

## Institutions, economic openness and credit cycles: An international evidence

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**Abstract.** This study aims at investigating the influence of institutions and economic openness on credit cycles in a global sample. Six institutional quality indicators combined with net inward FDI and trade openness are collected to estimate, respectively, the effects of institutions and economic openness on credit cycles. Our panel data covers 60 economies, including 32 low- and middle-income economies (LMEs) and 28 high-income economies (HIEs), the data ranging between 2003 and 2017. Although better institutions tend to stimulate credit growth, they significantly stabilize credit cycles. These findings are documented with significant results in LMEs while it is less obvious in HIEs.

**Keywords:** institutional quality, FDI, trade openness, credit cycles.

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## 1. INTRODUCTION

After the 2008 global financial crisis, we observed a deep economic recession in both advanced and lower income economies. Among many other things, this crisis and recession have been highlighting the importance of credit cycles. According to empirical studies (Ramos-Tallada, 2015, Phuc Nguyen et al., 2018), credit cycles have a strong impact on business cycles and macroeconomic stability through their effect on the aggregate demand (consumption and investment). Credit market cycles often lead to an increase in the macroeconomic disequilibrium such as higher inflation or financial instability. In a globalized context characterized by stronger financial integration, credit and macroeconomic cycles also lead to a contagion of turbulence between economies (Eickmeier & Ng, 2015).

Many empirical studies identify the links between the credit cycles and major economic factors such as economic growth, monetary policy, fiscal policy, inflation, interest rate, business cycles, banking system conditions (Matsuyama et al., 2016, Vo and Nguyen, 2014). It is also worth mentioning the existence of studies investigating the relationship between credit cycles and such external factors as inflow capital and trade (see Magud & Vesperoni (2015)). The aspect of credit cycles is usually addressed from two different perspectives: (i) economic models for estimating the equilibrium of credit in a given economy (see Kiss et al. (2006)); and (ii) estimating the relationship between the standard deviation of credit and a set of economic, demographic or financial factors (Rubaszek & Serwa, 2014). The majority of the existing studies focused on the determinants of overall credit level without considering the effects of the determinants in the periods of booming and recession at the credit market (see, e.g., Shen et al. (2016)). Furthermore, the existing literature dealing with this issue doesn't really consider the role of institutions in a comprehensive perspective with the influence of the inward FDI and trade openness in the dynamics of credit market cycles.

This study provides empirical evidence on how credits are affected by institutions and economic openness. Institutions can be defined as "the rule of game" in a society as they are defining market rules and constraints on human and economic agencies' behaviors. From such a perspective, good institutional quality is said to reduce the asymmetric information problem and risks by increasing market efficiency, asset allocation efficiency and property rights (Acemoglu & Robinson, 2008, Canh et al., 2018a, Canh et al., 2018b). Such an influential role might have a significant impact on the credit market. This article aims at investigating this aspect.

Our study is done in three steps. First, our argument is to estimate the influence of institutions on credit cycles by interpreting their impacts on economic incentives. Second, we estimate the equilibrium for credit by using four different indicators of credit market on a panel data of 60 economies in the period from 2003 to 2017. Afterwards, we calculate the residuals of our estimation and divide them by the fitted value from estimations to measure the credit cycles. Credit cycles are used as a dependent variable in our main model to which we add institutional indicators, inward FDI, and trade openness to describe the dynamics of these credit cycles. Moreover, we define a dummy variable for the credit cycles: the dummy variable is 0 if the credit cycle value is negative (to proxy a recession in credit market) and it is 1 if the credit cycle value is positive (to proxy a boom in credit market). The logit model is applied to estimate the influences of institutions and economic openness on the probability of transiting from a recession to a boom period in credit market. Finally, we estimate these institutional influences combined with the one of economic openness on the credit cycle values to investigate the roles of institutions and economic openness in stabilizing the credit cycles. We use four kinds of credit categories including the ratio of private credit by deposit money banks to GDP (%), the ratio of private credit by deposit money banks and other financial institutions to GDP (%), the ratio of domestic credit to private sector by banks to GDP (%), and the ratio of domestic credit to private sector to GDO (%) in order to explore the potential effects of institutions,

inward FDI, and trade openness on different cycles in credit market. We also use these four indicators to check for robustness. This article contributes to the literature dealing with credit cycles by defining the influences of institutions and economic openness on credit cycles.

The rest of this study is organized as follows. Section 2 outlines the literature review on the determinants of credit equilibrium and credit cycles. Section 3 describes our methodology. Section 4 discusses our results while Section 5 concludes this research with some policy suggestions.

## **2. LITERATURE REVIEW**

This section first presents an overview of the works dealing with the major determinants of credit cycles including institutional indicators, inward FDI and trade openness.

The existing literature mainly confirmed that the GDP growth is an important driver for the credit demand (Backé & Wójcik, 2008). Chen et al. (2012) used the real GDP as the first explanatory variable in credit cycle in the US while Duprey (2012), Karfakis (2013) or Dees (2016) used the real GDP as the major explanatory variable explaining banks' behavior in the context of macroeconomic fluctuations.

Broadly speaking, credit cycles are defined as an absolute and relative deviation from the credit equilibrium (Aikman et al., 2015). Several determinants influencing credit cycles can be mentioned. First, the economic growth that is mainly associated with the demand side of credit channels (Aysun & Hepp, 2013). Economic growth is expected to improve financial conditions of firms and households contributing therefore to a high level of credit (Kiss et al., 2006, Backé & Wójcik, 2008). However, an increase in the economic growth may lead to an excessive demand for credit leading to a potential demand credit booms (Lambertini et al., 2013). Second, the capital and risk conditions of the financial systems are also important determinants for the credit supply following bank lending channel literature (Altunbas et al., 2010, Canh, 2016)

FDIs are expected to contribute to additional capital into the host country's aggregate investment, however, it can trigger a lending boom in credit market (Mendoza and Terrones, 2008). A high level of inward capital flows also simulate the development of the financial sector while the domestic banking system can transform illiquid assets into liquid assets accessible although nationals may over-borrow abroad and over-lend domestically (Krugman, 1999). Even though inward FDI flows usually have a positive impact on the economic growth through a spillover effect (due to productivity, technological transfer and human capital), it is not necessary true in all cases (Huynh et al., 2020, Nguyen et al., 2018b, Nguyen et al. 2018c). Samarina and Bezemer (2016) showed that domestic banking system in emerging economies does not have the ability to transform assets due to the lack of financial tools – Such situation significantly reduces the effect of inward FDI on credit volatility. In the same vein, Igan and Tan (2015) emphasized that only non-FDI capital inflows boost credit growth to household and corporate sectors. Although, macroeconomic factors have a impact on the credit cycles, these effects are different across the countries (Dees, 2016). Differences in regulation of the financial system usually explain the differences in credit cycles (Jiménez et al., 2005, Imran & Nishat, 2013).

In the literature dealing with institutions, several studies investigated the relationship between the latter and the economic growth (Nguyen et al., 2018a, Phuc Nguyen et al., 2018, Thong & Canh, 2016). Other studies focused on the link between institutional quality and several macroeconomic factors such as trade, firm growth, productivity, market efficiency and competitiveness of firms (Araujo et al., 2016, Canh et al., 2018b; Luo & Schinckus 2015). Generally speaking, institutions contribute to an improvement of the social, political and economic structures influencing therefore the development of credit market. Precisely, a higher institutional quality might simulate banks and other financial institutions in lending and expanding their credit portfolios. Indeed, a good institutional quality improves the regulations and it increases trust between

banks and their customers leading to the reduction of asymmetric information and risks. This effect has a positive impact on the lending of banks and other financial institutions. In such case, if credit level is under equilibrium, an improvement in the institutional quality would increase it to equilibrium level or even higher exacerbating potentially the credit far away from the equilibrium. Institutions also impact the credit volatility through their influences on the changes in credit demand. A good institutional quality actually simulates the entrepreneurship, innovation and competition (Herrera-Echeverri et al., 2014, Canh et al., 2018a).

