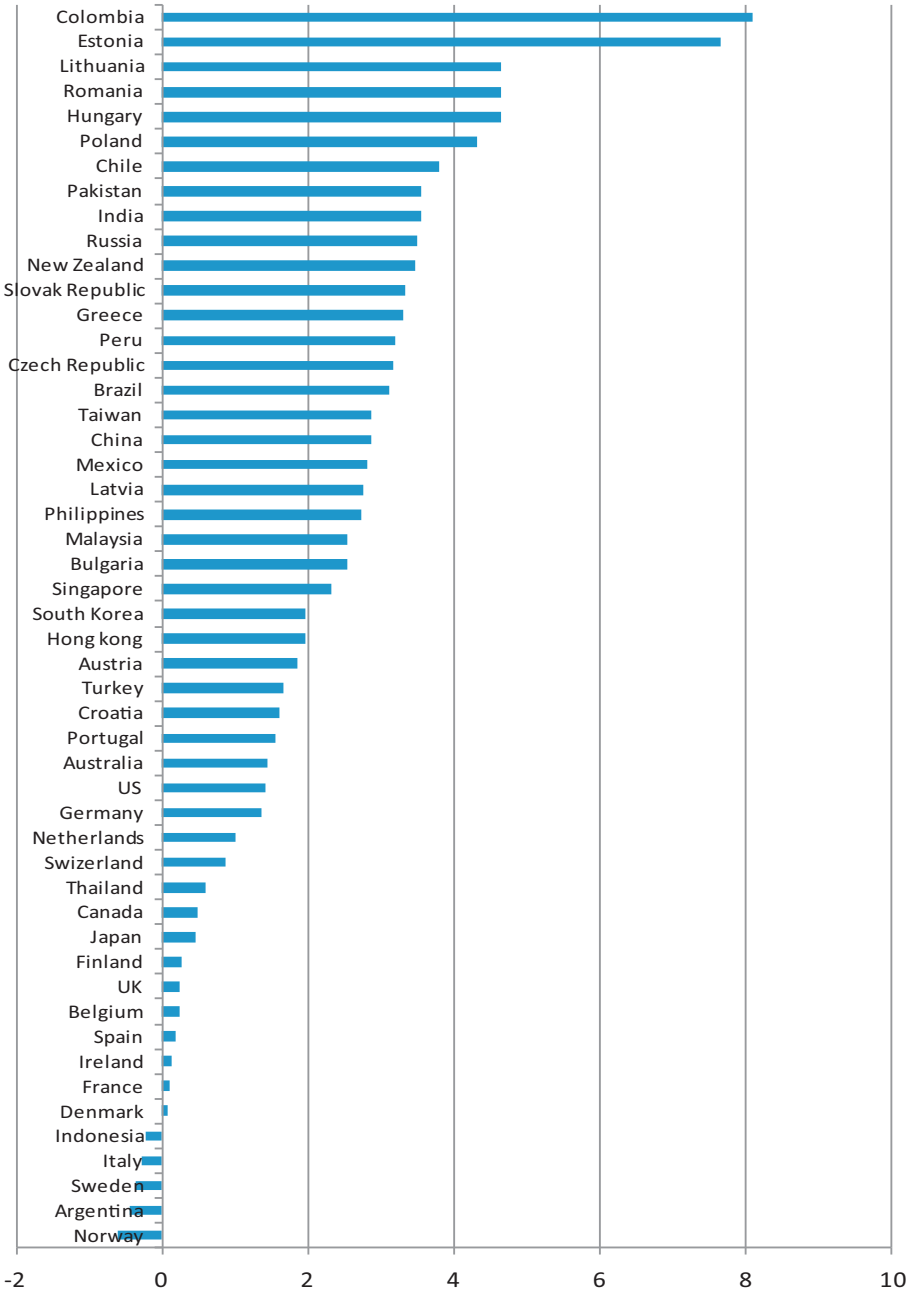

Fig. 1. *T*-stats of time trend coefficients of *ISPEED* regressions.

