Consumption Smoothing, Risk-Sharing, and Financial Integration*

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Abstract

Theories indicate that financial integration should allow economies to better share risk and thus improve consumption smoothing. We construct two widely used priced-based measures of financial integration (i.e. the standard correlation and the adjusted R-squared) and test whether consumption volatility declines as international equity markets become more integrated. Pooled and panel estimates for three different groups of countries (i.e. G7, G20 and EU) provide no significant evidence of improved consumption smoothing as financial integration rises. This evidence is supported by a battery of robustness checks and holds over time. Taken together, our results suggest that convergence in international equity prices does not necessarily represent the channel through which risk-sharing opportunities arise or consumption smoothing improves.

JEL classification: F36, F44, F62

Keywords: International Risk Sharing, Consumption Volatility, Financial Integration

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"*... risk sharing and international financial integration are closely related empirical phenomena*"

Sørensen et al. (2007)

1 Introduction

It is largely accepted that financial integration comes with several benefits. In particular, rising financial integration is found to increase risk sharing opportunities and thus improve consumption smoothing (Sutherland, 1996; Kose et al., 2003; Sørensen et al., 2007; Jappelli and Pistaferri, 2011). In this respect, the international business cycle (IBC) theory predicts that under full financial integration (i.e. market completeness) the welfare benefits in terms of risk sharing and consumption smoothing are rather sizable. Actually, this theoretical result holds even in the presence of mild financial frictions. Therefore, the chance to trade a large variety of international financial securities allows investors to insure consumption levels from the country-specific component of output fluctuations. This reduces the volatility of consumption relative to output (Mendoza, 1991; Backus et al., 1992; Colacito and Croce, 2013).

However, financial integration may also come with bad news. In this respect, it has been observed that highly integrated international financial markets tend to amplify both financial and macroeconomic contagion risk leading to a weaker risk-sharing and less international portfolio diversification benefits.

So far, there have been several empirical works attempting to capture financial integration dynamics by means of a large variety of quantity- or priced-based indicators. In some of these works, it is also argued that some measures tend to be more robust than others. More importantly, the majority of these studies argue that finding a proper measure of financial integration is key given the benefits financial integration provides to economies. However, among all these empirical works, very few examine whether the financial integration dynamics shaped by a variety of indicators are truly and significantly related to (i) well-known international finance empirical regularities (i.e. *increasing financial integration leads to declining international portfolio diversification benefits*) or (ii) established IBC theories (i.e.

higher financial integration improves risk sharing opportunities and consumption smoothing). On the one hand, there are studies examining the relationship between the degree of financial liberalizations or trade and financial openness and consumption smoothing (see, among others, Kose et al., 2003; Prasad et al., 2003; Sørensen et al., 2007; Suzuki, 2004). Overall, these empirical works provide mixed evidence of improved risk sharing following financial liberalizations and increasing degrees of trade and financial openness. Naturally, these findings have cast some doubts on the actual welfare benefits provided by the financial integration process. At odd with theoretical predictions, other empirical findings suggest that financial integration appears to be associated with rising consumption volatility (Kose et al., 2009). Differently, Sørensen et al. (2007) and Suzuki (2004) both show that economies tend to benefit from financial integration in terms of consumption smoothing. In all these studies, financial integration is captured by means of market liberalizations (i.e. *de jure* measures) or quantity-based measures. More recently, Billio et al. (2017) have instead tried to examine whether financial integration – measured by a variety of price-based indicators – is associated with either weaker or stronger international diversification benefits. Actually, the work of Billio et al. (2017) represents a first attempt to evaluate the performance of a variety of equity market integration measures in capturing an established international finance result. In contrast to the general idea that in the presence of international complete markets global investors have the chance to build a more diversified portfolio and thus improve diversification benefits, Billio et al. (2017) observe that international diversification benefits have declined due to increasingly integrated global equity markets.

In this paper, we simply bridge these two strands of the international finance literature and examine whether a rise in the level of financial integration accounts for higher risk sharing opportunities. Thus, we test whether there is a significant link between financial integration and consumption volatility. Said differently, this paper empirically provides the missing link between price-based financial integration measures and risk sharing by showing that international price convergence does not necessarily lead to improved consumption smoothing. By employing two widely used indicators of financial integration (i.e. the standard correlation and the R-squared) and pooled (time series) and panel regressions, we find little evidence of declining consumption volatility following a rise in the degree of financial integration.

Actually, most of our estimates indicate financial integration to be responsible for higher consumption volatility. Therefore, the presence of increasingly integrated international equity markets has been detrimental for macroeconomic stability. Apparently, the ability of standard measures of financial integration in capturing an established IBC fact (i.e. *higher degrees of financial integration lead to lower consumption volatility*) is rather weak. Loosely speaking, the employed measures of financial integration seem to primarily capture international price convergence rather than the actual degree of international risk-sharing.[1] We further show that our main findings are supported by a battery of robustness tests and hold over time.

Taken together, our results indicate that priced-based measures of financial integration tend to capture co-movement across international asset returns and are not significantly related to international risk sharing dynamics. It turns out that financial integration and consumption smoothing are not closely related empirical phenomena. Our findings are in line with very recent evidence suggesting that international price convergence, risk sharing and financial integration are not necessarily linked and therefore they should be treated as separate facts (Akbari et al., 2019).

The organization of the paper is straightforward. In Section 2 we discuss the relationship with the existing literature. We present data, discuss the main empirical results and perform a battery of additional empirical tests as well as a time-varying analysis in Section 3. Section 4 concludes.

2 Related literature

Our paper is most closely related to Kose et al. (2003) and Neaime (2005) who study the relationship between financial integration and risk sharing by means of panel regressions. Financial integration is captured by *de jure* (i.e. time dummies) and quantity-based indicators (i.e. foreign direct investments and international portfolio flows). Counterfactually, Kose et al. (2003) find that the proposed measures of financial integration increase consumption volatility. Moreover, the relationship between financial integration and macroeconomic

[1] See also Billio et al. (2017) on this point.

stability seems to be non-linear. Focusing on the MENA region for the pre- and after-2002 periods, Neaime (2005) finds that only *de jure* indicators are negatively related to consumption volatility. We differ from these works in several respects. First, in addition to standard financial and trade openness measures, we use two largely used price-based indicators of financial integration (i.e. the cross-country average correlation and the cross-country average adjusted R-squared). Second, our main results (*i*) are obtained by performing both time-series and panel regressions and (*ii*) rely on three different country groups (i.e. G7, G20 and EU). Third, we perform several robustness tests (including a pure time-varying analysis) that corroborate our main findings.

We are also very close to Billio et al. (2017) who first compare the dynamics of a set of price-based indicators of *de facto* integration and then show that all these indicators provide very similar information. Moreover, they try to assess the performance of all the employed financial integration measures in capturing international diversification benefits dynamics. Surprisingly, they observe a negative correlation between these two phenomena. While Billio et al. (2017) rely on a well-known international finance empirical fact, in this paper we focus on an established IBC theory (i.e. *rising financial integration improves consumption smoothing*). In practice, we evaluate the performance of two standard price-based measures of financial integration in capturing cross-country consumption volatility dynamics.

Our work is then more distantly related to Kose et al. (2009) who (*i*) test whether idiosyncratic risk affects consumption growth and (*ii*) measure the degree of risk sharing by means of regressions based on the Euler equation. Using several *de jure* and *de facto* measures of financial openness, they observe that risk sharing is very limited. In particular, it is shown that only advanced economies have obtained benefits from financial integration. In the spirit of Kose et al. (2009), Sørensen et al. (2007) construct a panel regression model to measure the effect of idiosyncratic and aggregate shocks on income. To measure financial openness, they build an indicator of equity home bias, that is defined as one minus the share of country's holding of foreign equity with respect to total equity portfolio. Such quantity-based measure is found to be negatively correlated to consumption volatility. In line with of Kose et al. (2009), we perform both time series and panel regressions, as well as a time-varying analysis. However, we do not rely exclusively on *de jure* or *de facto* quantity-based indicators

to investigate the relationship between financial integration and international risk sharing. In addition, we use as a proxy for risk-sharing the average cross-country consumption growth volatility.

By relying on firm-level data, Kalemli-Ozcan et al. (2014) examine the relationship between output volatility and financial integration. In their study financial integration is captured by the percentage of foreign ownership of firms with respect to regional aggregate. They find a positive link between financial integration and output volatility. We differ from them in two main aspects. First, Kalemli-Ozcan et al. (2014) use very granular data, whereas we employ macro-level data. We can thus reconcile our results with theirs only partially. Second, they rely on standard quantity-based measures of financial integration.

Finally, our work is related to those IBC studies focusing on the welfare benefits of financial integration (i.e. *international risk sharing*). For instance, Sutherland (1996) provides a theoretical link between macroeconomic volatility and financial integration. By modeling the latter as a reduction in trade frictions, he argues that increasing financial integration brings welfare gains in terms of reduced consumption volatility. Other studies have instead observed that financial integration does not provide welfare gains (i.e. improved consumption smoothing). For instance, Pommeret and Epaulard (2005) argue that financial integration comes with marginal benefits (or even worse with losses) if its process is not yet complete. Evans and Hnatkovska (2007) point out that there is a non-monotonic link between financial integration and macroeconomic volatility. More specifically, they show that aggregate macroeconomic volatility should initially rise as the economy moves from a financial autarky regime to a low-integrated status and start declining as integration proceeds afterwards. Of course, this suggests the presence of a non-linear relationship. Levchenko (2005) relaxes the assumption of the existence of a representative agent. He finds that financial integration benefits vanish for all those agents living in countries with underdeveloped financial markets. Therefore, in these countries one should observe a rise in the volatility of consumption following financial liberalizations. Differently from us, Levchenko (2005) relies on *de jure* indicators.

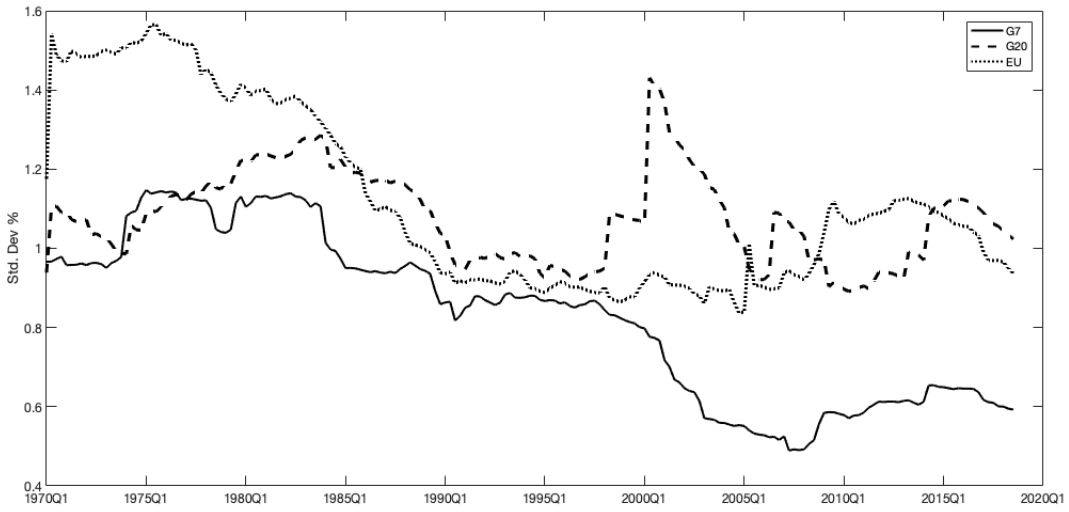
3 Empirical analysis

3.1 Data

We collect data for the following three groups of countries:

- G7: Canada, France, Germany, Italy, Japan, United States
- G20: Australia, Brazil, Canada, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Russia, South Africa, Turkey, United Kingdom, United States
- EU: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Poland, Portugal, Slovak, Republic Slovenia, Spain, Sweden, United Kingdom

Figure 1: Consumption Volatility Dynamics



Notes: The figure depicts the dynamics of the volatility of consumption growth for the G7, G20 and EU. Consumption volatility is computed using a rolling window of 40 quarters. Data run from 1970:Q1 to 2018:Q4.

