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**DOES FINANCIAL GLOBALIZATION STILL SPUR GROWTH IN EMERGING
AND DEVELOPING COUNTRIES? CONSIDERING EXCHANGE RATE
VOLATILITY'S EFFECTS**

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ABSTRACT

We examine the effects of financial globalization and exchange rate volatility on growth in emerging and developing countries. We generate several measures of exchange rate volatility, as well as their interaction terms with indicators of disaggregated financial globalization. Using the two-step GMM system method on dynamic panel data, we find that exchange rate volatility has a negative impact on long-term growth. On the contrary, financial globalization, and particularly investment-globalization, promotes growth not only directly, but also indirectly, by reducing the negative impact of exchange rate volatility. However, the results show that indebtedness-globalization does not produce these benefits. In this way, the results inform the government's decision on the liberalization of the domestic financial market.

JEL: E44, F21, F36, O42, G15, G18

Keywords: Foreign Investors; Government Policy; Dynamic Panel; Exchange Rate Volatility; Interactions

1. Introduction

This paper provides a new approach to highlight the impact of financial globalization and exchange rate volatility on long-term economic growth in emerging and developing countries. It combines and complements three different currents of literature, namely the literature on the effect of nominal exchange rate volatility; the one on the impact of financial globalization on nominal exchange rate volatility; and the literature on the impact of financial globalization on economic growth.

Regarding the first current, there are two opposing visions. Proponents of fixed exchange rate regimes consider that nominal exchange rate stability increases growth (e.g. Frankel and Rose, 2002; De Grauwe, 2005; De Los Rios, 2009; Arratibel, Furceri, Martin and Zdzienicka, 2011). On the other hand, proponents of flexible exchange rate regimes argue that exchange rate fluctuations are necessary for the absorption of shocks (e.g. Bayoumi and Eichengreen, 1994; Edwards and Levy-Yeyati, 2005) and therefore beneficial to economic growth.

As for the second current, numerous researches suggest that financial globalization enhances nominal exchange rate volatility (e.g. Mundell, 1961; Tille, 2008). Other studies do not show that greater financial openness necessarily produces higher nominal exchange rate volatility (e.g. McKinnon and Schnabl, 2004; Aizenman et al., 2010; Al-Abri, 2013).

With respect to the third current of empirical literature, a first subgroup includes several studies that prove that financial globalization has a positive effect on economic growth (e.g. McKinnon, 1973; Shaw, 1973; Quinn, 1997; Bekaert et al., 2011; Iamsiraroj, 2016). A second group comprises authors demonstrating that financial globalization has a spillover effect on economic growth rather than a direct effect, primarily by acting on the domestic financial system (e.g. Kim and Wu, 2008; Bruno and Hauswald, 2013; Ahmed, 2016; Trabelsi and Cherif, 2017). Other studies reveal a negative or non-significant effect of financial globalization on economic growth (e.g. Alesina et al., 1994; Rodrik, 1998; Broner et al., 2010; Lane and McQuade, 2014).

Considering all these controversies, three questions are worth being raised: i) What is the effect of financial globalization on growth? ii) What is the impact of nominal exchange rate volatility on growth? iii) What is the effect of financial globalization via the impact of nominal exchange rate volatility on growth, in other words, does financial globalization reduce (or increase) indirectly economic growth by enhancing (or reducing) the negative (or positive) effect of nominal exchange rate volatility?

In order to provide some elements of response to these questions, we use the two-step GMM system method on dynamic panel data and estimate two models of economic growth. These models comprise indicators of financial globalization, indicators of nominal exchange rate volatility and terms of interaction between those two. The estimations are carried out for a panel of 72 emerging and developing countries over the period 1972–2011.

On the basis of these estimations, we find that nominal exchange rate volatility has a negative and significant impact on growth. On the contrary, financial globalization, and in particular investment-globalization (foreign direct investment and portfolio investment), promotes growth not only directly, but also indirectly by reducing the negative impact of nominal exchange rate volatility. Thus, financial openness with monetary stabilization seems to be a recommendable political strategy. These results are robust on a wide range of sensibility tests. By evidencing these interactions, the present study goes beyond the literature on the impact of exchange rate volatility on growth (e.g. De Grauwe and Schnabl, 2008; Aghion, Bacchetta, Ranci ere and

Rogoff, 2009; De Los Rios, 2009; Arratibel et al., 2011), knowing that it does not consider the effect of financial globalization. Our study also complements recent research that explains the indirect effects (collateral effects) of financial globalization on growth, but which does not include the effects of exchange rate volatility (Kim and Wu, 2008; Lane and McQuade, 2014; Ahmed, 2016; Trabelsi and Cherif, 2017). Finally, this study goes one step further than the analyses focussing on the impact of financial globalization on exchange rate volatility, since it includes the effects of these two phenomena on long-term economic growth in emerging and developing countries (e.g. Aizenman et al., 2010; Al-Abri, 2013).

The following sections of the paper are organized as follows. Section 2 provides a literature review of the three currents mentioned; section 3 describes the data used, while section 4 discusses the methodology and the results. Section 5 presents the conclusions drawn.

2. Literature review

This paper combines and complements three currents of literature and attempts to settle their controversies. These currents include studies on the impact of nominal exchange rate volatility on growth; work on the relation between financial globalization and nominal exchange rate volatility; and research on the impact of financial globalization on economic growth.

2.1 Nominal exchange rate volatility and economic growth

In theory, advocates of rigid exchange rate regimes have shown that exchange rate volatility reduces economic growth. According to Frankel and Rose (2002), exchange rate volatility is associated with increased uncertainty. This uncertainty may cause macroeconomic instability and negatively affect foreign trade and production, as it increases transaction costs. De Grauwe (2005) also notes that uncertainty undermines price transparency and the efficiency of their adjustment mechanisms. Aizenman and Hausmann (2000) and De Los Rios (2009) argue that the stability of the nominal exchange rate is to be promoted in less developed financial systems. According to these authors, with a low level of risk management and strong exchange rate fluctuations, a financial crisis can occur, which will jeopardize investment and productivity growth.

Empirically, according to Arratibel et al. (2011), research on the effects of nominal exchange rate volatility on economic growth is relatively rare. In their own study, these researchers examined the impact of nominal exchange rate volatility on a wide range of macroeconomic variables, namely real GDP per capita growth, credit surpluses, foreign direct investment and current account balance of the balance of payments. The spatial horizon of the study concerns the member states of the European Union and countries of Central and Eastern Europe. The time horizon covers the period 1995–2008. With the estimation of several country-fixed effects models in panel data, Arratibel et al. (2011) have demonstrated that low nominal exchange rate volatility is associated with higher levels of economic growth, more foreign direct investment, higher current account deficits and larger surpluses of credits. In their growth model, the authors monitored a set of macroeconomic variables, including a binary crisis indicator and a demographic variable. The main indicator of nominal exchange rate volatility is the “Z-score” measure. It was constructed by Ghosh et al. (2003) and is based on the mean and variance of the monthly nominal exchange rate. Even before Arratibel et al. (2011), Schnabl (2007, 2008) sought to identify the nature of the impact of exchange rate volatility on growth in 41 countries comprising member states of the European Union and developing countries. The data used is are annual and relate to the period 1994–2005. In order to measure exchange rate volatility, the author used the standard deviation of the growth rate of the monthly nominal exchange rate and

the “Z-score”-variable. Together with these indicators, the author includes a binary variable of crises and performs regressions through the GLS and the GMM system. Based on these regressions, he shows that nominal exchange rate stability positively affects economic growth and that the transmission channels for this effect are foreign trade and foreign capital inflows. Schnabl adds that the beneficial effects of nominal exchange rate stability are stronger in developing countries (countries peripheral to the European Union) and weaker in European Union member states which are characterized by a developed financial system. In 2009 the same author finds a negative impact of nominal exchange rate volatility on growth in a more heterogeneous panel composed of a group of European countries in transition and a group of East Asian countries. In his view, exchange rate instability is counterproductive for two main reasons, namely, uncertainty and the resulting decline in macroeconomic stability. This runs counter the idea that nominal exchange rate stability could hamper growth by slowing the adjustment of the economy after external shocks and by encouraging speculation. Regarding the estimation techniques, Schnabl (2009) also chose the GMM and GLS methods. The time period and the exchange rate volatility variables are the same as those of the 2008 study. Similarly, De Grauwe and Schnabl (2008) show that nominal exchange rate volatility has a negative and highly significant impact on economic growth. The study was conducted for 18 countries in Central and Eastern Europe from 1994 to 2004. In order to arrive at these conclusions, the two researchers included in their growth model various indicators (*de jure* and *de facto*) of instability of the nominal exchange rate and run their estimations using the GMM method. These indicators comprise the rate of variability of the nominal exchange rate and the “Z-score”-measure. A set of real and monetary macroeconomic variables, including a binary crisis variable, are also embedded in the model.

Unlike these results, theoretical and empirical work has shown a positive relationship between exchange rate volatility and growth. According to Bayoumi and Eichengreen (1994), countries adjust better to external shocks under flexible exchange rate regimes, which is due to exchange rate volatility. Also, the fluctuation of the nominal exchange rate, according to Eichengreen (1998), reduces the risk of a crisis by restoring the interest rate differential after the shock to its initial level. Similarly, Chang and Velasco (2000) suggest that if a poorly developed financial system is coupled with a fixed exchange rate regime, where the nominal exchange rate does not fluctuate, the likelihood of a crisis increases. Three years later, in a study conducted on a large panel of 183 developed and developing countries over the period 1974-2000, Levy-Yeyati and Sturzenegger (2003) found that less flexibility in the exchange rate regime was associated with slower growth and higher output instability. Besides, the impact of the exchange rate regime on economic growth is not significant for the sub-group of developed countries in the sample. Edwards and Levy-Yeyati (2005) find similar results in a study on the impact of terms-of-trade shocks of exchange on growth, depending on exchange rate regimes. Indeed, for a large sample of 138 developed and developing countries analyzed over the period 1974–2004, the authors demonstrate that nominal exchange rate volatility, measured mainly by the standard deviation, allows a better absorption of the terms-of-trade shocks of exchange. As a result, countries with fluctuating exchange rates appear to be growing faster than those with a fixed exchange rate regime. In 2005, Coudert and Dubert confirmed the results of the last two studies. These authors have shown the positive effect on economic growth of floating exchange rate regimes, characterized by a high variance of the nominal exchange rate. The opposite effect has been demonstrated in the case of fixed exchange rate regimes, where the nominal exchange rate is of low variance. The study is carried out on 10 Asian countries between 1990–2001 and 2001–2004.