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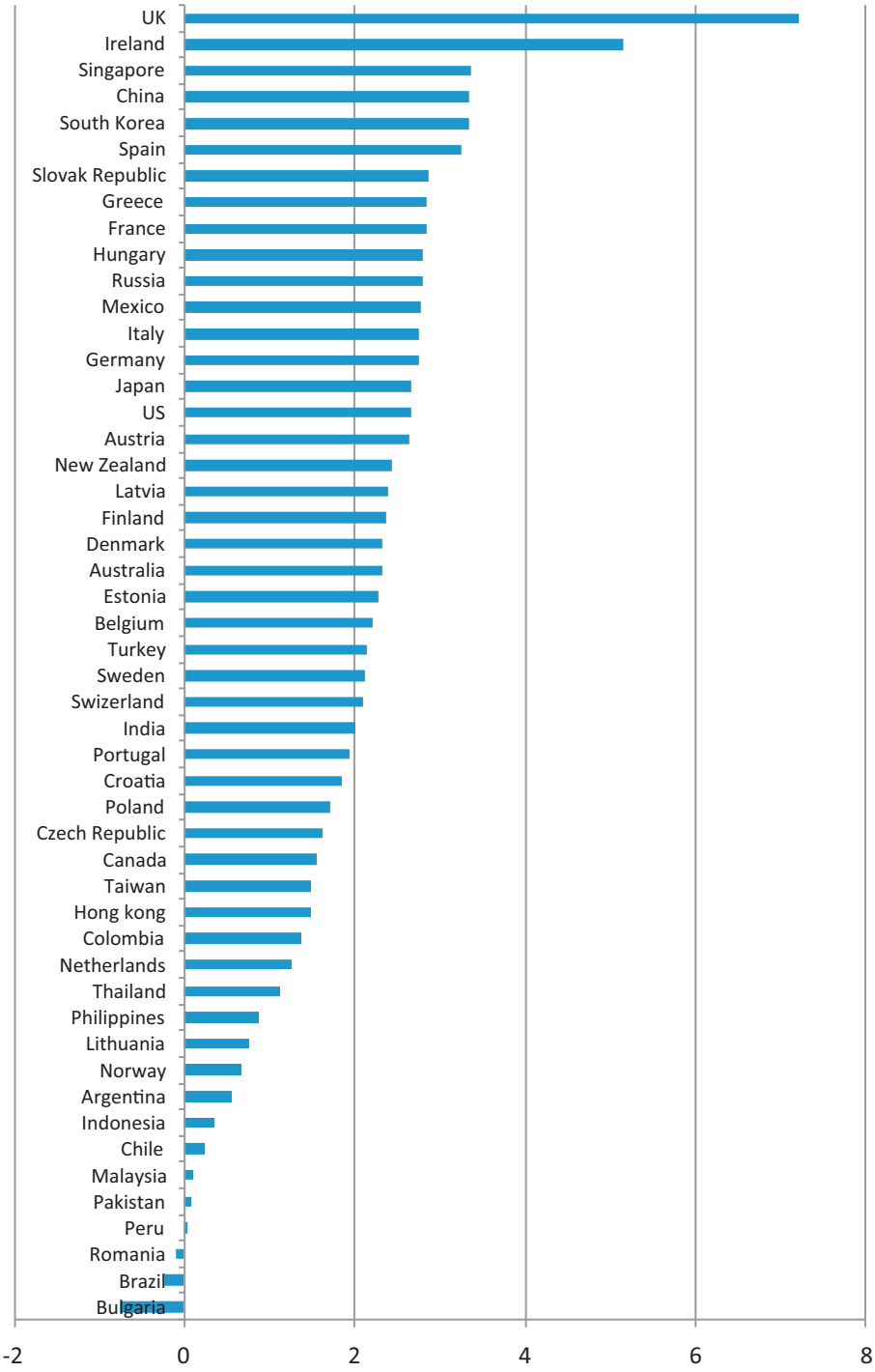

Fig. 2. *T*-stats of time trend coefficients of *FGLOB* regressions.

two lagged measures of capital flow volatility defined previously, denoted by CFV_{jt-1}.

Eq. (5) is estimated applying the GMM estimator introduced by Blundell and Bond (1998), using as instruments lagged values of the dependent variables treated as endogenous, and lagged values of the time dummies, *ISPEED* and *FGLOB* treated as exogenous. Table 3 reports the estimation results for the pooled sample, the advanced economies sample, and the emerging market sample. In these and all subsequent dynamic panel regressions, the Arellano and Bond tests for second-order serial correlation of the error term and the Sargan test for overidentifying restrictions support the model specification.

In the pooled sample (Regressions (1)–(3)), *ISPEED* is negatively and significantly associated with growth. Thus, an increase in financial integration, captured by a *reduction* in *ISPEED*, is associated with a higher GDP growth rate. Likewise, the coefficient associated with the lagged value of *FGLOB* is positive, and significant in (1) and (3), implying that higher financial globalization predicts higher

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Table 2
Correlation matrix.

	GDPG	*GDPGV*	*ISPEED*	*FGLOB*	*COFV*	*CIFV*	FOPEN
GDPG	1.00						
GDPGV	−0.4877*	1.00					
ISPEED	−0.1998*	0.2254*	1.00				
FGLOB	−0.1501*	0.1369*	0.02	1.00			
COFV	−0.2075*	0.3472*	0.0892*	0.04	1.00		
CIFV	−0.2040*	0.3248*	0.1044*	−0.0630*	0.6727*	1.00	
FOPEN	0.03	−0.0889*	−0.0760*	0.0657*	−0.0850*	−0.01	1.00

GDPG is GDP growth, *GDPGV* is the proxy measure of GDP growth volatility, *ISPEED* is the financial integration measure, *FGLOB* is the financial globalization measure, *COFV* and *CIFV* denote the proxy measures of volatility of capital outflows and inflows respectively, and *FOPEN* is financial openness.
* Value significantly different from 0 at a 5% confidence level.

Table 3
Growth regressions.