It is worth mentioning that better institutions could help to curd the credit cycles since they increase the responsibility from both banks and economic agents. Herrera-Echeverri et al. (2014), for instance, found a strong positive relationship between the institutional quality and business generation while a high institutional quality may also influence the capital structures of companies: by reducing asymmetric information risk, firms are more keen to fund their activities by using more equity (Bucsa et al. 2011; Petacchi, 2015). Such observations contribute to the stabilization of the credit cycles. The following section presents our data and the way we do analyze them.

### 3. METHODOLOGY

In this section, we present in detail our methodology. We use a traditional method (Kiss et al. (2006) or Igan and Tan (2015)) to estimate the equilibrium of credit market by integrating its lag influence and time effects; precisely the level of credit can be summarized as,

$$\text{Credit}_{it} = \beta_0 + \beta_1 \text{Credit}_{it-1} + \beta_2 T_t + \varepsilon_{it} \quad (1)$$

where,  $i$  is the country and  $t$  stands for time (year); Credit is the credit level that is captured through 4 indicators: ratio of private credit by deposit money banks to GDP (Credit1), the ratio of private credit by deposit money banks and other financial institutions to GDP (Credit2), the ratio of domestic credit to private sector by banks to GDP (Credit3), the ratio of domestic credit to private sector to GDP (Credit4). We use different proxies to capture the level of credit as robustness check, to be sure that our analysis of the credit provides acceptable results. Afterwards, the proxy of the credit level is regressed in logarithm form to reduce the heteroscedasticity.  $T$  is time variable, which is the year;  $\beta$  is a coefficient;  $\varepsilon$  is the classical residuals. After having estimated the equilibrium of credit level, we focus on the residuals and we divide them by the fitted value of each equation to measure credit cycles. In line with Igan and Tan (2015), we then model dynamics equation to test the effects of institutions, inward FDI, and trade openness on the credit volatility; more precisely,

$$\begin{aligned} \text{Crevo}_{it} &= \alpha_0 + \alpha_j X_{it} + \gamma_1 \text{Trade}_{it} + \gamma_2 \text{FDI}_{it} + \gamma_3 \text{INST}_{it} + \varepsilon_{it} \\ \text{Creditcycle}_{it} &= \text{Creditcycle}_{it-1} + \delta_i X_{it} + \alpha_1 \text{Fdiingdp}_{it} + \alpha_2 \text{Tradegdp}_{it} + \alpha_3 \text{Inqua}_{it} + u_{it} \end{aligned} \quad (2)$$

where, Crevo denotes for four different proxies of credit cycles, respectively; FDI is the ratio of net inward FDI to GDP; Trade is the ratio of total trade value to GDP; INST refers to the institutional quality, which is presented by the average of the six World Bank institutional indicators including government effectiveness (Goveff), regulatory quality (Requa), rule of law (Law), and control of corruption (Concor), political stability (Politic), and voice and accountability (Voice), respectively. These World Governance Indicators are scaled from -2.5 to +2.5 for each indicator implying that the higher value means better institutional quality.  $X$  is a set of control variables including the bank capital to total assets (Cap), the bank return on assets (ROA), the bank risk proxying by the bank Z-score index (Risk), real GDP growth rate (GDPg).

In this study, we collect data from different sources including World Development Indicators (WDI), World Governance Indicators (WGI), and Global Financial Development Database (GFDD) (World Bank). Due to the availability from World Governance Indicators and from Global Financial Development Database<sup>1</sup>, our final sample has 60 economies over the period 2003-2017. The sample is divided into two subsamples including 32 Low and Middle income economies (LMEs) and 28 High income economies (HIEs) to examine the combined effect of institutions and economic integration on the credit cycles for different income levels.

The description of four our proxies for credit levels are reported in Table 1A hereafter.

Table 1A

Data description of credit levels

Variable	Definitions	Source	Obs	Mean	Std. Dev.	Min	Max
<b>Full sample</b>							
Credit1	Private credit by deposit money banks to GDP (%)	GFDD	780	62.383	43.472	5.590	219.117
Credit2	Private credit by deposit money banks and other financial institutions to GDP (%)	GFDD	780	67.348	48.069	5.590	219.117
Credit3	Domestic credit to private sector by banks (% of GDP)	WDI	779	64.033	43.341	5.637	233.211
Credit4	Domestic credit to private sector (% of GDP)	WDI	779	68.743	47.879	5.682	233.211
GDP	GDP (current US\$)	WDI	780	8.7E+11	2.2E+12	1.9E+09	1.8E+13
<b>32 Low and Middle income economies (LMEs)</b>							
Credit1	Private credit by deposit money banks to GDP (%)	GFDD	416	38.337	27.340	5.590	140.400
Credit2	Private credit by deposit money banks and other financial institutions to GDP (%)	GFDD	416	39.798	28.795	5.590	147.086
Credit3	Domestic credit to private sector by banks (% of GDP)	WDI	416	40.653	27.995	5.637	152.541
Credit4	Domestic credit to private sector (% of GDP)	WDI	416	42.127	29.317	5.682	152.552
GDP	GDP (current US\$)	WDI	416	4.5E+11	1.2E+12	1.9E+09	1.11E+13
<b>28 High income economies (HIEs)</b>							
Credit1	Private credit by deposit money banks to GDP (%)	GFDD	364	89.864	42.203	20.249	219.117
Credit2	Private credit by deposit money banks and other financial institutions to GDP (%)	GFDD	364	98.833	46.334	20.250	219.117
Credit3	Domestic credit to private sector by banks (% of GDP)	WDI	363	90.828	42.315	13.350	233.211
Credit4	Domestic credit to private sector (% of GDP)	WDI	363	99.246	46.844	13.353	233.211
GDP	GDP (current US\$)	WDI	364	1.3E+1 2	2.9E+1 2	9.8E+0 9	1.8E+1 3

1 The data from WGIs is available from 2002, while the data from GFDD is available until 2017 (see <https://www.worldbank.org/en/publication/gfddr/data/global-financial-development-database>). Moreover, most of variables have data from 2003. Therefore, the period 2003-2017 is best sample for empirical investigation.

This article then uses the robust pool OLS to estimate equation [1] (all results can be provided on request). The description of final variables is presented in Table 1B.

Table 1B

## Data calculations and descriptions

Variable	Calculations	Source	Obs	Mean	Std. Dev.	Min	Max
Cre1vo	The percentage of residual from estimation in equation [1] to its fitted value for <i>Credit1</i>		720	0.0002	0.441	-2.297	1.668
Cre2vo	The percentage of residual from estimation in equation [1] to its fitted value for <i>Credit2</i>		720	0.0002	0.442	-2.303	1.669
Cre3vo	The percentage of residual from estimation in equation [1] to its fitted value for <i>Credit3</i>		719	0.0002	0.478	-2.605	2.252
Cre4vo	The percentage of residual from estimation in equation [1] to its fitted value for <i>Credit4</i>		719	0.0002	0.476	-2.605	2.234
Cap	Bank capital to total assets (%)	GFD D	780	9.405	3.776	2.700	26.50
ROA	Bank return on assets (% , after tax)	GFD D	780	1.163	1.153	-8.522	8.316
Risk	Bank Z-score	GFD D	780	13.442	8.598	0.017	53.51
GDPg	Real GDP growth (annual %)	WDI	780	3.720	3.689	-14.72	17.32
Trade	Trade (% of GDP)	WDI	780	93.10	71.15	21.58	442.62
FDI	Foreign direct investment, net inflows (% of GDP)	WDI	780	5.881	12.58	-58.32	252.31
INST	Average of six institutional indicators		780	0.357	0.837	-1.178	1.970
Concor	Control of Corruption (Estimate value)	WGI	780	0.375	1.036	-1.394	2.470
Goveff	Government Effectiveness (Estimate value)	WGI	780	0.490	0.911	-0.997	2.437
Politic	Political Stability and Absence of Violence/Terrorism (Estimate value)	WGI	780	0.041	0.875	-2.810	1.688
Requa	Regulatory Quality (Estimate value)	WGI	780	0.542	0.813	-1.296	2.261
Law	Rule of Law (Estimate value)	WGI	780	0.370	0.960	-1.251	2.100
Voice	Voice and Accountability (Estimate value)	WGI	780	0.324	0.871	-1.907	1.801

Note: GFDD is Global Financial Development Database, WDI is World Development Indicators, WGI is World Governance Indicators (World Bank)

Methodologically speaking, there is a potential problem of endogeneity. Since some studies suggested that credit cycles might influence economic stability indicators. To handle with this problem, we use the Granger-causality test of Dumitrescu and Hurlin (2012) to examine the causality between independent variables and dependent variable. The results are presented in the Table 2.