Based on this literature, it is fair to say that the volatility of the nominal exchange rate slows GDP growth in emerging and developing countries. In theory, this is due to the low development of their financial systems. In fact, these systems are generally unable to adequately hedge risks arising from uncertainty associated with exchange rate volatility. The result is a decline in investment, production and international trade.

2.2 Financial globalization and nominal exchange rate volatility

Are exchange rates more volatile in a context of free movement of capital?

The study carried out by Mundell (1961) is one of the best-known researches on which theoretical reflections on this issue have been based. Indeed, Mundell (1961) argues in favor of the application of flexible rather than fixed exchange rate regimes in a context of financial openness. He proves that this measure is indispensable if governments insist on targeting internal (growth and price stability) and external objectives (financial and trade openness). This is how the theory of the “triangle of incompatibility” emerged.

On the other hand, McKinnon (1973), one of the theoreticians of financial liberalization, argues that capital inflows increase the nominal exchange rate volatility, at least in the short term. However, the author does not define what he meant by short-term nor does he explain the extent to which the government should artificially maintain exchange rate fixation. Accordingly, Tille (2008) highlighted the importance of the monetary shock that financial globalization produces in open countries. He has proved that this shock is likely to destabilize the exchange rate and that it is more massive when the flows exchanged concern bonds rather than equities.

In contrast to all these theoretical results, McKinnon and Schnabl (2004) argue that, in practice, financial globalization does not automatically imply an increase in the instability of the nominal exchange rate. The authors explain this relationship by the “fear of floating” in East Asian economies, with the exception of Japan. After examining the daily evolution of the bilateral nominal exchange rate in these countries against the dollar over the period 1990–2002, the researchers found that this rate remained fairly stable even after the crisis of 1997–1998. The explanation for this phenomenon is as follows: out of fear of excessive instability in their currencies – “fear of floating” – East Asian governments have ensured the accumulation of currencies, especially the dollar, to stabilize their exchange rates. Later, Aizenman et al. (2010) revisited Mundell’s “triangle of incompatibility” from an empirical perspective, focussing on Asian countries over the period 1970–2007. The authors find that in a context of financial globalization East Asian countries succeed in maintaining the stability of their currencies by holding a level of foreign reserve assets averaging 20% their GDP. In the case of non-Asian emerging countries, the exchange rate is more volatile. More recently, in a study with a panel of 53 developing countries exporting primary products examined over the period 1980–2007, Al-Abri (2013) interrelated indicators of financial globalization and of terms-of-trade. He then estimated the impact of this interaction on exchange rate volatility. The results assert the stabilizing effect of financial globalization on the exchange rate by reducing the impact of terms-of-trade shocks on the exchange rate. This stabilizing effect is all the stronger as financial globalization concerns foreign direct investment. These results are corroborated by those of Cuñado, Biscarri and De Gracia (2006).

Overall, this literature suggests that most theoretical work argues that financial globalization destabilizes the nominal exchange rate. This is contradicted by some empirical work which mainly evokes mainly the case of Asian countries. These countries have been able to stabilize their currencies in a context of financial openness by accumulating foreign reserve assets.

2.3 Financial globalization and economic growth

The main conclusions of the studies on the tandem of financial globalization and economic growth can be classified in three groups. The first group represents studies that show that financial globalization has a positive effect on economic growth. The second group includes research that has demonstrated a negative or insignificant effect of financial globalization on economic growth. The last group includes investigations that have pointed out that financial globalization is more likely to affect economic growth collaterally rather than directly, by acting primarily on the domestic financial system.

For the first group, Quinn (1997) was one of the first economists to demonstrate unambiguously a direct and net positive relationship between financial openness and economic growth. The sample studied by the author, covering a period from 1958 to 1989, is composed of 64 developed and developing countries. In 2008, Quinn and Toyoda included in their model a multitude of indicators for the openness of the financial account and the liberalization of the banking market. The study was carried out on a sample of 94 countries from 1955 to 2004 and confirmed the existence of an impact of financial openness on the increase in GDP. Similarly, Bekaert et al. (2011) analyze the effects of financial globalization (openness of capital account and stock market) in a panel of 96 developed and developing countries between 1980 and 2006. The authors demonstrate the robustness of the impact of financial openness on both growth and overall productivity of production factors. Finally, the study by Iamsiraroj (2016) highlights that the relationship between foreign investment-globalization and growth is significantly positive and bi-directional. It is by empirically analyzing 124 countries in the period 1971–2010 that Iamsiraroj draws these conclusions. The positive effect of FDI on growth is also corroborated by Eller, Haiss and Steiner (2006). All these empirical results are theoretically justified by the theses of financial liberalization initiated by McKinnon (1973) and Shaw (1973). According to these theories, financial globalization allows to channel savings from the most capital-rich countries (developed countries) to the countries least endowed with capital (developing countries). Financial globalization thus serves the profitability of capital of the former and the development of savings, the reduction in the cost of capital as well as the economic growth of the latter.

Moreover, in the second group, Mishkin (2009) argues that a globalized domestic financial system is supposed to address the lack of financing which condemns the growth of lagging economies. Chinn and Ito (2007) show that financial openness contributes to financial development by intensifying competition between local and foreign banks within the domestic financial system. They also emphasize the positive effects of the entry of foreign investors in terms of liquidity and diversification of financial assets on the stock market. Likewise, according to Bruno and Hauswald (2013), the mere presence of foreign banks on the financial market is supposed to promote the “allocative efficiency” of credit, by undermining state intervention that may repress it. Levine (1996) argues that the participation of foreign investors in the capital of domestic banks helps to improve their governance. Moreover, according to De Haas and van Lelyveld (2004), portfolios held by foreign banks entering developing countries are characterized by both large capitalization and international diversification, which favors an inter-temporal smoothing of credit in periods of recession in the domestic economy. Later, De Haas and van Lelyveld (2010) explain the resilience of foreign banking subsidiaries to internal shocks through the support of their parent bank, which acts as a lender of last resort. This gives depositors confidence, avoids massive withdrawals of deposits and stabilizes the banking market.

In addition to these findings, empirical studies have shown that financial globalization improves growth through the development of the domestic financial system. Among these studies are those of Kim and Wu (2008), Ahmed (2016) and Trabelsi and Cherif (2017).

In the last group, Obstfeld (1998) theoretically proves that when financial openness is based on indebtedness, it risks harming household well-being. Indeed, with the repayment of debt, the level of capital eventually reaches a higher level than the autarkic level. However, paying interest on debt lowers consumption below its level of self-sufficiency. According to Mendoza (2006), in economies characterized by relative capital poverty, financial globalization is counterproductive. As the author argues, globalization therefore increases total debt and its cost. In the same vein, Broner et al. (2010) developed a standard growth model in which a country's lack of capital did not allow the economy to service its foreign debt. The two authors conclude that the repayment of foreign debt, in a context of free movement of capital, will depend on the ratio of domestic savings to external debt. The weakness of this ratio is a sign of loan default, which can slow down capital inflows and encourage capital flight. Broner et al. (2010) add that this is most likely in economies with a weak financial system and a fragile institutional framework. On the other hand, the economies receiving foreign savings aggravate the decline in the return on their capital. They end up with a slower rate of growth than in autarkic situations. Eichengreen et al. (2011) consider that financial openness develops the financial system but creates financial crises.

From an empirical point of view, the study by Alesina et al. (1994) is one of the first to prove that financial openness can neither increase nor decrease growth. It covered 20 OECD countries between 1950 and 1989. This is confirmed by Rodrik (1998) for 100 developed and developing countries during the period 1975–1989. More recently, Joyce (2011) examined the case of 20 emerging countries between 1976 and 2002. He concludes that while investment-globalization reduces the mischiefs of crises, external debts promote their impact. Finally, Lane and McQuade (2014) demonstrate that, in 54 developed and emerging countries, between 1993 and 2008, there was a strong correlation between external debt flows and the domestic credit boom, unlike investment flows.

In sum, this literature supports the lack of consensus on the effect of financial globalization on growth. This being said, recent research shows that it is easier to prove a positive and significant effect on growth of investment-globalization rather than of indebtedness-globalization.

3. Data

With reference to Kaya, Lyubimov and Miletkov (2012), we are basing our study on an unbalanced panel of 72 emerging and developing countries. We chose data between 1972 and 2011¹ that were transformed into a five-year average². This method is used by Aizenman et al. (2010), Al-Abri (2013), Iamsiraroj (2016) and Ahmed (2016) to smooth short-term variations in the growth level due to business cycle fluctuations. Thus, the method accounts for the long-term trend of growth (Temple, 1999). As an indicator of economic growth, we consider the growth rate of real GDP per capita (GDPPC) that is explained by the indicators of financial globalization and exchange rate volatility, as well as by control variables. The latter are selected in accordance with several studies on the phenomenon of economic growth, as they have been proven robust, namely by Sala-I-Martin, Doppelhofer and Miller (2004).

¹ For the list of sample countries, data description, statistics and correlations (Tables A, B and C), see appendix.

² The transformation yields eight non-overlapping sub-periods: 1972–1976, 1977–1981, 1982–1986, 1987–1991, 1992–1996, 1997–2001, 2002–2006, and 2007–2011.