	Pooled			Advanced			Emerging		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	GDPG(*t*)	*GDPG*(*t*)	*GDPG*(*t*)	*GDPG*(*t*)	*GDPG*(*t*)	*GDPG*(*t*)	*GDPG*(*t*)	*GDPG*(*t*)	*GDPG*(*t*)
GDPG(*t* − 1)	0.575***	0.596***	0.581***	0.410***	0.409***	0.406***	0.495***	0.515***	0.500***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
ISPEED(*t*)	−0.000462***	−0.000472***	−0.000491***	0.0124	0.0144	0.0120	−0.000582***	−0.000571***	−0.000609***
	[0.00]	[0.00]	[0.00]	[0.39]	[0.34]	[0.38]	[0.00]	[0.00]	[0.00]
FGLOB(*t* − 1)	0.0633***	0.0416	0.0462**	0.0493**	0.0555**	0.0561**	0.0886***	0.0770**	0.0700**
	[0.00]	[0.15]	[0.04]	[0.04]	[0.03]	[0.03]	[0.00]	[0.02]	[0.03]
COFV(*t* − 1)		0.0574			−0.0283			0.0336	
		[0.10]			[0.26]			[0.46]	
CIFV(*t* − 1)			0.0623*			−0.0258			0.0656
			[0.0672]			[0.205]			[0.117]
Time	0.000520***	0.000387**	0.000450**	0.000379	0.000395	0.000400	0.000223	0.000194	0.000195
	[0.00]	[0.03]	[0.01]	[0.14]	[0.14]	[0.15]	[0.63]	[0.68]	[0.65]
Constant	−1.811**	−1.968**	−2.150***	−2.132***	−2.073***	−2.062***	−0.279	−0.607	−0.751
	[0.01]	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]	[0.88]	[0.74]	[0.67]
M1 (*p*-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
M2 (*p*-value)	0.59	0.42	0.47	0.13	0.15	0.18	0.49	0.54	0.52
No. of instruments	42	42	42	42	42	42	42	42	42
Sargan (*p*-value)	0.15	0.19	0.19	0.18	0.2	0.21	0.33	0.26	0.33
Observations	939	939	939	544	544	544	395	395	395
Countries	48	48	48	24	24	24	24	24	24

The estimated models are $GDPG_{jt} = \alpha_{1j} + \alpha_{2t} + \alpha_3 t + \beta ISPEED_{jt} + \gamma FGLOB_{jt-1} + \delta CFV_{jt-1} + \rho GDPG_{jt-1} + \varepsilon_{jt}$.
GDPG is GDP growth, *ISPEED* is the financial integration measure, *FGLOB* is the financial globalization measure, and *CFV* denotes the proxy measures of volatility of capital outflows (*COFV*) and capital inflows (*CIFV*) as defined in the text. α_{1j} is country fixed effect, α_{2t} is time fixed-effects, and $\alpha_3 t$ is a time trend. Estimates are obtained by the GMM system estimator of Blundell and Bond (1998). M1 and M2 are the *p*-values of the Arellano–Bond statistics for first and second order correlation of residuals; Sargan is the *p*-value obtained by estimates of the two-step version of the models. Robust *p*-values are reported in brackets.
The range of annual data is 1985–2008.
* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

GDP growth.[5] Notably, the positive impact of advances of financial integration and globalization are quantitatively significant: a one-standard deviation decline in *ISPEED* results in an average increase in GDP growth of 0.58 percent (the coefficient −0.000462 multiplied by the standard deviation of *ISPEED*, equal to 1256 from Table 1), while a one-standard deviation increase in *FGLOB* results in an average increase in GDP growth of 0.92 percent (the coefficient 0.0633 multiplied by the standard deviation of *FGLOB*, equal to 14.5 from Table 1).

Furthermore, the coefficient associated with the volatility of capital *outflows* is not significant, indicating that this dimension of openness does not have an impact on growth. By contrast, the coefficient associated with the volatility of capital *inflows* (Regression (3)) is *positive* and significant, albeit weakly.

The results of the regressions for the sample of advanced economies (Regressions (4)–(6)) and that of emerging markets (Regressions ((7)–(8)) overall indicate differential strengths of the positive effects of financial integration and globalization on growth. These different results reflect in part the differences in cross-country variation of the integration and globalization measures across these samples, as illustrated in Figs. 1 and 2. For advanced economies, the coefficient associated with *ISPEED* is not significant, while it is negative and highly significant for the emerging market economies, signaling a stronger positive impact of financial integration for these countries. By contrast, the positive impact of globalization appears strong in both emerging and advanced economies, reflecting in the latter economies the intense globalization process occurred during the period considered. Lastly, both the volatility of capital outflows and inflows do not appear to have a significant impact for both country groups.

In sum, both advances in financial integration and globalization are associated with higher growth. Moreover, financial integration has had a comparatively stronger positive impact on growth in

[5] We have estimated the same regressions with *FGLOB* replaced by the level of financial openness *FOPEN*: results are all the same except that the coefficient of *FOPEN* is not significant in any regression.

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Table 4
Growth volatility regressions.