Consumption smoothing. In line with theoretical studies in open economy macroeconomics and international finance and in the spirit of existing empirical works focusing on the impact of financial integration on consumption smoothing, we capture risk-sharing by

means of variations in consumption growth (i.e. consumption volatility).[2] We retrieve data on consumption growth from the OECD (Quarterly National Accounts). The volatility of consumption growth for each country is then computed using a rolling window of 40 quarters (i.e. 10 years). The aggregate consumption volatility for each country group is instead defined as the average volatility across countries belonging to the same group.

Consumption volatility dynamics for the G7, G20 and EU are plotted in Fig. 1. One can observe a declining path in the G7 and in the EU, but only until the mid-2000s. Differently, consumption volatility in the G20 follows a declining path only over the Great Moderation era and starts to be more volatile from the late '90s. However, on average, one can observe that the pre-2000s period has been characterized by a relatively high consumption volatility (see Table 1). A partial explanation of the observed heterogeneity in the degree of risk-sharing across regions is provided by Guiso et al. (2016) who show that whenever two countries join in a union the integration process may fail due to cultural crashes. The idea is that cultural differences can affect welfare gains from financial integration but also from other channels of risk sharing such as the insurance and the public saving channel. According to De Vijlder (2018) and Cimadomo et al. (2018), these additional channels might play a key role in driving the consumption smoothing motive, especially in the presence of economic and monetary unions.

Table 1: Average Consumption Volatility Levels

Panel A: 1970:Q1 - 2000:Q1			
	G7	G20	EU
$\sigma(\Delta c)$	0.974	1.090	1.199
Panel B: 2000:Q2 - 2018:Q4			
	G7	G20	EU
$\sigma(\Delta c)$	0.598	1.057	0.990
Panel C: 2005:Q1 - 2018:Q4			
	G7	G20	EU
$\sigma(\Delta c)$	0.585	1.002	1.021

Notes: This table reports the average consumption growth volatility for the following sub-periods: pre-2000:Q1 (Panel A); post-2000:Q1 (Panel B) and post-2005:Q1(Panel C). Consumption volatility is computed using a rolling window of 40 periods.

[2]International business cycle studies provide evidence that improved risk-sharing is also associated with a relatively high real exchange-rate volatility and a relatively low Backus-Smith correlation (i.e. the correlation between real consumption growth differentials and the real exchange rate). However, as indicated by Prasad et al. (2003), consumption volatility represents a better proxy of macroeconomic instability. In this respect, they argue that large consumption variations tend to have negative impacts on economic welfare.

Financial integration. We follow the most recent international finance literature and measure financial integration in each country group (or country) by means of standard price-based indicators (Pukthuanthong and Roll, 2009; Volosovych, 2011; Billio et al., 2017; Akbari et al., 2019). Equity market returns are computed from share price indexes retrieved from the OECD - Monthly Financial Indicators.

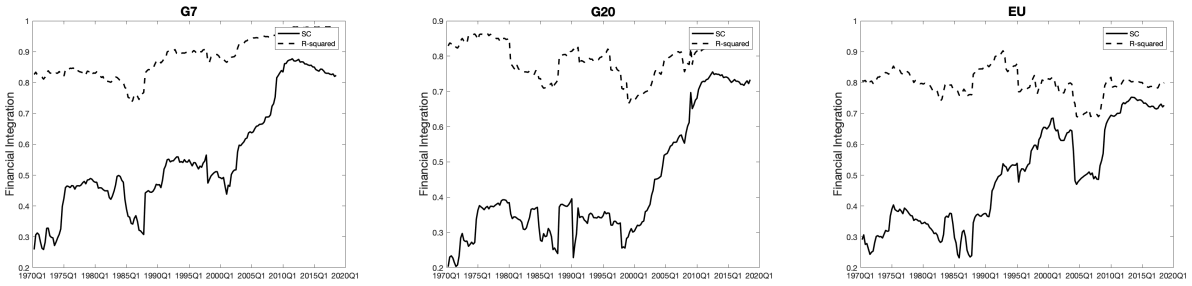
Our benchmark indicator of financial integration is represented by the dynamic standard correlation. For the pooled analysis it is computed as the average of all pairwise price return correlations (henceforth $\bar{\rho}$). Bilateral correlations are estimated using a rolling window of 40 quarters. For the panel analysis, one needs a country-level indicator of financial integration. In this case, the dynamic correlation for each country i is defined as the correlation between the country i's return ($R^j_{i,t}$) and the related country-group average return ($\bar{R}^j_t$). For the sake of completeness, we then follow Pukthuanthong and Roll (2009) and build a more robust indicator of equity market integration, i.e. the cross-country average adjusted R-squared. More precisely, the $\bar{R}^2$ is computed following the procedure described in Billio et al. (2017). For each country group, we extract the principal components (PCs) from equity market returns and then select a number of PCs such that the explained variability is around 90%.[3] We regress share price returns ($R_{i,t}$) on the selected PCs using a rolling window of 40 quarters and extract (for each window and each country) the adjusted R-squared. For the pooled analysis, financial integration in each country group is captured by the cross-country average adjusted R-squared (henceforth $\bar{R}^2$). As aforementioned, for the panel analysis a country-level measure of financial integration is needed. We therefore use the adjusted R-squared estimated from each single country regression.[4]

Fig. 2 depicts the dynamics of the two price-based indicators (i.e., $\bar{\rho}$ and $\bar{R}^2$) for the three different groups. As pointed out in Billio et al. (2017), due to the use of a number of principal components capturing around 90% of variations in cross-country equity returns, the $\bar{R}^2$ is

[3]Note that the PCs have been extracted (in each country group) using a homogeneous dataset of share price returns. In practice we have used only those countries for which share price indexes are available from 1960:Q1. This implies the use of seven countries for the G7, ten for the G20 and nine for the EU.

[4]Among all the measures developed and analyzed in Billio et al. (2017), we decided to rely only on the $\bar{R}^2$ and $\bar{\rho}$ and not on the percentage of variance explained by the first principal component (i.e $1stPC$) proposed by Volosovych (2011) for two main reasons: (i) differently from the $1stPC$, the $\bar{R}^2$ and the $\bar{\rho}$ allow also for a country-level measure of integration that it is used in our panel regression analysis and (ii) the $1stPC$ and $\bar{R}^2$ provides very similar financial integration patterns (Billio et al., 2017).

Figure 2: Financial Integration



Notes: The figure depicts the dynamics of the financial integration process in the G7 (left panel), G20 (middle panel) and EU (right panel). Equity market integration is captured by the (i) cross-country average standard correlation ($\bar{\rho}$) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$). Data run from 1970:Q1 to 2018:Q4.

always higher than the $\bar{\rho}$. However, over the long-run they provide qualitatively similar information. Average financial integration levels for three different periods are reported in Table 2. In line with existing international finance evidence (see, among others, Volosovych, 2011; Donadelli and Paradiso, 2014b; Billio et al., 2017; Zaremba et al., 2019), the degree of financial integration in the post-2000 period is found to be higher than in the pre-2000 period. An exception is the EU, where the degree of financial integration – measured by the $\bar{R}^2$ – has slowed down over the last decade due to political and financial instability, as well as to a high degree of heterogeneity among EU members (see also Guiso et al., 2016).

Table 2: Financial Integration Levels (Avg)

Panel A: 1970:Q1 - 2000:Q1			
	G7	G20	EU
$\bar{\rho}$	0.446	0.324	0.397
$\bar{R}^2$	0.842	0.791	0.813
Panel B: 2000:Q2 - 2018:Q4			
	G7	G20	EU
$\bar{\rho}$	0.735	0.607	0.647
$\bar{R}^2$	0.952	0.801	0.770
Panel C: 2005:Q1 - 2018:Q4			
	G7	G20	EU
$\bar{\rho}$	0.800	0.678	0.647
$\bar{R}^2$	0.969	0.828	0.769

Notes: This table reports the average level of financial integration in the pre-2000:Q1 (Panel A), post-2000:Q1 (Panel B) and post-2005:Q1 (Panel C) periods in the G7, G20 and EU. Equity market integration is captured by the (i) cross-country average standard correlation ($\bar{\rho}$) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$). Data run from 1970:Q1 to 2018:Q4.

Additional variables. In the spirit of existing empirical studies, we employ quantity-based measures of trade and financial (*de facto*) openness and an aggregate price level

indicator as control variables. In particular, trade openness (TO) is proxied by the ratio between the sum of imports and exports and GDP. Both trade and output data are collected from the OECD (Quarterly National Account). Financial openness (FO) is instead defined by the FDI-to-GDP ratio. Annual FDI net inflows data are from the World Bank. Linear interpolations are used to retrieve a FDI-to-GDP ratio at quarterly frequency. As additional control variable, we use inflation. This is captured by the Consumer Price Index (CPI) from the OECD. Aggregate country group series are obtained as cross-country averages.

All the employed data are at quarterly frequency, expressed as first difference and span the period 1970:Q2-2018:Q4.

3.2 Time-series regressions

In what follows, we provide a more formal regression analysis to understand the drivers of risk-sharing in a standard time series framework. In particular, the role of equity market integration in driving the time series pattern of consumption smoothing in each different country group is examined. To do so, we regress aggregate consumption volatility on financial integration and controls (i.e. trade openness, financial openness and inflation). Formally,

$$\sigma(\Delta c)_t^j = constant + \gamma FI_t^j + \beta_{TO} TO_t^j + \beta_{FO} FO_t^j + \beta_{CPI} CPI_t^j + \epsilon_t^j \tag{1}$$

where FI captures the degree of financial integration and $j = \{\text{G7, G20, EU}\}$. As aforementioned, we use two different price-based measures of financial integration: (i) the $\bar{\rho}$ and (ii) the $\bar{R}^2$. Estimation results are reported in Table 3.

Entries in Panel A – where $\bar{\rho}$ is used as indicator of financial integration – suggest that (on average) consumption smoothing worsen (i.e. consumption growth volatility increases) as financial integration rises. However, the observed positive relationship between financial integration and consumption volatility is found to be statistically significant only for the G7. Broadly, these evidence are at odd with IBC theories. Note that the observed positive link is robust to controlling for trade and financial openness (Table 3, specifications (2) and (3)). Changes in general price levels also do not alter the impact of financial integration on consumption smoothing (Table 3, specification (4)).

