Journal of Applied Economics and Business Research
JAEBR, 7(2): 97-115 (2017)

Does Financial Integration Reduce Consumption Volatility and Lead to Consumption Smoothing? - A Case of Latin America

İpek TEKİN[1]
Çukurova University, Turkey

Abstract

Almost all developing countries have liberalized their financial markets over the last thirty years. In this regard, developing Latin American countries attract great attention as experiencing both intensive capital flows after liberalization and capital outflows in later periods. It is of importance to examine the positive and negative effects of financial integration on these economies. This study aims to analyze the effect of financial integration on the volatility of consumption -which is an important macroeconomic volatility indicator- in Latin American countries. Having used panel data analysis method for the period of 1996-2014, the research results suggest that financial integration does not alleviates the volatility of consumption in these countries. In addition, the effect of income volatility, financial development, trade openness and inflation rate also have been investigated, and that income volatility has been determined to influence consumption volatility almost proportionately. On the other hand, trade openness indicator representing macroeconomic reforms has a decreasing effect on volatility while inflation rate affects volatility positively consistent with the theoretical expectations. The most striking result is the disappearance of adverse effect of financial integration on consumption volatility once interaction terms of financial development and institutional development with financial integration enter negatively and significantly in the equations. This result reveals the fact that in order to benefit from financial integration, institutional and financial development are inevitably required.

Key Words: Consumption volatility, consumption smoothing, financial integration, Latin America, panel data

JEL codes: C23, E20, F30, F36, G15

1. Introduction

Throughout the late 1980s and the 1990s, the degree of financial integration dramatically increased around the world. Many countries have promoted capital inflows by removing restrictions and controls on capital flows, dismantling domestic financial markets and deregulating foreign direct investment as well as improving economic environment and prospects through market-oriented reform implementations. Indeed, many developing and transition economies (DCs) in East Asia, Latin America and Eastern Europe have lifted restrictions on international financial transactions. Besides, they moved away from financial repression regimes through relaxing the regulations on domestic financial market operations (Agénor and Montiel, 2008).

[1]Correspondence to İpek TEKİN, E-mail: itekin@cu.edu.tr

The effect of massive financial liberalization on DCs and the major macroeconomic magnitudes has begun to be discussed extensively in the literature. These discussions focus on the effects via two dimensions: benefits and costs. On the one hand, a positive impact of financial liberalization on growth and welfare; on the other, increased vulnerability to external shocks and uncertainty with the emergence of financial liberalization. Two fundamental potential benefits of financial integration have been theoretically stressed, one of which is the efficient distribution of capital among countries. Capital flows increase the level of welfare by enabling households to adjust their consumption over time (Agenor and Montiel, 2008). The other is the emergence of international risk sharing opportunities. From a risk-sharing standpoint, international financial integration is expected to serve as a buffer against domestic shocks by providing access to a wider range of assets and reducing consumption volatility (Levchenko, 2005; Bekaert et al., 2006; Leblebicioğlu, 2009; Fanta, 2012). Kim et al. (2006) reported that there are three channels of consumption risk sharing. First, countries may share country-specific risks through the cross ownership of productive assets (portfolio diversification) and by the availability of developed capital markets. Second, countries may smooth consumption and adjust their assets, for instance, via lending and borrowing in international credit markets (intertemporal trade)[2]. Third, governments or international organizations can arrange fiscal transfer system that can function as an instrument for income and consumption smoothing.

Financial market reforms are generally associated with lower output and economic volatility the moment economic agents smooth their consumption and investment (Ahmed and Suardi, 2009). Kose et al. (2009) stated that economic agents will have the chance to share risk/distribute risk and by this means noted that financial globalization should reduce consumption volatility and provide welfare gains through removing the link between national consumption and output fluctuations. What is important in terms of welfare is smoothing consumption rather than income (Kose et al., 2009). Islamaj (2012) refers to one of the most significant benefits of financial integration is to protect consumers from the risks associated with idiosyncratic income shocks. This opportunity is reflected in various forms: a) a lower correlation between own consumption and own income ("own" identifies households for micro analysis and countries for macro analysis) b) a higher correlation between own consumption and aggregate/rest of the world consumption and income c) a lower consumption volatility. This means that consumption risk sharing occurs through the choice of a and b, which leads to c.

On the other hand, DCs' access to financial markets is at a low level compared to developed countries, and those living in these countries cannot have sufficient risk diversification with regard to their incomes. They also may not have the required skills and education enabling them to move across sectors under unanticipated or unfavorable economic conditions. These countries are exposed to various and considerably unstable external and domestic shocks, and they lack developed financial markets and have difficulties in accessing to international financial markets. Such factors significantly increase the welfare costs of consumption volatility (Ahmed and Suardi, 2009). As Buch and Yener (2010) states one possible explanation could be that DCs have integrated to financial markets more recently and more slowly than developed countries. Moreover, the former

[2] Kim et al. (2006) makes a distinction at this point which is worth to mention. Risk sharing and intertemporal consumption smoothing are conceptually different things. Risk sharing among regions which takes place ex ante is mutual insurance for idiosyncratic risks. On the other hand, intertemporal consumption smoothing which takes place ex post is diversification of idiosyncratic shocks in consumption inter temporally.

 ISSN 1927-033X

has weaker institutions and financial systems which disable them from reaping the benefits of financial integration and potential benefits require more time to occur.

Levchenko (2005) emphasizes two significant characteristics of DCs in this regard. First, domestic institutions and financial markets in these countries are underdeveloped. Second, all the economic units within the system are not able to access to international financial markets. If risks are idiosyncratic, they can be absorbed by the domestic economy; getting into international markets will increase the volatility of consumption. If risks are common to all countries, underdeveloped financial markets will prevent risk sharing for protection in international markets. Decline in volatility will be less with respect to a frictionless financial system. Gains from financial integration will be unevenly distributed. Those which do not have direct access to financial markets may experience higher volatility of consumption and welfare loss. However, efficient financial systems and domestic institutions allow economic agents to smooth their consumption against the fluctuations in income (Ang, 2011). Whether some of the positive effects allegedly arising from financial integration are in question or not should be investigated for DCs where debates about the development of financial markets are concerned.

Liberalization process in Latin America has started in the aftermath of the debt crisis at the beginning of 1980s. IMF played an important role in offering such solution as capital account liberalization for the debt crisis at least until the Asian crises of late 1990s. On the other hand, these countries would be able to reach high and sustainable growth stimulated by foreign savings. Even the crises have not reversed financial liberalization regimes of these countries (Carvalho, 2008). Having started in 1990, the vast majority of developing Latin American countries –In particular, Chile and Mexico- initiated market-oriented reforms and encouraged capital inflows. In 1992, the net value of funds increased so considerably that it exceeded 35% of their total exports. This sudden increase in capital flows was surprising to some analysts and led to speculative attacks on international markets (Edwards, 2000; Montiel, 2011). Critics to financial liberalization reforms have concentrated on the idea that unrestricted capital flows had comprised the origins of financial instability since the mid-1990s and early 2000s. Capital account openness increases speculative capital flows in good times while the speculative funds leave the country rapidly in bad times. Following reform process, since the mid-1990s the Latin America region has been affected by crisis after crisis (Mexico 1994, Ecuador 1998, Brazil 1999, Argentina 2001, Venezuela 2002, Uruguay 2002). (Edwards, 2003) Financial liberalization has been associated with financial instability in these countries.