	Pooled			Advanced			Emerging		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	GDPGV(*t*)	*GDPGV*(*t*)	*GDPGV*(*t*)	*GDPGV*(*t*)	*GDPGV*(*t*)	*GDPGV*(*t*)	*GDPGV*(*t*)	*GDPGV*(*t*)	*GDPGV*(*t*)
GDPGV(*t* − 1)	0.241***	0.288***	0.267***	0.263***	0.268***	0.263***	0.284	0.314	0.360*
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.11]	[0.11]	[0.08]
ISPEED(*t*)	0.000287**	0.000283**	0.000298**	−0.0166	−0.0149	−0.0163	0.000206	0.000203	0.000203
	[0.02]	[0.02]	[0.02]	[0.27]	[0.31]	[0.26]	[0.21]	[0.19]	[0.26]
FGLOB(*t* −)	−0.0244	−0.0163	−0.0174	0.00284	0.00641	0.00254	−0.0525	−0.0472	−0.0453
	[0.37]	[0.57]	[0.52]	[0.92]	[0.85]	[0.93]	[0.13]	[0.22]	[0.24]
COFV(*t* −)		−0.0315*			−0.0153			−0.0175	
		[0.09]			[0.51]			[0.62]	
CIFV(*t* −)			−0.0293			0.00235			−0.0382
			[0.17]			[0.89]			[0.28]
Time	0.000206	0.000242	0.000224	0.000341*	0.000344*	0.000339*	−0.000626**	−0.000610**	−0.000671**
	[0.21]	[0.15]	[0.17]	[0.08]	[0.08]	[0.09]	[0.03]	[0.04]	[0.03]
Constant	1.776***	1.793***	1.859***	2.153***	2.182***	2.142***	2.805***	2.803***	2.926***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
M1 (*p*-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03
M2 (*p*-value)	0.94	0.94	0.94	0.85	0.75	0.69	0.73	0.79	0.76
No. of instruments	42	42	42	42	42	42	42	42	42
Sargan (*p*-value)	0.89	0.91	0.90	0.95	0.18	0.20	0.18	0.94	0.94
Observations	939	939	939	544	544	544	395	395	395
Countries	48	48	48	24	24	24	24	24	24

The estimated models are $GDPGV_{jt} = \alpha_{1j} + \alpha_{2t} + \alpha_3 t + \beta ISPEED_{jt} + \gamma FGLOB_{jt-1} + \delta CFV_{jt-1} + \rho GDPG_{jt-1} + \varepsilon_{jt}$.
GDPG is GDP growth, *ISPEED* is the financial integration measure, *FGLOB* is the financial globalization measure, and *CFV* denotes the proxy measures of volatility of capital outflows (*COFV*) and capital inflows (*CIFV*) as defined in the text. α_{1j} is country fixed effect, α_{2t} is time fixed-effect, and $\alpha_3 t$ is a time trend. Estimates are obtained by the GMM system estimator of Blundell and Bond (1998). M1 and M2 are the *p*-values of the Arellano–Bond statistics for first and second order correlation of residuals; Sargan is the *p*-value obtained by estimates of the two-step version of the models. Robust *p*-values are reported in brackets.
The range of annual data is 1985–2008.
* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

emerging market economies, while globalization has had a similar positive impact on growth in advanced and emerging economies during the period considered.

3.2. Growth volatility

Table 4 reports the same regressions presented in Table 3 with a proxy measure of GDP growth volatility (*GDPGV*) as the dependent variable. As in the previous dynamic panel regressions, the tests for second-order serial correlation of the error term and the Sargan test for overidentifying restrictions support the model specification.

In the pooled sample (Regressions (1)–(3)), *ISPEED* is positively and significantly associated with growth volatility. Thus, an increase in financial integration, captured by a reduction in *ISPEED*, is associated with *lower* growth volatility. Remarkably, the positive impact of advances of financial integration is quantitatively significant: a one-standard deviation decline in *ISPEED* results in decline in GDP growth volatility of 0.36 (the coefficient 0.000287 multiplied by the standard deviation of *ISPEED*, equal to 1256 from Table 1), equivalent to a 14 percent reduction in average growth volatility.

By contrast, the measures of the lagged value of *FGLOB* and both measures of volatility of capital flows have no significant impact on growth volatility. When the sample is split between advanced and emerging economies, the signs of coefficients associated with both measures of financial integration and globalization are the same as the ones obtained in the full sample, although coefficients are not significant, owing to insufficient cross country variation within the two samples.

In sum, advances in financial integration are associated with lower growth volatility, while the impact of globalization and capital flow volatility appear unrelated to growth volatility. This latter result is somewhat at variance with the widespread conjecture of a positive association between these variables and the volatility of real activity.[6]

3.3. Robustness

We assess the robustness of the results reported in Tables 3 and 4 to possible sources of bias due to omitted variables. To this end, we implement the GMM dynamic panel estimations of our baseline growth and growth volatility regressions for the pooled sample using the "double differencing" estimation implemented by De Nicolò et al. (2008), which can control for the omission of all variables whose dynamics can be approximated by a stochastic trend.[7]

As shown in Table 5, the results are basically the same as those of the regressions reported in Tables 3 and 4. Thus, our results appear

[6] It is worth mentioning that our results do not contrast with those obtained in studies that find a positive association between measures of *levels* financial openness and growth volatility, since our measure of globalization is a *growth rate* of financial openness. The finding of a positive relationship between the level of openness and growth volatility is perhaps not surprising: a country that opens up its financial markets will be necessarily exposed to a wider set of shocks than a country that is financially closer, implying that these additional shocks may increase the volatility of real activity. Yet, when we replace *FGLOB* with *FOPEN* in our regression (1) in Table 4, the relevant coefficient is not significant.

