The link between financial globalisation and integration into global value chains and macroeconomic impacts

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Abstract:
This paper examines the association between participation in global value chains and financial globalisation measured by international net and capital flows. The results show that financial globalisation and the rise of global value chains are related but not two sides of the same coin. In fact, we find that GVC participation is positively associated with equity capital flows but negatively associated with debt capital flows. We also study the association of GVC participation and capital flows with aggregate economic outcomes. The findings show that both GVC participation and equity flows affect the share of mortgage and business credit. But we uncover also important differences in the impact of capital flows between advanced and emerging countries. Regarding changes in the economic structure our results suggest a positive association of both GVC participation and equity inflows on the manufacturing share, while debt inflows are primarily associated with a growth of the service sector in advanced economies, but not in emerging and developing countries. The finding that there is no strong association between the globalisation indicators and innovation suggests that the fragmentation of value chains leads to functional specialisation in tasks and tends to weaken the link between innovation and production at country level. We find in addition that a higher GVC participation is weakly associated with a higher growth of government revenue, as are debt flows but only in advances countries. This finding suggests also that debt flows were redirected primarily into safe countries in advanced countries.

1. Introduction

International capital flows and global value chains are the financial and the real aspects of the globalisation of the world economy. In the past decades production became internationalised and fragmented and cross-border capital flows increased substantially. This led to questions whether a greater integration in global production networks and higher capital flows bring only benefits or do they create macroeconomic and structural imbalances.

Recent decades have seen the emergence of global supply chains. The term global value chains refer to the fragmentation of production processes in stages that are performed in different countries. National accounts do record gross shipments but not value-added transactions. Conventional trade data does not reveal how much value added is traded in the global economy or contained a country export. The ratio of value added to gross exports declined over time and has accelerated since the 1990s (Johnson and Noguera, 2017). The implications of GVCs on economic growth can be heterogenous. For developing and emerging countries participation in GVCs can create opportunities to have access to new manufacturing processes and technology and, consequently, to increase their growth potential. In addition, productivity can be increased by specialisation in production stages with comparative advantage (Baldone et al. 2007, Criscuolo, Timmis, and Jonstone, 2016). But this function specialization in specific tasks in value chains can also reinforce technological asymmetries within the global economy and lead to growth traps (e. g. Stöllinger, 2019, Dosi et al. 2020).

International capital flows mirror the process of production fragmentation and are an important part of the catching-up of less developed economies through the formation an upgrading of productive capacity. Martinez-Galan and Fontoura (2019) document that the integration into global value chains is associated with foreign direct investment. But larger capital flows may be associated with costs. While capital inflows are important elements to support economic growth, provided that capital flows into productive investment. But the literature on international capital flows and crises shows also another reality, where capital inflows lead to a misallocation of financial resources, fostering real estate and consumption booms that are not sustainable (e.g., Obstfeld 2012). Begnino et al. (2015) show that large capital inflows were associated primarily with a growth of the non-tradeable sector. This also provides part of an explanation for the disappointing growth effects of international capital flows (Rodrik and Submanian, 2009). Broner et al. (2013) document that capital inflows and outflows have become significantly more correlated in countries of all income levels from the 1980s to the 2000s and are highest in high-income countries. This implies that sudden stops of capital inflows are increasingly accompanied by reduced outflows and surges in inflows accompanied by increases in outflows. Davies and van Wincoop (2018) suggest that this increased correlation between gross flows is the result of financial globalisation that is independent from trade globalisation.

In this paper we explore the role of integration into global value chains and financial globalization at the macroeconomic level for the time period 2005 to 2015. We study the interrelationship between global value chain integration and financial globalisation as measures by gross and net financial flows and study the impact on economic outcomes.

In this paper we explore this link in more detail. We study whether the participation in GVCs and the position in GVCs are associated with capital flows. We study the quantitative interaction between GVC participation and financial flows. We focus on gross and net financial flows. According to Borio et al. (2014) net capital flows and current account positions reveal little about financing conditions and the role of foreign finance in an economy. In addition, we distinguish between debt and equity inflows, as the empirical evidence shows that foreign debt inflows are riskier than debt inflows and a predictor of crises (Furceri et al. 2012, Gosh et al. 2016). Trade openness is generally considered to be an important factor pulling global capital flows at the country level. The integration into fragmented global production networks is also an indicator of the openness of an economy, but a somewhat specific indicator of openness, as it does only consider exported value added that is reexported by the trade partner and value-added imports that are related to exports.

The time period we cover is characterized by a stagnation of the expansion of GVCs measured in terms of value-added trade and financial globalisation measured in terms of global financial flows. The fragmentation of production (GVCs) and financial globalisation expanded vigorously up into the late 2000s, but after the financial crisis in 2008/09 the participation in GVCs stagnated and capital flows, especially gross debt flows declined substantially. Our econometric findings also show that the real globalisation of production (GVCs) is not strongly linked with global financial flows. GVC participation is positively associated with equity flows but negatively with debt flows. Our results suggest that the volatility in global financial flows is only weakly related to real globalisation (GVCs) but strongly associated with financial globalisation.

Based on these findings, we explore the association between GVC integration and capital flows on economic performance at the macroeconomic level. Does integration into GVCs affect the allocation of financial flows in economies. More specifically we look at the allocation of credit, investment in R&D, patenting, government revenue and GDP growth. Together these results provide evidence whether and how the greater integration into global financial and production networks affects economic growth and change at the country level.

We find that the equity inflows and GVC participation moderate the expansion of mortgage credit but does not affect the allocation of credit. The short-run impact on growth is positive for GVC participation. The relationship to innovation and the change in government revenue is weaker, however, this may be related to the time period considered that covers both the financial crisis in 2008/09 and the European debt crisis.

The paper is structured as follows: The next section presents data sources, data trends and indicators for the main variables of interest, GVC participation and capital flows. Section 3 studies the quantitative relationship between financial flows and participation in GVCs. We study the importance of GVC participation on the debt and equity inflows, net and gross flows and as determinant of the volatility of capital flows. Section 4 explores the interaction of GVC participation and capitals on economic outcomes such as the allocation of credit, investment, R&D and government revenue. Section 5 concludes the paper.

2. Data on GVCs and Financial flows

Global Value Chains: The last decades have witnessed an expansion of global value chains. Production is increasingly organised in several stages across countries, implying that exports have a significant amount of imported value added. In order to measure the participation in global value chains we use data from the OECD Trade in value added (TIVA) database. The last edition of this database covers the years 2005 – 2015 for most indicators. This is also the time horizon of the present study. The TIVA database makes use of global input-output tables to trace value-added flows through the stages of production. Figure 1 presents the structure of value added traded on gross export flows. Gross exports consist of domestic value added (DV), foreign value added (FV) and a double counting term. Domestic value added can in turn be decomposed according to the absorption of domestic exports: a) those that are absorbed abroad by the importer (DVA), b) those that are re-exported to other countries (iv) and the component that returns to the domestic country (RDV).

Figure 1 Decomposition of gross exports into value-added components
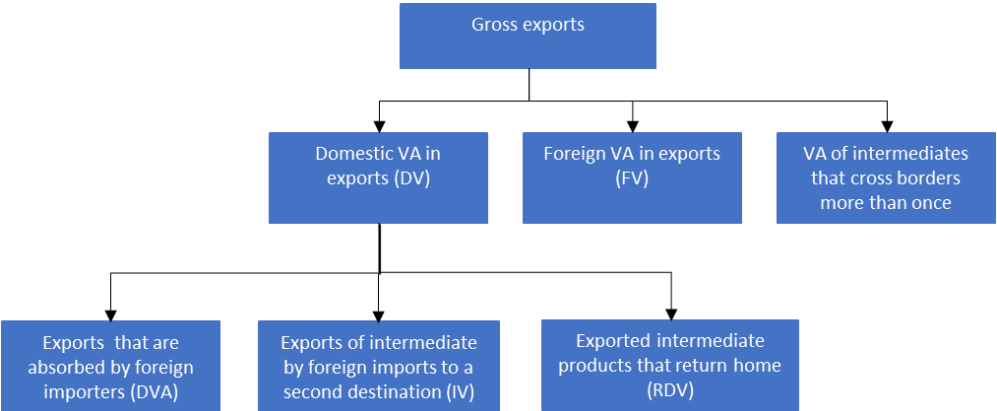
Source: Based on Koopman et al. (2014)

Based on these decompositions the participation in global production chains can be assessed. Backward participation in GVCs can be measured as the value added embedded in foreign inputs

used in the production of exports (FV). Forward participation, on the other hand, can be measured as the value added in intermediates which are exported and reprocessed and exported by the importing country (IV).