Let us remarks that theories indicate that quantity-based measures of integration (i.e. TO and FO) should also be associated with a drop in aggregate consumption volatility. However, results for all the three groups of countries indicate that goods and financial markets openness and consumption smoothing are not closely related empirical phenomena.[5]

Table 3: Consumption Smoothing vs. Financial Integration (Time Series Regressions)

Panel A: $\bar{\rho}$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.188***	0.168**	0.164**	0.165***	0.001	0.002	-0.014	-0.016	0.025	0.001	-0.004	0.008
	(0.068)	(0.069)	(0.065)	(0.064)	(0.100)	(0.106)	(0.106)	(0.105)	(0.091)	(0.086)	(0.087)	(0.092)
TO		-0.347	-0.375	-0.406		0.040	0.311	0.334		-0.158	-0.167	-0.177
		(0.247)	(0.246)	(0.263)		(0.323)	(0.603)	(0.654)		(0.258)	(0.250)	(0.250)
FO			0.413	0.506			-3.633	-3.746			0.014	0.011
			(0.501)	(0.551)			(5.387)	(5.723)			(0.179)	(0.184)
CPI				0.006				-0.004				0.003
				(0.006)				(0.009)				(0.002)
Constant	-0.003**	-0.002	-0.002	-0.004	-0.000	-0.000	-0.000	0.002	-0.003**	-0.002	-0.002	-0.004*
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.001)	(0.002)	(0.002)	(0.002)
Adj-R2	0.039	0.044	0.038	0.044	-0.003	0.029	0.032	0.027	-0.005	-0.004	-0.010	-0.009
Obs.	194	194	187	187	194	194	187	187	194	194	187	187
Panel B: $\bar{R}^2$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.111	0.079	0.074	0.091	-0.051	-0.051	-0.095	-0.102	0.074	0.053	0.049	0.060
	(0.162)	(0.171)	(0.161)	(0.168)	(0.133)	(0.146)	(0.122)	(0.121)	(0.140)	(0.139)	(0.143)	(0.141)
TO		-0.475*	-0.498*	-0.528*		0.040	0.325	0.352		-0.147	-0.154	-0.168
		(0.283)	(0.268)	(0.297)		(0.295)	(0.610)	(0.640)		(0.245)	(0.248)	(0.258)
FO			0.397	0.490			-3.714	-3.837			0.013	0.010
			(0.535)	(0.579)			(5.443)	(5.655)			(0.182)	(0.179)
CPI				0.006				-0.005				0.003
				(0.006)				(0.008)				(0.002)
Constant	-0.002*	-0.001	-0.001	-0.004	-0.000	-0.000	-0.000	0.002	-0.003**	-0.002	-0.002	-0.004*
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)	(0.002)	(0.002)	(0.002)	(0.002)
Adj-R2	-0.002	0.011	0.006	0.012	-0.004	0.029	0.032	0.026	-0.003	-0.003	-0.009	-0.008
Obs.	194	194	187	187	194	194	187	187	194	194	187	187

Notes: This table reports results for time series regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth volatility is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B).
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Similar results are obtained when the $\bar{R}^2$ is used to capture the financial integration process (Table 3, Panel B). Actually, only a couple of key differences arise. First, there is no longer a significant evidence of a positive relationship between financial integration and consumption volatility in the G7. Second, the link between trade openness and consumption volatility in the G7 is now negative and statistically significant, consistent with IBC theories.
Overall, our time series analysis does not provide a clear interpretation of the link between

[5]Our empirical findings are not distant from Kose et al. (2003) who observe trade openness to be positively associated with consumption and output volatility.

financial integration and consumption volatility. In the best case, a significant but counterfactual positive relationship between consumption volatility and financial integration is observed. In the worst case, the link is still positive but not significant. In this respect, we corroborate existing empirical studies suggesting that there is little evidence that financial integration significantly contributed to stabilize consumption growth variations across economies (Kose et al., 2003; Neaime, 2005).

3.3 Panel regressions

For the sake of robustness and to gain more insights on the effects of financial integration on international risk sharing, we estimate the standard regression model (1) in a panel framework. This allows us to exploit both the time-series and cross-sectional information available in the data. We therefore estimate the following panel regression accounting for country fixed effects (within each country group):

$$\sigma(\Delta c)^j_{i,t} = constant + \gamma FI^j_{i,t} + \beta_{TO} TO^j_{i,t} + \beta_{FO} FO^j_{i,t} + \beta_{CPI} CPI^j_{i,t} + \epsilon^j_{i,t} \tag{2}$$

where $j = \{\text{G7, G20, EU}\}$ and i denotes the i-th country belonging to group j. Table 4 reports estimation results from fixed effects panel regressions of consumption volatility on the two financial integration measures and controls.[6]

Entries in Table 4 are broadly consistent with our earlier time series regression results (see Table 3). Overall, there is no evidence of a significant relationship between financial integration and consumption smoothing. This holds across different country groups and financial integration indicators. Moreover, in line with existing empirical findings our panel estimates suggest that quantity-based measures of financial integration (i.e. TO and FO) and consumption volatility are not empirically related phenomena. Notably, the estimated coefficients associated with either price-based or quantity-based measures of financial integration are (in most of the cases) positive and not statistically significant. This indicates that cross-country consumption volatility rises as integration across international financial mar-

[6]Note that our main panel regression results are robust to (*i*) clustering standard errors by country (in each group); (*ii*) including year dummies and (*iii*) using random effects.

kets increases and economies become more open. Therefore, entries in Table 4 suggest that international price convergence and risk sharing opportunities are not empirically related phenomena and price-based indicators of financial integration fail to capture risk-sharing opportunities. This could be explained by the fact that these measures are based on realized prices and not on future expected prices, which would instead reflect the correlation of country-specific risk premia across the world (see Akbari et al., 2019).

Table 4: Consumption Smoothing vs. Financial Integration (Panel Regressions)

Panel A: ρ	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.055	0.053	0.053	0.056	-0.022	-0.02	-0.019	-0.019	0.079	0.08	0.08	0.08
	(0.048)	(0.049)	(0.048)	(0.045)	(0.015)	(0.015)	(0.015)	(0.014)	(0.091)	(0.083)	(0.083)	(0.086)
TO		-0.054	-0.052	-0.045		0.265	0.276	0.282		0.037	0.037	0.036
		(0.058)	(0.059)	(0.061)		(0.256)	(0.248)	(0.255)		(0.032)	(0.032)	(0.031)
FO			-0.053	-0.035			-1.108	-1.085			0.004	0.003
			(0.154)	(0.156)			(1.021)	(0.997)			(0.099)	(0.093)
CPI				0.004***				0.004				0.002
				(0.001)				(0.004)				(0.002)
Constant	-0.002***	-0.002***	-0.002***	-0.004***	0.001	0	0	-0.002	-0.001	-0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)
Adj-R2	-0.004	-0.005	-0.006	-0.004	-0.007	-0.007	-0.005	-0.005	-0.004	-0.004	-0.004	-0.004
Obs.	1358	1358	1358	1358	2215	2215	1903	1880	4268	4268	4268	4268
Panel B: R^2	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.054	0.054	0.054	0.058	-0.038	-0.037	-0.041	-0.044	0.111	0.112	0.112	0.112
	(0.042)	(0.039)	(0.04)	(0.044)	(0.096)	(0.09)	(0.086)	(0.087)	(0.103)	(0.104)	(0.103)	(0.106)
TO		-0.063	-0.061	-0.053		0.267	0.277	0.284		0.038	0.038	0.037
		(0.064)	(0.066)	(0.064)		(0.263)	(0.255)	(0.253)		(0.033)	(0.033)	(0.032)
FO			-0.053	-0.035			-1.113	-1.09			0.003	0.003
			(0.148)	(0.159)			(1.007)	(0.995)			(0.094)	(0.103)
CPI				0.004***				0.004				0.002
				(0.001)				(0.004)				(0.002)
Constant	-0.002***	-0.002***	-0.002***	-0.004***	0.001	0	0	-0.002	-0.001	-0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Adj-R2	-0.005	-0.005	-0.006	-0.005	-0.007	-0.008	-0.006	-0.006	-0.004	-0.004	-0.004	-0.004
Obs.	1358	1358	1358	1358	2200	2200	1889	1866	4268	4268	4268	4268

Notes: This table reports results for panel regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Country-fixed effects included. Consumption growth volatility (for each country) is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B).
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Sample: 1970:Q3-2018:Q4. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

3.4 Robustness checks

In this section we run a battery of tests to check whether there are statistically significant differences in the consumption smoothing-financial integration nexus when (i) controlling for the Subprime crisis and the Eurozone accession, (ii) using a different rolling window size to

construct the price-based measures of financial integration as well as consumption volatility, (*iii*) modelling consumption volatility by means of GARCH estimations, (*iv*) using (a) the ratio between consumption volatility and output volatility and (b) the volatility of the FX as an alternative measure of risk sharing, (*v*) running quantile regressions to capture potential asymmetries and non-linearities, (*vi*) employing the Diebold and Yilmaz (2012) spillover index as an alternative indicator of financial integration.

Robustness tests are performed both in a time series (Section 3.4.1) and panel (Section 3.4.2) regressions framework.[7]

3.4.1 Time-series

Subprime Crisis. In this first robustness check, we examine whether our main results survive once the 2007-2009 Subprime crisis is accounted for. To do so, we include in our regressions a dummy capturing the 2007:Q3-2009:Q2 period. Estimates from this alternative test are reported in Table A.1. The embedded dummy results to be significant in all groups. This has a positive (negative) sign in the G7 and EU (G20). Apparently, only the G20 benefited from the crisis in terms of a reduction in consumption volatility.[8] Estimated coefficients attached to financial integration and trade and financial openness do not exhibit significant differences.

Euro Accession. We test for the effect of the introduction of the Euro as a common currency on consumption smoothing in the EU group only. To do so, we include a dummy variable taking a value of one from 1999:Q1 onwards. Results are reported in Table A.2 and suggest that the Euro Dummy is not welfare-improving (i.e. consumption volatility rose as countries joined the EU). More importantly, the main results on the relationship between financial integration and consumption volatility are preserved.

[7]Note also that the main results presented in Sections 3.2 and 3.3 hold even if a sample of emerging economies is used. Precisely, data spanning the period 2000:Q3-2018:Q4 for the following countries: Brazil, India, Indonesia, Russia, South Africa, Chile, Czech Republic, Greece, Hungary, Israel, Korea, Mexico, Poland, Turkey. For brevity's sake results are not reported but available upon request.

[8]As indicated by Guiso et al. (2016) such heterogeneity can be driven by several factors including RBC's characteristics and cultural differences.

Different RW. This check involves whether employing a different window size to build the aggregate consumption volatility and the two price-based measures of financial integration affects our main empirical findings. In practice, we re-compute the consumption volatility, the $\bar{\rho}$ and the $\bar{R}^2$ using a rolling window of 32 quarters. Estimation results from this alternative specification are illustrated in Table A.3. Entries in Table A.3 indicate that the estimated effects of financial integration on consumption smoothing are quite robust to the choice of the widow size employed to build our measures of integration and macroeconomic stability. Differently, we observe dissimilarities in the effects of trade openness on consumption volatility. In fact, trade openness has a negative and significant effect on consumption volatility (i.e. as international trade rises consumption volatility drops). Results hold across different country groups and financial integration measures.