Table 2

## Correlation matrix

Correlation	Cre1vo	Cre2vo	Cre3vo	Cre4vo
<b>Cre2vo</b>	<b>0.991***</b>	<b>1.000</b>		
p-value	0.000			
<b>Cre3vo</b>	<b>0.867***</b>	<b>0.861***</b>	<b>1.000</b>	
p-value	0.000	0.000		
<b>Cre4vo</b>	<b>0.866***</b>	<b>0.867***</b>	<b>0.991***</b>	<b>1.000</b>
p-value	0.000	0.000	0.000	
<b>Cap</b>	<b>0.113***</b>	<b>0.123***</b>	<b>0.094**</b>	<b>0.103***</b>
p-value	0.002	0.001	0.012	0.006
<b>ROA</b>	<b>0.251***</b>	<b>0.253***</b>	<b>0.273***</b>	<b>0.275***</b>
p-value	0.000	0.000	0.000	0.000
<b>Risk</b>	<b>-0.064*</b>	<b>-0.066*</b>	<b>-0.053</b>	<b>-0.054</b>
p-value	0.089	0.078	0.159	0.147
<b>GDPg</b>	<b>0.384***</b>	<b>0.382***</b>	<b>0.452***</b>	<b>0.447***</b>
p-value	0.000	0.000	0.000	0.000
<b>Trade</b>	<b>-0.048</b>	<b>-0.056</b>	<b>-0.040</b>	<b>-0.043</b>
p-value	0.198	0.135	0.289	0.255

<b>FDI</b>	<b>-0.001</b>	<b>-0.005</b>	<b>-0.003</b>	<b>-0.005</b>			
p-value	0.973	0.902	0.940	0.896			
<b>INST</b>	<b>-0.118***</b>	<b>-0.124***</b>	<b>-0.101***</b>	<b>-0.106***</b>			
p-value	0.002	0.001	0.007	0.004			
<b>Concor</b>	<b>-0.105***</b>	<b>-0.112***</b>	<b>-0.091**</b>	<b>-0.097***</b>			
p-value	0.005	0.003	0.015	0.010			
<b>Goveff</b>	<b>-0.097***</b>	<b>-0.102***</b>	<b>-0.082**</b>	<b>-0.085**</b>			
p-value	0.010	0.006	0.028	0.023			
<b>Politic</b>	<b>-0.104***</b>	<b>-0.112***</b>	<b>-0.086**</b>	<b>-0.095**</b>			
p-value	0.005	0.003	0.021	0.011			
<b>Requa</b>	<b>-0.090**</b>	<b>-0.094**</b>	<b>-0.079**</b>	<b>-0.082**</b>			
p-value	0.016	0.011	0.035	0.028			
<b>Law</b>	<b>-0.120***</b>	<b>-0.127***</b>	<b>-0.101***</b>	<b>-0.106***</b>			
p-value	0.001	0.001	0.007	0.004			
<b>Voice</b>	<b>-0.136***</b>	<b>-0.132***</b>	<b>-0.115***</b>	<b>-0.120***</b>			
p-value	0.000	0.000	0.002	0.001			
<b>Correlation</b>	<b>Cap</b>	<b>ROA</b>	<b>Risk</b>	<b>GDPg</b>	<b>Trade</b>	<b>FDI</b>	
<b>ROA</b>	<b>0.339***</b>	<b>1.000</b>					
p-value	0.000						
<b>Risk</b>	<b>0.037</b>	<b>0.077**</b>	<b>1.000</b>				
p-value	0.297	0.031					
<b>GDPg</b>	<b>0.209***</b>	<b>0.479***</b>	<b>0.071**</b>	<b>1.000</b>			
p-value	0.000	0.000	0.048				
<b>Trade</b>	<b>-0.072**</b>	<b>-0.030</b>	<b>0.219***</b>	<b>0.038</b>	<b>1.000</b>		
p-value	0.044	0.410	0.000	0.288			
<b>FDI</b>	<b>-0.049</b>	<b>0.006</b>	<b>0.108</b>	<b>0.026</b>	<b>0.473***</b>	<b>1.000</b>	
p-value	0.174	0.871	0.003	0.471	0.000		
<b>INST</b>	<b>-0.492***</b>	<b>-0.346***</b>	<b>0.075**</b>	<b>-0.328***</b>	<b>0.391***</b>	<b>0.214***</b>	
p-value	0.000	0.000	0.037	0.000	0.000	0.000	
<b>Concor</b>	<b>-0.463***</b>	<b>-0.314***</b>	<b>0.071**</b>	<b>-0.271***</b>	<b>0.392***</b>	<b>0.220***</b>	
p-value	0.000	0.000	0.048	0.000	0.000	0.000	
<b>Goveff</b>	<b>-0.480***</b>	<b>-0.346***</b>	<b>0.102***</b>	<b>-0.293***</b>	<b>0.412***</b>	<b>0.192***</b>	
p-value	0.000	0.000	0.005	0.000	0.000	0.000	
<b>Politic</b>	<b>-0.340***</b>	<b>-0.226***</b>	<b>0.069*</b>	<b>-0.256***</b>	<b>0.415***</b>	<b>0.212***</b>	
p-value	0.000	0.000	0.054	0.000	0.000	0.000	
<b>Requa</b>	<b>-0.429***</b>	<b>-0.306***</b>	<b>0.115***</b>	<b>-0.319***</b>	<b>0.433***</b>	<b>0.228***</b>	
p-value	0.000	0.000	0.001	0.000	0.000	0.000	
<b>Law</b>	<b>-0.495***</b>	<b>-0.346***</b>	<b>0.074**</b>	<b>-0.310***</b>	<b>0.377***</b>	<b>0.192***</b>	
p-value	0.000	0.000	0.038	0.000	0.000	0.000	
<b>Voice</b>	<b>-0.498***</b>	<b>-0.369***</b>	<b>-0.018</b>	<b>-0.366***</b>	<b>0.122***</b>	<b>0.135***</b>	
p-value	0.000	0.000	0.621	0.000	0.001	0.000	
<b>Correlation</b>	<b>INST</b>	<b>Concor</b>	<b>Goveff</b>	<b>Politic</b>	<b>Requa</b>	<b>Law</b>	<b>Voice</b>
<b>Concor</b>	<b>0.967***</b>	<b>1.000</b>					
p-value	0.000						
<b>Goveff</b>	<b>0.956***</b>	<b>0.947***</b>	<b>1.000</b>				
p-value	0.000	0.000					
<b>Politic</b>	<b>0.822***</b>	<b>0.745***</b>	<b>0.696***</b>	<b>1.000</b>			
p-value	0.000	0.000	0.000				
<b>Requa</b>	<b>0.958***</b>	<b>0.919***</b>	<b>0.942***</b>	<b>0.729***</b>	<b>1.000</b>		
p-value	0.000	0.000	0.000	0.000			
<b>Law</b>	<b>0.975***</b>	<b>0.960***</b>	<b>0.955***</b>	<b>0.750***</b>	<b>0.945***</b>	<b>1.000</b>	
p-value	0.000	0.000	0.000	0.000	0.000		
<b>Voice</b>	<b>0.823***</b>	<b>0.733***</b>	<b>0.713***</b>	<b>0.616***</b>	<b>0.740***</b>	<b>0.746***</b>	<b>1.000</b>
p-value	0.000	0.000	0.000	0.000	0.000	0.000	

Note: \*, \*\*, \*\*\* are significant levels at 10%, 5%, 1%, respectively.