In the paper we measure GVC participation as the sum of FV and IV:

$$GVC\ Participation_{i,t} = \frac{FV_{it} + IV_{i,t}}{EX_{i,t}},$$

Where i denotes the country and t denotes time measured in years. Based on the same indicators the GVC position of country can be measured. The GVC position measures the relative position of the country in GVCs. The GVC position is defined as:

$$GVC\ Position_{i,t} = \ln\left(1 + \frac{IV_{it}}{EX_{i,t}}\right) - \ln\left(1 + \frac{FV_{i,t}}{EX_{i,t}}\right),$$

i denotes the country and t denotes time measured in years. The GVC position measures the relative importance of sourcing of inputs. A higher share of foreign value added by backward integration compared to forward integration would indicate a downstream position and a negative index value, as more value added for exports are sourced from abroad. A positive value indicates an upstream position, i.e., that forward integration dominates backward integration.

Figure **1**2 depicts the average time trends for the sample used in the study. We distinguish advanced from emerging and developing economies. The time trend clearly indicates that the expansion of trade in value added ceased after the financial crisis in 2008. The GVC participation decreases for all countries during the crisis and recovers but suffers a reduction in all country groups afterwards. The time trend is remarkably similar for the advanced and the emerging countries. The participation in global value chains is on average higher for the emerging and developing countries than for the advanced countries. The right panel in figure 2 shows the average time trend for the GVC position. Here the financial crisis in 2008/2009 leads to an increase in the indicator. This suggests that that the crisis affected less the forward integration into the value chains than the backward integration. After the crisis we see first a normalisation then again an increase in the GVC position, i.e., an increase of forward integration respective to backward integration. The graph indicates in addition that emerging and developing countries have a higher forward integration than developed countries. This may be associated with resource exports of some resource intensive countries.

Figure 2: Average GVC participation and GVC position across country groups
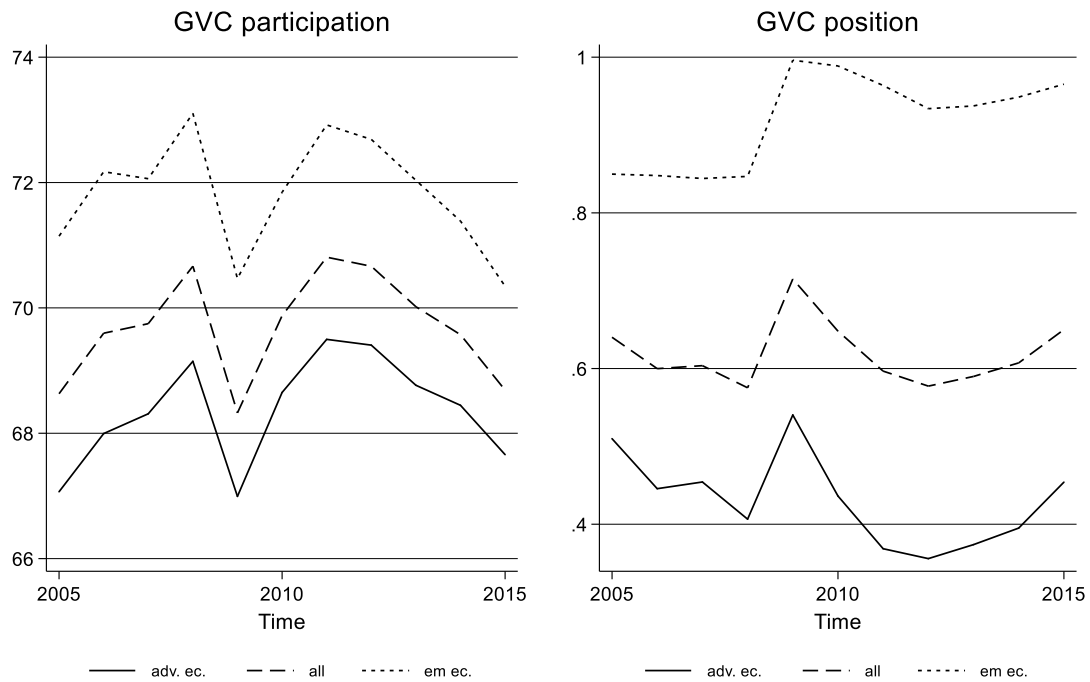
Financial Flows: Data on capital inflows and net flows comes from the International Financial Statistics (IFS) database by the IMF. This data has been used in many analyses of capital flows. There are nevertheless issues associated with these data as capital flow data, especially outflows tend to be misreported in many countries (e. g. Alfaro et al. 2014, Lane and Milesi-Ferretti 2001 for more details). This needs to be considered in the analysis that follows. The literature on capital flows focuses on net capital flows defined as the purchase of domestic assets by foreign agents (inflows) minus the purchase of foreign assets by domestic agents (outflows). Which are also net flows in the sense that inflows (net liability flows) capture the difference between "true" gross liability flows and repayments, while outflows (net asset flows) cover gross asset flows. For this reason, inflows and outflows can be positive or negative. The separation of capital flows into asset and liability flows allows the interpretation of liability flows as inflows from foreign agents, and asset flows as outflows by domestic agents. In our analysis we divide total flows into equity and debt flows. Equity flows consist of foreign direct investment and portfolio equity investment, debt flow sum over direct debt flows, portfolio debt flow and other investment debt flows. We distinguish these two types of flows because the literature on international financial flows has shown that the dynamics of equity and debt flows can be quite different. In our analysis we focus on capital inflows, capital net flows and capital gross flows. If we denote outflows as *OF* and inflows as *IF*, net outflows (*NF*) are defined as *NF = OF-IF*, and gross flows (*GF*) are the sum of the two flows *GF = OF + IF*.

We focus on these three indicators as (a) inflows indicate as the flow of capital into the country, (b) net flows the net impact of capital flows into a country and (c) gross flows the integration of a country into the global financial network of flow.

Figure 3: Average gross and net equity and debt flows across country groups
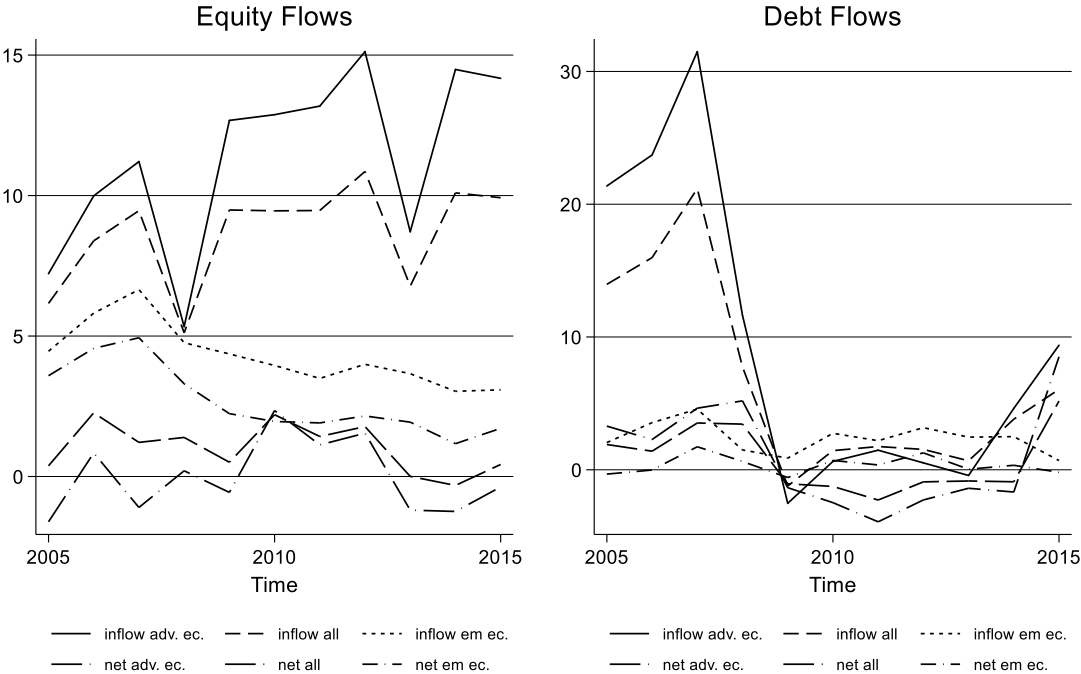
Figure 3 provides the time trend of financial flows for the time period 2005 to 2015. Again, we provide the average time trend in the sample and average time trend for the country groups used in the analysis. The left panel shows the equity inflows and net flows. During the financial crisis equity inflows were reduced substantially but they recovered very fast. In 2013 we observe an additional reduction of equity inflows that reflects the European sovereign debt crisis. Equity inflows into emerging and developing countries were not affected. However, for these countries' equity inflows show a steady decline since the financial crisis in 2008/2009. Equity net flows show a similar dynamic, but the volatility of changes is much lower. For the advanced economies, net equity inflows are around a value of 0 indicating that inflows and outflows are similar in magnitude. For the emerging and developing countries we observe over the whole period positive net equity flows. The right panel depicts debt inflows and net flows. Here the dynamics are very different. Debt inflows in the advanced economies came almost to a sudden stop during the financial crisis and did not recover since then. For the emerging countries we also observe a reduction but not in the magnitude of the

advanced countries. In addition, average debt flows recovered in those countries to levels observed before the crisis. Only in the last years 2014 and 2015 we observe an increase in debt inflows, that is again driven by the advanced economies.