[7] De Nicolò et al. (2008) procedure can be summarized as follows. Consider the regression (a): $Y_{it} = \alpha_i + X_{it}\beta + \ln(Z_{it})\gamma + \delta Y_{it-1} + \varepsilon_{it}$, and suppose that the vector of variables $\ln(Z_{it})$ includes *all* variables that affect Y_{it}. By defining $\Delta x_t \equiv x_t - x_{t-1}$, (a) can be expressed as: (b) $\Delta Y_{it} = \Delta X_{it}\beta + \Delta \ln(Z_{it})\gamma + \delta \Delta Y_{it-1} + \Delta \varepsilon_{it}$. Suppose vector Z_{it} satisfies $\Delta \ln(Z_{it}) = G_i + \nu_{it}$, where ν_{it} are identically, independently distributed and uncorrelated over time and across units (countries). Furthermore, define $A_i \equiv G_i\gamma$ and $\eta_{it} \equiv \nu_{it}\gamma + \Delta\varepsilon_{it}$, and assume *all* ν_{it} are uncorrelated with X_{it} and $\Delta\varepsilon_{it}$. Then, one can write (c) $\Delta Y_{it} = A_i + \Delta X_{it}\beta + \delta \Delta Y_{it-1} + \eta_{it}$. Estimation of β is obtained by applying the *difference* GMM estimation procedure developed by Blundell and Bond (1998) to equation (c), which is implemented by "doubly" differencing equation (a).

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Table 5
Robustness of growth and growth volatility regressions.

Variables	(1)	(2)
	DGDPG	*DGDPGV*
DGDPG($t-1$)	−0.124	
	[0.18]	
DISPEED($t-1$)	−0.000500***	0.000246**
	[0.00]	[0.02]
DFGLOB($t-1$)	0.0741***	−0.0244
	[0.00]	[0.15]
DGDPGV($t-1$)		−0.294***
		[0.00]
Constant	−2.253*	−0.617
	[0.09]	[0.55]
Observations	891	891
Number of countries	48	48
M1	0.02	0.00
M2	0.19	0.21
No. of instruments	61	61
Sargan *p*-value	0.265	0.43

Regressions (1)–(2) are the same regressions estimated in differences according to the procedure described in De Nicolò et al. (2008). Estimates are obtained by the GMM System estimator of Blundell and Bond (1998). M1 and M2 are the *p*-values of the Arellano–Bond statistics for first and second order correlation of residuals; Sargan is the *p*-value obtained by estimates of the two-step version of the models. Robust *p*-values are reported in brackets.
The range of annual data is 1985–2008.
* $p<0.10$.
** $p<0.05$.
*** $p<0.01$.

robust to the inclusion of any set of variables whose dynamics can be approximated by stochastic trends.

3.4. Systemic real risk

Here we assess whether there exists a significant relationship between financial integration, globalization, and indicators of systemic *real* risk, defined by De Nicolò and Juvenal (2012) as (left)-tail realizations of real activity. One advantage of using these indicators is eschewing the challenging task of defining and dating episodes of bank or financial fragility. Whenever financial instability carries significant adverse real effects, these will be reflected in significant declines in real activity and will be captured by our indicators.

We construct two measures of systemic real risk. The first one, called SR5, is a binary variables that take the value of one if in a given year a country's ratio of GDP growth to its standard deviation – which is computed for the entire length of the sample – is in the lowest 5th percentile of its distribution, and zero otherwise. The second measure, called SR0, can be viewed as a lower bound to systemic real risk realizations and is interpretable as associated with recessions. It is defined as a binary variable that takes the value of one if GDP growth in a given year is negative, and zero otherwise. To maximize the size of the empirical distribution of GDP growth, SR5 and SR0 were computed on the basis of GDP growth data since the year 1960 for each country.

We estimate the following Logit model:

$$P(SR_{jt}=1) = Logit(\alpha + \beta ISPEED_{jt} + \gamma FGLOB_{jt-1} + \delta CFV_{jt-1} + \rho GDPG_{jt-1}) \quad (6)$$

Table 6 reports the results for the pooled sample, as well as the samples of advanced and emerging market economies. In the pooled sample (Regressions (1)–(3) of panel A), the probability of a systemic risk realization SR5 is *lower* the higher is financial integration, as the coefficient associated with *ISPEED* is positive and significant. As in the previous regressions, the positive impact of advances of financial integration is quantitatively significant: a one-standard deviation decline in *ISPEED* results in an increase in the log odds of a significant decline in real activity of 0.38 (the coefficient 0.0003 multiplied by the standard deviation of *ISPEED*, equal to 1256 from Table 1).