Granger-causality tests show that there is a mutual causality between the independent variables and dependent variables. To solve this issue, we estimate the Equation [2] by using the lags of all independent variables:

$$\begin{aligned} \text{Crevo}_{it} &= \alpha_0 + \alpha_j X_{it-1} + \gamma_1 \text{Trade}_{it-1} + \gamma_2 \text{FDI}_{it-1} + \gamma_3 \text{INST}_{it-1} + \varepsilon_{it} & (3) \\ \text{Creditcycle}_{it} &= \text{Creditcycle}_{it-1} + \delta_i X_{it} + \alpha_1 \text{Fdiingdp}_{it} + \alpha_2 \text{Tradegdp}_{it} + \alpha_3 \text{Inqua}_{it} + u_{it} \end{aligned}$$

In the estimation this equation, we use the robust pool OLS to tackle the problem of heteroscedasticity of the sample. In addition, we use a dummy variable as explained hereafter,

$$\{ \text{DUM} = 0 \text{ if } \text{Crevo} < 0 \text{ DUM} = 1 \text{ if } \text{Crevo} \geq 0 \quad (4)$$

This dummy variable (DUM) is used to examine the effect of institutions and the economic integration on the possibility of a credit boom in the financial system. More specifically,

$$\text{DUM}_{it} = \alpha_0 + \alpha_j X_{it-1} + \gamma_1 \text{Trade}_{it-1} + \gamma_2 \text{FDI}_{it-1} + \gamma_3 \text{INST}_{it-1} + \varepsilon_{it} \quad (5)$$

By estimating the equation [5], a logit model is used since the dependent variable is a dummy variable. The estimation of the equation [3] can take two forms: positive credit cycle ( $\text{Crevo} \geq 0$ ) and negative credit cycles ( $\text{Crevo} < 0$ ). The following section aims at investigating these potential boom and recession on the credit market.

## 4. EMPIRICAL RESULTS AND DISCUSSION

### 4.1. The Global Sample

The effect of the institutional quality, inward FDI, and trade openness on the private sector credit cycles in private credit by deposit money banks to GDP ( $\text{Cre1vo}$ ) are presented in the table 3 hereafter.

First, we examine the effect of control variables on the credit cycles for private credit by deposit money banks. The positive coefficient for bank capital (Cap) and bank profitability (ROA) mean that the banking system with highly capitalized profitable conditions have all conditions to increase their credit growth. The results are in line with previous literature according to which highly capitalized profitable banking system have higher capability to supply credit (Altunbaş et al., 2002). Meanwhile, banking systems with a higher risk profile (Risk) has a lower credit growth rate, which is expected since riskier banking systems have to reduce their credit supply (Bernanke and Gertler, 1995). Such observation is however in opposition with some empirical findings claiming that riskier banking systems have to implement several risk-taking activities (de Moraes et al., 2016, Dell'Araccia et al., 2014). The positive coefficient for logarithm of GDP per capita is at 1% significance, suggesting that the economic growth leads to an increase of the credit level. In other words, a high economic growth favors credit cycles in line with existing studies on the issues (Kiss et al. (2006), Igan and Tan (2015), Mendoza and Terrones (2008), Chen et al. (2012), Duprey (2012), Apostoaie and Percic, 2014)).



Table 3

Granger-causality test

Full sample								
X Variable	X does not Granger-cause <b>Cre1vo</b>		X does not Granger-cause <b>Cre2vo</b>		X does not Granger-cause <b>Cre3vo</b>		X does not Granger-cause <b>Cre4vo</b>	
	Z-bar	p-value	Z-bar	p-value	Z-bar	p-value	Z-bar	p-value
Cap	11.93***	0.000	12.45***	0.000	9.743***	0.000	9.529***	0.000
ROA	8.041***	0.000	7.487***	0.000	7.947***	0.000	9.314***	0.000
Risk	14.81***	0.000	10.08***	0.000	12.58***	0.000	10.35***	0.000
GDPg	7.778***	0.000	6.193***	0.000	6.289***	0.000	5.529***	0.000
Trade	0.233	0.815	0.261	0.794	2.742***	0.006	2.158**	0.031
FDI	7.534***	0.000	6.864***	0.000	6.449***	0.000	6.298***	0.000
INST	3.699***	0.000	3.683***	0.000	4.296***	0.000	3.666***	0.000
Concor	0.479	0.631	0.180	0.857	0.205	0.837	0.356	0.721
Goveff	4.429***	0.000	4.914***	0.000	3.053***	0.002	3.014***	0.003
Politic	3.171***	0.002	3.878***	0.000	2.362**	0.018	4.323***	0.000
Requa	2.470**	0.013	3.176***	0.002	2.771***	0.006	4.289***	0.000
Law	4.735***	0.000	5.491***	0.000	3.311***	0.001	3.325***	0.001
Voice	1.284	0.199	1.489	0.136	-0.647	0.517	0.005	0.996
X Variable	<b>Cre1vo</b> does not Granger-cause X		<b>Cre2vo</b> does not Granger-cause X		<b>Cre3vo</b> does not Granger-cause X		<b>Cre4vo</b> does not Granger-cause X	
	Z-bar	p-value	Z-bar	p-value	Z-bar	p-value	Z-bar	p-value
Cap	1.495	0.134	1.884*	0.059	4.042***	0.000	3.780***	0.000
ROA	7.427***	0.000	7.296***	0.000	7.499***	0.000	7.711***	0.000
Risk	4.792***	0.000	4.334***	0.000	4.710***	0.000	4.838***	0.000
GDPg	16.34***	0.000	14.82***	0.000	8.470***	0.000	9.210***	0.000
Trade	15.93***	0.000	14.90***	0.000	6.533***	0.000	6.513***	0.000
FDI	5.107***	0.000	4.640***	0.000	2.802***	0.005	2.432**	0.015
INST	0.014	0.988	0.156	0.875	-0.941	0.346	-1.348	0.177
Concor	0.071	0.943	1.091	0.275	-0.363	0.716	-0.285	0.775
Goveff	-1.077	0.281	0.228	0.819	0.049	0.960	0.084	0.932
Politic	4.864***	0.000	3.752***	0.000	3.997***	0.000	4.150***	0.000
Requa	2.052**	0.040	1.951*	0.051	1.658*	0.097	1.398	0.162
Law	-0.373	0.708	-0.377	0.705	-0.923	0.355	-1.108	0.267
Voice	2.899***	0.004	2.334**	0.019	3.298***	0.001	2.421**	0.016

Note: The Granger non-causality test of Dumitrescu & Hurlin (2012) is used, H0: X does not Granger-cause Y, H1: X does Granger-cause Y for at least one panelvar (country). \*, \*\*, \*\*\* is significant levels at 10%, 5%, and 1%, respectively.

The estimation of our explanatory variables is interesting: first, inward FDI has a significant positive effect on the private sector credit volatility (in line with existing empirical studies on the topic, (Mendoza & Terrones, 2008) (Krugman, 1999). Our results also suggest that FDI has a significant contribution to the credit cycles. Trade openness exhibits a significant negative effect on the private sector credit volatility which also differs from some existing studies (Kaminsky and Reinhart, 1999). Precisely, our observations support the idea that trade openness can promote the development of the financial system and improve the quality of financial products (particularly credit contracts). In such context, trade openness increases the international competitiveness which stimulates productivity and economies of scale leading therefore to a rapid economic growth. This situation emphasizes the need for effective policies related to domestic capital and credit. The private sector credit volatility is also strongly affected by various institutional indicators. We find that the government effectiveness and the rule of law have a significant positive effect on the private sector credit volatility while the regulatory quality and the control of corruption have a significant negative effect. These results suggest that an improvement in government effectiveness promote the development

of financial markets. Indeed, the government effectiveness creates incentives for the private sector to develop further economic and business expansion (increasing therefore the credit demand). As a result, banks (and other financial institutions) are keen to increase the credit portfolio they allocate to the private sector. The significant positive effect of the rule of law indicates that an improvement in this indicator contributes to the development of a more stable and transparent business environment favoring business activities (increasing therefore the credit demand).