3. The relationship between financial flows and participation in GVCs

Trade openness is generally considered as an important pull factor of international financial flows. The integration into global value chains is a special element of openness, that considers especially trade in intermediate goods. In this section we study whether the integration in GVCs also a pull factor of global financial flows and whether it affects the volatility of financial flows.

We study the first question by using the push pull factor framework. The importance of "push" factors, i.e., in particular monetary and fiscal policies in advanced economies, is often stressed as important determinant of the rise of capital flows in the decade preceding the financial crisis. Others have emphasized "pull" factors, such as country-specific real divergences of growth and trade as important driver of the of capital flows.

We analyse the impact of GVC participation and GVC position together with a number of other factors that are often considered in the literature:

The total external asset and liability position of the country as a fraction of GDP, as an indicator of the integration into the global financial network. This indicator can be interpreted as a de facto measure of capital account liberalisation. The de jure aspect of capital account liberalisation is covered by the index of Chinn and Ito (2006). At the country level we include GDP per capita growth as an activity indicator and inflation (measured by the GDP deflator). Global aspects are covered by a global risk indicator, here we use the annual mean and the annual standard deviation (based on monthly observations) from the Global Stock Market Factor proposed by Habib and Venditti (2019) and by the global GDP growth rate.

The indicators of interest are the GVC participation and the GVC position indicators. **Table 1** reports the fixed regression results for the whole sample of 60 countries (see Appendix A2 for the coverage of countries). We use a fixed effect regression and control for the time variation using the risk indicators based on the global stock market factor (GSMF) and global GDP per capita growth.

For the GVC participation index we observe a positive coefficient for equity inflows (column 1) and gross equity flows (column 2). An increasing GVC participation is thus associated with higher equity capital inflows but also with higher equity capital outflows in country. The impact on net equity flows is small and not statistically significant. The opposite holds true for debt inflows. Here we observe that a higher GVC participation is associated – everything else equal – with lower debt inflows, lower

debt net flows and lower debt gross flows. This finding broadly confirms that GVC participation increases equity flows, but it also shows that a higher GVC integration does not go hand in hand with increasing total flows. For total financial inflows and gross flows, we find small and statistically insignificant effects (columns 7 and 9). In fact, we obtain the result that a higher GVC participation is associated with lower net total capital flows. This results from the fact that GVC participation is associated with lower net debt flows but not with a change in net equity flows.

Table 1 The impact of GVC participation and GVC position on Financial Flows, fixed effect regressions, 2005-2015

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Equity flows			Debt flows			Total private flows		
VARIABLES	IF	Net	Gross	IF	Net	Gross	IF	Net	Gross
GVC participation (lag)	1.27**	0.18	2.36**	-1.89**	-1.65**	-2.13*	-0.62	-1.46*	0.23
	(2.90)	(0.94)	(2.67)	(-2.73)	(-2.87)	(-2.11)	(-0.74)	(-2.56)	(0.17)
GVC position (lag)	14.21*	0.44	27.97*	-16.38+	-14.73*	-18.03	-2.17	-14.29+	9.95
	(2.49)	(0.18)	(2.44)	(-1.82)	(-1.98)	(-1.37)	(-0.20)	(-1.92)	(0.55)
Total Assets + Liabilities to GDP	1.81**	-0.10	3.71**	-2.86**	-0.64*	-5.08**	-1.05*	-0.74*	-1.37+
	(7.99)	(-1.00)	(8.15)	(-8.02)	(-2.17)	(-9.75)	(-2.45)	(-2.51)	(-1.89)
Chinn-Ito Index	-0.61	-2.47**	1.25	9.10**	1.15	17.05**	8.49*	-1.32	18.30**
	(-0.30)	(-2.77)	(0.31)	(2.86)	(0.44)	(3.67)	(2.21)	(-0.50)	(2.84)
GDP per capita growth	0.44+	0.33**	0.56	1.52**	0.84*	2.21**	1.97**	1.16**	2.77**
	(1.72)	(2.88)	(1.08)	(3.75)	(2.48)	(3.73)	(4.01)	(3.47)	(3.37)
inflation	0.21	0.14	0.28	-0.09	-0.13	-0.06	0.12	0.01	0.22
	(1.01)	(1.52)	(0.67)	(-0.28)	(-0.47)	(-0.12)	(0.29)	(0.05)	(0.33)
GSMF - mean	-1.31+	0.13	-2.74+	-2.69*	0.02	-5.39**	-3.99**	0.15	-8.13**
	(-1.73)	(0.38)	(-1.80)	(-2.26)	(0.02)	(-3.10)	(-2.78)	(0.15)	(-3.38)
GSMF - standard dev.	-4.92+	0.70	-10.54*	-3.93	1.30	-9.16	-8.85+	2.00	-19.69*
	(-1.92)	(0.62)	(-2.04)	(-0.97)	(0.39)	(-1.55)	(-1.81)	(0.60)	(-2.41)
World GDP per capita growth	-1.18+	-0.12	-2.24+	-1.31	-0.93	-1.69	-2.50*	-1.05	-3.94+
	(-1.83)	(-0.42)	(-1.72)	(-1.29)	(-1.10)	(-1.14)	(-2.03)	(-1.25)	(-1.91)
Constant	-95.50**	-9.55	-181.46**	151.03**	126.16**	175.90*	55.53	116.62**	-5.55
	(-2.99)	(-0.68)	(-2.82)	(3.00)	(3.02)	(2.39)	(0.91)	(2.80)	(-0.05)
Observations	600	600	600	600	600	600	600	600	600
R-squared (within)	0.147	0.046	0.144	0.215	0.041	0.281	0.102	0.054	0.103
Number of Countries	60	60	60	60	60	60	60	60	60

Notes: Fixed effect regressions, ** p<0.01, * p<0.05.

With regard to the GVC position we find that equity inflows and gross flows are associated with forward integration. A higher forward integration compared to backward integration increases equity inflows but not net flows. For debt flows we obtain a negative coefficient, that indicate that net debt flows are lower for a higher forward integration. However, total capital inflows seem not to be associated with the GVC position. We obtain a negative marginally significant (below 5% confidence) relationship for net flows. This suggests that a higher forward integration is associated with lower total net capital flows.

For the other variables we observe that the total asset position is positively associated with higher equity capital inflows and gross flows, with lower debt flows and with lower total capital flows. This most likely mirrors the development of debt flows in the aftermath of the financial crisis. The Chinn-Ito Index is a measure of the degree of financial market openness. This index refers to the legal-form restrictions on cross-border capital movements. The higher the Chinn-Ito Index, the more open a country is to international capital flows. The results show that debt inflows, debt gross flows and total inflows and total gross flows are positively associated with financial market liberalization, but not equity flows: net equity flows are lower with lower capital market liberalization. This result suggests that equity and debt flows are governed by a different logic and different actors. The literature suggests that debt flows are driven mainly by banks, equity flows also by nonfinancial business.

The growth rate of a country is a pull factor and associate with higher capital flows. A higher global risk as indicated by the two global stock market factor variables – one capturing the average level within a year (mean), the other the within year volatility (standard deviation) – is associated with lower capital inflows and gross flows.