The coefficients associated with *FGLOB* and capital flow volatility are all negative but not significant. By contrast, in the regressions with SR0 as the dependent variable, the coefficients of *ISPEED* remain positive but not significant. By contrast, the coefficient associated with *FGLOB* is negative and highly significant, and the coefficients associated with capital flow volatility are negative and significant as well. In particular, the positive impact of globalization is quantitatively non-negligible: a one-standard deviation increases in *FGLOB* results in an increase in the log odds of a significant decline in real activity of −0.06 (the coefficient −0.0045 multiplied by the standard deviation of *FGLOB*, equal to 14.5 from Table 1). These results suggest that advances in financial integration are associated with *lower* macroeconomic instability, while higher levels of globalization and capital flow volatility are associated with *lower* probabilities of recessions.

The results for the sample of advanced economies (Table 6, Panel B) and those of emerging markets (Table 6, Panel C) indicate differential strengths of the positive effects of financial integration and globalization on systemic real risk across these two country groups. For advanced economies, the coefficient associated with *ISPEED* is positive but not significant, while it is positive and significant for the emerging market economies, indicating a stronger impact of financial integration in reducing systemic real risk for these countries. By contrast, the coefficient of *FGLOB* is negative in all regressions in both country groups, but is significant only for SR0, suggesting again that financial globalization is associated with lower probabilities of recessions. Lastly, the coefficients associated with capital outflow volatility are not significant, while that associated with capital inflow volatility is negative and significant in the regressions with SR0 as the dependent variable in the emerging market sample.

Summing up, we find a significant negative relationship between financial integration, globalization and the probability of systemic real risk realizations, and, importantly, a negative relationship between capital inflow volatility and the probability of a recession. These results, together with the evidence on growth volatility reported previously, are at odds with the conjecture that there is a trade-off between financial integration, globalization, growth and macroeconomic stability.

3.5. The role of improvements in corporate governance and institutions

Many contributions in the literature have singled out the quality of corporate governance and institutional development as important determinants of financial integration and globalization.[8] Here we assess whether *improvements* in the quality of corporate governance and institutions *enhance* the positive effects of financial integration and globalization on real activity we have uncovered. We employ changes rather than levels, since such improvements may be introduced more in discrete jumps rather than in smooth progressions, as they are typically prompted by one-time enactments of new laws, regulations, and business practices.

[8] In De Nicolò and Juvenal (2012), we show that indicators of the quality of institutions and corporate governance have a positive and quantitatively significant impact on the levels of both our financial integration and globalization measures.

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Table 6
Systemic real risk regressions.

A. Pooled

	(1)	(2)	(3)	(4)	(5)	(6)
	SR5	SR5	SR5	SR0	SR0	SR0
$GDPG(t-1)$	−0.239**	−0.256**	−0.261**	−0.251***	−0.269***	−0.270***
	[0.02]	[0.03]	[0.02]	[0.00]	[0.00]	[0.00]
$ISPEED(t)$	0.0003**	0.0003**	0.0003**	0.0003	0.0003*	0.0004*
	[0.02]	[0.02]	[0.03]	[0.11]	[0.09]	[0.08]
$FGLOB(t-1)$	−0.024	−0.021	−0.021	−0.045***	−0.046***	−0.052***
	[0.28]	[0.44]	[0.52]	[0.00]	[0.00]	[0.00]
$COFV(t-1)$		−0.012			−0.024*	
		[0.70]			[0.09]	
$CIFV(t-1)$			−0.028			−0.0352*
			[0.42]			[0.06]
Constant	−3.318***	−3.175***	−3.049***	−1.552***	−1.286***	−1.207***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Pseudo R2	0.17	0.17	0.17	0.13	0.13	0.14
Observations/countries	939/48	939/48	939/48	939/48	939/48	939/48

B. Advanced

	(7)	(8)	(9)	(10)	(11)	(12)
	SR5	SR5	SR5	SR0	SR0	SR0
$GDPG(t-1)$	−0.541***	−0.577***	−0.526**	−0.361***	−0.361***	−0.360***
	[0.00]	[0.00]	[0.02]	[0.00]	[0.00]	[0.00]
$ISPEED(t)$	0.011	0.012	0.011	−0.008	−0.008	−0.008
	[0.30]	[0.23]	[0.31]	[0.25]	[0.26]	[0.25]
$FGLOB(t-1)$	−0.043	−0.072	−0.040	−0.045**	−0.046**	−0.044**
	[0.29]	[0.31]	[0.19]	[0.01]	[0.02]	[0.01]
$COFV(t-1)$		−0.144*			−0.0171	
		[0.09]			[0.49]	
$CIFV(t-1)$			0.022			0.004
			[0.76]			[0.89]
Constant	−3.780***	−2.810***	−4.006***	−1.121***	−0.995**	−1.152***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]
Pseudo R2	0.20	0.24	0.20	0.11	0.12	0.11
Observations/countries	544/24	544/24	544/24	544/24	544/24	544/24