Figure 1 depicts net capital flows to Latin America for 1980-2015 period in respect of each different component. In accordance with the statements above, fluctuations are seen clearly. Besides, portfolio investments have been behind foreign direct investments (FDI) since the mid-1990s whilst former had been above the latter until the mid-1990s. FDI levels have been increasing considerably since the mid-1990s. FDI towards Latin America have increased almost thirty times from 1980 to 2015 and have reached 135 billion dollars level. On the other hand, it is seen that short term portfolio investments involving equity and debt instruments are more volatile than FDI flows characterized as long term flows.

 ISSN 1927-033X

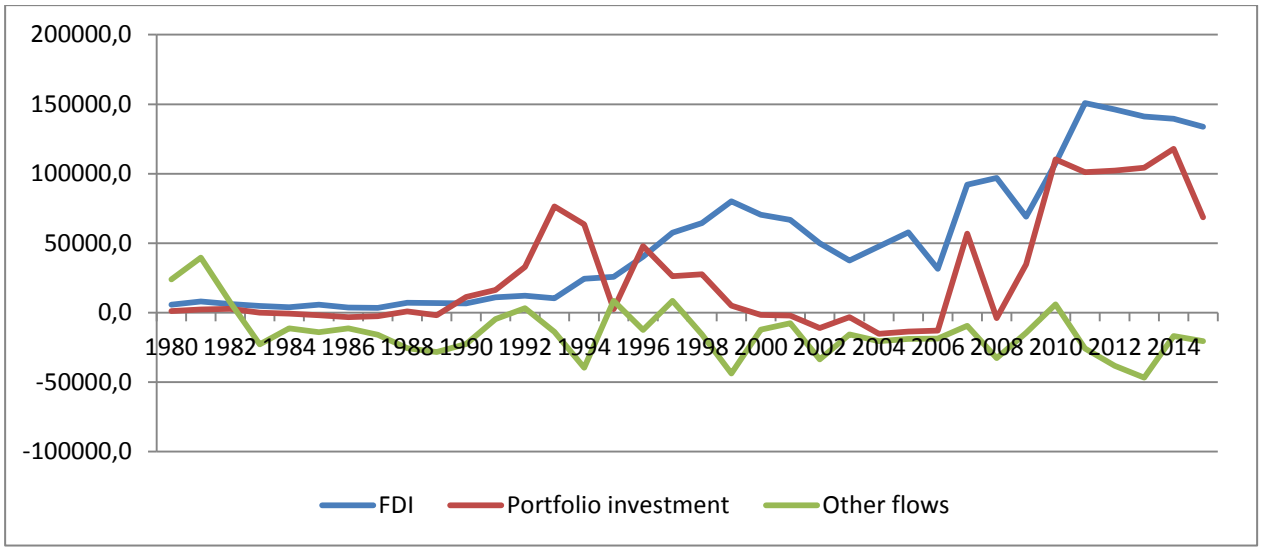

Figure 1: Net Capital Flows to Latin American Countries (million $)
Reference: ECLAC (United Nations Economic Commission for Latin America and the Caribbean)

Based on UNCTAD (2016) report, Figure 2 displays FDI shares of structurally weak, vulnerable and small economies after 2000. The share of FDI flows in Latin America and the Caribbean countries have been increasing more than the other country groups by 2000s.

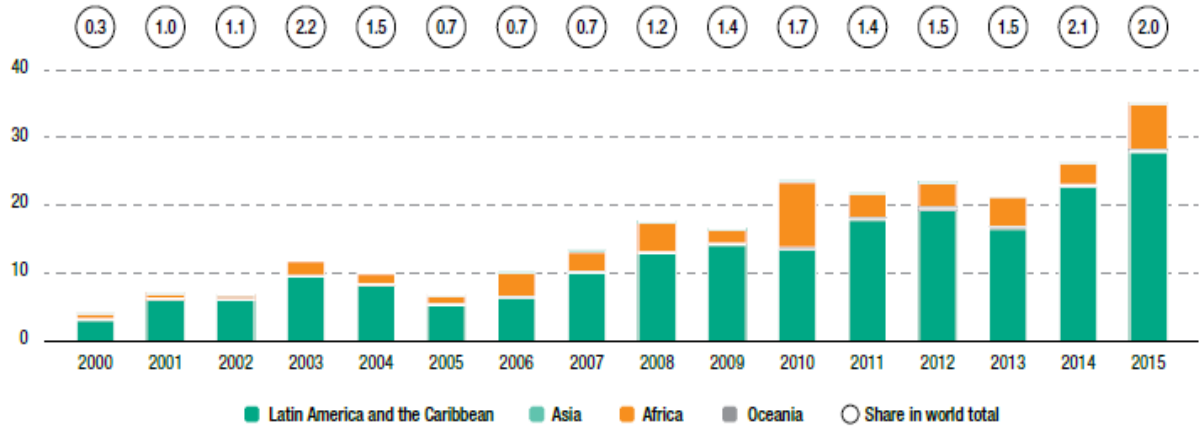

Figure 2: Foreign Direct Investment Inflows / 2000-2015 (billion $)
Reference: UNCTAD, 2016. (http://unctad.org/en/PublicationsLibrary/wir2016_en.pdf)

Figure 3 shows the total net capital flows to selected Latin American countries for 1980-2015. The largest share belongs to Brazil and Mexico for all period.

 ISSN 1927-033X

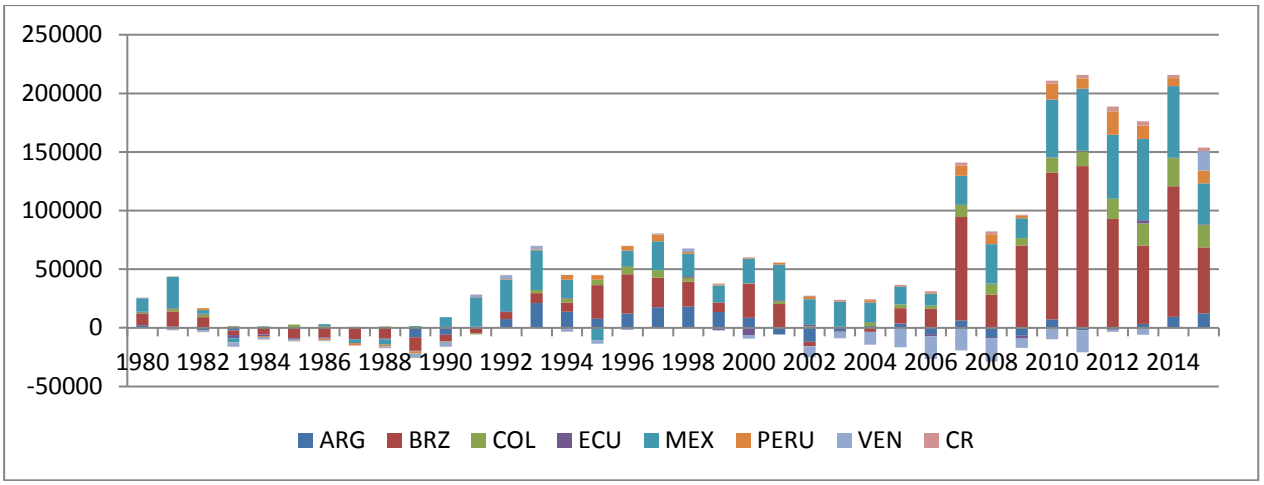

Figure 3: Total Net Capital Flows (million $)[3]
Reference: ECLAC (United Nations Economic Commission for Latin America and the Caribbean)