Table 2 The impact of GVC participation and GVC position on Financial Flows by country groups, fixed effect regressions, 2005-2015

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	advanced countries						emerging and developing countries					
	Equity flows			Debt flows			Equity flows			Debt flows		
VARIABLES	IF	Net	Gross	IF	Net	Gross	IF	Net	Gross	IF	Net	Gross
GVC participation (lag)	2.89**	0.22	5.56**	-3.71**	-3.50**	-3.93*	0.14	0.15	0.12	0.27*	0.18	0.36+
	(3.76)	(0.65)	(3.58)	(-3.12)	(-3.46)	(-2.28)	(1.30)	(1.37)	(1.02)	(2.05)	(1.32)	(1.84)
GVC position (lag)	43.21**	4.78	81.63**	-56.64**	-44.13**	-69.15**	-0.82	-0.56	-1.09	-5.77**	-1.83	-9.72**
	(3.80)	(0.97)	(3.54)	(-3.22)	(-2.95)	(-2.71)	(-0.62)	(-0.41)	(-0.73)	(-3.59)	(-1.08)	(-4.09)
Total Assets + Liabilities to GDP	1.92**	-0.12	3.95**	-2.93**	-0.73+	-5.13**	-2.45*	-3.30**	-1.61	-4.47**	-2.85*	-6.09**
	(6.52)	(-0.95)	(6.65)	(-6.44)	(-1.89)	(-7.79)	(-2.27)	(-2.92)	(-1.32)	(-3.40)	(-2.06)	(-3.13)
Chinn-Ito Index	0.88	-4.00*	5.77	22.27**	4.07	40.47**	-1.65**	-1.58**	-1.72**	-1.22*	-1.28*	-1.15
	(0.22)	(-2.34)	(0.72)	(3.65)	(0.79)	(4.59)	(-3.80)	(-3.47)	(-3.50)	(-2.30)	(-2.30)	(-1.47)
GDP per capita growth	0.81*	0.38*	1.25	1.36*	0.80	1.91*	0.27**	0.23**	0.31**	0.51**	0.36**	0.67**
	(1.98)	(2.11)	(1.51)	(2.14)	(1.49)	(2.08)	(3.59)	(2.89)	(3.67)	(5.58)	(3.72)	(4.90)
inflation	-0.09	0.42+	-0.60	0.21	-0.10	0.52	0.04	0.04	0.05	0.00	0.04	-0.03
	(-0.18)	(1.92)	(-0.59)	(0.27)	(-0.16)	(0.46)	(1.00)	(0.78)	(1.04)	(0.09)	(0.71)	(-0.39)
GSMF - mean	-1.18	1.14*	-3.50	-4.74*	-0.29	-9.18**	-0.77**	-0.76**	-0.77**	0.39	0.39	0.38
	(-0.95)	(2.10)	(-1.39)	(-2.46)	(-0.18)	(-3.29)	(-3.31)	(-3.14)	(-2.94)	(1.36)	(1.32)	(0.91)
GSMF - standard dev.	-7.47+	0.94	-15.88*	-1.20	4.13	-6.54	-0.29	0.33	-0.92	-1.15	0.17	-2.47+
	(-1.88)	(0.54)	(-1.97)	(-0.20)	(0.79)	(-0.73)	(-0.39)	(0.42)	(-1.07)	(-1.25)	(0.17)	(-1.81)
World GDP per capita growth	-1.82+	0.03	-3.66+	-0.82	-0.96	-0.68	-0.36+	-0.16	-0.57*	0.14	0.05	0.23
	(-1.79)	(0.07)	(-1.78)	(-0.52)	(-0.72)	(-0.30)	(-1.81)	(-0.75)	(-2.50)	(0.58)	(0.20)	(0.65)
Constant	-216.34**	-9.51	-423.17**	262.99**	255.56**	270.42*	-2.22	-4.43	-0.00	-7.07	-8.59	-5.56
	(-3.86)	(-0.39)	(-3.73)	(3.03)	(3.47)	(2.15)	(-0.28)	(-0.53)	(-0.00)	(-0.73)	(-0.84)	(-0.39)
Observations	370	370	370	370	370	370	230	230	230	230	230	230
R-squared (within)	0.183	0.062	0.179	0.279	0.073	0.351	0.291	0.286	0.241	0.316	0.144	0.304
Number of Countries	37	37	37	37	37	37	23	23	23	23	23	23

Notes: Fixed effect regressions, ** p<0.01, * p<0.05; + p<0.1.

Table 2 reports the regression results for the advanced and the emerging and developing countries separately. The results suggest that the main results for the GVC indicators are mainly driven by the

advanced countries. GVC participation is positively associated with equity inflows and equity gross flows only in the advanced country sample, for the emerging and developing country sample we find not statistically significant association. In contrast, while for advanced countries a higher GVC participation is associated with lower debt inflows and debt gross flows, for the emerging countries we find a positive association. This suggests that the fragmentation of production may indeed have different implications for advanced and emerging countries when capital flows are taken into account. However, this does not extend to the GVC position indicator. Here, we observe that in emerging countries the GVC position does not affect equity flows but it is also associated with lower debt flows, as in the case of the advanced countries. Interestingly, the results for the de jure capital liberalization (Chinn Ito index) shows that the result is mainly driven by the country groups. The aggregate result that a higher liberalization is associated with higher debt inflows and gross flows is entirely due to the advanced countries, in the emerging and developing countries the association is negative and statistically significant for debt inflows and net flows. The result that equity inflows are negatively related to the capital account liberalization is entirely due to the emerging and developing countries.

Overall, these results suggest that the association between financial and real globalisation may not very strong. GVC participation does not automatically lead to higher capital flows. To study this link over a longer time horizon we relate the volatility of capital flows to the means of total assets to GDP (as measure of financial globalisation) and to the GVC indicators. This exercise follows closely Davies and Van Wincoop (2018), who used these regressions to uncover whether financial or trade globalisation is associated with the moments of gross capital flows. Table 3 presents results from the regressions of capital flow volatility on financial globalisation and GVC indicators. The capital flow moments and means of the independent indicators are calculated by country over the whole time period. The regression results indicate whether countries with a higher stock of external assets and liabilities or a higher GVC participation tend to have more volatile capital inflows net or gross capital flows. The regression results confirm that the volatility of inflows, net flows and gross flows is primarily determined by financial globalisation the coefficients. The coefficients for total assets and liabilities to GDP are statistically significant and economically significant. In contrast to that GVC participation is not statistically associated with a higher volatility of financial flows. The same holds true for the GVC position, with the exception to the ratio of gross to net flows. This suggests that a higher forward integration leads to a higher volatility of gross flows compared to net flows. Overall, these results suggest that the volatility of capital inflows is mainly related to financial globalisation and not strongly associated with GVC participation.

Table 3 Impact of Financial and Trade Globalization on the volatility of capital flows

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Equity flows				Debt flows				Total private flows			
VARIABLES	sd(IF)	sd(net)	sd(gross)	sd(gross)/sd(net)	sd(IF)	sd(net)	sd(gross)	sd(gross)/sd(net)	sd(IF)	sd(net)	sd(gross)	sd(gross)/sd(net)
Total Assets +	8.49**	3.73**	17.59**	0.39**	15.22**	6.13*	27.14**	0.21*	17.04**	5.58*	32.74**	0.28**
Liabilities to GDP	(4.71)	(6.12)	(4.69)	(6.23)	(5.97)	(2.50)	(8.50)	(2.03)	(6.12)	(2.25)	(7.91)	(7.27)
GVC participation	1.01	1.77	-7.63	-0.75	-16.45	-10.28	-19.71	1.48	-16.67	-12.65	-25.57	-0.31
	(0.07)	(0.37)	(-0.26)	(-1.52)	(-0.82)	(-0.53)	(-0.79)	(1.86)	(-0.76)	(-0.65)	(-0.79)	(-1.05)
GVC positon	-1.13	-0.60	-0.37	0.20*	0.11	-0.16	0.51	0.34*	-0.33	0.04	-0.06	0.09+
	(0.45)	(0.70)	(0.07)	(-2.21)	(-0.03)	(0.05)	(-0.11)	(-2.38)	(0.08)	(-0.01)	(0.01)	(-1.68)
Constant	-6.23	-7.02	25.70	4.25*	66.01	44.27	75.26	-5.01	67.50	54.92	99.35	2.59*
	(-0.11)	(-0.35)	(0.21)	(2.05)	(0.79)	(0.55)	(0.72)	(-1.50)	(0.74)	(0.67)	(0.73)	(2.06)
Observations	60	60	60	60	60	60	60	60	60	60	60	60
R-squared	0.337	0.468	0.319	0.410	0.426	0.118	0.600	0.207	0.442	0.098	0.567	0.492

Notes: ** p<0.01, * p<0.05; + p<0.1.

Table 4 reports the results for the two country groups. The results are quite similar for the two samples and confirm the aggregate picture that financial globalisation is driving the volatility of capital flows and not GVC participation.