C. Emerging

	(13)	(14)	(15)	(16)	(17)	(18)
	SR5	SR5	SR5	SR0	SR0	SR0
$GDPG(t-1)$	−0.167*	−0.179*	−0.204**	−0.202***	−0.229***	−0.247***
	[0.09]	[0.10]	[0.03]	[0.00]	[0.00]	[0.00]
$ISPEED(t)$	0.0002**	0.0002**	0.0003**	0.0003*	0.0003*	0.0004**
	[0.02]	[0.02]	[0.02]	[0.10]	[0.10]	[0.03]
$FGLOB(t-1)$	−0.0126	−0.010	0.001	−0.038***	−0.038***	−0.057***
	[0.59]	[0.76]	[0.98]	[0.00]	[0.00]	[0.00]
$COFV(t-1)$		−0.009			−0.024	
		[0.76]			[0.18]	
$CIFV(t-1)$			−0.0648			−0.0746***
			[0.24]			[0.00]
Constant	−3.041***	−2.895***	−2.469***	−1.674***	−1.310***	−0.916**
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Pseudo R2	0.19	0.19	0.21	0.17	0.18	0.20
Observations/countries	395/24	395/24	395/24	395/24	395/24	395/24

The estimated models are $P(SR_{jt}=1) = Logit(\alpha + \beta ISPEED_{jt} + \gamma FGLOB_{jt-1} + \delta CFV_{jt-1} + \rho GDPG_{jt-1})$.
SR are the indicators of systemic real risk: SR5 equal to 1 if real GDP growth is lower than the 5th percentile of the cross-country distribution of GDP growth, and 0 otherwise; SR0 equals to 1 if real GDP growth is negative, and 0 otherwise. *ISPEED* is the financial integration measure, *FGLOB* is the financial globalization measure, and *GDPG* is GDP growth. Estimates are obtained by Logit regressions with standard errors clustered by country. Robust *p*-values are reported in brackets.
The range of annual data is 1985–2008.
* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

A measure of improvements in the quality of corporate governance, denoted by *CGQ*, is the yearly *change* of the composite indicator of corporate governance quality constructed by De Nicolò et al. (2008), based on accounting data of firms listed in equity markets, and updated to the year 2009. This composite indicator captures the quality of disclosure and transparency of accounting standards, and it is standardized so that an increase of the indicator signals better corporate governance. Specifically, this indicator is an average of three dimensions of corporate governance: *Accounting Standards*, gauging the degree of accounting disclosure of firms in a country; *Earning Smoothing*, a measure of "earnings opacity" tracking the extent to which managers may conceal the true performance of firms using accruals to smooth fluctuations of annual profits, and *Stock Price Synchronicity*, a measure proposed by

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Table 7
The role of corporate governance and the quality of institutions: growth, growth volatility, and systemic real risk.

	Panel regressions		Logit regressions		
	(1)	(2)		(3)	(4)
	GDPG(*t*)	GDPGV(*t*)		Sr5	Sr0
GDPG(*t* − 1)	0.483***				
	[0.000111]				
GDPV(*t* − 1)		0.263			
		[0.303]			
ISPEED(*t*)	−0.00169***	0.00126*	*ISPEED*(*t*)	0.000455	0.000812**
	[0.00311]	[0.0860]		[0.33]	[0.02]
ISPEED(*t*) * CGQ	−0.0133	0.0219***	*ISPEED*(*t*) * CGQ	0.0362***	0.0197**
	[0.137]	[0.00221]		[0.00]	[0.03]
ISPEED(*t*) * INST	5.57e-05	−3.97e-05	*ISPEED*(*t*) * INST	−4.29e-05***	−2.09e-05***
	[0.108]	[0.177]		[0.00]	[0.00]
FGLOB(*t* − 1)	0.0882**	0.00360	*FGLOB*(t−1)	−0.0754**	−0.0382**
	[0.0425]	[0.926]		[0.02]	[0.03]
FGLOB(*t* − 1) * CGQ	0.176	0.501	*FGLOB*(t−1) * CGQ	0.319	0.125
	[0.698]	[0.378]		[0.69]	[0.67]
FGLOB(*t* − 1) * INST	−0.000318	0.000588	*FGLOB*(t−1) * INST	1.47e-05	0.000101
	[0.647]	[0.419]		[0.98]	[0.77]
Time	−0.00369	0.00129			
	[0.658]	[0.911]			
Constant	3.819	0.201	Constant	−3.725***	−1.974***
	[0.699]	[0.988]		[0.00]	[0.00]
M1 (*p*-value)	0.00	0.08	Pseudo-R2	0.462	0.140
M2 (*p*-value)	0.31	0.01	Observations	426	426
No. of instruments	39.00	39.00			
Sargan (*p*-value)	0.22	0.49			
Observations	425	425			
Countries	39	39			