It is significant to analyze the effects of financial integration in Latin America to determine the potential wealth effects of liberalization predicted theoretically. So this study aims to explore as to whether the subsequent increase in the level of financial integration in these countries, as discussed above, has led to a reduction in the volatility of consumption. Hence, panel data analysis method is used covering the period between 1996 and 2014 for eight developing Latin American countries (Argentina, Brazil, Costa Rica, Peru, Venezuela, Ecuador, Colombia, Mexico) in the upper middle-income group referring to the World Bank 2016 income classification. It is supposed to make a contribution to literature by taking into account a specific country group and period as well as different financial integration measures. The rest of the paper is organized as follows: The next section presents a brief theoretical background. Third section presents the empirical literature on the relationship between financial integration and consumption volatility. Section four displays data, findings and method within the scope of econometric analysis. Concluding remarks are given in the last section.

2. Consumption Smoothing via Risk Sharing

On the basis of Buch and Yener (2010), standard complete market model may be used in order to show how consumption volatility and financial integration are linked. A known income of the representative household in period t=1 is Y1, and there is no uncertainty related to future income Y2. Consumption plans (C1, C2) depends on uncertainty over output in t=2. So utility function is:

$$U_1 = U_1(C_1, C_2) = u(C_1) + \beta\{\pi(1)u[C_2(1)] + \pi(2)u[C_2(2)]\}$$

Intertemporal budget constraint is given by:

$$C_1 + \frac{C_2(1)p(1) + C_2(2)p(2)}{1+r} = Y_1 + \frac{Y_2(1)p(1) + Y_2(2)p(2)}{1+r}$$

[3] Abbreviations for countries are; CR Costa Rica, VEN Venezuela, PERU Peru, MEX Meksika, ECU Ecuador, COL Colombia, BRZ Brazil and ARG Argentina.

 ISSN 1927-033X

While β is the subjective discount factor, s is state of nature, optimizing the equation with respect to C gives standard Euler equation for consumption:

$$\beta\pi(s)u'\big(C_2(s)\big) = \frac{p(1)}{1+r}u'(C_1) \quad ; \qquad \text{s=1,2}$$

When foreign variables are denoted by *, similar implication for foreign country may be set. Market equilibrium conditions in a two-country model are:

$$C_1 + C_1^* = Y_1 + Y_1^* = Y_1^w$$

$$C_2(s) + C_2^*(s) = Y_2(s) + Y_2^*(s) = Y_2^w(s) \quad ; \qquad \text{s=1,2}$$

The change in consumption over time is determined by the change in world income in the financially integrated markets which is shown as:

$$\Delta^I C = \frac{C_2(s) - C_1}{C_1} - \frac{Y_2^w(s) - Y_1^w}{Y_1^w}$$

On the other hand, under autarchic systems, change in consumption is determined by domestic income. The change in consumption volatility passing from autarchic system to financial integration is:

$$\Delta^A C - \Delta^I C = \frac{Y_2(s) - Y_1}{Y_1} - \frac{Y_2^w(s) - Y_1^w}{Y_1^w}$$

Thus, the more correlated domestic and foreign income are, the less consumption volatility is. However, some empirical studies find that consumption correlations across countries are lower than income correlations. Besides, domestic consumption is more correlated with domestic income than with foreign consumption. One reason of the puzzle could be that welfare gains from a decrease in consumption volatility might be small. But potential gains are higher in developing countries than in developed ones. Less developed financial systems in developing countries do not let them reap the benefits of financial integration through lower consumption volatility (Buch ve Yener, 2010).

3. Literature Review

Some empirical literature on estimating the level of consumption smoothing in developed and developing countries considers the Permanent Income Hypothesis (PIH) model, which assumes that consumers can redistribute their resources inter temporally and thus there is no borrowing/liquidity constraint. Since consumption smoothing is a result of consuming permanent income rather than current income, findings related to consumption smoothing can be obtained by testing PIH (Agenor and Montiel, 2008). Habibullah and Smith (1999) stated that the life cycle-permanent income hypothesis is valid in financially liberalized countries as financial liberalization may eliminate liquidity constraint and allows consumers to smooth their consumption. Those who are not exposed to liquidity constraint will determine their consumption not only depending on current income but also on wealth, permanent income and relative financial prices.

 ISSN 1927-033X

Moreover, deficiencies in functioning of financial and capital markets in DCs may reduce the flexibility of borrowing of households, and the assumption of consumption smoothing in PIH may not be valid (Tekin, 2016). The other part of literature is comprised of analyzing the impact of an increase in the level of financial integration (or vice versa, the liquidity constraint), which is thought to contribute to the improvement of consumption risk sharing, upon consumption volatility and smoothing. In this regard, consumption volatility may be calculated through estimating risk sharing models or using various volatility measures. Measures that are used to represent financial integration also vary across different studies.

Suzuki (2014) found that financial integration in OECD countries and non-OECD countries caused risk sharing and consumption smoothing, and the validity of rational expectations permanent income hypothesis is confirmed. Using data from 26 countries and panel data analysis method, Fanta (2012) indicated that financial liberalization reduces consumption volatility. The obtained results have revealed that a standard deviation increase in financial development level alleviates consumption volatility by about 0.16, while the increase in inequality increases the volatility of consumption between 0.36-0.48. Similar results have been found in a study conducted by Bekaert et al. (2006). They have examined the influence of both equity market liberalization and capital account openness on real consumption volatility. As capital account deficit increases, the consumption volatility decreases, indicating the increased risk sharing. The overall results have shown that economies with an open equity market and capital account possess almost 2% lower consumption volatility than totally closed economies. Even though the combined results are not satisfying enough for emerging markets, they have unveiled that differences in terms of volatility levels can be attributed to the size of banking and public sectors and key institutional factors.

Kose et al. (2009) have analyzed the impact of financial integration on risk sharing among different groups of developed and developing countries over the period of 1960-2004. In this context, they calculated idiosyncratic consumption and income shocks, taking both de jure and de facto measures separately as a measure of financial integration. The results show that idiosyncratic consumption risks are more common in the industrialized countries through the integration of global markets compared to the emerging markets. On the other hand, financial integration has been identified to provide a limited contribution to the development of risk sharing even in developed countries. The importance of capital flow composition has been stressed on the basis of the positive effect of foreign direct investment and portfolio flows on sharing risk unlike debt stock.

By analyzing consumption risk sharing level and channels in East Asian countries by using variance decomposition method, Kim et al. (2006) pointed out that the level of risk sharing in developing East Asian countries is lower in contrast to countries within monetary union (US and OECD, EU countries). Bracke and Schmitz (2011), using de-facto financial openness measure, have examined consumption smoothing by means of capital gains and factor revenues in 35 countries over the period of 1970-2005. The result of the analysis indicates that capital gains channel is more important in terms of risk sharing. Volosovych (2012) has analyzed both consumption and income smoothing by using a large sample of countries for the period of 1985-2004. The results indicate that countries with high financial openness level have lower income smoothing, and protection of the investor increases income and consumption risk sharing.