Table 4 Impact of Financial and Trade Globalization on the volatility of capital flows, country groups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Equity flows				Debt flows				Total private flows			
VARIABLES	sd(IF)	sd(net)	sd(gross)	sd(gross)/sd(net)	sd(IF)	sd(net)	sd(gross)	sd(gross)/sd(net)	sd(IF)	sd(net)	sd(gross)	sd(gross)/sd(net)
(a) advanced countries												
Total Assets +	11.69**	5.07**	23.56**	0.28**	18.79**	7.29+	33.96**	0.23**	21.25**	7.05	40.81**	0.18**
Liabilities to GDP	(3.88)	(5.18)	(3.71)	(2.98)	(4.34)	(1.70)	(6.54)	(4.11)	(4.52)	(1.64)	(5.98)	(3.79)
GVC participation	-10.60	-3.74	-29.33	-0.24	-34.00	-22.88	-44.62	-0.02	-39.16	-30.73	-58.82	0.38
	(-0.41)	(-0.45)	(-0.54)	(-0.29)	(-0.92)	(-0.63)	(-1.01)	(-0.04)	(-0.98)	(-0.84)	(-1.01)	(0.94)
GVC positon	-3.46	-1.23	-4.23	0.34*	-3.01	-1.97	-4.20	0.16+	-3.92	-1.61	-6.27	0.16*
	(-0.72)	(-0.79)	(-0.42)	(2.30)	(-0.44)	(-0.29)	(-0.51)	(1.82)	(-0.53)	(-0.24)	(-0.58)	(2.11)
Constant	37.06	13.62	106.56	2.27	134.12	95.86	168.47	1.32	155.24	128.79	225.77	-0.18
	(0.34)	(0.39)	(0.47)	(0.68)	(0.87)	(0.63)	(0.91)	(0.65)	(0.92)	(0.84)	(0.93)	(-0.10)
Observations	37	37	37	37	37	37	37	37	37	37	37	37
R-squared	0.362	0.499	0.326	0.261	0.392	0.093	0.594	0.358	0.413	0.088	0.552	0.363
(b) emerging and developing countries												
Total Assets +	3.22*	3.44*	3.69*	-0.03	2.78	2.38*	4.35+	1.05	5.79*	4.85+	7.42*	0.23
Liabilities to GDP	(2.42)	(2.65)	(2.86)	(-0.12)	(1.57)	(2.14)	(1.80)	(1.16)	(2.20)	(1.99)	(2.34)	(1.12)
GVC participation	0.29	0.37	1.42	0.63	-0.05	0.97	2.92	1.08	-0.96	0.04	0.43	-0.41
	(0.08)	(0.10)	(0.38)	(1.00)	(-0.01)	(0.30)	(0.41)	(0.41)	(-0.12)	(0.01)	(0.05)	(-0.69)
GVC positon	-0.64	-0.64	-0.54	0.04	-0.32	-0.45	-0.27	0.42	-0.78	-0.86	-0.63	0.10
	(-1.22)	(-1.24)	(-1.05)	(0.46)	(-0.46)	(-1.02)	(-0.28)	(1.16)	(-0.74)	(-0.89)	(-0.50)	(1.23)
Constant	0.53	0.26	-4.16	-1.53	2.50	-1.52	-9.34	-3.49	7.26	3.15	1.96	2.93
	(0.03)	(0.02)	(-0.27)	(-0.58)	(0.12)	(-0.11)	(-0.32)	(-0.32)	(0.23)	(0.11)	(0.05)	(1.17)
Observations	23	23	23	23	23	23	23	23	23	23	23	23
R-squared	0.413	0.452	0.497	0.152	0.202	0.370	0.295	0.272	0.327	0.309	0.356	0.109

Notes: ** p<0.01, * p<0.05; + p<0.1.

4. The impact of GVCs and financial flows on economic outcomes

GVCs and financial flows and the allocation of credit. Although financial globalisation and integration in value chains are not very tightly connected economic factors, it is relevant to assess their impact on economic outcomes. The literature on financial flows emphasizes the possibility of misallocation of financial inflows in unproductive uses. But it is not known whether the integration into global value chains may amplify or reduce the impact of financial flows on the allocation of credit in an economy. Samarina and Bezemer (2016) provide evidence that capital inflows affect the domestic bank lending. They argue that there is a substitution effect between domestic bank loans and foreign capital inflows into non-financial firms in economies with limited investment opportunities. We use the dataset provided by Bezemer et al. (2020) to assess whether financial inflows or GVC participation affects mortgage lending and the lending to nonfinancial enterprises. We regress GVC participation, GVC position, equity and debt inflows together with Total credit/GDP and inflation on the share of mortgage credit in total credit, credit to nonfinancial enterprises in total credit. In addition, we use the allocation of credit as an indicator of the allocation of credit:

$$credit\ allocation = \frac{credit\ to\ nonfinancial\ enterprises}{mortgage\ credit}$$

This variable should provide some evidence on the process that shifts credit to the household sector. The integration in GVC can, in this respect, also be considered to provide some information on the investment opportunities in these countries.

Fehler! Verweisquelle konnte nicht gefunden werden. presents the explorative regression results using two-way fixed effects (time and country fixed effects). In addition, we present for comparison purposes a regression that links GVC indicators and capital indicators to GDP growth.

The results in table 5 suggest that a higher GVC participation is associated with a lower share of mortgage credit in total credit. For the GVC position, we obtain conflicting results. On the one hand, a higher forward integration is associated in the total sample with a higher share of business credit but in the emerging market sample with a higher share of mortgage credit. This result may be due to the fact that some of emerging and developing countries are also resource intensive countries. Financial inflows, on the other hand, provide a mixed picture: Higher equity inflows are associated with lower mortgage credit shares and lower nonfinancial business credit shares. Debt inflows in contrast are associated with a higher mortgage share in total credit and lower share of business credit. This confirms the view that debt inflows are substantially riskier than equity inflows and that

financial globalisation through debt flows may increase imbalances by inducing a mortgage credit expansion. The picture does not change if we consider capital net flows. Panel b in table 5 displays the results.

Table 5: Credit allocation and financial flows and GVC indicators Fixed effect regression with time and country fixed effects