Table 4

## Institutions, Economic Openness and Credit volatility

<b>Part A: Robust Pool OLS regression</b>							
Dep. Var: <i>CreIvo</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Indep. Var:	<b>INST</b>	<b>Concor</b>	<b>Goveff</b>	<b>Politic</b>	<b>Requa</b>	<b>Law</b>	<b>Voice</b>
<b>Cap(-1)</b>	<b>0.005</b>	<b>0.005</b>	<b>0.006</b>	<b>0.002</b>	<b>0.005</b>	<b>0.005</b>	<b>0.004</b>
	[0.006]	[0.006]	[0.006]	[0.005]	[0.006]	[0.006]	[0.006]
<b>ROA(-1)</b>	<b>0.084***</b>	<b>0.084***</b>	<b>0.086***</b>	<b>0.081***</b>	<b>0.084***</b>	<b>0.084***</b>	<b>0.083***</b>
	[0.022]	[0.022]	[0.022]	[0.022]	[0.022]	[0.022]	[0.022]
<b>Risk(-1)</b>	<b>-0.004**</b>	<b>-0.004**</b>	<b>-0.004**</b>	<b>-0.004**</b>	<b>-0.004**</b>	<b>-0.004**</b>	<b>-0.003**</b>
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
<b>GDPg(-1)</b>	<b>0.037***</b>	<b>0.036***</b>	<b>0.037***</b>	<b>0.035***</b>	<b>0.037***</b>	<b>0.036***</b>	<b>0.036***</b>
	[0.006]	[0.005]	[0.005]	[0.005]	[0.006]	[0.006]	[0.006]
<b>Trade(-1)</b>	<b>-0.001***</b>	<b>-0.001**</b>	<b>-0.001***</b>	<b>-0.0005**</b>	<b>-0.001***</b>	<b>-0.0006**</b>	<b>-0.0004*</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
<b>FDI(-1)</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
<b>INST(-1)</b>	<b>0.056**</b>	<b>0.039**</b>	<b>0.064***</b>	<b>0.020</b>	<b>0.066***</b>	<b>0.043**</b>	<b>0.036*</b>
	[0.024]	[0.018]	[0.022]	[0.019]	[0.026]	[0.021]	[0.022]
Cons.	-0.213***	-0.199***	-0.227***	-0.165***	-0.221***	-0.205***	-0.208***
	[0.061]	[0.058]	[0.062]	[0.050]	[0.062]	[0.061]	[0.065]
N	720	720	720	720	720	720	720
R-squared	0.203	0.201	0.206	0.197	0.205	0.201	0.200
<b>Part B: Logit regression</b>							
Dep. Var: <i>DUM1</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Indep. Var:	<b>INST</b>	<b>Concor</b>	<b>Goveff</b>	<b>Politic</b>	<b>Requa</b>	<b>Law</b>	<b>Voice</b>
<b>Cap(-1)</b>	<b>0.012</b>	<b>0.014</b>	<b>0.022</b>	<b>-0.006</b>	<b>0.009</b>	<b>0.014</b>	<b>-0.007</b>
	[0.026]	[0.026]	[0.027]	[0.025]	[0.026]	[0.027]	[0.025]
<b>ROA(-1)</b>	<b>0.430***</b>	<b>0.439***</b>	<b>0.461***</b>	<b>0.394***</b>	<b>0.419***</b>	<b>0.434***</b>	<b>0.396***</b>
	[0.121]	[0.123]	[0.127]	[0.116]	[0.120]	[0.123]	[0.116]
<b>Risk(-1)</b>	<b>-0.011</b>	<b>-0.011</b>	<b>-0.013</b>	<b>-0.011</b>	<b>-0.012</b>	<b>-0.012</b>	<b>-0.011</b>
	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]
<b>GDPg(-1)</b>	<b>0.145***</b>	<b>0.144***</b>	<b>0.148***</b>	<b>0.135***</b>	<b>0.147***</b>	<b>0.144***</b>	<b>0.133***</b>
	[0.033]	[0.032]	[0.032]	[0.032]	[0.033]	[0.032]	[0.032]
<b>Trade(-1)</b>	<b>-0.004**</b>	<b>-0.004**</b>	<b>-0.004***</b>	<b>-0.003*</b>	<b>-0.004**</b>	<b>-0.004**</b>	<b>-0.003*</b>
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]
<b>FDI(-1)</b>	<b>0.014**</b>	<b>0.013*</b>	<b>0.015**</b>	<b>0.014*</b>	<b>0.014**</b>	<b>0.014**</b>	<b>0.014*</b>
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.008]
<b>INST(-1)</b>	<b>0.275**</b>	<b>0.257**</b>	<b>0.364***</b>	<b>0.085</b>	<b>0.279**</b>	<b>0.251**</b>	<b>0.050</b>
	[0.130]	[0.101]	[0.118]	[0.109]	[0.132]	[0.111]	[0.115]
Cons.	-0.854***	-0.862***	-0.999***	-0.583**	-0.845***	-0.860***	-0.621*
	[0.309]	[0.300]	[0.311]	[0.271]	[0.309]	[0.307]	[0.319]
N	720	720	720	720	720	720	720
No. of countries	60	60	60	60	60	60	60

Note: Standard errors are in []. \*, \*\*, \*\*\* are significant levels at 10%, 5%, 1%, respectively.

The positive effect of institutions (INST) show that their improvement might cause an increase in risk explaining the raising of the private sector credit volatility. This is due to the positive effect of institutions on the economic incentives by promoting the economic activities. Moreover, the results from logit regression in Part B of table 4 show consistent findings meaning that our results can be reasonably considered as robust. Our results also mean that the credit cycles in better institutional environment are more likely moving from recession to booming periods. The Table 4 below documents the results for our estimations for two periods when the credit cycles are positive and negative, respectively.

The results show that all control variables were consistent in the period of positive cycles ( $Cre1vo \geq 0$ ). Interestingly, the institutions have a negative effect on the credit cycles. Moreover, in the period of negative cycles ( $Cre1vo < 0$ ), the institutions have a positive effect meaning that a better institutional quality has lower influence on the credit cycles since it reduces the credit cycles in booming period while increases the credit cycles in recession period.

Meanwhile, both, the trade openness and FDI inflows have an opposite effect, they increase the credit cycles in booming period while they reduce credit cycle more deeply in recession period. This observation implies that the economic openness has a negative side by inducing higher probability of volatility in credit markets. This finding might explains the cause the financial crisis, which is consistent with many previous results (Igan & Tan, 2015).

For robustness purpose, the economic analysis has been repeated with three different proxies of credit levels (the ratio of private credit by deposit money banks and other financial institutions to GDP (Credit2), the ratio of domestic credit to private sector by banks to GDP (Credit3), the ratio of domestic credit to private sector to GDP (Credit4)) respectively. All these proxies offer the same consistent results than our major analysis with Credit1. The detailed results of our robustness checks can be provided on request.

## **4.2. The effects of institutions, economic integration on credit cycles in two subsamples: LMES and HIES**

In this sub-section, we propose the same analysis than the one presented above but for two subsamples: one including 32 LMEs and another sample with 28 HIEs. This section discusses the results for each of these samples.

### *4.2.a) Low and Middle income economies*

Table 5 presents the effects of institutions, inward FDI, and trade openness on the Private credit by deposit money banks to GDP ( $Cre1vo$ ) in the context of LMEs.

Some results are very interesting: control variables including bank capital (Cap), bank return (ROA), bank risk (Risk), real GDP growth (GDPg) confirm previous studies claiming that the banking system with a better capital or profitability would likely increase their credit supply higher while riskier banking systems would reduce their credit supply. Also, our findings confirm that economic growth is one of the main driver of high credit growth in LMEs.