 ISSN 1927-033X

In other respects, some studies with more different results are available in the literature. For instance, Ang (2011) has examined the relationship between financial repression and consumption volatility in India. The presence of a threshold effect indicates that the financial system reduces the consumption volatility only if it is 'sufficiently' liberalized. It is also mentioned that some form of financial regulation may help subside consumption volatility in DCs. Islamaj (2008) has questioned as to why the increase in financial liberalization level did not result in improvement in consumption smoothing. He has also identified that the effect of financial liberalization on consumption smoothing depends upon both the initial size of financial integration and the productivity shock link with the rest of the world. Leblebicioğlu (2009), who differently conducted micro-level analysis, has used two-country real business cycle model. Consumption volatility has been found to be lower under financial autarky. In the context of financial integration, households can be protected against fluctuations in the non-tradable goods and services sector through foreign assets. Hence, terms of trade and relative prices may moderate, and total consumption may precisely react to productivity changes. However, without international goods, the terms of trade deteriorate, consumption declines, and volatility reduces.

4. Data

This section investigates the impact of financial liberalization on the consumption volatility growth in eight Latin American countries over the period of 1996-2014 by using fixed and random effects estimators. Within this framework, the variables used in the analysis are primarily explained. The next step includes applying cross section dependency tests and identification of the integration degree of the variables, that is, their stationarity. Finally, model estimations are done via dynamic panel data analysis method and findings are interpreted.

4.1 Financial Integration Measure

Financial integration/liberalization measures are categorized as de jure and de facto. De jure financial liberalization indicators take into account the time schedule for the implementation of the liberalization policy and some indexes comprising of legal restrictions on financial liberalization. They typically include binary dummy variables which take unity when certain restrictions do not exist or zero in other cases as well as indexes based on such binary variables or legislative regulations (Suzuki, 2014). An example of the last, which is also used in current analysis, is an index that was developed by Chinn and Ito (2006, 2008) for 182 countries for the 1970–2014 period in order to measure capital account openness of countries. The reason for which this index is chosen in this research is its relatively long period coverage. Chinn and Ito (2006, 2008) defined the index as KAOPEN which is based on binary dummy variables encoding the restrictions on cross-border transactions in IMF annual report on exchange rate regulations and restrictions. Moreover, in order to focus on financial openness instead of controls, these dichotomous variables were reversed and 1 is supposed to define "no restriction".

On the other hand, de facto measures based on actual capital flows and other realized macroeconomic variables may provide more realistic and effective results. As a de facto liberalization measure, a stock-based measurement that was used by Suzuki (2014) and Kose et al. (2009), and proposed by Lane and Milesi-Ferretti (LM) (2007) is available. LM predicted equity and FDI stock values by adapting IMF flow data through taking into account the changes in financial prices and exchange rates (Alfaro vd., 2007). This measure considers stock of foreign assets and liabilities (including portfolio investment, direct investment, debts, financial derivatives

 ISSN 1927-033X

and official reserves) rather than net flows, and it is valid for the period of 1970-2011. The effect of both measures has also been investigated for robustness check in the model estimation.

4.2 Other Variables

As a measure of consumption volatility which is the dependent variable, arithmetic average of the annual growth rate of household final consumption expenditures is calculated for the countries and time period subject to analysis. As Fanta (2012), the proxy for consumption volatility is acquired by calculating the deviation from this average. Besides, gross domestic product growth rate volatility is also been calculated in a similar way as a source of consumption volatility. Likewise inspired by Fanta (2012), inflation (INF) and trade openness growth rates (TRADE) have been included in the estimated models as control variables in order to take into account the effect of macroeconomic reforms. INF as a source of uncertainty and instability is expected to trigger consumption volatility. The effect of trade openness on consumer volatility is ambiguous. An increase in trade openness may increase unanticipated income shocks and therefore consumption volatility (Bekaert et al., 2006). On the other hand, trade openness by enhancing risk-sharing opportunities may also alleviate consumption volatility. Credit to private sector (CRED) is also taken into account as a proxy of financial development. The increase in credits is likely to eliminate the liquidity constraint and reduce consumption volatility. Last but not least institutional quality index is supposed to decrease volatility. Table 1 depicts variable explanations and sources that variables are obtained.

Table 1: Descriptions of the Variables

Variables	*Description*	*Source*
CONS	Household final consumption expenditure (annual % growth)	WB-WDI*
GDP	Gross domestic product (annual % growth)	WB-WDI
FINDEV	Domestic credit to private sector (annual % growth):	WB-WDI
INF	Inflation rate (CPI)	WB-WDI
TRADE	Trade openness (annual % growth)	WB-WDI
CONSVOL	Consumption volatility (mean deviation)	Calculations
GDPVOL	GDP volatility (mean deviation)	Calculations
FININT	Financial integration growth	Lane and Milesi-Ferretti (2007), *2011 updated data*
CHITO	Capital account liberalization index	Chinn and Ito (2006, 2008); 2014 updated
INST	Political risk index: Average of these factors: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, control of corruption.[4]	PRS (Political Risk Services) Group

* World Bank World Development Indicators, 2017

Using panel consumption volatility data, stack cross sections in Figure 4 are obtained for the countries. A visual inspection implies that consumption volatility does not move within a small band. Besides this, consumption and income volatility nearly move together.

[4] Since 1997, 1999 and 2001 data are not available for institutional quality, absent data are generated by means of averaging previous and next year data.