3.1 Indicators of financial globalization

Our indicators of financial globalization are extracted from the database of Lane and Milesi-Ferretti (2007), updated in 2011. INVOPGLG is the indicator of investment-globalization. It is the growth rate of total stocks of external foreign direct investment (FDI) and portfolio equity, assets and liabilities. We add up FDI and portfolio equities, since they represent ownership titles and not debt securities, which is the case for external debts.

OPDEBG is the indicator of indebtedness-globalization. It is the growth rate of total stocks of external debt, assets and liabilities.

OPGLG corresponds to the sum of INVOPGLG and OPDEBG and is the indicator of financial globalization.

The use of these indicators is recommended by Kose et al. (2009). The authors stress that it is more advantageous to use this type of indicator (*de facto* measure), as they take into account the reality of the impact of financial globalization rather than the degree of liberalization of the capital account (*de jure* measure). Moreover, according to Baltagi et al. (2009), endogeneity bias is more important for *de jure* indicators, reflecting a policy choice of financial openness than indicators of *de facto* financial globalization.

3.2 Indicators of nominal exchange rate volatility

The indicators of nominal exchange rate volatility are VEXCHAV, VABRCHAV, VAEXCHAVR, VAVEXCHAV, z_sEXCHAV and EXST.³ VEXCHAV and VAEXCHAVR represent the five-year average standard deviation and the five-year average absolute deviation of the annual nominal exchange rate logarithmic growth from the IMF database.

- VABRCHAV and VAEXCHAVR represent respectively the five-year average absolute deviation and the five-year standard deviation of the residual ε resulting from the following regression:

$$x_t = a + bx_{t-1} + ct + \varepsilon_t$$

When x is the logarithmic growth of the annual nominal exchange rate from the IMF database. It is calculated on the base of the monthly bilateral nominal exchange rate from the IMF database, a is a constant and t is time. This regression is estimated separately for every country in the sample.

- z_sEXCHAV is the measure of the *de facto* exchange rate volatility (Z-score) proposed by Ghosh et al. (2003):

$$z_sEXCHAV = \sqrt{\mu_t^2 + \sigma_t^2}$$

μ and σ are respectively the five-year average arithmetic standard deviation of the nominal exchange rate.

- EXST is the five-year arithmetic average of the measure of the stability of the exchange rate (ERS) constructed by Aizenman, Chinn and Ito (2008). This is the annual standard deviation (*stdev*) of the growth rate of the monthly nominal exchange rate (*exch_rate*),

³ The indicators VABRCHAV and VEXCHAV are used for the basic estimations. The other ones serve the robustness tests.

normalized and calculated in the form of an index. When the value of the latter approaches “1”, the exchange rate tends towards stability. On the contrary, when ERS displays a value close to “0”, the exchange rate tends towards instability.

$$ERS = \frac{0.01}{0.01 + stdev(\Delta(\log(exch_rate)))}$$

Three points should be noted with regard the choice of these indicators.

First, we have followed the methodology of Aghion et al. (2009) and Aizenman et al. (2010) in order to measure nominal exchange rate volatility by calculating the standard deviation of the five-year exchange rate.

Second, the “Z-score” indicator is used by many researchers, such as Schnabl (2007, 2008), De Grauwe and Schnabl (2008), and Arratibel et al. (2011). The same applies for the exchange rate stability indicator (ERS) developed by Aizenman et al. (2008) and recently used by Hsing (2012), Ito and Kawai (2014) and Aizenman et al. (2016).

Thirdly, the calculation of the average absolute deviation of the growth rate of a variable, as well as the standard deviation and the average absolute deviation of the residual of an econometric regression are measures of macroeconomic volatility recommended by Cariolle and Goujon (2015).

3.3 Control variables

The control variables used in the estimations are the following:

L.GDPPC: lagged real GDP per capita (World Development Indicators (2014)); EDU: the ratio of total secondary enrollment, regardless of age, and the population of the age group that officially corresponds to that level of education (World Development Indicators (2014)); GOV: the ratio of government spending as a share of GDP (World Development Indicators (2014)); CRISIS: a dummy variable that indicates crises (Systemic Banking Crises Database, IMF (2012)) ; and PRIV: an indicator of financial development, namely the amount of domestic credits to private sector as a percentage of GDP (in logarithm) (Beck, Demirgüç-Kunt et Levine (2009)).

Concerning the robustness tests, we are including the following new control variables:

POPG: the percentage of the population’s growth rate (World Development Indicators (2014)); EXP: (World Development Indicators (2014)); POLI: the indicator of political rights (Freedom House (2014)); LIQG: the logarithmic growth of liabilities (M3) to the GDP (Beck et al. (2009)).

4. Empirical analysis

4.1 Estimated models

Referring to the previous studies by Chousa et al. (2005), Durham (2006) and Eller et al., we use the neoclassical growth model to examine the effects on economic growth of financial globalization and nominal exchange rate volatility independently and in interaction over the long term in emerging and developing countries. More specifically, we test the following two models:

Model 1: Financial globalization, nominal exchange rate volatility and economic growth: direct effects

$$\Delta Y_{it} = \alpha_0 + \gamma Y_{it-1} + \alpha_1 \text{int1}_{it} + \alpha_2 \text{int2}_{it} + \beta' X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Model 2: Financial globalization, nominal exchange rate volatility and economic growth: indirect effects

$$\Delta Y_{it} = \alpha_0 + \gamma Y_{it-1} + \alpha_1 \text{int}2_{it} + \alpha_2 (\text{int}1_{it} * \text{int}2_{it}) + \beta' X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

$\Delta Y_{it} = Y_{it} - Y_{it-1}$ is the growth rate of real GDP per capita (GDPPCG); Y_{it-1} is the lagged real GDP per capita (L.GDPPC); $\text{Int}1_{it}$ represents the indicators of financial globalization (OPGLG or INVOPGLG or OPDEBG); $\text{Int}2_{it}$ represents the indicators of nominal exchange rate volatility (VEXCHAV, VABRCHAV, VAEXCHAVR, VAVEXCHAV, z_sEXCHAV or EXST); $\text{int}1_{it} X \text{int}2_{it}$ represents an interaction term between financial globalization measures and nominal exchange rate volatility measures; X_{it} regroups the set of control variables (EDU, GOV, CRISIS, PRIV, EXP, POLI and/or GOV); α_0 is a constant; μ_i is the country-specific effect; λ_t is the time-specific effect; ε_{it} is the error term. The indicators i and t represent respectively the countries ($i = 1, 2 \dots N$) and the periods ($t = 1, 2 \dots T$).

According to Model (2), the marginal effect of nominal exchange rate volatility on economic growth is obtained by calculating the partial derivative of the growth rate of the real GDP per capita on the nominal exchange rate volatility indicator.

$$\frac{d(\Delta Y)_{it}}{d(\text{int}2)_{it}} = \alpha_1 + \alpha_2 \text{int}1_{it} \quad (3)$$

If α_1 and α_2 are both positive (negative), measures of nominal exchange rate volatility have a positive (negative) effect on economic growth, and measures of financial globalization measures affect positively (amplify) this impact ; if $\alpha_1 > 0$ and $\alpha_2 < 0$, measures of nominal exchange rate have a positive impact on economic growth, although financial globalization measures reduce this impact ; and if $\alpha_1 < 0$ and $\alpha_2 > 0$, measures of nominal exchange rate volatility have a negative effect on economic growth, although financial globalization measures reduce this impact.

4.2 Estimation method

In line with the studies by Gimet and Lagoarde-Segot (2012) and Smaoui, Grandes and Akindede (2017), we use the GMM system dynamic panel data estimator developed by Arellano and Bond (1991), Arellano and Boyer (1995) and Blundell and Bond (1998), and we compute robust two-step⁴ standard errors by following the methodology proposed by Windmeijer (2005)⁵. This method solves the potential problem of endogeneity of explanatory variables.

⁴ A first estimation revolves around the hypothesis of the absence of a correlation of errors and their homoscedasticity. In a second step of the calculation, the vector of residuals derived from this first estimation is used to assess a variance-covariance matrix of errors in a convergent manner. At this second stage, the hypothesis of the absence of the correlation of errors and their homoscedasticity is being verified. This leads to the GMM estimator that is assessed in two stages is more efficient than the GMM estimator assessed in one step, especially for the GMM system (Roodman, 2009a, 2009b). Also, all our regressions are estimated with Stata 12, in which the GMM system method is pre-programmed (commands: xtabond2 and twostep robust). Additionally, we base the writing of our commands related to our assessments on the recommendations of Roodman (2009a, 2009b) and Newey and Windmeijer (2009), including the application of the correction by Windmeijer (2005). Through use of Stata 12, the command collapse guarantees a small number of instruments which does not exceed the number of observations, allowing us to assess the model in an unbiased manner, which potentially prevents the problem of instrument proliferation (Roodman, 2009a, 2009b). Indeed, with a number of instruments that is too large and that surpasses the number of observations, endogenous variables can be overrepresented through their instruments, suggesting the risk of a persisting problem of endogeneity.

Moreover, in our models, the explanatory variables are of a macroeconomic and institutional nature, which constitutes a risk an inverse causality with growth. This method also allows us to solve the potential bias related to possible correlation between country-fixed effects and the error term. This may cause a problem of correlation between this term and the explanatory variables, especially because one of the explanatory variables is the lagged GDP per capita. In addition, the individual dimension of our panel – which is relatively larger than its temporal dimension ($T < N$) – justifies the choice of the GMM system estimator in two steps (Roodman, (2009a, 2009b)). The validity of the GMM system estimator is conditioned upon the quality of the selected instruments (*Hansen-test*), as well as the non-autocorrelation of errors of order two (*AR2*) in the equation in difference⁶.