GARCH What if a different approach is used to compute consumption volatility? Computing consumption growth volatility in a rolling-window fashion has the major drawback of losing some important information. We decide to re-compute consumption volatility using a GARCH(4,4) model and employ it as dependent variable. Very similar effects of rising financial integration on risk sharing are found. Precisely, we do not find evidence of a statistically significant link between the two priced-based measures of financial integration and consumption volatility (see Table A.4).

Real Exchange Rate Volatility. According to IBC studies, increasing financial integration (i.e. *a higher level of international risk-sharing opportunities*) should be also associated with rising real exchange rate (RER) volatility. Intuitively, the higher chances to buy and sell securities across international capital markets should add pressure on exchange rates making them more volatile (see, among others, Bodenstein, 2008; Colacito and Croce, 2013; Donadelli and Paradiso, 2014a; Caporale et al., 2015; Tretvoll, 2018). We compute the RER volatility by relying on the Real Trade Weighted U.S. Dollar Index from FRED Economic data. As for consumption growth volatility, the RER volatility is computed using a rolling window of 40 quarters.[9] We next investigate whether financial integration and RER volatil-

[9]Note that by using this index we implicitly assume that the main commercial partner of each country are the United States. However, this sounds like a mild assumption given the currency weights reported in

ity are empirically related phenomena. For all country groups, we observe a positive link between the RER volatility and financial integration. Thus, as predicted by the theory, RER volatility rises as international financial markets become more integrated. However, this positive relationship is statistically significant only for the G20 (Table A.5).

Consumption-to-Output Volatility Ratio. We next investigate whether results are robust to using an alternative measure of consumption smoothing. Actually, we follow Kose et al. (2003) and use the ratio between consumption growth volatility and output growth volatility. Results from this alternative test are reported in Table A.6 and indicate that consumption smoothing improves (i.e. consumption volatility decreases) as financial integration rises. However, the coefficient γ is negative and statistically significant only for the EU.

Quantile Regression. Evans and Hnatkovska (2007) argues that consumption volatility should initially increase when countries move from a financial autarky regime to a low integrated status and should start decreasing once the financial integration process is close to be completed. In this respect, one could observe asymmetry and non-linearity in the relationship between financial integration and consumption volatility. In this robustness test we attempt to account for these additional empirical features by estimating Eq. (1) using quantile regressions. We therefore examine the effect of financial integration on consumption volatility when the latter is low (20th percentile) and when it is high (80th percentile). For the sake of completeness, we report the estimation results using also the 50th percentile. Time series quantile regression estimates are reported in Table A.7. Importantly, our main results remain unaltered. There is only a mild evidence of a negative relationship between financial integration and consumption volatility for the G20 when the 50th and 80th percentiles are considered.[10]

Mico (2005).

[10]Additionally, we test for a (quadratic) non-linear relationship between financial integration and consumption volatility. We find no evidence of a non-linear link. For brevity's sake results are not reported but available upon request.

Financial Interconnectedness (Spillover Index). So far, our analysis has employed the cross-country average R-squared and the standard correlation as benchmark indicators of financial integration. Our choice was motivated by the work of Billio et al. (2017) who observe no significant differences in the dynamics of the financial integration process shaped by different standard or more robust indicators. A measure that has not been considered in Billio et al. (2017) and that might capture a different dimension of integration is the Diebold and Yilmaz (2009) spillover index.[11] We therefore conclude our battery of robustness tests by constructing (for each country group) the dynamics of the degree of financial interconnectedness.[12] Results are reported in Table A.8 and confirm that there is no statistically significant empirical link between consumption volatility and financial integration/interconnectedness.

3.4.2 Panel

In this section we replicate most of the previously implemented robustness tests in a panel regression framework.

Subprime Crisis. In Table A.9 we report the estimates from the panel regression model defined in Eq. (2) where the 2007-2009 crisis is accounted for. In line with the time series regression results reported in Table A.1, we find evidence for the G7 and the EU that the crisis induced a higher consumption volatility. This reflects the idea that financial integration comes also with bad news due to rising international financial and macro contagion risk, especially during crisis times. We confirm then the absence of a statistical significant relationship between financial integration and consumption smoothing.

Euro Accession. In a panel framework, our Euro Dummy takes value one from the year a country joined the common currency onwards and zero otherwise. Note that the Euro Dummy in our panel allows to better represent the European integration process in the

[11] Note that, as opposed to the standard correlation and R-squared, the Diebold and Yilmaz (2012) spillover index is based on ex-ante information.

[12] Specifically, we construct this alternative measure of financial integration over a rolling window of 40 quarters using one lag in the VAR estimation and a four quarters variance decomposition horizon. Note that a possible extension could be to employ the generalised forecast error variance decomposition from a time-varying parameter VAR that does not require to arbitrarily set the rolling window-size, as suggested by Antonakakis et al. (2018).

sample. In fact, this leads to different results. Differently from time series estimates in Table A.2, the Euro dummy is negative (Table A.2 vs. Table A.10). However, it is not statistically significant. Still, there is no evidence that financial integration has improved consumption smoothing over the last decades.

Different RW. Table A.11 presents panel regression results where the consumption volatility and the two integration price-based measures of integration are estimated using a rolling window of 32 quarters. Results are not qualitatively different from the benchmark ones reported in Table 4. Actually, we observe one relevant difference in the G20, in particular when the R^2 is employed. In this case, the relationship between financial integration and consumption volatility is positive (and statistically significant), whereas in the benchmark panel regression was negative (but not significant). More importantly, we still find that consumption volatility rises as international financial markets become more integrated in the G7 and EU groups.

GARCH. In line with what has been done in the time series analysis for the three country groups, we compute country specific consumption volatility using a GARCH(4,4) model. The newly obtained panel regression results – reported in Table A.12 – do not exhibit significant differences if compared to the benchmark results, where consumption volatility (for each country in the panel) is computed using a rolling window of 40 quarters. Only one difference is noteworthy. More precisely, for the EU there is now significant evidence that rising financial integration improves macroeconomic stability. This only when the standard correlation is employed as financial integration measure (Table A.12, Panel A).

Consumption-to-Output Volatility Ratio. In this test we use the ratio between consumption volatility and output volatility as an alternative measure of consumption smoothing. Differently from the benchmark panel estimates reported in Table 4, we observe a negative effect on consumption-to-output volatility following rising integration in the G20 and EU. This is in line with our pooled-based results reported in Table A.6. However, estimated coefficients are not statistically significant. Taken together, entries in Table A.13 indicate

that there is no statistically significant link between financial integration and consumption smoothing.

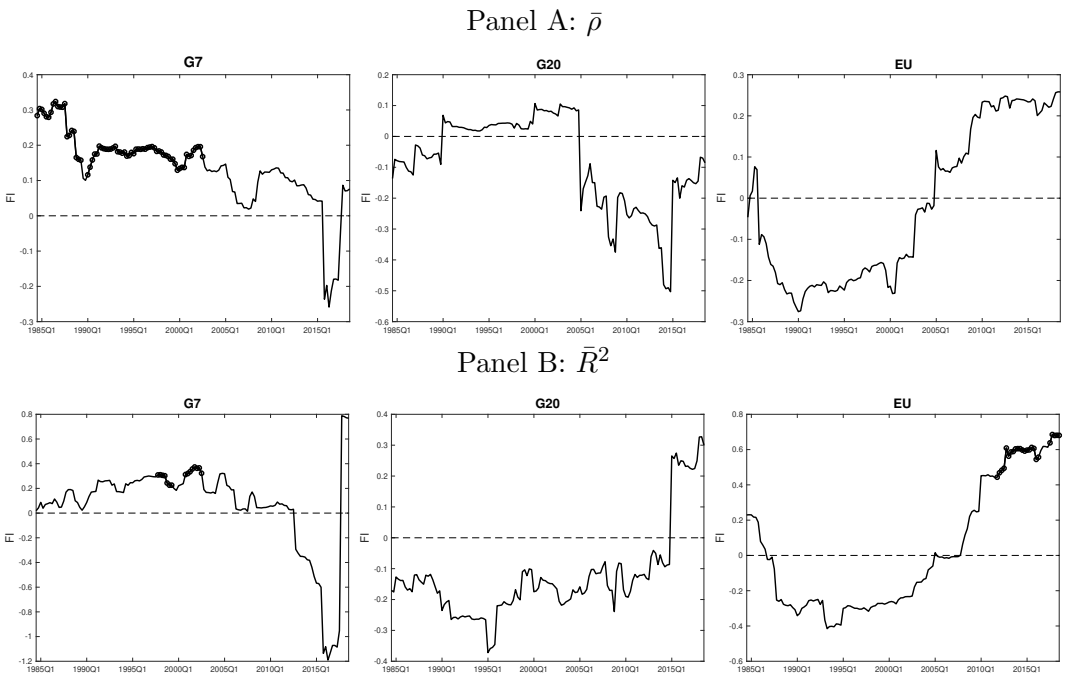
Quantile Regression. As we have done for our time series analysis, we account for asymmetry and non-linearity by re-estimating Eq. (2) using a panel quantile regression. Regression results for the three different percentiles are reported in Table A.14. Notably, we find no significant evidence of asymmetry and non-linearity in the relationship between financial integration and consumption volatility.

Financial Interconnectedness (Spillover Index). Based on the Diebold and Yilmaz (2009) spillover index, we construct a country-level measure of financial interconnectedness for our panel analysis. To this end, we employ the directional interconnectedness spillovers. In practice, we use the contribution of country i to all other countries j (i.e. spillover index). We observe a positive relationship between consumption volatility and financial interconnectedness (Table A.15). Once again, there seems to be no evidence of improved consumption smoothing following a rise in the degree of financial interconnectedness.

3.5 A time-varying analysis

It has been shown that financial integration has a strong time-varying component (see, among others, Pukthuanthong and Roll, 2009; Volosovych, 2011; Donadelli, 2013; Donadelli and Paradiso, 2014b; Billio et al., 2017). It is thus likely that the impact of changes in the degree of financial integration on international risk sharing is also time-varying. We account for this by estimating the dynamic impact of rising integration on consumption volatility. By doing so, we also test whether our main results are robust over time. In practice, we estimate the coefficient γ both in a time series and panel regression framework using a rolling-window of 60 periods. The dynamics of the relationship between financial integration and consumption volatility estimated from time series (Eq. 1) and panel (Eq. 2) regressions are plotted in Fig. 3 and Fig. 4, respectively. Broadly, we confirm the main empirical findings from our previous static time series and panel regression analyses, i.e. there is weak evidence that financial integration has improved consumption smoothing over the last