 ISSN 1927-033X

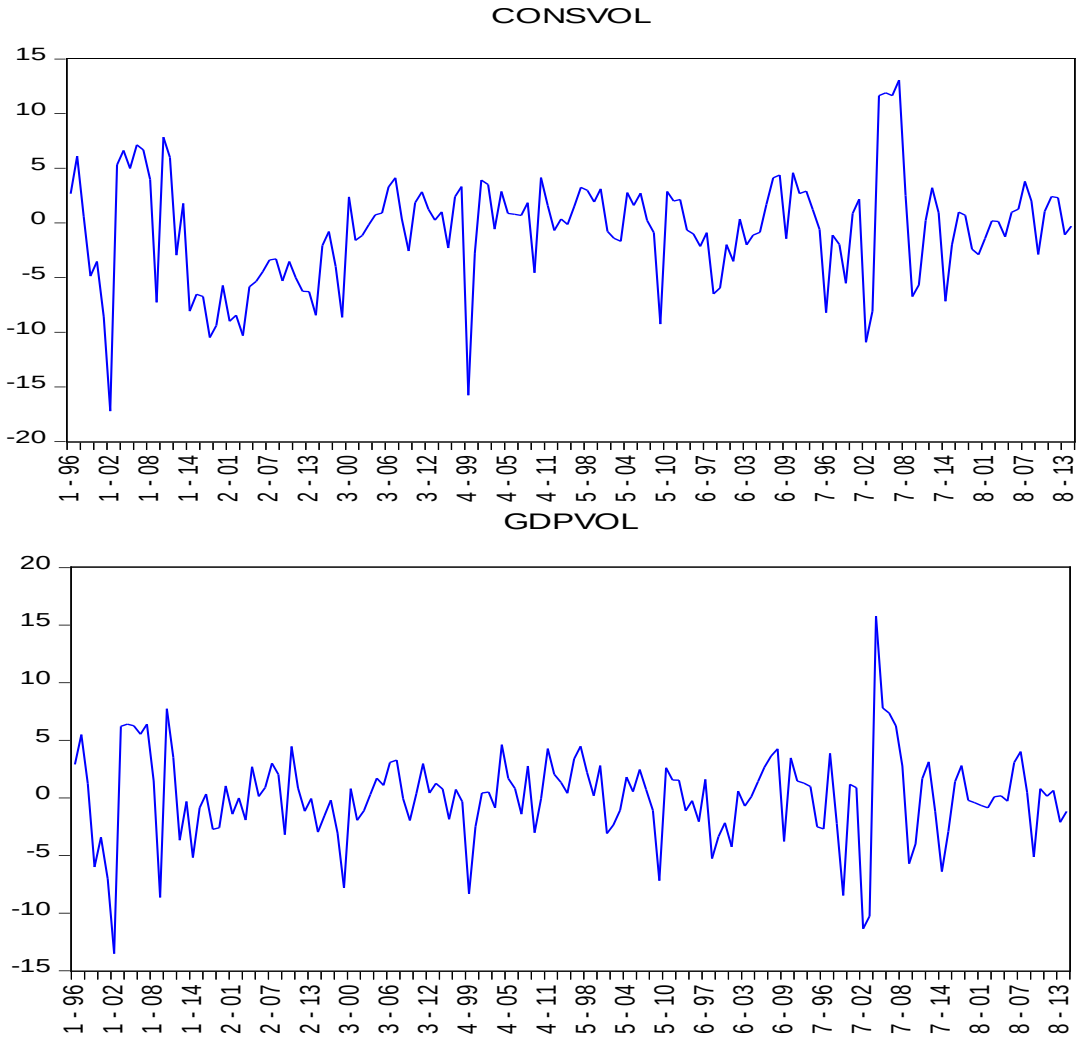

Figure 4: Pattern of Consumption and GDP Volatility

Determining the correlation among variables is crucial to avoid multicollinearity problem and biased estimation results. Correlation matrix in Table 2a and 2b show that except for a high correlation between CONSVOL and GDPVOL no correlation being able to lead to multicollinearity problem exists among the other variables.

Table 2a: Correlation matrix (de facto measure)

	CONSVOL	*GDPVOL*	*FININT*	*INF*	*TRADE*	*CRED*	*INST*
CONSVOL	1.000000						
GDPVOL	0.821524	1.000000					
FININT	0.190899	0.255093	1.000000				
INF	-0.156760	-0.150891	-0.182128	1.000000			
TRADE	0.122911	0.291286	-0.081771	0.057510	1.000000		
FINDEV	0.474340	0.568552	0.204844	-0.086380	0.087281	1.000000	
INST	0.018602	0.068965	0.015280	-0.231827	-0.004275	0.092825	1.000000

Table 2b: Correlation matrix (de jure measure)

 ISSN 1927-033X

	CONSVOL	*GDPVOL*	*CHITO*	*INF*	*TRADE*	*CRED*	*INST*
CONSVOL	1.000000						
GDPVOL	0.782986	1.000000					
CHITO	0.117798	0.173681	1.000000				
INF	-0.175105	-0.209624	-0.280549	1.000000			
TRADE	-0.063848	0.112387	0.035778	0.036818	1.000000		
FINDEV	0.329203	0.347798	0.117125	-0.085333	0.098259	1.000000	
INST	0.049431	0.123962	0.424955	-0.295824	0.019433	0.062731	1.000000

5. Preliminary Analysis

5.1 Cross-Section Dependency

In panel data models, before determining the appropriate estimation method, the underlying assumptions regarding estimators are required to be tested in order to avoid biased estimation of parameters. As the panel unit root tests are classified into two types as first-generation and second-generation panel unit root tests, depending on the presence or absence of cross section dependency. In case of cross-section dependency, the implementation of first generation panel unit root tests is invalid. By extension, LM test statistics developed by Pesaran, Ullah and Yamagata (2008) and Pesaran (2004) are utilized with a view to analyzing the cross-section dependency. As suggested by Pesaran (2004) and Pesaran et al. (2008), the size and power of these statistics are far more plausible when the time dimension is larger than the cross-section size (T> N). The null hypothesis indicates non-existence of cross section dependency and vice versa for alternative hypothesis. Table 2 displays test statistics and probability values for these statistics. Bias adjusted cross-section dependency (CD) test results have revealed that the whole series signify no cross-section dependency, while a few of the Pesaran (2004) test results indicate cross section independence at the 1% significance level. The bias adjusted LM statistics is taken, as emphasized by Pesaran et al. (2008), into account since it presents consistent results even when Pesaran (2004) LM statistic is inconsistent, and the rest of the analysis is based on the assumption that cross section dependency does not exist.

Table 3: Cross Section Dependency Tests

Variables	*Cross Section Dependency Tests*	
	CD_{LM} - Pesaran, 2004	*Bias adjusted CD test – Pesaran vd. (2008)*
CONSVOL	-2.259 (0.012)	0.412 (0.340)
GDPVOL	-2.094 (0.018)	-1.459 (0.928)
FININT	-2.156 (0.016)	-0.083 (0.533)
INF	-1.215 (0.112)	1.029 (0.152)
TRADE	-1.727 (0.042)	0.050 (0.480)
FINDEV	-2.480 (0.007)	-0.563 (0.713)
INST	-2.670 (0.004)	1.015 (0.155)

* Test statistics of CHITO index which is a kind of dummy variable, contains repeated observations could not be estimated

 ISSN 1927-033X

5.2 Panel Unit Root Tests

Both LLC developed by Levin et al. (2002) for cross sections as a whole and IPS developed by Im et al. (2001), Fisher ADF developed by Maddala & Wu (1999), and non-parametric Fisher-PP developed by Choi (2001) which are calculated for each cross-section on the basis of heterogeneity across the countries are applied. All of the unit root test results show that the null hypothesis in which the series are not stationary is rejected for the models with constant only. For the models with constant and trend, the series except for INF are all stationary and INF is stationary according to Fisher-PP test statistic. Therefore, it is possible to make an inference that series are level stationary.