4.3 Basic results

Table 1 shows the basic regressions for the Models 1 and 2. It shows three main results. First, regressions (1), (3), (7) and (9) show that the coefficients associated with the indicators of financial globalization (OPGLG) and investment-globalization (INVOPGLG) are significant and positive. This reflects the positive impact on growth of financial globalization, and more specifically investment-globalization. On the other hand, concerning regressions (5) and (11), the coefficient related to the indicator of indebtedness-globalization (OPDEBG) is not significant. This type of globalization does not benefit economic growth.

In theory, several authors explain the positive impact of financial globalization, particularly investment-globalization, on direct growth through better share of risk, complementarity between domestic and foreign investment (crowding effect) and technology transfer. For instance, Borensztein et al. (1998) argue that foreign direct investment from developed countries is a source of technical progress. It mobilizes advanced management skills and technologies that are lacking in the industrial fabric of the least developed economies. Also, according to Bekaert and Harvey (2000), investment-globalization leads to international risk diversification, which reduces the cost of project financing in capital-poor countries. Similarly, Chinn and Ito (2005) clearly emphasize the positive effects of the entry of foreign investors (FDI and portfolio equity) in terms of liquidity and diversification of financial assets on the stock market.

The absence of a positive impact of indebtedness-globalization on growth is also theoretically justified. Indeed, theoretical models, such as those developed by Obstfeld (1998) and Broner et al. (2010) (see above), often predict negative or ambiguous repercussions on growth for this type of globalization. According to McKinnon and Pill (1996, 1998), indebtedness-globalization can lead to agency problems in the domestic financial system, and it is in this sense that Rodrik and Velasco (1999) pointed out that foreign debt flows are often synonymous with risks and crises.

Second, when looking at Table 1, we see that the coefficients associated with the nominal exchange rate volatility indicators, VABRCHAV and VEXCHAV, are significant and negative in all regressions (from (1) to (12)). This leads to the conclusion that nominal exchange rate volatility has negative repercussions on long-term per capita income growth. It should be noted

⁶ In all our estimates, the value of the Hansen test (p-values) is above the 10% threshold. This indicates that the null hypothesis of non-correlation of the instrumental variables with the error terms is satisfied. Therefore, the instruments used seem to be valid in practice and the GMM system estimator convergent. This result is consolidated by the acceptance of the null hypothesis of no autocorrelation of the errors of order two (p-values *AR2*) which are above the threshold of 10% in all our regressions.

that the same conclusion has been drawn from some empirical studies that cover different periods and samples than ours, such as Schnabl (2007, 2008, 2009), De Grauwe and Schnabl (2008) and Arratibel et al. (2011).

This effect is mainly explained by the negative impact of uncertainty, due to exchange rate instability, on investment, production and foreign trade (e.g. Frankel and Rose, 2002). Exchange rate volatility can also lead to crises resulting from movements of extreme instability, such as a strong currency appreciation (e.g. Kaminsky and Reinhart (1999), Aizenman and Hausmann (2000)).

Third, still by looking at Table 1, we find that the coefficients associated with the terms of interaction between financial globalization, investment-globalization and nominal exchange rate volatility (OPGLG X VABRCHAV, OPGLG X VEXCHAV, VABRCHAV X INVOPGLG and VEXCHAV X INVOPGLG) are both positive and significant in regressions (2) and (8). This shows that a positive effect of financial globalization, and investment-globalization in particular, offsets the negative effect of nominal exchange rate instability on real GDP per capita growth. It therefore appears that financial globalization leads to a favorable indirect effect (a collateral advantage) on growth in addition to its direct positive impact. This is due to the reduction in the adverse effect of nominal exchange rate volatility. Conversely, the non-significance of the terms of interaction between indebtedness-globalization and nominal exchange rate volatility (VABRCHAV X OPDEBG and VEXCHAV X OPDEBG) proves that indebtedness-globalization does not provide this collateral advantage.

This third result can be explained by the following mechanism:

It is because financial globalization indirectly promotes financial development that it mitigates the negative effect of nominal exchange rate volatility on growth. Indeed, one of the transmission channels of the negative effect of exchange rate instability on growth is the uncertainty that reduces investment, trade and production. Yet, exchange rate risk hedging in a developed financial market reduces this uncertainty, as well as the harmful repercussions that result from it (De Grauwe, 1992). This explanation is based on two conclusions drawn from previous theoretical and empirical studies. The first conclusion is that financial development mitigates the negative effect of exchange rate volatility on economic growth (Aghion et al., 2009). As for the second, it is the assertion that one of the collateral advantages of financial globalization on growth is the development of the domestic financial system of the open country (see the literature above). In addition, this financial development is attributed more to investment-globalization than indebtedness-globalization (see the literature above).

A final interpretation remains to be made from Table 1, which refers to the control variables. Indeed, it seems that the coefficients of those variables, when significant, are consistent with the theoretic intuitions for all regressions in the table. The negative sign of the variable's coefficient describing the size of government (GOV) is in line with public choice theory. The education level indicator (EDU) is characterized by a positive coefficient, which is consistent with the human capital theory. The negativity and significance of the crisis indicator (CRISIS) is consistent with the results of several empirical studies, such as those conducted by Levy-Yeyati and Sturzenegger (2003), De Grauwe and Schnabl (2008) and Arratibel et al. (2011).

Table 1. Basic results

	Mod(1)	Mod2(2)	Mod1(3)	Mod2(4)	Mod1(5)	Mod2(6)	Mod1(7)	Mod2(8)	Mod1(9)	Mod2(10)	Mod1(11)	Mod2(12)
L.GDPPC	-0.025 (0.020)	-0.026 (0.016)	-0.011 (0.012)	-0.022 (0.014)	-0.028* (0.017)	-0.031* (0.017)	-0.014 (0.017)	-0.016 (0.018)	-0.015 (0.014)	-0.016 (0.018)	-0.017 (0.018)	-0.019 (0.015)
EDU	0.019*** (0.007)	0.020*** (0.007)	0.011* (0.005)	0.019** (0.008)	0.024** (0.011)	0.020** (0.010)	0.019*** (0.007)	0.018** (0.007)	0.013* (0.007)	0.015 (0.009)	0.019** (0.009)	0.020** (0.009)
PRIV	0.005 (0.011)	0.003 (0.010)	0.005 (0.007)	0.006 (0.007)	0.004 (0.010)	0.006 (0.011)	-0.002 (0.011)	-0.002 (0.011)	0.004 (0.008)	0.001 (0.009)	-0.001 (0.011)	0.002 (0.011)
GOV	-0.050** (0.022)	-0.054*** (0.019)	-0.050*** (0.017)	-0.051*** (0.016)	-0.049** (0.021)	-0.069*** (0.020)	-0.042** (0.017)	-0.051** (0.022)	-0.046** (0.021)	-0.048*** (0.018)	-0.054*** (0.020)	-0.044* (0.026)
CRISIS	-0.024** (0.010)	-0.021** (0.009)	-0.022*** (0.008)	-0.023** (0.009)	-0.025* (0.012)	-0.023* (0.012)	-0.023** (0.009)	-0.022** (0.009)	-0.023** (0.011)	-0.018* (0.010)	-0.022* (0.011)	-0.026** (0.011)
OPGLG	0.053** (0.021)						0.053*** (0.017)					
VABRCHAV	-0.023** (0.012)	-0.039*** (0.009)	-0.031*** (0.008)	-0.038*** (0.010)	-0.028** (0.013)	-0.030*** (0.011)						
OPGLG X VABRCHAV		0.202*** (0.061)										
INVOPGLG			0.057*** (0.019)						0.039* (0.021)			
INVOPGLG X VABRCHAV				0.040** (0.019)								
OPDEBG					0.028 (0.027)						0.012 (0.023)	
OPDEBG X VABRCHAV						0.078 (0.083)						
VEXCHAV							-0.057*** (0.017)	-0.072*** (0.018)	-0.050** (0.020)	-0.079*** (0.023)	-0.063*** (0.020)	-0.073*** (0.023)
OPGLG X VEXCHAV								0.350*** (0.116)				
INVOPGLG X VEXCHAV									0.099** (0.044)			
OPDEBG X VEXCHAV												0.297 (0.240)
Constant	0.231* (0.121)	0.251** (0.106)	0.163** (0.077)	0.217** (0.083)	0.236** (0.107)	0.313*** (0.103)	0.161* (0.089)	0.200* (0.105)	0.173** (0.085)	0.196** (0.095)	0.209* (0.107)	0.180 (0.110)
Observations	309	309	307	307	309	309	309	309	307	307	309	309
Countries	66	66	66	66	66	66	66	66	66	66	66	66
AR2 P-value	0.698	0.686	0.836	0.549	0.626	0.393	0.718	0.635	0.627	0.554	0.557	0.486
Hansen P-value	0.213	0.341	0.735	0.390	0.200	0.289	0.409	0.484	0.555	0.449	0.310	0.339

Notes: Dependent Variable: Growth rate of real GDP per capita. Period: 1972- 2011 (Non-overlapping five-year data). Estimation: Two-step system GMM with Windmeijer (2005) small sample robust correction. Time and fixed effects are included in all regressions. Standard errors are presented below the corresponding coefficient. Symbols *, ** and *** mean significant at 10%, 5% and at 1

4.4 Robustness tests

We subject our estimations from the GMM system estimator for the Models 1 and 2 to a set of tests to validate their robustness. These tests consist of using alternative estimation methods⁷, inserting alternative variables of nominal exchange rate volatility, including and removing control variables and changing the dependent variable.

4.4.1 *Alternative variables of nominal exchange rate volatility*

The Tables 2 and 2bis below refer to the results of the estimations made on Models 2 and 3 through the introduction of new alternative variables of nominal exchange rate volatility, namely EXST, VAVEXCHAV, Z_sEXCHAV, VAEXCHAVR instead of the original indicators VABRCHAV and VEXCHAV.