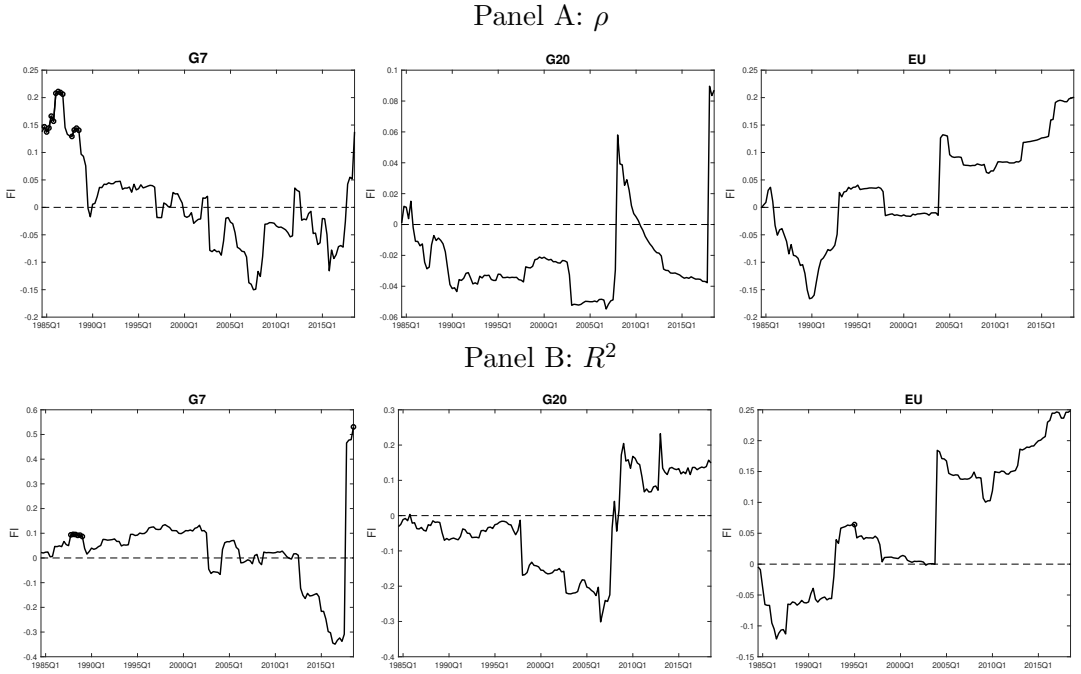
Figure 3: Consumption Smoothing vs. Financial Integration: Dynamic Time Series Regression



Notes: This figure depicts the evolution of the impact of changes in financial integration on consumption growth volatility (i.e. γ) for the G7, G20 and EU. Coefficients (i.e. γs) are estimated from Eq. (1) using a rolling-window of 60 periods. Black lines denote the point estimates. Dots indicate statistically significant (at 5% level) point estimates. Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) the cross-country average adjusted R-squared ($\bar{R}^2$, Panel B).

decades. As indicated by the presence of dots in Figs. 3 and 4, the estimated coefficient γ is rarely significant and, if found to be significant, it comes with a counterfactual positive sign. In line with what the theory predicts, a negative sign is observed only over the mid-90s, in particular in the G20 and EU groups. However, it is not statistically significant. Noteworthy, the positive relationship between financial integration and consumption volatility seem to strengthen in the post-2005 era. In other words, the welfare costs of financial integration have increased over the last 15 years. We argue that this result has been mainly driven by the intensification of macroeconomic and financial contagion risk that has substantially undermined international risk sharing benefits. Taken together, our results suggest that there should be additional channels – rather than convergence in international stock market returns – driving international risk-sharing. To some extent our analysis is in line with Billio et al. (2017) who argue that (on average) all price-based measures of integration tend to primarily capture co-movement across international equity market returns.

Figure 4: Consumption Smoothing vs. Financial Integration: Dynamic Panel Regression



Notes: This figure depicts the dynamics of financial integration effects on consumption growth volatility for the G7, G20, EU Coefficients are estimated from Eq. (2) using a rolling-window of 60 periods. Black lines denote the point estimates. Dots indicate statistically significant (at 5% level) point estimates. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B).

4 Concluding remarks

Standard IBC models indicate that in the presence of highly integrated financial markets consumption smoothing improves. In this respect, financial integration is supposed to be welfare-improving by reducing macroeconomic volatility. Measuring financial integration properly is thus key. For this reason, over the last two decades several indicators of financial integration have been proposed (some more robust than others). In this paper, we first build two widely used and recently tested priced-based financial integration measures. We then empirically examine the implications of rising financial integration on consumption smoothing in the three different country groups (i.e. G7, G20 and EU), using both time series and panel regression analyses. We therefore simply question whether financial integration and risk-sharing (i.e. consumption smoothing) are empirically related phenomena. Put it differently, are these measures really capturing consumption smoothing dynamics? In line with other empirical studies, we find that there is no a statistically significant relationship

between financial integration and consumption volatility. *Reduction ad absurdum*, financial integration is found to have a counterfactual positive effect on consumption volatility, inconsistent with international macroeconomic theories. Our results hold across different country groups and are confirmed by a battery of robustness checks.

Although financial integration has grown significantly in the last decades, its effect on consumption smoothing is ambiguous and even more puzzling in the post-2000 era. Rising financial integration, on the one hand, is associated with stronger financial and macroeconomic contagion risk (Elliott et al., 2014). International price convergence leads to a reduction in diversification benefits. This undermines risk sharing benefits in terms of consumption smoothing, as contingent goods fail to provide hedge against idiosyncratic risks. Therefore, shocks are more likely to affect other countries by strengthening contagion risk. It turns out that financial integration does not necessarily lead to greater macroeconomic stability. One should then ask whether benefits of financial integration in terms of risk sharing opportunities actually exceed possible drawbacks from a higher contagion risk. On the other hand, financial integration – measured by means of price-based indicators – is likely to be contaminated by (*i*) volatility biases and (*ii*) economic integration (i.e. international business cycle synchronization). As indicated by Akbari et al. (2019), here we have two distinct empirical evidence: a stronger synchronization of international business cycles (i.e. *economic integration*) and an increasing degree of risk-sharing (i.e. *financial integration*). While the former leads to highly correlated companies' cash flows, the latter should improve consumption smoothing.

There are several directions under which this work can be fruitfully extended. First, in this paper we focus predominantly on one proxy of international risk-sharing, i.e. cross-country consumption smoothing. However, IBC studies show that full risk sharing (i.e. highly integrated financial markets) is also associated with (*i*) a relatively high RER volatility, (*ii*) a relatively low Backus-Smith correlation, and (*iii*) a relatively low cross-country consumption growth correlation. All these additional international macro-finance facts should be taken into account in future research. Second, in our analysis we rely exclusively on the equity market to build price- and quantity-based measures of financial integration. Of course, other measures of financial openness/integration can be built by relying on different markets (e.g.

bond, credit or housing markets). This will allow to evaluate the effects of alternative risk-sharing channels on macroeconomic stability. As suggested by Akbari et al. (2019), financial integration and economic integration are different phenomena. Further analysis should take into account this evidence and check whether a proper measure of economic integration would better capture international risk-sharing dynamics. All these additional tests are left for future research.

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A Additional Empirical Tests

A.1 Time series

Crisis

Table A.1: Consumption Smoothing vs. Financial Integration (Time Series Regressions)

Panel A: $\bar{\rho}$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.168***	0.160**	0.155**	0.156**	-0.070	-0.071	-0.150	-0.151	-0.026	-0.031	-0.036	-0.026
	(0.063)	(0.064)	(0.064)	(0.063)	(0.122)	(0.127)	(0.108)	(0.113)	(0.077)	(0.080)	(0.080)	(0.083)
Crisis Dummy	0.012**	0.011**	0.013**	0.014**	-0.021*	-0.023**	-0.037*	-0.037*	0.024**	0.023**	0.023**	0.023*
	(0.005)	(0.005)	(0.006)	(0.006)	(0.011)	(0.011)	(0.021)	(0.020)	(0.010)	(0.012)	(0.011)	(0.012)
TO		-0.193	-0.218	-0.242		-0.189	0.075	0.085		-0.045	-0.054	-0.065
		(0.247)	(0.235)	(0.238)		(0.347)	(0.541)	(0.554)		(0.245)	(0.253)	(0.245)
FO			0.740	0.867			-5.390	-5.405			0.062	0.059
			(0.503)	(0.534)			(6.196)	(6.157)			(0.181)	(0.192)
CPI				0.007				-0.001				0.002
				(0.005)				(0.007)				(0.002)
Constant	-0.003**	-0.003*	-0.003*	-0.005**	0.000	0.001	0.002	0.003	-0.004***	-0.004***	-0.004**	-0.005**
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.002)	(0.001)	(0.001)	(0.002)
Adj-R2	0.055	0.052	0.051	0.060	0.003	-0.002	0.032	0.027	0.037	0.032	0.027	0.025
Obs.	194	194	187	187	194	194	187	187	194	194	187	187
Panel B: $\bar{R}^2$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.099	0.082	0.077	0.097	0.012	0.008	-0.011	-0.012	0.001	-0.002	-0.006	0.003
	(0.170)	(0.153)	(0.167)	(0.158)	(0.092)	(0.102)	(0.114)	(0.113)	(0.123)	(0.127)	(0.127)	(0.134)
Crisis Dummy	0.015***	0.012**	0.014**	0.015**	-0.021*	-0.022*	-0.036*	-0.036*	0.023**	0.023**	0.023**	0.022*
	(0.005)	(0.005)	(0.006)	(0.007)	(0.011)	(0.012)	(0.021)	(0.019)	(0.009)	(0.011)	(0.011)	(0.012)
TO		-0.294	-0.318	-0.338		-0.183	0.065	0.072		-0.031	-0.039	-0.053
		(0.244)	(0.243)	(0.268)		(0.339)	(0.556)	(0.577)		(0.247)	(0.242)	(0.237)
FO			0.756	0.886			-5.196	-5.207			0.061	0.057
			(0.533)	(0.567)			(6.191)	(6.176)			(0.186)	(0.186)
CPI				0.007				-0.001				0.003
				(0.005)				(0.007)				(0.002)
Constant	-0.003**	-0.002	-0.002	-0.005*	0.000	0.001	0.002	0.002	-0.004***	-0.004***	-0.004**	-0.005**
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.002)	(0.001)	(0.002)	(0.002)
Adj-R2	0.022	0.023	0.023	0.032	0.003	-0.001	0.035	0.030	0.036	0.032	0.026	0.024
Obs.	194	194	187	187	194	194	187	187	194	194	187	187

Notes: This table reports results for time series regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU. Consumption growth volatility (for each country) is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B). Crisis Dummy takes value 1 in the period 2007:Q3-2009:Q2, 0 otherwise.
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Euro

Table A.2: Consumption Smoothing vs. Financial Integration (Time Series Regressions)

Panel A: $\bar{\rho}$					Panel B: $\bar{R}^2$			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.032	-0.000	-0.006	0.006	0.072	0.041	0.037	0.049
	(0.090)	(0.084)	(0.083)	(0.087)	(0.138)	(0.144)	(0.135)	(0.144)
Euro Dummy	0.007**	0.008**	0.009**	0.009**	0.007**	0.007**	0.009**	0.009**
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
TO		-0.221	-0.242	-0.253		-0.211	-0.230	-0.245
		(0.240)	(0.239)	(0.236)		(0.242)	(0.223)	(0.238)
FO			0.027	0.025			0.026	0.023
			(0.176)	(0.177)			(0.179)	(0.177)
CPI				0.003				0.004
				(0.003)				(0.003)
Constant	-0.006***	-0.005***	-0.005***	-0.007***	-0.006***	-0.005***	-0.005***	-0.007***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Adj-R2	0.014	0.019	0.021	0.023	0.015	0.020	0.021	0.024
Obs.	194	194	187	187	194	194	187	187

Notes: This table reports results for time series regressions of consumption growth volatility on financial integration indexes for the **EU** group. Consumption growth volatility is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B). Euro Dummy takes value one for observations from 1999:Q1, zero otherwise.
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Different RW

Table A.3: Consumption Smoothing vs. Financial Integration (Time Series Regressions)