Table 4: Panel Unit Root Tests

Variables		*Unit Root Test Statistics*			
		LLC	*IPS*	*ADF-Fisher*	*Fisher-PP*
CONSVOL	Constant	-3.75 (0.000)	-2.97 (0.002)	35.73 (0.003)	48.17 (0.000)
	Constant+ trend	-4.07 (0.000)	-2.48 (0.007)	31.76 (0.011)	40.22 (0.001)
GDPVOL	Constant	-4.96 (0.000)	-3.51 (0.000)	39.91 (0.001)	59.88 (0.000)
	Constant+ trend	-5.02 (0.000)	-2.38 (0.009)	29.58 (0.02)	44.96 (0.000)
FININT	Constant	-2.68 (0.004)	-2.54 (0.006)	31.29 (0.012)	61.26 (0.000)
	Constant+ trend	-3.98 (0.000)	-3.09 (0.001)	37.44 (0.002)	74.29 (0.000)
INF	Constant	-2.14 (0.016)	-2.37 (0.009)	32.38 (0.009)	348.53 (0.00)
	Constant+ trend	-0.62 (0.267)	-0.61 (0.271)	17.73 (0.340)	66.94 (0.000)
TRADE	Constant	-3.54 (0.000)	-3.95 (0.000)	43.44 (0.000)	98.64 (0.000)
	Constant+ trend	-2.46 (0.007)	-2.27 (0.011)	28.34 (0.029)	77.64 (0.000)
FINDEV	Constant	-4.34 (0.000)	-3.48 (0.000)	40.01 (0.001)	60.83 (0.000)
	Constant+ trend	-5.19 (0.000)	-3.28 (0.001)	37.94 (0.002)	51.15 (0.000)
INST	Constant	-2.35 (0.009)	-1.66 (0.048)	27.36 (0.038)	53.92 (0.000)
	Constant+ trend	-0.89 (0.185)	-0.14 (0.446)	16.41 (0.424)	28.34 (0.028)

* The values in parentheses are the probability values for the test statistics.

6. Methodology and Model

Dynamic panel data models include lagged dependent variable as an independent variable in the model. The idea that existence of lagged dependent variable as an independent variable will lead to correlation between unobservable individual effects (μ_{it}), thereby error term u_{it} and lagged dependent variable $y_{i,t-1}$. In this regard, ordinary least squares (OLS) estimator will be biased and inconsistent. Under these circumstances, Anderson and Hsiao (1981) suggest that μ_{it} can be excluded from the model by first differencing of the model. Since this method prevents the use of all moments conditions, it is consistent, but inefficient. On the other hand, Arellano and Bond (1991) proposed a more efficient generalized method of moments (GMM) procedure by claiming that the estimator using differences rather than levels for instruments has a singularity point and large variances over a significant range of parameters. GMM estimator is advantageous for taking into consideration endogeneity problem and biased parameters by using instrumental variables. Besides, since the consistency of the GMM estimator depends on the absence of second order autocorrelation ($E(\Delta v_{it}\Delta v_{i(t-2)}) = 0$) , an AR test has been developed to determine whether there

is a second order correlation between error terms of the equation whose first difference is taken (Arrelano and Bond, 1991; Baltagi, 2005). The effectiveness of difference-GMM estimator increases as T increases. Blundell and Bond (1998) developed GMM-System estimator which is more efficient than basic first differenced GMM estimator for the samples with large variances over individual effects and if the coefficient concerning difference of dependent variable is close to 1 and time dimension (T) is limited. They claimed that mild stationarity restriction in initial conditions allows for the use of augmented GMM-System estimator which is using lagged difference of y_{it} in level equations, lagged value of y_{it} in difference equations as an instrumental variable. Blundell and Bond (1998) support the use of extra moments in the series which are persistent and where T is limited (Baltagi, 2005). Arellano and Bond (1991) suggest Sargan specification test developed for the validity of the instrumental variables. The test statistics is included in Arrelano & Bond (1991). In case of the acceptance of the hypothesis, the validity of the instruments will be confirmed. On the other hand, Wald test which is robust to heteroscedasticity has asymptotic χ_k^2 distribution and tests the simultaneous significance of independent variables under the null hypothesis of no relationship (coefficients are zero) (Wooldridge, 2010; Arrelano and Bond, 1991).

In this regard, the generalized version of dynamic panel data models who will be estimated via GMM estimator in the study are presented in equation III:

$$CONSVOL_{i,t} = \alpha_0 CONSVOL_{i,t-1} + \Sigma_{N=1}^{K} \theta X_{it}^{N} + \mu_{it} + \nu_{it} \;\; ; \; |\alpha_0| < 1 \qquad \text{(III)}$$

where μ refers to time-invariant unobservable individual (country specific) effects, ν_{it} is white noise (random) error term, K is the total number of explanatory variables, X_{it}^{N} describes potential explanatory variables set, i and t subscripts refer to the countries and time period, respectively.

7. Results and Discussion

The results in Table 5 and Table 6 display that the differences in liberalization measures reflect to the statistical significance of the coefficients. Results on one-step system GMM estimation of the first model in which de-facto measure is considered are at Table 5.

Table 5: Consumption volatility and financial integration: 1996-2011 (de-facto measure)

	Coefficient	*Std. Error*	*z*	*p-value*	
CONSVOL (-1)	0.145205	0.044382	3.2717	0.00107	***
constant	-1.55426	1.07015	-1.4524	0.14640	
FININT	-0.124907	0.216802	-0.5761	0.56453	
GDPVOL	1.06801	0.040876	26.1281	<0.00001	***
INF	0.02847	0.013222	2.1531	0.03131	**
TRADE	-0.564064	0.123678	-4.5607	<0.00001	***
FINDEV	-0.193481	0.114359	-1.6919	0.09067	*
Instrumental variables: 118					
Diagnostic Tests					
AR (1) Test: z = -1.987 [0.0469]					
AR (2) Test: z = -0.063 [0.9495]					
Wald test: χ-square (6) = 13887.1 [0.0000]					
Sargan test: χ-square (97) = 83.809 [0.8277]					

*, **, *** denote %10, %5 and %1 significance levels. Probability values of test statistics are in square brackets. Time dummies are also included.

 ISSN 1927-033X

Sargan test results in Table 5-8 illustrate that instrumental variables are exogenous and valid. Besides, Wald test show explanatory variables are statistically significant for explaining the dependent variable. Since consistency of GMM estimator is valid only in the absence of second order autocorrelation, AR (2) test statistics ensure that.

According to coefficient estimation results in Table 5, lagged value of consumption volatility is significant and positive at 5 percentage level and implies that consumption partially follows random walk. Coefficient of financial integration is negative and not significantly effects consumption volatility. However, income volatility significantly and almost proportionately effect consumption volatility. On the other side, trade openness (inflation) which is included in the model as a proxy for macroeconomic reforms has a relatively strong (weak) negative (positive) impact on consumption volatility. In this context, 1 percent rise in trade openness (inflation) reduces (increases) consumption volatility by 0.56 percent (0.03 percent). Moreover, financial development has a negative impact on volatility but the impact is not that strong.

Next step is directly related to the estimation of consumption volatility by using de-jure capital account liberalization this time. Results are presented at Table 6.

Table 6: Consumption volatility and financial integration: 1996-2014 (de-jure measure)

	Coefficient	*Std. Error*	*z*	*p-value*	
CONSVOL (-1)	0.132815	0.0608163	2.1839	0.02897	**
constant	-0.342168	0.859973	-0.3979	0.69072	
CHITO	0.300443	0.121626	2.4702	0.01350	**
GDPVOL	1.01395	0.055724	18.1959	<0.00001	***
INF	0.001975	0.0195157	0.1012	0.91939	
TRADE	-3.85713	1.74723	-2.2076	0.02727	**
FINDEV	-0.296844	1.25091	-0.2373	0.81242	

Instrumental variables: 120

Diagnostic Tests

AR (1) Test: z = 2.174 [0.0297]
AR (2) Test: z =-0.592 [0.5535]
Wald test: χ square (6) = 4319.57 [0.0000]
Sargan test: χ square (90) = 83.797 [0.8280]

*, **, *** denote %10, %5 and %1 significance levels. Probability values of test statistics are in square brackets. Time dummies are also included.