The tables highlight the negative and significant impact of the new indicators in most regressions. This is further empirical evidence of the harmful (positive) impact of nominal exchange rate instability (stability) on long-term income growth. The indicator of financial globalization and that of investment-globalization have significantly positive coefficients, confirming their beneficial effects on growth. On the other hand, the indicator of indebtedness-globalization remains statistically non-significant. The terms of interaction between the indicators of financial globalization and investment-globalization and nominal exchange rate volatility are also characterized by significant and positive coefficients. However, these coefficients are insignificant for the interaction between indebtedness-globalization and nominal exchange rate volatility. The control variables retain the same signs and almost the same significance.

Overall, it must be said that replacing the initial indicators of nominal exchange rate volatility with alternative variables did not significantly affect the stability of our estimates.

⁷ Models 1 and 2 were also re-estimated using the feasible generalized least squares (FGLS) panel regression method. These alternative estimates confirm our main results, in terms of signs and significance of all explanatory variables (interest and control) and the interaction terms. The tables presenting these results are not reproduced in order to lighten the paper. They are available on request. For this test, our regressions are estimated with Stata 12, in which the FGLS method is pre-programmed (commands: xtglm and force panels(hetero) corr(ar1) igls). We refer to Phillips (2010) for the choice of these methods as robustness tests of GMM estimations. Indeed, Phillips (2010) has shown that the IFGLS estimator provides robust results compatible with those of the GMM estimator, although this estimator remains the best recommended for dynamic panel models.

Table 2. Alternative variables of nominal exchange rate volatility

	Mod(1)	Mod2(2)	Mod1(3)	Mod2(4)	Mod1(5)	Mod2(6)	Mod1(7)	Mod2(8)	Mod1(9)	Mod2(10)	Mod1(11)	Mod2(12)
L.GDPPC	-0.015 (0.020)	-0.009 (0.009)	-0.022* (0.013)	-0.032** (0.013)	-0.020 (0.018)	-0.025* (0.014)	-0.029** (0.012)	-0.027** (0.012)	0.003 (0.033)	-0.020 (0.016)	-0.031** (0.012)	-0.029** (0.012)
EDU	0.018*** (0.006)	0.023*** (0.007)	0.015** (0.007)	0.024** (0.011)	0.021** (0.009)	0.020** (0.009)	0.023*** (0.008)	0.023*** (0.008)	0.011 (0.025)	0.019** (0.008)	0.024** (0.009)	0.023** (0.009)
PRIV	-0.003 (0.013)	-0.002 (0.007)	0.008 (0.008)	0.009 (0.014)	-0.002 (0.010)	0.002 (0.011)	0.011 (0.008)	0.011 (0.008)	0.003 (0.025)	0.012 (0.010)	0.013 (0.008)	0.013 (0.008)
GOV	-0.051*** (0.017)	-0.024* (0.014)	-0.052** (0.022)	-0.017 (0.025)	-0.056*** (0.018)	-0.052** (0.021)	-0.051** (0.023)	-0.050** (0.023)	-0.029 (0.058)	-0.014 (0.021)	-0.053** (0.022)	-0.054** (0.022)
CRISIS	-0.021** (0.009)	-0.006 (0.019)	-0.024** (0.011)	0.026 (0.042)	-0.016* (0.009)	-0.024* (0.013)	-0.021 (0.015)	-0.023 (0.016)	-0.009 (0.047)	-0.002 (0.025)	-0.021 (0.016)	-0.022 (0.016)
OPGLG X z_sEXCHAV		0.281** (0.136)										
INVOPGLG			0.032** (0.016)							0.070* (0.036)		
OPGLG	0.051*** (0.018)						0.061* (0.033)					
z_sEXCHAV	-0.043*** (0.016)	-0.065** (0.028)	-0.032** (0.014)	-0.079** (0.036)	-0.046*** (0.017)	-0.047** (0.018)						
OPGLG	0.051*** (0.018)						0.061* (0.033)					
INVOPGLG X z_sEXCHAV				0.151* (0.076)								
OPDEBG					0.036 (0.026)						0.041 (0.028)	
OPDEBG X z_sEXCHAV						0.063 (0.111)						
EXST							0.036** (0.015)	0.030* (0.016)	0.033** (0.016)	0.003 (0.016)	0.039*** (0.014)	0.035** (0.016)
OPGLG X EXST								0.066* (0.036)				
INVOPGLG X EXST										0.101** (0.049)		
OPDEBG X EXST												0.046 (0.031)
Constant	0.192* (0.105)	0.074 (0.061)	0.221*** (0.081)	0.166 (0.118)	0.228** (0.096)	0.246*** (0.085)	0.198** (0.099)	0.191* (0.098)	-0.008 (0.181)	0.073 (0.101)	0.209** (0.092)	0.207** (0.095)
Observations	309	309	307	307	309	309	310	310	307	307	310	310
Countries	66	66	66	66	66	66	66	66	66	66	66	66
AR2 P-value	0.843	0.494	0.564	0.186	0.887	0.526	0.472	0.397	0.408	0.137	0.445	0.414
Hansen P-value	0.297	0.604	0.541	0.593	0.274	0.299	0.539	0.466	0.760	0.628	0.481	0.483

Notes: Dependent Variable: Growth rate of real GDP per capita. Period: 1972- 2011 (Non-overlapping five-year data). Estimation: Two-step system GMM with Windmeijer (2005) small sample robust correction. Time and fixed effects are included in all regressions. Standard errors are presented below the corresponding coefficient. Symbols *, ** and *** mean significant at 10%, 5% and at 1%.

Table 2bis. Alternative variables of nominal exchange rate volatility

	Mod(1)	Mod2(2)	Mod1(3)	Mod2(4)	Mod1(5)	Mod2(6)	Mod1(7)	Mod2(8)	Mod1(9)	Mod2(10)	Mod1(11)	Mod2(12)
L.GDPPC	-0.019 (0.016)	-0.025 (0.016)	-0.016 (0.014)	-0.027 (0.018)	-0.031 (0.019)	-0.024 (0.015)	-0.021 (0.017)	-0.021 (0.018)	-0.017 (0.014)	-0.023 (0.015)	-0.021 (0.018)	-0.019 (0.016)
OPGLG	0.078*** (0.025)						0.061** (0.028)					
VAEXCHAVR	-0.020*** (0.007)	-0.029*** (0.007)	-0.019*** (0.006)	-0.028*** (0.009)	-0.022*** (0.008)	-0.026*** (0.008)						
EDU	0.023*** (0.007)	0.020*** (0.007)	0.013* (0.007)	0.020** (0.010)	0.022** (0.010)	0.020** (0.009)	0.020** (0.008)	0.017** (0.007)	0.013* (0.007)	0.016** (0.008)	0.019* (0.010)	0.017* (0.009)
PRIV	0.000 (0.009)	0.003 (0.009)	0.007 (0.009)	0.004 (0.009)	0.005 (0.011)	0.007 (0.010)	0.002 (0.013)	0.002 (0.011)	0.009 (0.009)	0.007 (0.008)	0.003 (0.012)	0.004 (0.011)
GOV	-0.040* (0.024)	-0.053*** (0.019)	-0.049* (0.025)	-0.056*** (0.017)	-0.062*** (0.022)	-0.049** (0.023)	-0.049* (0.027)	-0.065*** (0.022)	-0.017 (0.017)	-0.058*** (0.021)	-0.043* (0.024)	-0.050* (0.026)
CRISIS	-0.018* (0.010)	-0.020** (0.009)	-0.024** (0.011)	-0.017 (0.011)	-0.019 (0.013)	-0.019 (0.012)	-0.016 (0.011)	-0.021** (0.010)	-0.003 (0.025)	-0.019** (0.009)	-0.027** (0.012)	-0.027** (0.013)
OPGLG X VAEXCHAVR		0.157*** (0.044)										
INVOPGLG			0.036** (0.018)						0.082** (0.031)			
INVOPGLG X VAEXCHAVR				0.038* (0.021)								
OPDEBG					0.016 (0.027)						0.020 (0.024)	
OPDEBG X VAEXCHAVR						0.076 (0.078)						
VAVEXCHAV							-0.071** (0.027)	-0.088*** (0.023)	-0.086* (0.050)	-0.105*** (0.036)	-0.081** (0.033)	-0.082*** (0.028)
OPGLG X VAVEXCHAV								0.468** (0.182)				
INVOPGLG X VAVEXCHAV									0.121* (0.069)			
OPDEBG X VAVEXCHAV												0.179 (0.241)
Constant	0.165 (0.126)	0.247** (0.104)	0.187** (0.092)	0.263** (0.101)	0.291** (0.122)	0.217** (0.106)	0.204 (0.127)	0.262** (0.108)	0.092 (0.104)	0.245*** (0.086)	0.190* (0.112)	0.208* (0.106)
Observations	309	309	307	307	309	309	310	310	308	308	310	310
Countries	66	66	66	66	66	66	66	66	66	66	66	66
AR2 P-value	0.796	0.710	0.714	0.549	0.548	0.772	0.797	0.729	0.317	0.741	0.823	0.719
Hansen P-value	0.400	0.359	0.603	0.319	0.254	0.143	0.424	0.491	0.811	0.284	0.330	0.316

Notes: Dependent Variable: Growth rate of real GDP per capita. Period: 1972- 2011 (Non-overlapping five-year data). Estimation: Two-step system GMM with Windmeijer (2005) small sample robust correction. Time and fixed effects are included in all regressions. Standard errors are presented below the corresponding coefficient. Symbols *, ** and *** mean significant at 10%, 5% and at 1%.