Table 5

## Institutions, Economic Openness and Credit volatility: Credit Booming and Recession Periods

Dep. Var: <i>CreIvo</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Indep. Var:	INST	Concor	Goveff	Politic	Requa	Law	Voice
<b>Part A: If <i>CreIvo</i> ≥ 0</b>							
Cap(-1)	<b>0.009</b>	<b>0.008</b>	<b>0.008</b>	<b>0.010*</b>	<b>0.009</b>	<b>0.008</b>	<b>0.011**</b>
	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]
ROA(-1)	<b>0.075***</b>	<b>0.068***</b>	<b>0.067***</b>	<b>0.082***</b>	<b>0.077***</b>	<b>0.069***</b>	<b>0.086***</b>
	[0.021]	[0.021]	[0.021]	[0.021]	[0.021]	[0.021]	[0.022]
Risk(-1)	<b>-0.005***</b>	<b>-0.005***</b>	<b>-0.005***</b>	<b>-0.005***</b>	<b>-0.005***</b>	<b>-0.005***</b>	<b>-0.005***</b>
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
GDPg(-1)	<b>0.021***</b>	<b>0.020***</b>	<b>0.020***</b>	<b>0.022***</b>	<b>0.021***</b>	<b>0.020***</b>	<b>0.023***</b>
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
Trade(-1)	<b>0.0001</b>	<b>0.0002</b>	<b>0.0002</b>	<b>-0.0001</b>	<b>0.0001</b>	<b>0.0001</b>	<b>-8.4e-06</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0001]
FDI(-1)	<b>0.001*</b>	<b>0.001*</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.001</b>
	[0.0006]	[0.0006]	[0.001]	[0.001]	[0.0006]	[0.0006]	[0.001]
INST(-1)	<b>-0.021</b>	<b>-0.037**</b>	<b>-0.040*</b>	<b>0.011</b>	<b>-0.015</b>	<b>-0.039**</b>	<b>0.023</b>
	[0.022]	[0.017]	[0.022]	[0.018]	[0.023]	[0.019]	[0.019]
Cons.	0.085	0.104	0.107	0.061	0.078	0.105	0.030
	[0.067]	[0.063]	[0.067]	[0.055]	[0.065]	[0.065]	[0.069]
N	363	363	363	363	363	363	363
R-squared	0.264	0.272	0.270	0.263	0.263	0.271	0.266
<b>Part B: If <i>CreIvo</i> &lt; 0</b>							
Cap(-1)	<b>-0.008*</b>	<b>-0.009**</b>	<b>-0.006</b>	<b>-0.014***</b>	<b>-0.008*</b>	<b>-0.007*</b>	<b>-0.011**</b>
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
ROA(-1)	<b>0.023</b>	<b>0.023</b>	<b>0.023</b>	<b>0.020</b>	<b>0.022</b>	<b>0.023</b>	<b>0.023</b>
	[0.016]	[0.016]	[0.016]	[0.016]	[0.016]	[0.016]	[0.016]
Risk(-1)	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
GDPg(-1)	<b>0.014***</b>	<b>0.013**</b>	<b>0.014***</b>	<b>0.011**</b>	<b>0.015***</b>	<b>0.014***</b>	<b>0.013**</b>
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
Trade(-1)	<b>-0.0002</b>	<b>-0.0001</b>	<b>-0.0003</b>	<b>0.00004</b>	<b>-0.0002</b>	<b>-0.0002</b>	<b>0.0001</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
FDI(-1)	<b>-0.003**</b>	<b>-0.003**</b>	<b>-0.003*</b>	<b>-0.003*</b>	<b>-0.003*</b>	<b>-0.003*</b>	<b>-0.004**</b>
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
INST(-1)	<b>0.065***</b>	<b>0.048**</b>	<b>0.072***</b>	<b>0.017</b>	<b>0.075***</b>	<b>0.060***</b>	<b>0.044*</b>
	[0.024]	[0.018]	[0.021]	[0.020]	[0.027]	[0.020]	[0.025]
Cons.	-0.340***	-0.327***	-0.358***	-0.274***	-0.348***	-0.346***	-0.329***
	[0.051]	[0.048]	[0.053]	[0.041]	[0.056]	[0.052]	[0.054]
N	357	357	357	357	357	357	357
R-squared	0.087	0.085	0.097	0.069	0.092	0.090	0.077
No. of countries	60	60	60	60	60	60	60

Note: Standard errors are in []. \*, \*\*, \*\*\* are significant levels at 10%, 5%, 1%, respectively.

In the case of our explanatory variables, the inward FDI has a positive influence on credit cycles whereas trade openness has a negative one. These results are consistent with previous findings, however, the effect of the economic integration is not always statistical significant meaning that the major drivers of credit growth in the LMEs are still the real GDP growth and the financial system conditions (Auel and de Mendonça, 2011). In addition, the institutions have a positive effect on credit cycles confirming the positive influence of better institutions on the credit growth in the LMEs. Moreover, the results of the logit regression in Part B of the Table 8 shows a significant impact of the trade openness and institutions on the probability of observing credit cycles. The negative effect of trade openness means that a higher trade

integration reduces the probability of credit booming while better institutions increase the probability of booming credit cycles in the LMEs. This finding can be understood by the fact that better institutions induce booming economic activities in the LMEs with relatively low institutional quality; in such situation, the credit growth would mainly be supported by the economic agents' demand and the policy of the government (Omri et al., 2015). The Table 6 below reports the results for two cases of estimations: the booming period and the recession period in credit markets.

Table 6

Institutions, Economic Openness and Credit volatility - Summary for Robustness check

<b>Part A: Robust Pool OLS regression – Cre2vo</b>							
Indep. Var:	INST	Concor	Goveff	Politic	Requa	Law	Voice
<b>Trade(-1)</b>	<b>-0.001***</b>	<b>-0.0006***</b>	<b>-0.001***</b>	<b>-0.0005**</b>	<b>-0.001***</b>	<b>-0.0006***</b>	<b>-0.0005**</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
<b>FDI(-1)</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>	<b>0.002**</b>
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
<b>INST(-1)</b>	<b>0.055**</b>	<b>0.037**</b>	<b>0.063***</b>	<b>0.016</b>	<b>0.066**</b>	<b>0.040*</b>	<b>0.041*</b>
	[0.024]	[0.019]	[0.022]	[0.019]	[0.026]	[0.021]	[0.022]
<b>Part B: Logit regression – DUM2</b>							
<b>Trade(-1)</b>	<b>-0.003**</b>	<b>-0.003**</b>	<b>-0.004**</b>	<b>-0.002</b>	<b>-0.003**</b>	<b>-0.003**</b>	<b>-0.002</b>
	[0.002]	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]
<b>FDI(-1)</b>	<b>0.014**</b>	<b>0.014*</b>	<b>0.015**</b>	<b>0.015*</b>	<b>0.014**</b>	<b>0.014**</b>	<b>0.014*</b>
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
<b>INST(-1)</b>	<b>0.212</b>	<b>0.203**</b>	<b>0.329***</b>	<b>0.030</b>	<b>0.206</b>	<b>0.182</b>	<b>0.046</b>
	[0.130]	[0.101]	[0.118]	[0.109]	[0.131]	[0.111]	[0.117]
<b>Part C: Robust Pool OLS regression – Cre3vo</b>							
<b>Trade(-1)</b>	<b>-0.0006**</b>	<b>-0.0006**</b>	<b>-0.0007***</b>	<b>-0.0005*</b>	<b>-0.0007**</b>	<b>-0.0006**</b>	<b>-0.0004*</b>
	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0002]
<b>FDI(-1)</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002</b>
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
<b>INST(-1)</b>	<b>0.054**</b>	<b>0.037*</b>	<b>0.063**</b>	<b>0.019</b>	<b>0.062**</b>	<b>0.043*</b>	<b>0.036</b>
	[0.027]	[0.021]	[0.025]	[0.022]	[0.029]	[0.024]	[0.024]
<b>Part D: Logit regression – DUM3</b>							
<b>Trade(-1)</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.003*</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.002</b>
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
<b>FDI(-1)</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>
	[0.007]	[0.007]	[0.007]	[0.006]	[0.007]	[0.007]	[0.007]
<b>INST(-1)</b>	<b>0.094</b>	<b>0.072</b>	<b>0.188*</b>	<b>0.028</b>	<b>0.102</b>	<b>0.051</b>	<b>0.010</b>
	[0.125]	[0.098]	[0.114]	[0.106]	[0.127]	[0.108]	[0.112]
<b>Part E: Robust Pool OLS regression – Cre4vo</b>							
<b>Trade(-1)</b>	<b>-0.0006**</b>	<b>-0.0006**</b>	<b>-0.0007***</b>	<b>-0.0005*</b>	<b>-0.0007**</b>	<b>-0.0006**</b>	<b>-0.0004*</b>
	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0002]
<b>FDI(-1)</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>	<b>0.002*</b>
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
<b>INST(-1)</b>	<b>0.053*</b>	<b>0.036*</b>	<b>0.064***</b>	<b>0.015</b>	<b>0.063**</b>	<b>0.042*</b>	<b>0.034</b>
	[0.027]	[0.021]	[0.025]	[0.022]	[0.029]	[0.023]	[0.024]
<b>Part G: Logit regression – DUM4</b>							
<b>Trade(-1)</b>	<b>-0.003*</b>	<b>-0.003*</b>	<b>-0.003**</b>	<b>-0.002</b>	<b>-0.003*</b>	<b>-0.003*</b>	<b>-0.002</b>
	[0.001]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]
<b>FDI(-1)</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
<b>INST(-1)</b>	<b>0.141</b>	<b>0.110</b>	<b>0.249**</b>	<b>0.020</b>	<b>0.159</b>	<b>0.093</b>	<b>0.049</b>
	[0.125]	[0.098]	[0.115]	[0.106]	[0.128]	[0.108]	[0.112]