Likewise, previous results, results in Table 6 illustrate that lagged consumption volatility is positive and significant at 5% significance level. Coefficient of CHITO measuring financial integration is 0.30 and significantly positive contrary to theoretical framework. Income volatility has still significantly and almost proportionately affects consumption volatility which would be interpreted as the validity of excess sensitivity of consumption to current income. On the other hand, trade openness which is included in the model as a proxy for macroeconomic reforms has a strong negative impact on consumption volatility. However, the impact of inflation on consumption volatility is now not significant. Besides, the effect of financial development on volatility is not statistically significant. In addition, institutional quality index (INST) is also taken into consideration within the estimation process of the next regressions. Fanta (2012) mentions political and bureaucratic instabilities and corruption as some kinds of risk indicators which lead to inefficient controls on an economy. A negative correlation is expected between institutional quality and macroeconomic volatilities. Institutional quality index is included in models as of both singular and interaction term with financial integration measures. Similarly, financial development is also

 ISSN 1927-033X

interacted with financial integration. The purpose here is revealing whether institutional quality and financial development have a role on the relationship between financial integration and volatility.

Table 7a: Consumption volatility and institutional quality: 1996-2011 (de-facto measure)

	Coefficient	*Std. Error*	*z*	*p-value*	
CONSVOL (-1)	*0.14432*	*0.04584*	*3.1484*	*0.00164*	***
constant	-1.0805	1.20883	-0.8938	0.37140	
FININT	-0.11433	0.21054	-0.5430	0.58711	
GDPVOL	1.06798	0.04275	24.9826	<0.00001	***
INF	0.02614	0.01476	1.7712	0.07653	*
FINDEV	-0.17789	0.12705	-1.4001	0.16148	
TRADE	-0.56515	0.12719	-4.4431	<0.00001	***
INST	-0.08599	0.18314	-0.4696	0.63867	

Instrumental variables: 119

Diagnostic Tests

AR (1) Test: z = -1.98036 [0.047]
AR (2) Test: z =--0.07047 [0.944]
Wald test - χ square (6) = 6.015e+006 [0.000]
Sargan test - χ square (90) = 82.8151 [0.8471]

*, **, *** denote %10, %5 and %1 significance levels. Probability values of test statistics are in square brackets. Time dummies are also included.

Table 7b: Consumption volatility and institutional quality: 1996-2011 (de-facto measure)

	Coefficient	*Std. Error*	*z*	*p-value*	
CONSVOL (-1)	0.14711	0.04676	3.1457	0.00166	***
constant	-1.63711	1.09831	-1.4906	0.13607	
GDPVOL	1.05796	0.03513	30.1119	<0.00001	***
FININT*FINDEV	-0.17882	0.15479	-1.1552	0.24799	
FININT*INST	0.10218	0.21008	0.4864	0.62671	
INF	0.02629	0.01315	1.9999	0.04551	**
FINDEV	-0.601783	1.74289	-0.3453	0.72989	
TRADE	-0.465262	0.101426	-4.5872	<0.00001	***

Instrumental variables: 119

Diagnostic Tests

AR (1) Test: z = -2.06224 [0.0392]
AR (2) Test: z = 0.34199 [0.7324]
Wald test - χ square (6) = 129214 [0.0000]
Sargan test - χ square (90) = 82.8391 [0.8467]

*, **, *** denote %10, %5 and %1 significance levels. Probability values of test statistics are in square brackets. Time dummies are also included.

No significant effects of institutional quality and interaction terms are found once the models with de-facto measure have been estimated.

In Table 8a-b, the effects of same parameters are estimated by using de-jure measure. While institutional quality has no significant effect on volatility, the interaction term is significant at 5

percentage level. The impact of financial integration on volatility is positive and a 1 percent increase in financial integration raises volatility by 0.53. Besides, coefficient of interaction terms in Table 8b named as FININT*FININST and FININT*FINDEV are -0.32 and -0.27 respectively. Hence, the potential decreasing effect of financial integration on volatility is higher in countries which are more institutionally and financially developed.

Table 8a: Consumption volatility and institutional quality: 1996-2014 (de-jure measure)

	Coefficient	*Std. Error*	*z*	*p-value*	
CONSVOL (-1)	0.12873	0.04381	2.9384	0.00330	***
constant	-0.46974	1.28321	-0.3661	0.71431	
CHITO	0.53881	0.32258	1.6703	0.09486	*
GDPVOL	1.07733	0.04348	24.7727	<0.00001	***
INF	0.03204	0.01947	1.6453	0.09990	*
FINDEV	-0.13337	0.14105	-0.9456	0.34435	
TRADE	-0.5116	0.14352	-3.5647	0.00036	***
INST	-0.31175	0.30584	-1.0194	0.30804	
Instrumental variables: 149					
Diagnostic Tests					
AR (1) Test: z = -2.10491 [0.0353]					
AR (2) Test: z = -0.747042 [0.4550]					
Wald test - χ square (6) = 19172 [0.0000]					
Sargan test -χ square (90) = 110.068 [0.8099]					

*, **, *** denote %10, %5 and %1 significance levels. Probability values of test statistics are in square brackets. Time dummies are also included.

Table 8b: Consumption volatility and institutional quality: 1996-2014 (de-jure measure)

	Coefficient	*Std. Error*	*z*	*p-value*	
CONSVOL (-1)	0.10738	0.0335403	3.2014	0.00137	***
constant	-1.56667	0.971738	-1.6122	0.10691	
CHITO	0.63123	0.310741	2.0314	0.04222	**
GDPVOL	1.06386	0.0562527	18.9121	<0.00001	***
INF	0.03651	0.0190181	1.9196	0.05491	*
FINDEV	-0.11534	0.129685	-0.8894	0.37379	
TRADE	-0.53969	0.1385	-3.8967	0.00010	***
CHITO*INST	-0.32479	0.157111	-2.0673	0.03871	**
CHITO*FINDEV	-0.27842	0.128765	-2.1622	0.03060	**
Instrumental variables: 150					
Diagnostic Tests					
AR (1) Test z = -2.06551 [0.0389]					
AR (2) Test z =-0.597484 [0.5502]					
Wald test - χ square (6) = 4.59e+017 [0.0000]					
Sargan test - χ square (90) = 109.168 [0.8263]					

*, **, *** denote %10, %5 and %1 significance levels. Probability values of test statistics are in square brackets. Time dummies are also included.

8. Concluding remarks

 ISSN 1927-033X

Most of developed and developing countries, including those of Latin American countries since 1980s, and especially after 1990, have liberalized their capital transactions to a great extent. However, the positive effect of financial liberalization has not been fully reflected in the developing countries due to a number of constraints. Higher level of country vulnerabilities resulting in capital outflows associated with the disruptions and underdevelopment of the financial markets is one of the topics that frequently discussed in the literature. The main research question of this study is to determine whether the anticipated positive effects of financial liberalization occur by creating risk-sharing opportunities. For this purpose, this study analyzes the relationship between consumption volatility and financial integration in emerging Latin American countries from a broad perspective for the post-liberalization period 1996-2014, considering the increasing level of financial integration and macroeconomic volatility.