4.4.2 Adding control variables

In Table 3, we have retained Models 1 and 2, by adding four new control variables: the population growth rate (POPG), an institutional variable (POLI), namely the Freedom House political rights indicator, a liquidity increase indicator (LIQG) and the export effort rate (EXP). Simultaneously with these additions, we have subtracted the variables CRISIS and PRIV from both models to see if these changes are likely to alter the explanatory power of our variables of interest, such as the interaction terms. In fact, Eichengreen et al. (2011) argue that increasing liquidity in the domestic financial market and improving the quality of institutions can be seen as channels through which financial globalization affects growth. Consequently, the resumption of our main estimations, after controlling for the two variables POLI and LIQG, may lead to a decrease in the significance of the coefficients in relation to the indicators of financial globalization and the interaction terms. The same is true for the variable EXP, which is likely to absorb part of the effect on growth of the indicators of nominal exchange rate volatility. Indeed, subject to the “Marshall-Lerne condition”, fluctuations in nominal exchange rate may alter the volume of exports. Table 3 below shows that changing the control variables leaves the variables of interest and interaction terms significant with signs that support our basic conclusions in all regressions.

4.4.3 Changing the dependent variable

So far, we have considered the rate of increase in real GDP per capita (GDPPCG) as an indicator of economic growth and the variable to be explained. In order to verify once again the robustness of our initial estimations we modified this indicator as part of this test. The first alternative indicator we used refers to a definition of economic growth based not on per capita income but on the volume of production. It is the logarithmic growth rate of real GDP based on the Purchasing Power Parity (PPP) rates in dollars (World Development Indicators (2014)), expressed as RGDPG. The second alternative indicator we used is the investment rate (World Development Indicators (2014)), denoted as INVEST. We have chosen these two indicators for this robustness test because, as indicated above, it is by lowering production and investment that nominal exchange rate volatility theoretically reduces growth.

In Tables 4 and 4.bis below, the indicators RGDPG and INVEST are used as dependent variables in Models 1 and 2. The results confirm the positive and significant impact of the financial globalization variable and of investment-globalization on domestic production and investment; the negative and significant effect of nominal exchange rate volatility variables on production and investment; the non-significant effect of indebtedness-globalization on domestic production and investment; the positivity and the significance of the coefficients of the terms of interaction between financial globalization, investment-globalization and nominal exchange rate volatility; and finally, the lack of significance of the terms of interaction between indebtedness-globalization and nominal exchange rate volatility. Also, it should be noted that in addition to the public policy indicator (GOV), the other control variables are of little significance. This can be explained by the difference between the determinants of the growth rate of real GDP per capita (initial explanatory variables) and the indicators of the growth rate of production and the investment rate (alternative explanatory variables).

Table 3. Adding control variables

	Mod1(1)	Mod2(2)	Mod1(3)	Mod2(4)	Mod1(5)	Mod2(6)	Mod1(7)	Mod2(8)	Mod1(9)	Mod2(10)	Mod1(11)	Mod2(12)
L.GDPPC	-0.038** (0.015)	-0.038*** (0.012)	-0.037** (0.014)	-0.036*** (0.012)	-0.040*** (0.015)	-0.038*** (0.013)	-0.037** (0.014)	-0.029* (0.016)	-0.041*** (0.015)	-0.032*** (0.012)	-0.036*** (0.013)	-0.029* (0.015)
OPGLG	0.048** (0.021)		0.042** (0.019)									
VABRCHAV	-0.033*** (0.008)	-0.044*** (0.012)			-0.034*** (0.009)	-0.039*** (0.014)			-0.035*** (0.009)	-0.035** (0.014)		
EDU	0.017** (0.007)	0.020** (0.007)	0.017* (0.008)	0.016** (0.007)	0.017** (0.007)	0.007 (0.012)	0.015 (0.010)	0.006 (0.011)	0.019** (0.008)	0.012 (0.011)	0.016** (0.007)	0.011 (0.011)
POPG	-0.001 (0.004)	-0.000 (0.004)	0.001 (0.004)	-0.001 (0.004)	-0.001 (0.003)	-0.003 (0.003)	0.001 (0.003)	-0.000 (0.004)	-0.002 (0.004)	-0.002 (0.004)	-0.000 (0.003)	0.000 (0.004)
EXP	0.042*** (0.013)	0.042*** (0.015)	0.038** (0.017)	0.033** (0.013)	0.047*** (0.012)	0.046*** (0.017)	0.041*** (0.013)	0.060*** (0.017)	0.039*** (0.014)	0.039** (0.017)	0.035*** (0.011)	0.035** (0.015)
POLI	0.000 (0.003)	0.000 (0.003)	0.000 (0.002)	-0.000 (0.003)	0.001 (0.003)	-0.002 (0.003)	0.001 (0.002)	-0.000 (0.003)	-0.000 (0.003)	-0.003 (0.004)	-0.000 (0.002)	-0.003 (0.002)
LIQG	0.005 (0.031)	0.021 (0.028)	0.008 (0.030)	0.024 (0.026)	0.001 (0.027)	0.008 (0.031)	-0.000 (0.021)	-0.012 (0.027)	0.011 (0.029)	0.009 (0.031)	0.008 (0.028)	0.011 (0.027)
GOV	-0.030** (0.015)	-0.029* (0.016)	-0.021 (0.016)	-0.027 (0.020)	-0.025* (0.013)	-0.032 (0.022)	-0.019 (0.017)	-0.021 (0.024)	-0.031* (0.016)	-0.028 (0.021)	-0.022 (0.017)	-0.013 (0.029)
OPGLG X VABRCHAV		0.207** (0.102)										
VEXCHAV			-0.069*** (0.021)	-0.095*** (0.024)			-0.067*** (0.018)	-0.098*** (0.027)			-0.074*** (0.023)	-0.076*** (0.018)
OPGLG X VEXCHAV				0.346** (0.163)								
INVOPGLG					0.047** (0.022)		0.035* (0.019)					
INVOPGLG X VABRCHAV						0.049** (0.023)						
INVOPGLG X VEXCHAV								0.120** (0.046)				
OPDEBG									0.028 (0.019)		0.020 (0.017)	
OPDEBG X VABRCHAV										0.081 (0.135)		
OPDEBG X VEXCHAV												0.172 (0.176)
Constant	0.150 (0.094)	0.142 (0.093)	0.134 (0.086)	0.171** (0.082)	0.129 (0.085)	0.196** (0.089)	0.115 (0.071)	0.055 (0.080)	0.179 (0.108)	0.156 (0.102)	0.152* (0.090)	0.110 (0.085)
Observations	302	302	302	302	300	300	300	300	302	302	302	302
Countries	66	66	66	66	66	66	66	66	66	66	66	66
AR2 P-value	0.540	0.510	0.823	0.956	0.376	0.530	0.605	0.587	0.624	0.546	0.852	0.654
Hansen P-value	0.335	0.237	0.351	0.313	0.342	0.177	0.331	0.237	0.328	0.104	0.377	0.233

Notes: Dependent Variable: Growth rate of real GDP per capita. Period: 1972- 2011 (Non-overlapping five-year data). Estimation: Two-step system GMM with Windmeijer (2005) small sample robust correction. Time and fixed effects are included in all regressions. Standard errors are presented below the corresponding coefficient. Symbols *, ** and *** mean significant at 10%, 5% and at 1%.

Table 4. Changing of the dependent variable

	Mod(1)	Mod2(2)	Mod1(3)	Mod2(4)	Mod1(5)	Mod2(6)	Mod1(7)	Mod2(8)	Mod1(9)	Mod2(10)	Mod1(11)	Mod2(12)
L.RGDP	-0.008 (0.008)	0.001 (0.005)	0.003 (0.004)	-0.007 (0.008)	-0.008 (0.009)	-0.004 (0.008)	-0.003 (0.007)	-0.001 (0.007)	-0.001 (0.004)	-0.007 (0.007)	-0.007 (0.010)	-0.003 (0.011)
OPGLG	0.052** (0.023)						0.052*** (0.014)					
VABRCHAV	-0.054*** (0.018)	-0.059*** (0.012)	-0.046*** (0.014)	-0.059*** (0.015)	-0.053*** (0.019)	-0.050*** (0.012)						
EDU	0.017 (0.010)	0.010 (0.008)	0.009 (0.010)	0.015 (0.011)	0.019 (0.011)	0.016 (0.011)	0.010 (0.010)	0.011 (0.010)	0.006 (0.009)	0.010 (0.009)	0.017 (0.013)	0.014 (0.011)
PRIV	-0.005 (0.010)	-0.005 (0.006)	-0.006 (0.008)	0.001 (0.010)	-0.006 (0.012)	-0.007 (0.009)	-0.004 (0.008)	-0.007 (0.008)	-0.004 (0.007)	0.003 (0.012)	-0.001 (0.011)	-0.007 (0.012)
GOV	-0.051*** (0.016)	-0.036** (0.018)	-0.043*** (0.012)	-0.047** (0.018)	-0.052*** (0.016)	-0.055*** (0.018)	-0.044*** (0.016)	-0.044** (0.021)	-0.035*** (0.011)	-0.036*** (0.010)	-0.056** (0.028)	-0.049* (0.028)
CRISIS	-0.009 (0.012)	-0.016 (0.014)	-0.015 (0.011)	-0.010 (0.008)	-0.011 (0.012)	-0.018 (0.013)	-0.011 (0.013)	-0.012 (0.018)	-0.001 (0.013)	-0.005 (0.011)	-0.002 (0.011)	-0.008 (0.011)
OPGLG X VABRCHAV		0.306*** (0.101)										
INVOPGLG			0.046** (0.021)						0.045** (0.022)			
INVOPGLG X VABRCHAV				0.050** (0.023)								
OPDEBG					0.031 (0.030)						0.014 (0.032)	
OPDEBG X VABRCHAV						0.173 (0.122)						
VEXCHAV							-0.091*** (0.026)	-0.091*** (0.021)	-0.090*** (0.025)	-0.110*** (0.025)	-0.115*** (0.033)	-0.092*** (0.026)
OPGLG X VEXCHAV								0.275* (0.149)				
INVOPGLG X VEXCHAV									0.090** (0.043)			
OPDEBG X VEXCHAV												0.132 (0.303)
Constant	0.329* (0.173)	0.101 (0.112)	0.077 (0.097)	0.280 (0.191)	0.328 (0.198)	0.234 (0.196)	0.193 (0.148)	0.167 (0.153)	0.137 (0.097)	0.268* (0.142)	0.305 (0.246)	0.200 (0.271)
Observations	198	198	198	198	198	198	198	198	198	198	198	198
Countries	65	65	65	65	65	65	65	65	65	65	65	65
AR2 P-value	0.644	0.605	0.771	0.904	0.578	0.703	0.726	0.594	0.564	0.854	0.751	0.552
Hansen P-value	0.594	0.398	0.534	0.564	0.455	0.443	0.765	0.479	0.613	0.710	0.727	0.650