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	all countries				advanced countries				emerging and developing countries			
	mortgage credit share in total credit	nonfinancial sectors share in total credit	allocation of credit	GDP per captia growth	mortgage credit share in total credit	nonfinancial sectors share in total credit	allocation of credit	GDP per captia growth	mortgage credit share in total credit	nonfinancial sectors share in total credit	allocation of credit	GDP per captia growth
a) Capital inflows												
Total credit (lag)	0.15**	0.39**	-0.01		0.14**	0.39**	0.01**		0.24**	0.41**	-0.13	
	(11.53)	(18.54)	(-0.49)		(9.04)	(15.27)	(4.55)		(8.44)	(8.42)	(-1.51)	
GDP per capita (lag)				-0.00**				-0.00*				-0.00**
				(-3.27)				(-2.46)				(-4.07)
Equity inflows	-0.04*	-0.06*	-0.00	0.07**	-0.04+	-0.07+	-0.00	0.06**	-0.03	0.01	0.08	0.15+
	(-1.99)	(-2.09)	(-0.18)	(5.09)	(-1.72)	(-1.94)	(-0.69)	(4.34)	(-0.36)	(0.11)	(0.41)	(1.69)
Equity inflows (lag)	-0.08**	-0.00	0.01	-0.00	-0.08**	-0.02	0.00	0.00	0.02	0.20+	-0.01	0.01
	(-4.00)	(-0.04)	(0.47)	(-0.06)	(-3.38)	(-0.70)	(0.21)	(0.70)	(0.34)	(1.75)	(-0.07)	(0.07)
Debt inflows	0.03**	-0.03*	-0.01	0.01*	0.03**	-0.02+	-0.00**	0.01	0.18**	0.09	-0.12	0.13*
	(4.83)	(-2.33)	(-0.87)	(2.30)	(4.25)	(-1.93)	(-3.94)	(1.44)	(3.82)	(1.15)	(-0.82)	(2.15)
Debt inflows (lag)	-0.00	0.08**	0.00	0.00	0.00	0.06**	0.00	0.00	0.11*	0.09	-0.07	0.01
	(-0.48)	(5.09)	(0.52)	(0.56)	(0.09)	(3.41)	(0.93)	(0.18)	(2.44)	(1.08)	(-0.47)	(0.16)
GVC participation (lag)	-0.22*	0.09	-0.01	0.24**	-0.30	0.02	0.02	0.06	-0.28**	0.18	0.01	0.25*
	(-2.07)	(0.48)	(-0.10)	(3.02)	(-1.65)	(0.06)	(1.10)	(0.51)	(-3.38)	(1.30)	(0.03)	(2.42)
GVC position (lag)	1.23	-4.30*	-0.91	1.00	-1.72	-0.22	0.21	2.46	-3.24**	-0.56	-0.61	-2.38+
	(0.97)	(-2.03)	(-0.78)	(1.06)	(-0.71)	(-0.06)	(0.82)	(1.56)	(-2.88)	(-0.29)	(-0.18)	(-1.77)
Inflation (lag)	0.01	0.26**	0.11*	0.00	-0.08	0.90**	0.04**	-0.03	-0.02	0.04	0.22+	-0.03
	(0.17)	(2.75)	(2.03)	(0.04)	(-0.62)	(4.20)	(2.71)	(-0.35)	(-0.45)	(0.58)	(1.90)	(-0.72)
Constant	32.03**	-2.37	3.38	-4.26	43.92**	2.38	-0.48	9.35	13.21*	-5.31	9.17	-3.09
	(4.21)	(-0.19)	(0.48)	(-0.67)	(3.48)	(0.11)	(-0.36)	(0.98)	(2.26)	(-0.53)	(0.53)	(-0.39)
Observations	536	536	536	536	347	347	347	347	189	189	189	189
R-squared (within)	0.478	0.577	0.037	0.521	0.508	0.623	0.319	0.567	0.614	0.601	0.100	0.582
Number of Countries	56	56	56	56	37	37	37	37	19	19	19	19
b) Capital net flows												
Total credit (lag)	0.14**	0.41**	-0.00		0.14**	0.40**	0.01**		0.24**	0.40**	-0.13	
	(10.99)	(18.73)	(-0.26)		(8.55)	(15.51)	(4.39)		(8.18)	(8.02)	(-1.48)	
GDP per capita (lag)				-0.00**				-0.00*				-0.00**
				(-3.19)				(-2.24)				(-4.37)
Equity net flows	-0.06*	-0.11*	-0.00	0.09**	-0.10**	-0.13*	0.00	0.09**	0.06	0.03	-0.08	0.17*
	(-2.14)	(-2.50)	(-0.02)	(4.56)	(-3.10)	(-2.35)	(0.98)	(4.06)	(0.95)	(0.30)	(-0.43)	(2.19)
Equity net flows (lag)	-0.02	-0.10*	0.01	0.03	-0.07+	-0.14**	0.00	0.03	-0.02	0.25*	0.16	-0.05
	(-0.86)	(-2.17)	(0.24)	(1.36)	(-1.95)	(-2.64)	(0.27)	(1.56)	(-0.34)	(2.42)	(0.92)	(-0.63)
Debt net flows	0.03**	-0.04**	-0.00	0.01*	0.03**	-0.04*	-0.00**	0.01	0.15**	0.03	-0.06	0.08
	(3.87)	(-2.64)	(-0.48)	(2.12)	(3.06)	(-2.35)	(-3.42)	(1.31)	(3.26)	(0.43)	(-0.44)	(1.37)
Debt net flows (lag)	-0.01	0.01	0.00	0.04**	-0.03	-0.03	0.00	0.04**	0.10*	0.04	-0.09	0.11+
	(-0.35)	(0.33)	(0.07)	(3.28)	(-1.15)	(-0.82)	(1.03)	(2.78)	(2.16)	(0.49)	(-0.68)	(1.88)
GVC participation (lag)	-0.25*	-0.06	-0.02	0.29**	-0.34+	-0.26	0.02	0.14	-0.24**	0.22	-0.02	0.27**
	(-2.27)	(-0.31)	(-0.16)	(3.51)	(-1.78)	(-0.86)	(0.88)	(1.11)	(-2.88)	(1.54)	(-0.09)	(2.63)
GVC position (lag)	-0.06	-5.65**	-0.91	1.30	-5.37*	-3.21	0.30	3.80*	-2.03+	0.59	-1.51	-2.11
	(-0.04)	(-2.65)	(-0.78)	(1.38)	(-2.17)	(-0.80)	(1.18)	(2.40)	(-1.87)	(0.32)	(-0.48)	(-1.62)
Inflation (lag)	0.01	0.28**	0.11*	0.00	-0.14	0.87**	0.04**	0.01	0.01	0.05	0.20+	-0.03
	(0.17)	(2.85)	(2.03)	(0.09)	(-1.01)	(4.20)	(2.70)	(0.15)	(0.35)	(0.80)	(1.72)	(-0.59)
Constant	33.05**	6.00	3.62	-6.75	44.74**	18.98	-0.21	4.75	11.95*	-5.74	10.05	-2.85
	(4.20)	(0.46)	(0.51)	(-1.04)	(3.40)	(0.89)	(-0.15)	(0.49)	(2.00)	(-0.57)	(0.58)	(-0.36)
Observations	536	536	536	536	347	347	347	347	189	189	189	189
R-squared	0.448	0.561	0.036	0.512	0.485	0.617	0.314	0.558	0.595	0.599	0.100	0.580
Number of cou	56	56	56	56	37	37	37	37	19	19	19	19

Notes: Annual data. Fixed effect regression with time and country fixed effects. ** p<0.01, * p<0.05; + p<0.1.

While these results suggest that GVC participation may moderate the building up of an excessive mortgage credit expansion, the results for the allocation of credit of all GVC indicators are insignificant. Only debt inflow and net debt flows are associated with a misallocation of credit but only in the advanced countries. For the emerging and developing countries we do not find no

statistically significant relationship between GVC indicators or financial flows and the allocation of credit. Per capita growth in contrast is positively associated with GVC participation and equity inflows. In the emerging countries also debt inflows and a higher forward integration are associated with a higher GDP per capita growth. The result confirms the mixed relationship between financial inflows and economic performance for emerging and developing countries. Financial inflows may create imbalances but are also an element to support economic growth.

GVC and financial flows and innovation. The link between innovation and GVC is ex ante unclear. The integration into global value chains may increase the ability for technology transfer and a technological catch-up. But at the same time the fragmented nature of production across stages may lead to a lock-in a functional specialization that hampers growth and the acquisition of new competences at the country level. Similar arguments can be made for equity inflows that show some correlation with GVC indicators. Unfortunately, not many indicators of innovation are available for a large set of countries. We use growth in R&D expenditures to GDP and patent applications by residents per million people as indicators of innovation.

In order to provide precise measures of the relationship we divide the sample into two time periods. The first covering 2005 to 2010 the second covering 2011 to 2015. This allows to use fixed effect regression with period dummies and so provide estimates that control for country-specific fixed effects that remain stable over the time period. Such country-specific fixed effects could relate to institutions and culture. The first period includes the financial crisis, and the second time period covers the period of the European debt crisis. This may affect the estimates, but the structural nature of innovation makes an analysis at longer time horizons necessary.

The indicators we use are R&D expenditures to GDP, the 5-year growth rate (in logs) of R&D expenditure to GDP and patent applications of residents per million of people. For comparison purposes we include a regression that uses the 5-year growth rate of GDP per capita. As control variables we use initial GDP per capita in constant prices, the human capital index, and R&D expenditures per GDP in the patent regressions and the GDP per capita regressions.

It is important to note that our regressions do not say very much about the direction of causality. We can establish an association, but the direction of causality can in principle run in both ways. This especially true for the regressions in levels. If we uncover a positive association between R&D intensity and GVC participation this can mean that changes in the R&D intensity are related to changes in GVC participation. This implies that those countries with a higher R&D activity are also countries with higher GVC integration. In the context of the fixed effect regression this means that

changes in R&D intensity are correlated with changes in GVC participation. However, nothing can be said on whether R&D intensity attracts GVC production into a country or whether the attractiveness as a location for intermediate production steps leads to an increase in R&D. Therefore, we also include regressions which use the 5year growth rate of the R&D intensity into the picture. Here a positive coefficient implies that changes in the growth rate of R&D are found in countries with a greater change in GVC participation.

However, the results in table 6 suggest that we are not able to uncover statistically significant coefficients for the relationship between the GVC indicators and innovation indicators for the whole sample and the set of advanced economies. The results in the upper panel imply that there is no robust relationship between GVC participation and financial flows with R&D intensity across countries. A higher participation in GVC or higher inflows of financial flows are not associated with higher innovation expenditures or higher patenting. Only for the 5-year growth rate of R&D expenditures to GDP in emerging and developing countries we obtain a positive association with the GVC position. This implies that a higher forward integration is associated with a growth of R&D expenditures. The same picture is obtained for the GVC indicators in the net flow regressions (panel b of table 6). We do not find a statistically significant association of GVC indicators with innovation indicators except for the GVC position in the 5-year growth rate of R&D expenditures to GDP for emerging and developing countries. In developing and emerging countries, we find again a statistically significant association between the GVC position and the 5-year growth rate in GDP per capital. Emerging and developing countries with a higher forward integration were able to increase their R&D expenditures during the period. In addition, we uncover a statistically significant association between GVC indicators and GDP per capita growth and GVC participation. for the emerging and developing countries. In those countries a higher GVC participation is associated positively with per capita growth.

When we turn to capital flows, we observe a negative statistically significant relationship between net debt inflows and R&D intensity (R&D/GDP) for the overall sample and the advanced countries. The other capital flow indicators are not statistically significant. For the GDP regressions, we see a negative relationship between gross equity inflows and GDP growth in the advanced countries and a positive association for the emerging and developing countries. This again suggests that the impacts of financial flows can be different for countries at different stages of economic development.