Note: Standard errors are in []. \*, \*\*, \*\*\* are significant levels at 10%, 5%, 1%, respectively.

Results show that institutional indicators (excluding political stability and voice and accountability) have a significant negative effect in the context of positive credit cycles ( $Cre1vo \geq 0$ ); and an insignificant positive effect in a context of negative credit cycles ( $Cre1vo < 0$ ). These results imply a very important observation for the LMEs facing with a high growth rate of financial systems: institutional quality might be an excellent choice to limit the possibility of credit booming in these countries.

Regarding the economic integration, the influence of FDI inflows are the same with our previous results: FDI inflows increase the credit cycles in booming period and they reduce the credit growth in period of recession. However, the trade openness has an opposite effect than what we observe globally. A higher trade openness reduces the credit cycles in booming period while it induces higher credit growth in recession period. This means that the higher trade openness tends to stabilize the credit market by reducing the credit cycles in the LMEs. The results provided in this section suggest that institutional reforms combined with trade openness in the LMEs might be an appropriate policy to stabilize the credit cycles. The robustness check for the case of LMEs with three alternative proxies of credit volatility ( $Cre2vo$ ,  $Cre3vo$ ,  $Cre4vo$ ) shows properly consistent conclusion and it can be provided on request.

#### 4.2.b) High income economies

Table 7 hereafter presents the influence of institutions and economic openness on the credit cycles ( $Cre1vo$ ) for 28 High income economies.

Table 7

Institutions, Economic Openness and Credit volatility: Credit Booming and Recession Periods (Summary for Robustness check)

Indep. Var:	INST	Concor	Goveff	Politic	Requa	Law	Voice
<b>Part A: If <math>Cre2vo \geq 0</math></b>							
<b>Trade(-1)</b>	<b>0.00002</b>	<b>0.0001</b>	<b>0.0001</b>	<b>-0.0001</b>	<b>-9.3e-06</b>	<b>0.0001</b>	<b>-0.00004</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0001]
<b>FDI(-1)</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001*</b>	<b>0.001</b>
	[0.0006]	[0.0006]	[0.001]	[0.001]	[0.001]	[0.0006]	[0.001]
<b>INST(-1)</b>	<b>-0.017</b>	<b>-0.035**</b>	<b>-0.040*</b>	<b>0.014</b>	<b>-0.008</b>	<b>-0.036*</b>	<b>0.022</b>
	[0.022]	[0.017]	[0.022]	[0.018]	[0.023]	[0.019]	[0.019]
<b>Part B: If <math>Cre2vo &lt; 0</math></b>							
<b>Trade(-1)</b>	<b>-0.0003</b>	<b>-0.0003</b>	<b>-0.0004**</b>	<b>-0.0001</b>	<b>-0.0004*</b>	<b>-0.0004*</b>	<b>-0.00006</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
<b>FDI(-1)</b>	<b>-0.003*</b>	<b>-0.003*</b>	<b>-0.003</b>	<b>-0.003</b>	<b>-0.003*</b>	<b>-0.003</b>	<b>-0.003*</b>
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
<b>INST(-1)</b>	<b>0.074***</b>	<b>0.054***</b>	<b>0.075***</b>	<b>0.023</b>	<b>0.085***</b>	<b>0.067***</b>	<b>0.052**</b>
	[0.024]	[0.018]	[0.021]	[0.020]	[0.027]	[0.020]	[0.024]
<b>Part C: If <math>Cre3vo \geq 0</math></b>							
<b>Trade(-1)</b>	<b>0.0001</b>	<b>0.0001</b>	<b>0.0002</b>	<b>-0.0001</b>	<b>0.0001</b>	<b>0.0001</b>	<b>-0.0001</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
<b>FDI(-1)</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.001</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.001*</b>
	[0.0006]	[0.0006]	[0.001]	[0.0006]	[0.0006]	[0.0006]	[0.0006]
<b>INST(-1)</b>	<b>-0.038</b>	<b>-0.040*</b>	<b>-0.063**</b>	<b>0.009</b>	<b>-0.036</b>	<b>-0.049**</b>	<b>0.002</b>
	[0.028]	[0.022]	[0.029]	[0.021]	[0.029]	[0.024]	[0.020]
<b>Part D: If <math>Cre3vo &lt; 0</math></b>							
<b>Trade(-1)</b>	<b>-0.0003</b>	<b>-0.0003</b>	<b>-0.0004*</b>	<b>-0.00001</b>	<b>-0.0004</b>	<b>-0.0004</b>	<b>0.00004</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
<b>FDI(-1)</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.001</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.002</b>

	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
<b>INST(-1)</b>	<b>0.097***</b>	<b>0.076***</b>	<b>0.101***</b>	<b>0.021</b>	<b>0.108***</b>	<b>0.100***</b>	<b>0.061**</b>
	[0.028]	[0.021]	[0.025]	[0.024]	[0.031]	[0.024]	[0.027]
<b>Part E: If <math>Cre4vo \geq 0</math></b>							
<b>Trade(-1)</b>	<b>0.0001</b>	<b>0.0002</b>	<b>0.0002</b>	<b>-0.0001</b>	<b>0.0001</b>	<b>0.0002</b>	<b>-0.00005</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
<b>FDI(-1)</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.0009</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.001*</b>	<b>0.001*</b>
	[0.0006]	[0.0006]	[0.0006]	[0.0006]	[0.0006]	[0.0006]	[0.0006]
<b>INST(-1)</b>	<b>-0.042</b>	<b>-0.044**</b>	<b>-0.063**</b>	<b>0.004</b>	<b>-0.038</b>	<b>-0.051**</b>	<b>-0.005</b>
	[0.028]	[0.022]	[0.028]	[0.021]	[0.028]	[0.023]	[0.020]
<b>Part G: If <math>Cre4vo &lt; 0</math></b>							
<b>Trade(-1)</b>	<b>-0.0003</b>	<b>-0.0003</b>	<b>-0.0004</b>	<b>-0.00002</b>	<b>-0.0004</b>	<b>-0.0003</b>	<b>0.00004</b>
	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]	[0.0002]
<b>FDI(-1)</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.001</b>	<b>-0.001</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.002</b>
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
<b>INST(-1)</b>	<b>0.087***</b>	<b>0.068***</b>	<b>0.091***</b>	<b>0.020</b>	<b>0.099***</b>	<b>0.091***</b>	<b>0.052**</b>
	[0.027]	[0.020]	[0.025]	[0.023]	[0.031]	[0.023]	[0.026]

Note: Standard errors are in []. \*, \*\*, \*\*\* are significant levels at 10%, 5%, 1%, respectively.

Regarding our control variables, all results are substantially consistent excepting for the case of bank capita. In the HIEs, the banking system with a highly capitalized market have a lower credit growth meaning that the banking system with lower capitalized profile provide higher credit growth through the implementation of risk taking activities in banking system in HIEs.