Notes: Dependent Variable: Investment rate. Period: 1972- 2011 (Non-overlapping five-year data). Estimation: Two-step system GMM with Windmeijer (2005) small sample robust correction. Time and fixed effects are included in all regressions. Standard errors are presented below the corresponding coefficient. Symbols *, ** and *** mean significant at 10%, 5% and at 1%. c

Table 4bis. Changing of the dependent variable

	Mod(1)	Mod2(2)	Mod1(3)	Mod2(4)	Mod1(5)	Mod2(6)	Mod1(7)	Mod2(8)	Mod1(9)	Mod2(10)	Mod1(11)	Mod2(12)
L.INVEST	0.528*** (0.164)	0.505*** (0.145)	0.655*** (0.163)	0.622*** (0.119)	0.445** (0.189)	0.943*** (0.199)	0.578*** (0.163)	0.549*** (0.122)	0.743*** (0.117)	0.688*** (0.113)	0.416** (0.167)	0.329* (0.169)
EDU	0.096 (0.066)	0.066 (0.077)	0.003 (0.089)	0.023 (0.084)	0.114 (0.073)	0.156* (0.090)	0.090 (0.062)	0.083 (0.066)	-0.052 (0.073)	0.002 (0.083)	0.065 (0.105)	0.082 (0.114)
PRIV	0.018 (0.095)	0.087 (0.096)	0.107 (0.092)	0.118 (0.107)	-0.047 (0.115)	-0.049 (0.132)	0.005 (0.089)	0.078 (0.084)	0.115 (0.098)	0.142 (0.090)	0.065 (0.080)	0.009 (0.110)
GOV	-0.422* (0.233)	-0.403* (0.225)	-0.239 (0.237)	-0.256 (0.210)	-0.307 (0.244)	0.035 (0.348)	-0.372* (0.222)	-0.386* (0.225)	-0.085 (0.153)	-0.236 (0.177)	-0.050 (0.160)	0.184 (0.289)
CRISIS	-0.079 (0.143)	-0.019 (0.149)	-0.040 (0.171)	-0.107 (0.173)	0.129 (0.502)	-0.152 (0.133)	-0.075 (0.145)	-0.038 (0.130)	-0.116 (0.154)	-0.049 (0.169)	-0.042 (0.484)	0.186 (0.503)
OPGLG	1.581*** (0.394)						1.590*** (0.365)					
VABRCHAV	-0.283*** (0.089)	-0.602*** (0.163)	-0.357*** (0.087)	-0.562*** (0.130)	-0.874*** (0.314)	-0.570*** (0.180)						
OPGLG X VABRCHAV		3.770** (1.621)										
INVOPGLG			0.562* (0.304)						0.585** (0.232)			
INVOPGLG X VABRCHAV				0.752** (0.368)								
OPDEBG					0.283 (0.572)						0.356 (0.529)	
OPDEBG X VABRCHAV						3.523 (2.313)						
VEXCHAV							-0.733*** (0.177)	-1.618*** (0.332)	-0.884*** (0.164)	-1.480*** (0.224)	-1.760** (0.803)	-2.591*** (0.965)
OPGLG X VEXCHAV								7.660*** (2.266)				
INVOPGLG X VEXCHAV									1.965** (0.879)			
OPDEBG X VEXCHAV												5.933 (5.794)
Constant	2.057** (0.836)	2.131*** (0.778)	1.357* (0.808)	1.503*** (0.494)	2.335** (0.902)	-0.209 (1.192)	1.849** (0.805)	1.967*** (0.598)	0.896* (0.452)	1.281** (0.507)	1.644** (0.702)	1.451* (0.814)
Observations	306	306	303	303	306	306	306	306	303	303	306	306
Countries	66	66	66	66	66	66	66	66	66	66	66	66
AR2 P-value	0.997	0.789	0.918	0.745	0.858	0.669	0.842	0.871	0.981	0.812	0.856	0.807
Hansen P-value	0.349	0.174	0.278	0.283	0.319	0.821	0.483	0.516	0.349	0.563	0.102	0.507

Notes: Dependent Variable: growth rate of real GDP (PPP). Period: 1972- 2011 (Non-overlapping five-year data). Estimation: Two-step system GMM with Windmeijer (2005) small sample robust correction. Time and fixed effects are included in all regressions. Standard errors are presented below the corresponding coefficient. Symbols *, ** and *** mean significant at 10%, 5% and at 1%.

5. Conclusion and recommendation

This paper examines the impact on growth of financial globalization, investment-globalization, indebtedness-globalization and nominal exchange rate volatility. The effects of the three indicators of financial globalization and nominal exchange rate volatility on growth are studied independently and in interaction with each other for a panel of 72 emerging and developing countries over the period 1972-2011.

Two dynamic panel models are estimated through the GMM system in two steps. The estimations are robust to a series of tests consisting of the use of alternative estimation methods, the insertion of alternative variables of nominal exchange rate volatility, the modification of the control variables and changes in the dependent variable. We obtain four main results: i) financial globalization and investment-globalization in particular directly promote long-term economic growth; ii) on the contrary, nominal exchange rate volatility represses growth; iii) financial globalization and investment-globalization in particular indirectly promote long-term economic growth by reducing the negative effect of nominal exchange rate volatility on the latter; iv) indebtedness-globalization does not serve growth directly or indirectly.

In the light of these findings, it seems that investment-globalization is more attractive for emerging and developing countries than indebtedness-globalization. This justifies the application of a regulated financial openness. Moreover, nominal exchange rate stability appears to be a stimulus to economic growth in emerging and developing countries in a context of financial globalization. Ultimately, if these countries suffer from nominal exchange rate instability in an increasingly globalized international context, they ought to develop their domestic financial systems for a better exchange risk management. Indeed, the latter is detrimental to investment, foreign trade, production and income increase. Here again, it is advisable to promote investment-globalization and to curb indebtedness-globalization. In fact, only investment-globalization reduces the perverse impact of nominal exchange rate volatility and develops the banking and stock market.

Appendix

Table A. Variable description and sources

Variable	Description	Source
GDPPCG	Real GDP per capita growth (log first difference).	World Development Indicators (2014).
RGDPG	Logarithmic growth rate of real GDP based on the Purchasing Power Parity (PPP) rates in dollar.	World Development Indicators (2014).
INVEST	Investment rate.	World Development Indicators (2014).
L.GDPPC	Logarithm of real GDP per capita lagged one period.	World Development Indicators (2014).
L.RGDP	Logarithm of real GDP based on the Purchasing Power Parity (PPP) rates in dollar lagged one period.	World Development Indicators (2014).
L.INVEST	Investment rate lagged one period.	
OPGLG	Logarithmic first difference of total stocks of external assets and liabilities, FDI, portfolio equity, and debts.	External Wealth of Nations Dataset (Updated and Extended, 1970-2011).
INVOPGLG	Logarithmic first difference of total stocks of external assets and liabilities, FDI, and portfolio equity.	External Wealth of Nations Dataset (Updated and Extended, 1970-2011).
OPENDEB	Logarithmic first difference of total stocks of external assets and liabilities, debts.	External Wealth of Nations Dataset (Updated and Extended, 1970-2011).
PRIV	Logarithme of domestic credit to private sector (% of GDP)	Beck et al. (2009), updated in 2013.
GOV	Logarithm of the government spending as a share of GDP.	World Development Indicators (2014).
EDU	Logarithme of the ratio of total secondary enrollment, regardless of age, to the population of the age group that officially corresponds to that level of education.	World Development Indicators (2014).
POL	Freedom House's index of Political Rights, with 1 representing the most free and 7 the least free.	Freedom House (2014).
LIQG	The growth rate of liquid liabilities to the GDP.	Beck et al. (2009), updated in 2013.
CRISIS	Number of years in which a country underwent a systemic banking crisis, as a fraction of the number of years in the corresponding period.	Systemic Banking Crises Database: An Update (IMF, 2012).
EXP	Logarithme of exports of goods and services (% of GDP).	World Development Indicators (2014).
POPG	Growth rate of population (%).	World Development Indicators (2014).
EXCHAVG	The log-difference of nominal exchange rate versus U.S. Dollar, period average.	External Wealth of Nations Dataset (Updated and Extended, 1970-2011).
VEXCHAV	The five-year standard deviation of the log-difference of nominal exchange rate versus U.S. Dollar, period average.	External Wealth of Nations Dataset (Updated and extended, 1970-2011) (calculations by the authors).
VABRCHAV	The five-year average absolute value of residual ε_t . ε_t is the pooled OLS estimated residual of the following regression: $x_t = a + bx_{t-1} + ct + \varepsilon_t$ Where x is of the log-difference of nominal exchange rate versus U.S. Dollar, period average, a is a constant and t the time. This regression is estimated separately for every country in the sample. $x_t = a + bx_{t-1} + ct + \varepsilon_t$	External Wealth of Nations Dataset (Updated and extended, 1970-2011) (calculations by the authors).
VAEXCHAVR	The five-year standard deviation of residual ε_t . ε_t is the pooled OLS estimated residual of the following regression: $x_t = a + bx_{t-1} + ct + \varepsilon_t$ Where x is of the log-difference of nominal exchange rate versus U.S. Dollar, period average, a is a constant and t the time. This regression is estimated separately for every country in the sample.	External Wealth of Nations Dataset (Updated and extended, 1970-2011) (calculations by the authors).
VAVEXCHAV	The five-year average absolute deviation of the log-difference of nominal exchange rate versus U.S. Dollar, period average.	External Wealth of Nations Dataset (Updated and Extended, 1970-2011).
z_sEXCHAV	The measure of de facto exchange rate volatility proposed by Ghosh et al. (2003). $z_sEXCHAV = \sqrt{\mu_t^2 + \sigma_t^2}$ where μ corresponds to the arithmetic five-year average of nominal exchange rate versus U.S Dollar, period average, and σ is the five-year standard deviation of nominal exchange rate versus U.S Dollar, period average.	External Wealth of Nations Dataset (Updated and extended, 1970-2011) (calculations by the authors "Ghosh et al (2003) method").
EXST	The five-year average of index of exchange rate stability, by Aizenman et al. (2008).	The "Trilemma Indexes" (updated on July 1, 2016).