Panel A: $\bar{\rho}$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.133**	0.110*	0.111**	0.111**	0.143	0.115	0.099	0.099	0.039	0.018	0.004	0.004
	(0.058)	(0.058)	(0.055)	(0.055)	(0.118)	(0.113)	(0.122)	(0.117)	(0.059)	(0.054)	(0.068)	(0.067)
TO		-0.410	-0.387	-0.426		-0.677**	-0.828*	-0.831*		-0.364	-0.407*	-0.410*
		(0.310)	(0.294)	(0.311)		(0.343)	(0.437)	(0.463)		(0.231)	(0.222)	(0.229)
FO			-0.224	-0.110			2.020	2.038			0.305*	0.304*
			(0.569)	(0.598)			(3.181)	(3.178)			(0.160)	(0.160)
CPI				0.008				0.001				0.001
				(0.007)				(0.005)				(0.003)
Constant	-0.002	-0.001	-0.001	-0.005	-0.002	-0.000	0.000	0.000	-0.004**	-0.002	-0.001	-0.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
Adj-R2	0.017	0.02	0.015	0.025	-0.000	0.000	-0.003	-0.009	-0.003	0.014	0.019	0.014
Obs.	195	195	195	195	195	195	188	188	195	195	188	188
Panel B: $\bar{R}^2$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.043	0.008	0.008	0.038	0.255	0.229	0.223	0.226	0.224	0.194	0.165	0.172
	(0.167)	(0.162)	(0.160)	(0.162)	(0.169)	(0.170)	(0.190)	(0.180)	(0.148)	(0.145)	(0.135)	(0.143)
TO		-0.547*	-0.530*	-0.563*		-0.689**	-0.828*	-0.834*		-0.326*	-0.365*	-0.370*
		(0.304)	(0.290)	(0.335)		(0.330)	(0.456)	(0.461)		(0.193)	(0.198)	(0.195)
FO			-0.177	-0.061			1.984	2.017			0.280*	0.278**
			(0.572)	(0.584)			(3.162)	(3.163)			(0.147)	(0.133)
CPI				0.008				0.001				0.001
				(0.007)				(0.006)				(0.003)
Constant	-0.002	-0.001	-0.001	-0.004	-0.001	-0.000	0.001	0.000	-0.004**	-0.002	-0.001	-0.002
	(0.001)	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
Adj-R2	-0.005	0.006	0.001	0.011	0.002	0.003	-0.000	-0.006	0.016	0.029	0.03	0.026
Obs.	195	195	195	195	195	195	188	188	195	195	188	188

Notes: This table reports results for time series regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth volatility is computed using a rolling window of 32 quarters. Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B).
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q2-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

GARCH

Table A.4: Consumption Smoothing vs. Financial Integration (Time Series Regressions)

Panel A: $\bar{\rho}$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.162	0.236	0.115	0.118	-0.110	-0.062	-0.321	-0.342	-0.412	-0.469	-0.364	0.032
	(0.528)	(0.511)	(0.478)	(0.473)	(0.533)	(0.543)	(0.480)	(0.527)	(0.389)	(0.426)	(0.406)	(0.225)
TO		1.309	1.515	1.457		1.855	2.050	2.302		-0.389	-0.087	-0.412
		(1.246)	(1.257)	(1.338)		(2.196)	(2.324)	(2.345)		(0.874)	(0.617)	(0.558)
FO			0.312	0.487			0.524	-0.669			0.076	-0.004
			(1.922)	(2.017)			(6.236)	(6.191)			(6.128)	(5.886)
CPI				0.011				-0.046**				0.110***
				(0.028)				(0.021)				(0.017)
Constant	-0.007	-0.010	-0.006	-0.010	-0.007	-0.011	-0.004	0.019	0.025**	0.027*	0.021	-0.030*
	(0.008)	(0.007)	(0.007)	(0.014)	(0.012)	(0.012)	(0.010)	(0.014)	(0.012)	(0.016)	(0.014)	(0.016)
Adj-R2	-0.004	-0.006	-0.009	-0.013	-0.005	-0.006	-0.004	0.005	-0.003	-0.008	-0.014	0.106
Obs.	194	194	187	187	194	194	187	187	193	193	187	187
Panel B: $\bar{R}^2$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.501	0.583	0.489	0.524	-1.502	-1.508	-2.097	-2.172	-0.011	-0.032	0.077	0.431
	(0.923)	(0.920)	(0.913)	(0.918)	(1.740)	(1.663)	(1.646)	(1.680)	(0.401)	(0.413)	(0.407)	(0.357)
TO		1.217	1.511	1.452		1.911	2.371	2.662		-0.153	0.123	-0.331
		(1.302)	(1.281)	(1.413)		(2.243)	(2.565)	(2.407)		(0.887)	(0.661)	(0.569)
FO			0.294	0.483			-1.253	-2.613			0.069	-0.015
			(1.967)	(2.003)			(6.147)	(5.928)			(6.370)	(5.861)
CPI				0.012				-0.051**				0.111***
				(0.028)				(0.021)				(0.018)
Constant	-0.007	-0.009	-0.006	-0.011	-0.007	-0.011	-0.005	0.021	0.024*	0.025	0.019	-0.030*
	(0.008)	(0.008)	(0.007)	(0.014)	(0.011)	(0.011)	(0.010)	(0.015)	(0.013)	(0.016)	(0.014)	(0.016)
Adj-R2	-0.004	-0.005	-0.007	-0.011	0.012	0.011	0.040	0.052	-0.005	-0.010	-0.016	0.107
Obs.	194	194	187	187	194	194	187	187	193	193	187	187

Notes: This table reports results for time series regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth volatility is modelled as a GARCH(4,4) process. Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B).

Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Table A.5: RER Volatility vs. Financial Integration (Time Series Regressions)

Panel A: $\bar{\rho}$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.009	0.006	0.006	0.006	0.007	0.007	0.006*	0.006*	0.008	0.006	0.005	0.008
	(0.006)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)	(0.004)	(0.089)
TO		-0.041	-0.042	-0.038		-0.030	-0.028	-0.027		-0.014	-0.014	-0.177
		(0.029)	(0.028)	(0.026)		(0.022)	(0.020)	(0.020)		(0.013)	(0.013)	(0.246)
FO			-0.009	-0.014			-0.029	-0.034			0.001	0.011
			(0.023)	(0.027)			(0.040)	(0.040)			(0.006)	(0.184)
CPI				-0.000				-0.000				0.003
				(0.000)				(0.000)				(0.002)
Constant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.004*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Adj-R2	0.045	0.118	0.117	0.124	0.051	0.100	0.099	0.101	0.044	0.077	0.071	-0.009
Obs.	142	142	135	135	142	142	135	135	142	142	135	135
Panel B: $\bar{R}^2$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.014	0.010	0.010	0.009	0.014*	0.013**	0.012*	0.012**	0.008	0.006	0.005	0.005
	(0.010)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)	(0.008)	(0.006)	(0.006)	(0.005)
TO		-0.044	-0.044	-0.041		-0.031	-0.030	-0.029		-0.015	-0.016	-0.015
		(0.031)	(0.032)	(0.030)		(0.022)	(0.020)	(0.020)		(0.014)	(0.014)	(0.013)
FO			-0.010	-0.015			-0.024	-0.029			0.001	0.001
			(0.025)	(0.028)			(0.038)	(0.039)			(0.006)	(0.006)
CPI				-0.000				-0.000				-0.000
				(0.000)				(0.000)				(0.000)
Constant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Adj-R2	0.017	0.105	0.105	0.110	0.056	0.111	0.108	0.109	0.020	0.066	0.061	0.072
Obs.	142	142	135	135	142	142	135	135	142	142	135	135

Notes: This table reports results for time series regressions of Real Exchange Rate (RER) volatility on financial integration indexes for the G7, G20 and EU group. RER volatility is captured by Real Trade Weighted US Dollar Index using a rolling window of 40 quarters . Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B).

Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Consumption-to-Output Volatility Ratio

Table A.6: Consumption Smoothing vs. Financial Integration (Time Series Regressions)

Panel A: $\bar{\rho}$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	-10.676	-3.201	-3.504	-3.108	-2.426	-1.260	-1.516	-1.533	-16.111**	-11.716***	-11.756**	-11.285**
	(12.931)	(9.058)	(9.226)	(8.897)	(7.330)	(6.460)	(6.287)	(6.267)	(6.998)	(4.518)	(4.747)	(4.668)
TO		131.703*	132.252*	124.328*		45.487*	51.839*	52.049*		29.564**	30.026**	29.639**
		(73.238)	(73.491)	(68.845)		(25.930)	(28.799)	(28.350)		(14.363)	(14.502)	(14.355)
FO			25.745	49.520			-79.950	-80.946			-3.193	-3.288
			(97.930)	(101.702)			(96.337)	(96.022)			(6.939)	(7.275)
CPI				1.512**				-0.039				0.131
				(0.673)				(0.189)				(0.136)
Constant	0.021	-0.265	-0.248	-0.914**	0.064	-0.021	-0.024	-0.005	-0.139*	-0.293**	-0.296**	-0.357**
	(0.167)	(0.272)	(0.271)	(0.395)	(0.101)	(0.129)	(0.128)	(0.136)	(0.076)	(0.123)	(0.126)	(0.149)
Adj-R2	0.001	0.060	0.058	0.087	-0.003	0.029	0.032	0.027	0.071	0.134	0.130	0.129
Obs.	194	194	187	187	194	194	187	187	194	194	187	187
Panel B: $\bar{R}^2$	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	-14.171	-5.164	-5.408	-1.005	2.633	2.488	1.904	1.858	-16.646*	-11.940**	-12.033**	-11.519**
	(21.896)	(20.296)	(20.294)	(20.605)	(15.439)	(13.657)	(12.990)	(13.492)	(9.026)	(5.268)	(5.228)	(5.153)
TO		133.468*	134.179*	126.747*		45.991*	52.186*	52.364*		32.892**	33.359**	32.701**
		(72.841)	(75.972)	(69.851)		(26.387)	(28.195)	(28.790)		(14.508)	(15.006)	(14.985)
FO			26.147	49.832			-76.341	-77.171			-3.059	-3.180
			(99.113)	(101.791)			(95.570)	(95.003)			(6.454)	(6.720)
CPI				1.513**				-0.031				0.161
				(0.665)				(0.175)				(0.124)
Constant	0.002	-0.273	-0.258	-0.928**	0.058	-0.025	-0.030	-0.014	-0.176**	-0.336***	-0.341***	-0.413***
	(0.178)	(0.275)	(0.282)	(0.388)	(0.092)	(0.119)	(0.124)	(0.140)	(0.083)	(0.125)	(0.129)	(0.154)
Adj-R2	-0.003	0.060	0.058	0.086	-0.004	0.029	0.032	0.026	0.033	0.115	0.111	0.112
Obs.	194	194	187	187	194	194	187	187	194	194	187	187

Notes: This table reports results for time series regressions of consumption growth over GDP growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth and GDP growth volatility (for each country) are computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B).

Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Quantile Regression

Table A.7: Consumption Smoothing vs. Financial Integration (Time Series Quantile Regressions)

Panel A: $\bar{\rho}$	G7			G20			EU28		
Quantile	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%
FI	0.086	0.129**	0.178***	0.012	-0.067	-0.126*	-0.125	-0.019	0.003
	(0.081)	(0.057)	(0.058)	(0.158)	(0.057)	(0.072)	(0.112)	(0.074)	(0.086)
TO	-0.042	-0.243	-0.436**	-0.212	-0.236	0.008	0.163	-0.184	-0.363
	(0.336)	(0.168)	(0.213)	(0.395)	(0.189)	(0.354)	(0.234)	(0.148)	(0.245)
FO	0.682	0.040	-0.232	1.144	0.484	-0.124	-0.443	0.081	0.047
	(0.507)	(0.259)	(0.510)	(1.497)	(0.637)	(2.329)	(0.414)	(0.170)	(0.147)
CPI	-0.004	0.005*	0.005	-0.001	-0.000	0.003	-0.002	0.003**	0.003
	(0.005)	(0.003)	(0.004)	(0.005)	(0.003)	(0.005)	(0.003)	(0.001)	(0.002)
Constant	-0.007***	-0.003**	0.003	-0.012***	-0.002	0.006**	-0.015***	-0.003**	0.006**
	(0.003)	(0.001)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.003)
Obs.	187	187	187	187	187	187	187	187	187
Panel B: $\bar{R}^2$	G7			G20			EU28		
Quantile	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%
FI	0.187	0.119	0.144	0.019	-0.125	-0.256	0.023	-0.058	-0.027
	(0.175)	(0.097)	(0.180)	(0.142)	(0.079)	(0.164)	(0.229)	(0.117)	(0.164)
TO	0.126	-0.241	-0.677**	-0.144	-0.274	0.033	0.085	-0.157	-0.411*
	(0.354)	(0.183)	(0.270)	(0.421)	(0.175)	(0.416)	(0.261)	(0.156)	(0.225)
FO	0.776	-0.011	-0.321	1.293	0.658	-0.556	-0.394	0.100	0.066
	(0.515)	(0.300)	(0.552)	(1.495)	(0.652)	(2.409)	(0.403)	(0.180)	(0.141)
CPI	-0.002	0.005	0.005	-0.001	-0.000	0.004	-0.002	0.003**	0.003
	(0.005)	(0.003)	(0.004)	(0.005)	(0.003)	(0.004)	(0.003)	(0.001)	(0.002)
Constant	-0.009***	-0.003	0.005*	-0.012***	-0.002	0.005**	-0.014***	-0.004**	0.006**
	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)	(0.001)	(0.003)
Obs.	187	187	187	187	187	187	187	187	187

Notes: This table reports results for time series quantile regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth and GDP growth volatility (for each country) are computed using a rolling window of 40 quarters.
Financial integration (FI) is captured by the (i) cross-country average standard correlation ($\bar{\rho}$, Panel A) and (ii) cross-country average adjusted R-squared ($\bar{R}^2$, Panel B).
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Financial Interconnectedness (Spillover Index)

Table A.8: Consumption Smoothing vs. Financial Integration (Time Series Regressions)

DY	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.009	-0.002	-0.006	0.000	0.139	0.141	0.121	0.128	0.067	0.067	0.063	0.063
	(0.070)	(0.077)	(0.078)	(0.073)	(0.140)	(0.157)	(0.150)	(0.145)	(0.079)	(0.089)	(0.085)	(0.083)
TO		-0.491*	-0.515**	-0.544**		0.071	0.338	0.381		-0.013	-0.016	-0.020
		(0.264)	(0.258)	(0.270)		(0.318)	(0.637)	(0.680)		(0.314)	(0.306)	(0.308)
FO			0.400	0.488			-3.575	-3.761			-0.012	-0.012
			(0.568)	(0.574)			(5.393)	(5.690)			(0.170)	(0.173)
CPI				0.006				-0.007				0.001
				(0.006)				(0.010)				(0.004)
Constant	-0.002*	-0.001	-0.001	-0.003	0.000	0.000	0.000	0.004	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.002)	(0.002)	(0.002)	(0.003)
Adj. R2	-0.005	0.010	0.005	0.010	-0.001	-0.006	0.006	0.005	-0.004	-0.009	-0.015	-0.021
Obs.	195	195	188	188	195	195	188	188	195	195	188	188

Notes: This table reports results for time series regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth and GDP growth volatility (for each country) are computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the Diebold and Yilmaz (2009) (DY) generalized spillover index (computed using a rolling window of 40 quarters).
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q2-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

A.2 Panel

Crisis

Table A.9: Consumption Smoothing vs. Financial Integration (Panel Regressions)

Panel A: ρ	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.045	0.046	0.046	0.049	-0.022	-0.021	-0.026	-0.026	0.072	0.072	0.072	0.073
	(0.048)	(0.048)	(0.050)	(0.047)	(0.026)	(0.027)	(0.029)	(0.029)	(0.090)	(0.090)	(0.087)	(0.089)
Crisis Dummy	0.014***	0.015***	0.015***	0.015***	-0.016	-0.015	-0.022	-0.022	0.020***	0.021***	0.021***	0.020***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.038)	(0.038)	(0.036)	(0.037)	(0.007)	(0.007)	(0.006)	(0.007)
TO		0.036	0.035	0.045		0.126	0.220	0.223		0.047	0.047	0.046
		(0.059)	(0.059)	(0.058)		(0.236)	(0.469)	(0.494)		(0.033)	(0.033)	(0.033)
FO			0.047	0.069			-1.330	-1.317			0.006	0.005
			(0.239)	(0.191)			(1.436)	(1.451)			(0.104)	(0.096)
CPI				0.004***				0.008				0.002
				(0.002)				(0.008)				(0.002)
Constant	-0.003***	-0.003***	-0.003***	-0.005***	0.002	0.002	0.002	-0.002	-0.002	-0.002	-0.002	-0.003*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.005)	(0.001)	(0.001)	(0.001)	(0.002)
Adj-R2	0.001	0.000	-0.001	0.001	-0.007	-0.007	-0.005	-0.005	-0.002	-0.002	-0.002	-0.002
Obs.	1358	1358	1358	1358	2200	2200	1889	1866	4268	4268	4268	4268
Panel B: R^2	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.051	0.051	0.051	0.055	-0.004	-0.004	-0.005	0.001	0.097	0.098	0.097	0.098
	(0.043)	(0.043)	(0.040)	(0.044)	(0.132)	(0.130)	(0.142)	(0.136)	(0.102)	(0.097)	(0.104)	(0.103)
Crisis Dummy	0.015***	0.015***	0.015***	0.016***	-0.016	-0.015	-0.022	-0.022	0.019***	0.020***	0.020***	0.020***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.039)	(0.037)	(0.036)	(0.037)	(0.007)	(0.007)	(0.007)	(0.007)
TO		0.030	0.029	0.039		0.096	0.143	0.149		0.048	0.048	0.047
		(0.065)	(0.063)	(0.066)		(0.209)	(0.432)	(0.429)		(0.031)	(0.033)	(0.032)
FO			0.049	0.071			-1.327	-1.318			0.005	0.005
			(0.189)	(0.217)			(1.410)	(1.483)			(0.098)	(0.091)
CPI				0.004***				0.007				0.002
				(0.001)				(0.008)				(0.002)
Constant	-0.003***	-0.003***	-0.003***	-0.005***	0.002	0.001	0.002	-0.002	-0.002	-0.002	-0.002	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)	(0.005)	(0.001)	(0.001)	(0.001)	(0.002)
Adj-R2	0.001	-0.000	-0.001	0.001	-0.007	-0.007	-0.005	-0.004	-0.002	-0.002	-0.002	-0.002
Obs.	1358	1358	1358	1358	2215	2215	1903	1880	4268	4268	4268	4268

Notes: This table reports results for panel regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth volatility (for each country) is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B). Crisis Dummy takes value 1 in the period 2007:Q3-2009:Q2, 0 otherwise.

Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q3-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Euro

Table A.10: Consumption Smoothing vs. Financial Integration (Panel Regressions)

Panel A: ρ					Panel B: R^2			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.079	0.080	0.080	0.080	0.111	0.112	0.112	0.112
	(0.086)	(0.089)	(0.085)	(0.089)	(0.105)	(0.097)	(0.108)	(0.102)
Euro Dummy	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
TO		0.037	0.037	0.036		0.038	0.038	0.037
		(0.032)	(0.032)	(0.032)		(0.033)	(0.034)	(0.033)
FO			0.004	0.003			0.003	0.003
			(0.101)	(0.100)			(0.098)	(0.098)
CPI				0.002				0.002
				(0.002)				(0.002)
Constant	-0.000	-0.001	-0.001	-0.001	-0.000	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Adj-R2	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
Obs.	4268	4268	4268	4268	4268	4268	4268	4268

Notes: This table reports results for panel regressions of consumption growth volatility on financial integration indexes for the EU group. Consumption growth volatility (for each country) is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B). Euro Dummy takes value one when a country joins euro, zero otherwise.
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Sample: Q3-1970 to Q4-2018. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Different RW

Table A.11: Consumption Smoothing vs. Financial Integration (Panel Regressions)

Panel A: ρ	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.123**	0.121**	0.121**	0.122**	-0.012	-0.01	-0.015	-0.013	0.078	0.076	0.082	0.083
	(0.061)	(0.06)	(0.059)	(0.06)	(0.023)	(0.026)	(0.03)	(0.029)	(0.069)	(0.069)	(0.078)	(0.084)
TO		-0.062	-0.07	-0.058		0.206	0.302	0.287		-0.086	-0.106	-0.123
		(0.188)	(0.181)	(0.177)		(0.375)	(0.693)	(0.727)		(0.095)	(0.094)	(0.09)
FO			0.203	0.233			0.028	0.055			0.086**	0.085***
			(0.305)	(0.293)			(0.252)	(0.286)			(0.038)	(0.032)
CPI				0.006***				0.008				0
				(0.002)				(0.012)				(0.002)
Constant	-0.002***	-0.002***	-0.002***	-0.005***	-0.001	-0.001	-0.001	-0.005	-0.006***	-0.006***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.007)	(0.002)	(0.001)	(0.002)	(0.002)
Adj-R2	-0.004	-0.005	-0.006	-0.004	-0.007	-0.007	-0.005	-0.005	-0.004	-0.004	-0.004	-0.004
Obs.	1358	1358	1358	1358	2215	2215	1903	1880	4268	4268	4268	4268
Panel B: R^2	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.057	0.054	0.055	0.061	0.119***	0.125***	0.092**	0.100***	0.157	0.154	0.184	0.186
	(0.042)	(0.039)	(0.04)	(0.042)	(0.036)	(0.036)	(0.039)	(0.032)	(0.109)	(0.101)	(0.131)	(0.129)
TO		-0.093	-0.101	-0.089		0.236	0.369	0.355		-0.078	-0.094	-0.112
		(0.18)	(0.177)	(0.19)		(0.341)	(0.714)	(0.724)		(0.091)	(0.094)	(0.093)
FO			0.207	0.238			0.014	0.041			0.085**	0.084*
			(0.302)	(0.297)			(0.259)	(0.287)			(0.036)	(0.048)
CPI				0.006***				0.008				0
				(0.002)				(0.012)				(0.002)
Constant	-0.002***	-0.002***	-0.002***	-0.005***	0	0	0	-0.004	-0.006***	-0.006***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.007)	(0.002)	(0.001)	(0.002)	(0.002)
Adj-R2	-0.005	-0.005	-0.006	-0.005	-0.007	-0.008	-0.006	-0.006	-0.004	-0.004	-0.004	-0.004
Obs.	1358	1358	1358	1358	2200	2200	1889	1866	4268	4268	4268	4268