The estimated models are those in Table 3 (dependent variable: GDP growth, *GDPG*), Table 4 (dependent variable: GDP growth volatility, GDPGV), and Table 6 (the logit model).
ISPEED is the financial integration measure, *FGLOB* is the financial globalization measure. *SR* are the indicators of systemic real risk: SR5 equal to 1 if real GDP growth is lower than the 5th percentile of the country distribution of GDP growth, and 0 otherwise; SR0 equals to 1 if real GDP growth is negative, and 0 otherwise. Estimates are obtained by the GMM System estimator of Blundell and Bond (1998). M1 and M2 are the *p*-values of the Arellano–Bond statistics for first and second order correlation of residuals; Sargan is the *p*-value obtained by estimates of the two-step version of the models. Robust *p*-values are reported in brackets.
The range of annual data is 1985–2008.
* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

Morck et al. (2000), which they have shown as associated with corporate governance quality and degree of financial development. A measure of improvements in the quality of institutions, denoted by *INST*, is the yearly *change* of the simple average of the governance indicators constructed by Kaufmann et al. (2009). These include six survey-based measures of institutional quality detailed in the Appendix.

To assess the potential impact of improvements in the quality of corporate governance and institutions on the strength of the relationship between financial integration, globalization, and real activity, in Table 7 we report the dynamic panel regression specification in Tables 3–4 with the addition of interaction terms of *ISPEED* and *FGLOB* with *CGQ* and *INST*, and add the same interaction terms to the logit regressions specified as in Table 6.

Regressions (1) in Table 7 show the results with GDP growth as the dependent variable. Similarly to the pooled regressions of Table 3, the coefficient of *ISPEED* is negative and significant and that of the lagged value of *FGLOB* is positive and significant, indicating that advances in financial integration and globalization are associated with a higher GDP growth rate. However, the interaction terms of *ISPEED* and *FGLOB* are not significant. Regressions (2) in Table 7 show the results with growth volatility as the dependent variable. The coefficient of *ISPEED* is positive and significant, consistent with the result in Table 4, while that of *ISPEED* * *CGQ* is positive and significant: this means that greater financial integration is associated with lower growth volatility, with the size of the impact of advances in financial integration significantly enhanced by improvements in corporate governance. By contrast, the coefficients associated with other interaction variables are not significant.

Lastly, Eqs. (3) and (4) in Table 7 report the Logit regressions with systemic real risk as the dependent variable and the interaction terms. The interaction term *ISPEED* * *CGQ* is positive and significant in both regressions, indicating that the risk-reducing impact of financial integration is larger in countries experiencing advances in corporate governance. By contrast, the interaction term *ISPEED* * *INST* is negative, but coefficients are extremely small, and the remaining interaction terms are not significantly different from zero.

All in all, improvements in corporate governance emerge as an important determinant of the magnitude of the positive impact of financial integration on macroeconomic stability. By contrast, there is weak evidence that the impact of globalization is significantly affected by improvements in corporate governance and the quality of institutions.

4. Conclusions

This paper has examined the distinct impact of financial integration and globalization on three dimensions of real activity: growth, growth volatility and measures of macroeconomic instability. Both financial integration and globalization are associated with higher growth, lower growth volatility, and lower probabilities of sharp declines in real activity, and the positive impact of financial integration on macroeconomic stability is magnified by

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improvements in corporate governance and the quality of institutions.

Overall, these results suggest that financial integration and globalization are likely to yield the beneficial real effects resulting from a more efficient resource allocation predicted by theory. We do not find direct evidence of costs in the dimension of macroeconomic instability. Policies aimed at fostering financial integration of capital markets and financial sectors, removing impediments to financial globalization, and promoting improvements in corporate governance and the quality of institutions may be necessary, albeit not sufficient, to allow countries to reap these benefits.

Appendix A. Data appendix

Description of the variables

Variable	Description
Excess returns	Equity market data at monthly frequency is taken from DataStream. The risk-free rate is the yield on government securities at maturities ranging from one month to three months, depending on data availability. Data is available from 1985 through 2009. Starting dates vary by country. Source: The primary source of the risk-free rate is DataStream but in the cases in which data is missing data is taken from the International Financial Statistics of the IMF (see table for details).
GDP growth	Growth of real gross domestic product from 1960 through 2009. Source: World Bank.
Financial globalization	*FGLOB*, is the growth rate of financial openness, defined as the ratio of the sum of external assets and liabilities to GDP. Data is available for all countries except Slovakia from 1992 through 2009. Source: Lane and Milesi-Ferretti (2007) and updates.
Governance indicators	The governance indicators constructed by Kaufmann et al. (2009) are chosen as measures of the quality of institutions. These include six survey-based measures of institutional quality: *Control of Corruption*, the extent to which public power is exercised for private gain; *Voice and Accountability*, citizens' ability to participate in selecting their government; *Political Stability*, the stability of elected government bodies, *Government Effectiveness*, the quality of public services and that of policy formulation and implementation; *Regulatory Quality*, the ability of the government to implement regulations that permit and promote private sector development; and *Rule of Law*, the quality of contract enforcement and protection of property rights. Data is available for all countries from 1996 through 2008. Source: World Bank.
Corporate governance	We use the corporate governance quality index constructed by De Nicolò et al. (2008), and updated to the year 2008, with data available from 1995.

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