Table 6 Innovation and financial flows and GVC indicators

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	all countries				advanced countries				emerging and developing countries			
	R& expenditures /GDP	5yr growth in RD expenditures /GDP	Patent applications (residents) / mill.	5yr growth in GDP per capita	R& expenditures /GDP	5yr growth in RD expenditures /GDP	Patent applications (residents) / mill.	5yr growth in GDP per capita	R& expenditures /GDP	5yr growth in RD expenditures /GDP	Patent applications (residents) / mill.	5yr growth in GDP per capita
						a) Capital inflows						
GVC participation	0.03	0.01	-6.27	0.01	0.05	-0.02	0.51	-0.00	-0.01	0.00	-6.99	0.02*
	(1.33)	(0.30)	(-0.87)	(1.11)	(1.49)	(-0.62)	(0.04)	(-0.54)	(-0.39)	(0.15)	(-0.72)	(2.78)
GVC position	-0.16	0.31	95.61	-0.09	-0.26	-0.38	60.40	-0.08	0.39	1.15*	-67.37	-0.29
	(-0.70)	(1.31)	(1.20)	(-1.23)	(-0.59)	(-0.92)	(0.39)	(-0.68)	(1.07)	(2.75)	(-0.35)	(-1.67)
Equity inflows/GDP	-0.00	-0.00	0.42	-0.00	-0.00	0.00	0.26	-0.00+	-0.04	-0.02	7.40	0.02+
	(-1.28)	(-0.21)	(0.38)	(-1.63)	(-1.12)	(0.79)	(0.20)	(-1.90)	(-1.58)	(-0.78)	(0.56)	(2.09)
Debt inflows/GDP	-0.01	0.00	0.34	-0.00	-0.01	0.00	-0.01	-0.00	0.04	-0.04	-5.55	-0.01
	(-1.44)	(0.09)	(0.25)	(-0.58)	(-1.20)	(1.03)	(-0.01)	(-0.69)	(1.35)	(-1.45)	(-0.38)	(-1.03)
Human capital index	-0.30	0.08	240.97	-0.21	-0.36	0.46	258.07	-0.12	0.64	1.88+	-71.56	-0.93*
	(-0.67)	(0.18)	(1.53)	(-1.43)	(-0.57)	(0.80)	(1.17)	(-0.75)	(0.73)	(1.91)	(-0.16)	(-2.34)
GDP PC (Initial)	0.00	0.00	0.01	-0.00	0.00	0.00	0.01	-0.00	0.00	-0.00+	0.00	-0.00
	(1.08)	(0.70)	(0.91)	(-0.19)	(1.02)	(0.40)	(0.96)	(-0.48)	(1.29)	(-1.96)	(0.09)	(-1.77)
R&D expenditures /GDP			226.15**	-0.07			200.32**	-0.06			386.30*	0.20
			(4.31)	(-1.40)			(3.07)	(-1.19)			(2.44)	(1.43)
Constant	0.07	-1.03	-591.33	0.40	-1.19	-0.24	-1,213.38	1.06	-1.40	-4.42	495.30	1.32
	(0.04)	(-0.51)	(-0.85)	(0.63)	(-0.37)	(-0.08)	(-1.08)	(1.27)	(-0.64)	(-1.78)	(0.44)	(1.33)
Observations	109	109	109	109	70	70	70	70	39	39	39	39
R-squared (within)	0.314	0.069	0.358	0.192	0.362	0.122	0.349	0.258	0.487	0.686	0.540	0.707
Number of Countries	57	57	57	57	35	35	35	35	22	22	22	22
						b) Capital net flows						
GVC participation	0.02	0.01	-5.55	0.01	0.03	-0.02	2.39	-0.01	-0.01	-0.00	-7.84	0.02*
	(0.99)	(0.35)	(-0.78)	(1.08)	(0.93)	(-0.52)	(0.19)	(-0.70)	(-0.31)	(-0.03)	(-0.82)	(2.53)
GVC position	-0.28	0.32	111.76	-0.10	-0.61	-0.23	104.15	-0.14	0.28	1.35*	-20.70	-0.25
	(-1.35)	(1.41)	(1.43)	(-1.35)	(-1.52)	(-0.57)	(0.67)	(-1.10)	(0.69)	(2.83)	(-0.11)	(-1.38)
Equity inflows	0.00	-0.01	-0.16	0.00	0.00	-0.00	0.04	0.00	-0.02	-0.03	8.67	0.01
	(0.11)	(-0.92)	(-0.08)	(1.53)	(0.20)	(-0.35)	(0.02)	(1.31)	(-0.98)	(-1.33)	(0.84)	(1.04)
Debt inflows	-0.01**	0.00	1.51	-0.00	-0.01*	0.00	1.50	-0.00	0.01	-0.03	-8.00	0.01
	(-3.03)	(0.91)	(1.01)	(-0.03)	(-2.74)	(0.58)	(0.85)	(-0.30)	(0.34)	(-0.85)	(-0.61)	(0.51)
Human capital index	-0.38	0.06	250.95	-0.22	-0.32	0.44	266.22	-0.11	0.90	1.78	-32.14	-1.05*
	(-0.93)	(0.14)	(1.64)	(-1.56)	(-0.56)	(0.75)	(1.22)	(-0.66)	(0.94)	(1.56)	(-0.07)	(-2.33)
GDP PC (Initial)	0.00	0.00	0.01	-0.00	0.00	0.00	0.01	-0.00	0.00	-0.00	-0.00	-0.00
	(0.96)	(0.80)	(0.90)	(-0.20)	(0.89)	(0.65)	(0.90)	(-0.48)	(0.77)	(-1.33)	(-0.02)	(-1.04)
R&D expenditures			247.56**	-0.05			229.03**	-0.04			383.50*	0.15
			(4.41)	(-0.92)			(3.22)	(-0.79)			(2.62)	(1.07)
Constant	0.95	-1.10	-701.40	0.42	0.43	-0.51	-1,412.39	1.14	-1.84	-4.43	442.07	1.52
	(0.52)	(-0.55)	(-1.02)	(0.66)	(0.15)	(-0.17)	(-1.26)	(1.27)	(-0.77)	(-1.57)	(0.39)	(1.39)
Observations	109	109	109	109	70	70	70	70	39	39	39	39
R-squared (within)	0.412	0.091	0.371	0.176	0.477	0.101	0.365	0.175	0.426	0.613	0.558	0.663
Number of Countries	57	57	57	57	35	35	35	35	22	22	22	22

Notes: Five-year averages. Fixed effect regression with time and country fixed effects. ** $p<0.01$, * $p<0.05$; + $p<0.1$.

GVCs and financial flows and structural change. Closely related to the question of innovation is structural change, as much of R&D is performed in manufacturing industries. The recent decades showed across all countries a structural change towards service sectors. The evidence shows that since the mid-1990 the average service is higher for any level of economic development and the manufacturing share shows a stronger decline in advanced countries in recent time (Hölzl 2020). The manufacturing share is lower in more recent periods. This is relevant for catching-up processes of lagging countries, if manufacturing is a key sector in the process of catching-up (Rodrik, 2013). GVCs are often seen as one of the drivers of technological diffusion that allows countries to catch up. But the fragmentation of production associated with GVCs can also strengthen functional specialization patterns that may hamper the transition towards high technology manufacturing industries and make it more difficult for lower income countries to avoid being struck in low value-added activities.

Here we examine the association between the manufacturing share of value added to total value added and the services share of value added to total value added with GVC and capital flow indicators. We run a two-fixed effect regression to control for country-specific and time period fixed effects using a split sample covering to time periods: 2005 to 2010 and 2011 to 2015. The use of the fixed effects reduces the trap to fall into omitted variable bias due to some unobserved factors. The regression asks if a change in GVCs or financial flows is associated with structural change. The regression results should not be interpreted in terms of causality. For example, the manufacturing share can increase because of the attractiveness of the country as location of intermediate production stages, but the GVC participation can also increase because the country is strong in manufacturing. But the associations provide important information on the interrelationship between structural change at the country level and financial and real globalization.

Table 7 collects the results. For GVC participation we observe that a greater GVC participation is positively associated with the (5-year) changes in manufacturing share for all countries and the advanced countries. This suggests that in advanced countries a higher GVC participation is associated with a relative increase of the manufacturing share compared to countries with a lower GVC participation. For the emerging and developing countries we observe that an increase of the GVC participation is associated with a lower service share.