The findings reveal that de-facto financial integration measure does not affect consumption volatility significantly and therefore does not lead to consumption smoothing. However, contrary to theory, de-jure financial integration creates an adverse effect on consumption volatility. The sensitivity of the results to the measurement of different financial integration is noteworthy, suggesting that analyzes made by considering a single liberalization measurement may not be reliable. Besides, an increase in trade openness level reduces volatility though an increase in inflation rate increases volatility. The effect of financial development on consumption volatility is not statistically significant in none of the estimations. The most significant result is the disappearance of adverse effect of financial integration on consumption volatility once interaction terms of financial development and institutional development with financial integration are taken into consideration. When a country is financially and institutionally developed the effect of financial integration on consumption volatility turns out to be negative.

Corruption, bureaucratic obstacles, political instabilities under institutional quality index prevent countries from reaping the benefits of financial integration and smoothing consumption over time via risk sharing. Thus, in order to acquire positive outcome in Latin America, the policies constituting financial deepening and development, establishing a new environment of confidence via decreasing country risk should be implemented.

9. References

Agénor PR, Montiel PJ. 2008. *Development macroeconomics*, 4th ed. Princeton University Press, United Kingdom.

Ahmed AD, Suardi S. 2009. Macroeconomic volatility, trade and financial liberalization in Africa. *World Development*, 37:10, 1623-1636.

Anderson TW, Hsiao C. 1981. Estimation of dynamic models with error components. *Journal of the American Statistical Association*, 76, 598-606.

Ang JB. 2011. Finance and consumption volatility: Evidence from India. *Journal of International Money and Finance*, 30:6, 947-964.

Arrelano M, Bond S. 1991. Some tests of specification for Panel Data: Monte Carlo Evidence and an application to employment equations, *Review of Economic Studies*, 58, 277-297.

Baltagi BH, Li Q. 1991. A transformation that will circumvent the problem of autocorrelation in an error-component model. *Journal of Econometrics*, 48:3, 385-393.

Baltagi BH. 2005. *Econometric Analysis of Panel Data*, 3rd ed. John Wiley & Sons, England.

Beck N, Katz JN. 1995. What to do (and not to do) with time-series cross-section data. *American political science review*, 89:03, 634-647.

 ISSN 1927-033X

Bekaert G, Harvey CR, Lundblad C. 2006. Growth volatility and financial liberalization. *Journal of international money and finance*, 25:3, 370-403.

Blundell R, Bond S. 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, 87:1, 115-143.

Bracke T, Schmitz M. 2011. Channels of international risk-sharing: capital gains versus income flows. *International Economics and Economic Policy*, 8:1, 45-78.

Buch CM, Yener S. 2010. Consumption volatility and financial openness. *Applied Economics*, 42:28, 3635-3649.

Carvalho FC. 2008. Financial Liberalization in Brazil and Argentina. In P. Arestis and L.F. de Paula (Eds.), Financial Liberalization and Economic Performance in Emerging Countries (pp.121-141). Palgrave Macmillan, New York.

Chinn MD, Ito H. 2006. What matters for financial development? Capital controls, institutions, and interactions. *Journal of development economics*, 81:1, 163-192.

Chinn MD, Ito H. 2008. A new measure of financial openness. *Journal of comparative policy analysis*, 10:3, 309-322.

Choi I. 2001. Unit root tests for panel data. *Journal of international money and Finance*, 20:2, 249-272.

ECLAC (2017). Data and Statistics, http://www.cepal.org/en/datos-y-estadisticas (04.03.2017)

Edwards S. 2000. Capital Flows, Real Exchange Rates, and Capital Controls: Some Latin American Experiences, in: Edwards, S. (Ed.), *Capital Flows and the Emerging Economies: Theory, Evidence, and Controversies*.The University of Chicago Press, London, 197-246.

Edwards S. 2003. Financial instability in Latin America. *Journal of International Money and Finance,* 22, 1095-1006.

Fanta F. 2012. Financial liberalization and consumption volatility: explaining heterogeneity across countries. *Macroeconomics and Finance in Emerging Market Economies*, 5:2, 197-212.

Greene WH, 2003. *Econometric analysis*. Pearson Education India.

Habibullah MS, Smith P. 1999. Liquidity constraints and financial liberalization: the case for Asian developing countries. *Applied Economics Letters*, 6:4, 259-262.

Im KS, Pesaran MH, Shin Y. 2003.Testing for unit roots in heterogeneous panels. *Journal of econometrics*, 115:1, 53-74.

Islamaj E. 2008. Why don't we observe improvements in consumption smoothing as countries get more financially integrated: Bridging theory and empirics. *Economics Letters*, 100:2, 169-172.

Islamaj E. 2012. *Financial liberalization and consumption smoothing: What have we learned so far*. Working Paper, Vassar College. Available at http://irving.vassar. edu/faculty/ei/survey.pdf.

Kim S, Kim SH, Wang Y. 2006. Financial integration and consumption risk sharing in East Asia. *Japan and the World Economy*, 18:2, 143-157.

Kose MA, Prasad ES, Terrones ME. 2009. Does financial globalization promote risk sharing? *Journal of Development Economics*, 89:2, 258-270.

Lane PR, Milesi-Ferretti GM. 2007. The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004. *Journal of international Economics*, 73:2, 223-250.

Leblebicioğlu A. 2009. Financial integration, credit market imperfections and consumption smoothing. *Journal of Economic Dynamics and Control*, 33:2, 377-393.

 ISSN 1927-033X

Levchenko AA. 2005. Financial liberalization and consumption volatility in developing countries. *IMF Staff Papers*, 237-259.

Levin A, Lin CF, Chu CSJ. 2002. Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics*, 108:1, 1-24.

Maddala GS, Wu S. 1999. A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 61: S1, 631-652.

Montiel PJ. 2011. *Macroeconomics in Emerging Markets*, Cambridge University Press, New York.

Pesaran MH. 2004. General diagnostic tests for cross section dependence in panels, CESifo Working Paper Series No. 1229; IZA Discussion Paper No. 1240.

Pesaran MH, Ullah A, Yamagata T. 2008. A bias-adjusted LM test of error cross-section independence. *The Econometrics Journal*, 11:1, 105-127.

Suzuki Y. 2014. Financial integration and consumption risk sharing and smoothing. *International Review of Economics & Finance*, 29, 585-598.

UNCTAD. 2016. World Investment Report. http://unctad.org/en/PublicationsLibrary/wir2016_en.pdf (05.02.2017)

Tekin, İ. 2016. Testing the Rational Expectations Permanent Income Hypothesis for Developing Countries. *Ekonomik Yaklasim*, 27:100, 41-67.

The PRS Group. 2016. http://epub.prsgroup.com/products/political-risk-services (02.02.2017)

Volosovych V. 2013. Risk sharing from international factor income: explaining cross-country differences. *Applied Economics*, 45:11, 1435-1459.

World Bank. 2017. World Development Indicators, The World Bank, Washington (15.12.2016)

 ISSN 1927-033X