Table B. Summary statistics

Variables	Obs	Mean	Std.dev	Min	Max
GDPPCG	2514	0,010	0,072	-1,051	0,651
GDPPC	2591	6,511	0,762	3,913	8,337
OPGLG	2450	0,099	0,157	-1,078	3,040
INVOPGLG	2409	0,139	0,229	-2,419	2,118
OPDEBG	2469	0,091	0,187	-1,392	3,161
EXCHAVG	2605	0,114	0,496	-0,384	13,450
EXST	2695	0,673	0,344	0,001	1,000
EDU	1843	3,268	0,917	0,171	4,785
POPG	2880	2,278	1,214	-7,597	11,043
EXP	2471	3,154	0,638	0,926	4,849
POLI	2714	5,541	2,106	1,000	7,000
LIQG	1901	0,028	0,168	-1,666	3,580
GOV	2370	2,586	0,464	0,319	4,242
PRIV	1986	2,572	0,847	-2,120	4,692
CRISIS	2880	0,059	0,236	0,000	1,000
RGDPG	1470	0,035	0,074	-1,023	0,724
RGDP	1546	23,513	1,913	18,771	29,386
INVEST	2378	2,943	0,499	-1,228	4,534

Data from 1972 to 2011, including the 72 emerging and developing countries listed below.

List of Country sample (72 countries)

Albania, Chad, Georgia, Kiribati, Niger, Sudan, Armenia, Comoros, Ghana, Lesotho, Nigeria, Swaziland, Bangladesh, Rep. Demo of Congo, Guatemala, Liberia, Pakistan Rep., Syria, Belize, Republic of Congo, Guinea, Madagascar, Papua New Guinea, Tajikistan, Benin, Côte d'Ivoire, Guinea-Bissau, Malawi, Paraguay, Tanzania, Bhutan, Djibouti, Guyana, Mali, Philippines, Tonga, Bolivia, Egypt, Haiti, Mauritania, Rwanda, Uganda, Burkina Faso, Salvador, Honduras, Moldova, Samoa, Uzbekistan, Burundi, Eritrea, India, Mongolia, Senegal, Vanuatu, Cambodia, Ethiopia, Indonesia, Mozambique, Sierra Leone, Vietnam, Cameroon, Fiji, Iraq, Nepal, Solomon Islands, Zambia Rep., Central African Republic, Gambia, Kenya, Nicaragua, Sri Lanka, and Zimbabwe.

Table C. Correlation coefficients

	GDPPCG	GDPPC	OPGLG	INVOPGLG	OPDEBG	EXCHAVG	EXST	EDU	POPG	EXP	POLI	LIQG	GOV	PRIV	CRISIS	RGDPG	RGDP	INVEST
GDPPCG	1.0000																	
GDPPC	0.0796	1.0000																
<i>(p-values)</i>	<i>0.0001</i>																	
OPGLG	0.0658	0.0247	1.0000															
<i>(p-values)</i>	<i>0.0015</i>	<i>0.2318</i>																
INVOPGLG	0.1389	0.0367	0.2515	1.0000														
<i>(p-values)</i>	<i>0.0000</i>	<i>0.0781</i>	<i>0.0000</i>															
OPDEBG	0.0091	0.0110	0.9371	0.0727	1.0000													
<i>(p-values)</i>	<i>0.6590</i>	<i>0.5919</i>	<i>0.0000</i>	<i>0.0004</i>														
EXCHAVG	-0.1754	-0.1000	-0.0725	-0.0566	-0.0362	1.0000												
<i>(p-values)</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0003</i>	<i>0.0057</i>	<i>0.0731</i>													
EXST	0.0308	0.1241	0.1236	0.0322	0.0969	-0.2437	1.0000											
<i>(p-values)</i>	<i>0.1290</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.1163</i>	<i>0.0000</i>	<i>0.0000</i>												
EDU	0.0538	0.5793	-0.0792	0.0965	-0.1075	0.0084	-0.1562	1.0000										
<i>(p-values)</i>	<i>0.0282</i>	<i>0.0000</i>	<i>0.0014</i>	<i>0.0001</i>	<i>0.0000</i>	<i>0.7296</i>	<i>0.0000</i>											
POPG	0.0370	-0.2856	0.0271	-0.0712	0.0351	-0.0109	0.1382	-0.4598	1.0000									
<i>(p-values)</i>	<i>0.0636</i>	<i>0.0000</i>	<i>0.1802</i>	<i>0.0005</i>	<i>0.0808</i>	<i>0.5774</i>	<i>0.0000</i>	<i>0.0000</i>										
EXP	0.0330	0.5579	-0.0082	0.0610	-0.0296	-0.0176	0.0340	0.3933	-0.1566	1.0000								
<i>(p-values)</i>	<i>0.1080</i>	<i>0.0000</i>	<i>0.6972</i>	<i>0.0038</i>	<i>0.1557</i>	<i>0.3937</i>	<i>0.0956</i>	<i>0.0000</i>	<i>0.0000</i>									
POLI	-0.0694	-0.2841	0.0605	-0.0120	0.0806	0.0658	0.0869	-0.3065	0.1169	-0.1790	1.0000							
<i>(p-values)</i>	<i>0.0006</i>	<i>0.0000</i>	<i>0.0028</i>	<i>0.5578</i>	<i>0.0001</i>	<i>0.0009</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>								
LIQG	-0.0596	-0.0183	0.0507	0.1091	0.0263	-0.0067	-0.0275	0.0294	-0.0698	0.0319	0.0153	1.0000						
<i>(p-values)</i>	<i>0.0104</i>	<i>0.4308</i>	<i>0.0283</i>	<i>0.0000</i>	<i>0.2543</i>	<i>0.7698</i>	<i>0.2321</i>	<i>0.2943</i>	<i>0.0023</i>	<i>0.1742</i>	<i>0.5043</i>							
GOV	-0.1237	0.1519	0.0656	0.0203	0.0659	-0.0938	0.1763	-0.0064	0.0333	0.2114	-0.0739	-0.0199	1.0000					
<i>(p-values)</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0022</i>	<i>0.3488</i>	<i>0.0020</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.7976</i>	<i>0.1055</i>	<i>0.0000</i>	<i>0.0004</i>	<i>0.4053</i>						
PRIV	0.0110	0.4130	-0.0074	-0.0058	-0.0100	-0.2431	0.0058	0.3216	-0.1123	0.3105	-0.2853	0.0298	0.1449	1.0000				
<i>(p-values)</i>	<i>0.6313</i>	<i>0.0000</i>	<i>0.7465</i>	<i>0.8024</i>	<i>0.6623</i>	<i>0.0000</i>	<i>0.7960</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.1965</i>	<i>0.0000</i>					
CRISIS	-0.1313	-0.0608	-0.0646	-0.0341	-0.0458	0.1157	-0.0613	-0.0043	-0.0357	-0.0058	0.0579	0.0179	-0.0518	-0.0100	1.0000			
<i>(p-values)</i>	<i>0.0000</i>	<i>0.0020</i>	<i>0.0014</i>	<i>0.0940</i>	<i>0.0230</i>	<i>0.0000</i>	<i>0.0015</i>	<i>0.8523</i>	<i>0.0554</i>	<i>0.7722</i>	<i>0.0025</i>	<i>0.4364</i>	<i>0.0116</i>	<i>0.6546</i>				
RGDPG	0.9707	0.0280	0.0608	0.1401	-0.0132	-0.2280	0.0658	-0.0759	0.2140	-0.0036	-0.0657	-0.0620	-0.0848	0.0023	-0.1788	1.0000		
<i>(p-values)</i>	<i>0.0000</i>	<i>0.2831</i>	<i>0.0217</i>	<i>0.0000</i>	<i>0.6166</i>	<i>0.0000</i>	<i>0.0125</i>	<i>0.0232</i>	<i>0.0000</i>	<i>0.8912</i>	<i>0.0118</i>	<i>0.0312</i>	<i>0.0017</i>	<i>0.9357</i>	<i>0.0000</i>			
RGDP	0.1128	-0.0168	0.0496	0.0284	0.0305	0.0255	-0.1051	0.1328	0.0413	-0.0193	0.1613	-0.0242	-0.4025	0.1655	0.0217	0.1183	1.0000	
<i>(p-values)</i>	<i>0.0000</i>	<i>0.5089</i>	<i>0.0559</i>	<i>0.2741</i>	<i>0.2394</i>	<i>0.3239</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.1049</i>	<i>0.4554</i>	<i>0.0000</i>	<i>0.3906</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.3949</i>	<i>0.0000</i>		
INVEST	0.2084	0.2586	0.1452	0.1788	0.0892	-0.1189	0.0874	0.2969	-0.0842	0.2118	-0.1527	0.0723	0.2138	0.2565	-0.1335	0.2588	0.1044	1.0000
<i>(p-values)</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0024</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0001</i>	

This table reports the correlation coefficients of Pearson between the main variables used in this paper.

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