The results for our explanatory variables indicate that an improvement in institutions have a positive but insignificant effect on credit cycles. Meanwhile, the trade openness has a negative influence whereas the FDI inflows have a positive one. Interestingly, the results of our logit regression in the Part B of the Table 7 show that the trade openness has a significant negative effect and the FDI inflows has a significant positive influence. This means that the economic integration has an opposite effect on credit cycles: the trade openness reduces the credit growth far away from booming, while the FDI inflows support the booming credit growth in the HIEs. These observations highlight the importance of economic integration in explaining the credit cycles in the HIEs where an already well-developed institutional framework play a less important role in the credit market. Table 8 shows the results for estimations in cases of positive credit cycles and negative credit cycles.

Table 8

Institutions, Economic Openness and Credit volatility: Low and Middle Income Economies

<b>Part A: Robust Pool OLS regression</b>							
Dep. Var: <i>Cre1vo</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Indep. Var:	<b>INST</b>	<b>Concor</b>	<b>Goveff</b>	<b>Politic</b>	<b>Requa</b>	<b>Law</b>	<b>Voice</b>
<b>Cap(-1)</b>	<b>0.012*</b>	<b>0.012*</b>	<b>0.013*</b>	<b>0.013*</b>	<b>0.012*</b>	<b>0.013*</b>	<b>0.013*</b>
	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
<b>ROA(-1)</b>	<b>0.110***</b>	<b>0.110***</b>	<b>0.110***</b>	<b>0.108***</b>	<b>0.109***</b>	<b>0.109***</b>	<b>0.109***</b>
	[0.031]	[0.031]	[0.031]	[0.031]	[0.031]	[0.031]	[0.031]
<b>Risk(-1)</b>	<b>-0.005**</b>	<b>-0.005**</b>	<b>-0.005**</b>	<b>-0.005*</b>	<b>-0.005**</b>	<b>-0.004*</b>	<b>-0.004*</b>
	[0.002]	[0.002]	[0.002]	[0.003]	[0.003]	[0.002]	[0.002]
<b>GDPg(-1)</b>	<b>0.045***</b>	<b>0.044***</b>	<b>0.044***</b>	<b>0.045***</b>	<b>0.045***</b>	<b>0.045***</b>	<b>0.046***</b>
	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]	[0.009]
<b>Trade(-1)</b>	<b>-0.001*</b>	<b>-0.001</b>	<b>-0.001</b>	<b>-0.001</b>	<b>-0.001</b>	<b>-0.001</b>	<b>-0.001</b>
	[0.0007]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]

<b>FDI(-1)</b>	<b>0.008</b>	<b>0.008</b>	<b>0.009*</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008*</b>	<b>0.008</b>
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
<b>INST(-1)</b>	<b>0.074</b>	<b>0.047</b>	<b>0.040</b>	<b>0.027</b>	<b>0.053</b>	<b>-0.004</b>	<b>0.043</b>
	[0.068]	[0.057]	[0.060]	[0.034]	[0.057]	[0.051]	[0.041]
Cons.	-0.383***	-0.397***	-0.409***	-0.406***	-0.406***	-0.447***	-0.444***
	[0.125]	[0.126]	[0.124]	[0.126]	[0.119]	[0.123]	[0.112]
N	384	384	384	384	384	384	384
R-squared	0.251	0.250	0.250	0.250	0.251	0.249	0.251
<b>Part B: Logit regression</b>							
Dep. Var: <i>DUM1</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Indep. Var:	<b>INST</b>	<b>Concor</b>	<b>Goveff</b>	<b>Politic</b>	<b>Requa</b>	<b>Law</b>	<b>Voice</b>
<b>Cap(-1)</b>	<b>0.060*</b>	<b>0.055</b>	<b>0.056</b>	<b>0.067**</b>	<b>0.060*</b>	<b>0.064*</b>	<b>0.068**</b>
	[0.034]	[0.035]	[0.034]	[0.034]	[0.034]	[0.034]	[0.034]
<b>ROA(-1)</b>	<b>0.468***</b>	<b>0.477***</b>	<b>0.504***</b>	<b>0.459***</b>	<b>0.460***</b>	<b>0.473***</b>	<b>0.465***</b>
	[0.179]	[0.180]	[0.190]	[0.176]	[0.178]	[0.179]	[0.176]
<b>Risk(-1)</b>	<b>-0.019</b>	<b>-0.020</b>	<b>-0.021</b>	<b>-0.017</b>	<b>-0.018</b>	<b>-0.016</b>	<b>-0.014</b>
	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]
<b>GDPg(-1)</b>	<b>0.198***</b>	<b>0.189***</b>	<b>0.181***</b>	<b>0.195***</b>	<b>0.197***</b>	<b>0.189***</b>	<b>0.192***</b>
	[0.052]	[0.051]	[0.051]	[0.052]	[0.052]	[0.051]	[0.054]
<b>Trade(-1)</b>	<b>-0.009**</b>	<b>-0.008**</b>	<b>-0.011***</b>	<b>-0.007*</b>	<b>-0.008**</b>	<b>-0.008**</b>	<b>-0.006*</b>
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
<b>FDI(-1)</b>	<b>0.005</b>	<b>0.006</b>	<b>0.019</b>	<b>0.007</b>	<b>0.008</b>	<b>0.010</b>	<b>0.011</b>
	[0.023]	[0.023]	[0.023]	[0.024]	[0.023]	[0.023]	[0.025]
<b>INST(-1)</b>	<b>0.610*</b>	<b>0.594**</b>	<b>0.776***</b>	<b>0.150</b>	<b>0.345</b>	<b>0.298</b>	<b>0.004</b>
	[0.342]	[0.285]	[0.294]	[0.178]	[0.275]	[0.274]	[0.214]
Cons.	-1.322**	-1.204*	-1.178*	-1.623***	-1.564***	-1.517**	-1.827***
	[0.607]	[0.623]	[0.614]	[0.600]	[0.583]	[0.613]	[0.564]
N	384	384	384	384	384	384	384
No. of countries	32	32	32	32	32	32	32

Note: Standard errors are in []. \*, \*\*, \*\*\* are significant levels at 10%, 5%, 1%, respectively.

The results above show that the economic integration has a positive effect on credit cycles in booming period, while it has a negative effect on these cycles in recession period. In other words, economic integration generates stronger credit cycles. In contrast, the institutions have an opposite effect on credit cycles. For robustness purpose, this analysis has been consistently done with three different proxies of credit levels (Cre2vo, Cre3vo, Cre4vo) confirming our result – this robustness check can be provided on request.

## 5. CONCLUSION

This article investigates the influence of institutions, foreign direct investment and trade openness on the credit cycles in 60 economies (categorized into two sub-samples: LMEs and HIES). The contribution of this study is to investigate the combined effect of institutions and economic integration for the different credit cycles of a global sample over the period of 2003-2017.

Generally speaking, our results show that, the effect of inward FDI on the credit cycles is positive while the influence of trade openness is significantly negative. The credit cycles are also affected by institutional quality. Precisely, better institutions induce a higher growth rate of credit levels which then induce credit cycles toward booming period. Meanwhile, the economic integration has an opposite effect on credit cycles on two aspects: trade openness and FDI inflows. The trade openness reduces the credit growth while FDI inflows induce a credit growth toward booming period.



The trade openness and FDI inflows have a positive effect on the credit growth during a booming period while they have a negative influence in recession period. This means that a higher economic integration exacerbates the dynamics of credits. Notably, the institutions exhibit a negative influence on the credit growth in credit booming period while it has a positive effect in credit recession period. This observation shows the important roles of institutions in curving the credit cycles and helping to reduce the effects of economic integration on credit cycles.

Thirdly, the effects of institutions and economic integration on credit cycles are confirmed for both LMEs and HIEs. For LMEs, the economic integration plays a more important role (than institutions) in affecting credit cycles. Interestingly, the trade openness and institutions help to stabilize credit cycles. In HIEs, the economic integration exacerbates credit cycles while institutions marginally help to stabilize them.

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