Notes: This table reports results for panel regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth volatility is computed using a rolling window of 32 quarters. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B).
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Sample: Q3-1970 to Q4-2018. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

GARCH

Table A.12: Consumption Smoothing vs. Financial Integration (Panel Regressions)

Panel A: ρ	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.053	0.088	0.089	-0.083	0.386	0.466	0.462	0.435	-0.863*	-0.883*	-0.873*	-0.852*
	(0.653)	(0.725)	(0.7)	(0.65)	(0.371)	(0.406)	(0.399)	(0.384)	(0.522)	(0.519)	(0.512)	(0.479)
TO		3.408	3.398	3.081		9.332	9.303	9.079		-1.44	-1.352	-1.322
		(3.55)	(3.31)	(3.356)		(12.435)	(11.902)	(12.29)		(2.266)	(2.379)	(2.483)
FO			0.256	-0.55			2.805	2.279			1.848*	1.832*
			(2.079)	(1.702)			(2.876)	(3.341)			(1.018)	(0.996)
CPI				-0.162**				-0.137				0.045
				(0.073)				(0.147)				(0.16)
Constant	-0.006**	-0.013	-0.013	0.061**	0.001	-0.017	-0.017	0.066	-0.001	0.006	0.006	-0.018
	(0.003)	(0.009)	(0.008)	(0.031)	(0.005)	(0.023)	(0.023)	(0.09)	(0.004)	(0.014)	(0.015)	(0.076)
Adj-R2	-0.005	-0.005	-0.006	-0.001	-0.007	-0.007	-0.007	-0.007	-0.006	-0.006	-0.006	-0.007
Obs.	1355	1355	1355	1355	2343	2343	2031	2008	3558	3558	3558	3558
Panel B: R^2	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.729	0.83	0.83	0.721	-1.367	-1.397	-1.393	-1.411	0.142	0.104	0.098	0.114
	(1.165)	(1.2)	(1.217)	(1.181)	(1.224)	(1.17)	(1.184)	(1.212)	(0.462)	(0.479)	(0.475)	(0.44)
TO		3.569	3.558	3.228		9.287	9.259	9.036		-1.401	-1.314	-1.283
		(3.605)	(3.461)	(3.703)		(12.163)	(12.334)	(12.72)		(2.397)	(2.35)	(2.293)
FO			0.27	-0.529			2.839	2.304			1.852*	1.835*
			(2.156)	(1.605)			(3.025)	(3.891)			(1.004)	(0.985)
CPI				-0.161**				-0.138				0.045
				(0.072)				(0.14)				(0.145)
Constant	-0.007**	-0.015	-0.014	0.058**	0.005	-0.012	-0.012	0.071	-0.005*	0.003	0.002	-0.022
	(0.004)	(0.01)	(0.009)	(0.029)	(0.006)	(0.024)	(0.023)	(0.088)	(0.003)	(0.014)	(0.014)	(0.07)
Adj-R2	-0.005	-0.005	-0.006	-0.001	-0.007	-0.007	-0.007	-0.006	-0.006	-0.006	-0.007	-0.007
Obs.	1355	1355	1355	1355	2330	2330	2019	1996	3558	3558	3558	3558

Notes: This table reports results for panel regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth volatility is modelled as a GARCH(4,4) process. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B).
Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Sample: Q3-1970 to Q4-2018. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Consumption-to-Output Volatility Ratio

Table A.13: Consumption Smoothing vs. Financial Integration (Panel Regressions)

Panel A: ρ	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	6.297	8.232	8.251	8.828	-7.125*	-7.045	-6.619	-6.900	-1.018	-0.565	-0.589	-0.211
	(8.777)	(9.129)	(9.308)	(8.554)	(4.229)	(4.379)	(4.607)	(4.697)	(2.597)	(2.295)	(2.382)	(2.380)
TO		71.845***	71.026***	72.922***		10.952	12.651	10.356		17.800*	17.683**	17.808**
		(19.499)	(19.644)	(19.239)		(12.914)	(24.215)	(25.271)		(9.116)	(8.316)	(8.831)
FO			20.494	25.136			14.845	25.345			-2.106	-2.381
			(43.245)	(34.527)			(22.234)	(25.462)			(5.606)	(5.534)
CPI				0.934*				1.679**				0.597**
				(0.493)				(0.804)				(0.248)
Constant	-0.040	-0.188**	-0.186**	-0.612**	-0.003	-0.023	-0.005	-0.982*	-0.432**	-0.522***	-0.521***	-0.812***
	(0.063)	(0.083)	(0.081)	(0.276)	(0.118)	(0.132)	(0.164)	(0.538)	(0.172)	(0.184)	(0.184)	(0.208)
Adj-R2	-0.005	0.006	0.005	0.010	-0.005	-0.005	-0.006	0.004	-0.007	-0.004	-0.004	-0.002
Obs.	1354	1354	1354	1354	2287	2287	1975	1952	3292	3292	3292	3292
Panel B: R^2	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	2.375	3.099	3.129	4.126	-0.642	-0.678	-2.490	-1.909	-4.304	-3.548	-3.551	-3.342
	(6.407)	(6.280)	(6.126)	(6.557)	(5.407)	(5.604)	(4.909)	(5.373)	(4.511)	(3.950)	(3.925)	(3.944)
TO		70.436***	69.620***	71.432***		8.857	6.998	5.439		17.577**	17.462**	17.575**
		(19.279)	(18.681)	(17.991)		(11.178)	(19.749)	(21.879)		(8.046)	(8.894)	(8.807)
FO			20.366	24.981			14.026	23.868			-2.103	-2.380
			(42.278)	(49.275)			(24.669)	(25.048)			(5.329)	(5.982)
CPI				0.928*				1.567**				0.595**
				(0.515)				(0.769)				(0.255)
Constant	-0.032	-0.175**	-0.173**	-0.596**	-0.040	-0.055	-0.025	-0.938*	-0.424**	-0.513***	-0.513***	-0.801***
	(0.057)	(0.076)	(0.074)	(0.272)	(0.135)	(0.136)	(0.175)	(0.494)	(0.164)	(0.182)	(0.189)	(0.214)
Adj-R2	-0.005	0.005	0.004	0.009	-0.007	-0.007	-0.009	0.000	-0.006	-0.003	-0.004	-0.001
Obs.	1354	1354	1354	1354	2272	2272	1961	1938	3292	3292	3292	3292

Notes: This table reports results for panel regressions of consumption growth over GDP growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth volatility (for each country) is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B).

Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Sample: Q3-1970 to Q4-2018. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Quantile Regressions

Table A.14: Consumption Smoothing vs. Financial Integration (Panel Quantile Regressions)

Panel A: ρ	G7			G20			EU28		
Quantile	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%
FI	0.018	0.062	0.098	-0.055	-0.030	-0.004	0.032	0.070	0.133
	(0.082)	(0.112)	(0.155)	(0.053)	(0.057)	(0.080)	(0.097)	(0.116)	(0.170)
TO	0.037	-0.058	-0.135	0.479	0.304	0.123	0.002	0.029	0.073
	(0.209)	(0.285)	(0.394)	(0.643)	(0.688)	(0.971)	(0.081)	(0.096)	(0.142)
FO	0.045	-0.048	-0.124	-0.057	-1.221	-2.429	-0.007	0.001	0.015
	(0.285)	(0.390)	(0.538)	(2.094)	(2.231)	(3.152)	(0.050)	(0.060)	(0.088)
CPI	0.000	0.004	0.008	0.005	0.008	0.012	0.000	0.001	0.004
	(0.004)	(0.006)	(0.008)	(0.014)	(0.015)	(0.021)	(0.006)	(0.007)	(0.010)
Obs.	1358	1358	1358	1880	1880	1880	4268	4268	4268
Panel B: R^2	G7			G20			EU28		
Quantile	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%	A: 20%	B: 50%	C: 80%
FI	0.031	0.061	0.086	-0.118	-0.016	0.087	0.040	0.096	0.189
	(0.138)	(0.085)	(0.069)	(3.480)	(2.108)	(0.742)	(0.745)	(0.605)	(0.415)
TO	0.042	-0.067	-0.156	0.434	0.232	0.029	0.002	0.029	0.074
	(0.281)	(0.174)	(0.140)	(10.462)	(6.337)	(2.232)	(0.398)	(0.323)	(0.222)
FO	0.046	-0.046	-0.122	-0.043	-1.220	-2.407	-0.007	0.001	0.014
	(0.386)	(0.239)	(0.192)	(34.303)	(20.776)	(7.320)	(0.248)	(0.201)	(0.138)
CPI	-0.000	0.004	0.008***	0.004	0.007	0.011	0.000	0.001	0.003
	(0.006)	(0.004)	(0.003)	(0.227)	(0.137)	(0.048)	(0.028)	(0.023)	(0.016)
Obs.	1358	1358	1358	1866	1866	1866	4268	4268	4268

Notes: This table reports results for panel quantile regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Country-fixed effects included. Consumption growth volatility (for each country) is computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the (i) standard correlation (ρ, Panel A) and (ii) adjusted R-squared (R^2, Panel B).

Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Sample: 1970:Q1-2018:Q4. Standard errors are reported in parenthesis. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.

Financial Interconnectedness (Spillover Index)

Table A.15: Consumption Smoothing vs. Financial Integration

DY	G7				G20				EU			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
FI	0.018	0.017	0.017	0.017	0.064**	0.071***	0.099**	0.100**	0.065**	0.065**	0.065**	0.066**
	(0.020)	(0.020)	(0.020)	(0.020)	(0.025)	(0.027)	(0.039)	(0.039)	(0.029)	(0.029)	(0.029)	(0.028)
TO		-0.066	-0.064	-0.057		0.357	0.746	0.760		-0.012	-0.011	-0.010
		(0.063)	(0.059)	(0.058)		(0.505)	(0.706)	(0.732)		(0.046)	(0.042)	(0.045)
FO			-0.054	-0.037			0.111	0.138			-0.047	-0.042
			(0.137)	(0.153)			(0.234)	(0.219)			(0.154)	(0.148)
CPI				0.004**				0.006**				0.002
				(0.001)				(0.003)				(0.002)
Constant	-0.002***	-0.002***	-0.002***	-0.004***	-0.001	-0.002*	-0.002***	-0.005***	-0.004***	-0.004***	-0.004***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Adj-R2	-0.005	-0.006	-0.006	-0.005	-0.005	-0.004	-0.002	-0.002	-0.003	-0.004	-0.004	-0.004
Obs.	1365	1365	1365	1365	1788	1788	1512	1489	1746	1746	1746	1746

Notes: This table reports results for panel regressions of consumption growth volatility on financial integration indexes for the G7, G20 and EU group. Consumption growth and GDP growth volatility (for each country) are computed using a rolling window of 40 quarters. Financial integration (FI) is captured by the Diebold and Yilmaz (2009) (DY) generalized spillover index (computed using a rolling window of 40 quarters).

Control variables: $TO := \frac{(IMP+EXP)}{GDP}$, $FO := \frac{FDI}{GDP}$, CPI. Bootstrap standard errors (1000 repetitions) are reported in parenthesis. Sample: 1970:Q2-2018:Q4. Significance at 1%, 5%, 10% are denoted respectively by ***, **, *.