For the GVC position we observe that countries with a higher forward integration have a higher service share and a larger 5-years growth rate of the service share. In the advanced countries an increase in the GVC position (forward integration) is also associated with a higher 5-year growth rate in the 5-years growth rate in manufacturing (in the gross flow regression) but also with a lower manufacturing share (in the net flow regression).

For gross flows we observe a statistically significant coefficient for the relationship between changes in debt inflows and the service share, but not for other gross flows. Net flows in contrast show a clearer pattern of association with structural change. Net equity inflows support the manufacturing share and show a negative association with the service share (both for changes in levels and growth rates) and debt flows show the opposite pattern (for changes in growth rates only). These impacts are primarily driven by the evidence on advanced countries. For emerging and developing country sample we do not observe strong statistically significant associations. For the net equity flows, the (statistically insignificant) sign is even reversed.

Table 7: Structural change and financial flows and GVC indicators

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	all countries				advanced countries				emerging and developing countries			
	manufacturing share	services share	change in manufacturing share	change in services share	manufacturing share	services share	change in manufacturing share	change in services share	manufacturing share	services share	change in manufacturing share	change in services share
a) Capital inflows												
GVC participation	-0.00	-0.00	0.03*	-0.01	0.00	-0.00	0.06**	-0.01	-0.00	-0.00+	0.02	-0.01
	(-0.03)	(-1.47)	(2.58)	(-1.32)	(0.16)	(-0.25)	(3.27)	(-1.37)	(-0.37)	(-1.87)	(0.91)	(-0.70)
GVC position	-0.01	0.04**	0.11	0.10+	-0.04	0.01	0.55*	-0.02	-0.00	0.04	-0.30	0.13
	(-0.95)	(2.71)	(0.73)	(1.75)	(-1.34)	(0.43)	(2.23)	(-0.18)	(-0.01)	(1.63)	(-1.31)	(1.11)
Equity inflows/GDP	-0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	0.01	0.00
	(-0.99)	(0.93)	(0.33)	(0.79)	(-0.20)	(1.23)	(0.03)	(0.99)	(-0.79)	(0.47)	(0.62)	(0.10)
Debt inflows/GDP	-0.00	-0.00	-0.00	0.00*	-0.00	-0.00	-0.00	0.00*	-0.00	-0.00	-0.02	0.00
	(-1.45)	(-1.29)	(-0.68)	(2.29)	(-0.52)	(-0.70)	(-0.70)	(2.26)	(-0.50)	(-0.77)	(-1.26)	(0.04)
GDP PC (Initial)	-0.13	-0.08	-1.09	1.01	0.17	-0.87	-4.54	1.09	-0.45	-0.37	0.05	0.16
	(-0.74)	(-0.45)	(-0.59)	(1.33)	(0.21)	(-1.23)	(-0.63)	(0.40)	(-1.19)	(-0.81)	(0.01)	(0.07)
Population (Initial)	0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	0.00	-0.00	0.00
	(0.09)	(0.51)	(-0.45)	(0.33)	(-0.02)	(0.07)	(-0.59)	(0.24)	(0.86)	(0.44)	(-0.78)	(0.33)
Constant	0.49	0.93*	0.06	-1.87	0.02	1.47*	-0.46	-0.29	0.09	0.65**	-0.72	0.34
	(1.18)	(2.20)	(0.01)	(-1.08)	(0.03)	(2.33)	(-0.07)	(-0.12)	(0.52)	(3.12)	(-0.36)	(0.35)
Observations	120	120	120	120	74	74	74	74	46	46	46	46
R-squared	0.381	0.664	0.353	0.362	0.247	0.652	0.519	0.388	0.667	0.769	0.296	0.437
b) Capital net flows												
GVC participation	0.00	-0.00	0.03**	-0.01	0.00	-0.00	0.06**	-0.01	-0.00	-0.00*	0.01	-0.01
	(0.03)	(-1.47)	(3.03)	(-1.26)	(0.19)	(-0.18)	(3.45)	(-1.16)	(-0.42)	(-2.29)	(0.80)	(-0.74)
GVC position	-0.02	0.04**	-0.04	0.13*	-0.04+	0.01	0.16	0.07	0.01	0.05*	-0.13	0.12
	(-1.26)	(2.79)	(-0.29)	(2.38)	(-1.75)	(0.63)	(0.83)	(0.88)	(0.36)	(2.55)	(-0.67)	(1.27)
Equity net flows/GDP	0.00*	-0.00**	0.00+	-0.00**	0.00*	-0.00**	0.01+	-0.00**	-0.00	0.00	-0.00	0.00
	(2.09)	(-3.41)	(1.80)	(-2.91)	(2.48)	(-4.13)	(1.99)	(-3.38)	(-1.03)	(1.48)	(-0.23)	(0.38)
Debt netflows/GDP	-0.00	-0.00	-0.01**	0.00**	-0.00	-0.00	-0.01**	0.00**	-0.00	-0.00+	-0.00	-0.00
	(-1.06)	(-0.36)	(-4.70)	(3.26)	(-0.84)	(-0.16)	(-4.44)	(3.57)	(-0.00)	(-2.02)	(-0.18)	(-0.46)
GDP PC (Initial)	-0.13	-0.31+	2.06+	1.19+	0.27	-1.71**	4.27	2.17	-0.41	-0.62	3.73	-0.24
	(-0.77)	(-1.75)	(1.78)	(1.74)	(0.39)	(-2.78)	(0.87)	(0.97)	(-1.02)	(-1.40)	(1.28)	(-0.10)
Population (Initial)	-0.00	0.00	-0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	-0.00	0.00
	(-0.11)	(0.87)	(-0.93)	(0.58)	(-0.05)	(-0.34)	(0.45)	(0.45)	(0.81)	(0.46)	(-1.15)	(0.38)
Constant	0.48	1.43**	-7.00**	-2.33	-0.07	2.18**	-7.68+	-1.40	0.10	0.60**	0.41	0.25
	(1.20)	(3.51)	(-2.68)	(-1.47)	(-0.11)	(3.92)	(-1.75)	(-0.69)	(0.57)	(3.13)	(0.22)	(0.25)
Observations	120	120	120	120	74	74	74	74	46	46	46	46
R-squared	0.412	0.680	0.460	0.454	0.374	0.722	0.625	0.571	0.656	0.809	0.194	0.444

Notes: Five-year averages. Fixed effect regression with time and country fixed effects. ** p<0.01, * p<0.05; + p<0.1.

GVCs and financial flows and government revenue. The last relationship we want to explore is the relationship to government revenue. It is sometimes argued that integration into global value chains and financial globalization put pressure on governments to reduce taxes and allows for the shifting of profit income. Both mechanisms should impact the government revenue to GDP ratio that we use to analyse this relationship.

We use data from the ICTD/UNU-WIDER government revenue dataset (GRD) and use two indicators of government revenue. The first that includes grants and social contributions and a second that excludes grants and social contributions. The second indicator is the suggested total revenue variable for econometric analysis in the dataset, as it is most consistent and complete across countries. For both indicators we use government expender to GDP ratios and their 5-year growth rates.

As before we set up a short panel structure by setting up two time periods: the first covering 2005 to 2010 and the second 2011 to 2015. We regress the GVC and capital flow indicators on the government revenue to GDP indicators using a two-way fixed effects regression that includes both fixed country and fixed time period effects.

The results are in table 7 and show that GVC participation is positively associated with government revenue to GDP (excluding social contributions and grants). Overall, the relationship between GVC participation and government revenue to GDP is not very strong. For all countries we observe a positive relationship between GVC participation and the growth rate in government revenue (excluding SC and grants) to GDP in both the inflow and the net flow regressions. The association is also statistically significant for the net capital flows regression for advanced countries.

For the GVC position we observe a negative relationship between government revenue for all countries and the advanced country sample but not for emerging and developing countries. This result suggests that for advanced countries a higher forward integration is associated with a lower government revenue to GDP ratio and conversely that a higher backward integration is associated with a higher government revenue to GDP. While the gross flows regressions do not show statistically significant associations, in the net flow regression the GVC position is positively associated with the growth rate in government revenue to GDP in the advanced countries and positively for the government revenue excluding social contributions and growth for the emerging and developing countries. This implies that countries with a higher forward integration display a higher government revenue to GDP ratio (when SC and grans are excluded). Interestingly the other indicator of government revenue is not only statistically insignificant but carries also another sign.

For capital inflows we do not obtain a statistically significant association to government revenue to GDP. However, the estimates are imprecise, which suggest considerable variation across countries even after controlling for fixed effects. In the net flows we obtain a positive relationship of net debt flows with the growth rates of both government revenue indicators. This implies that countries with higher debt net flows also had a higher growth rate of government revenue to GDP. For the emerging and developing countries we observe an association between equity net flows and debt net flows and the narrower measure of government revenue. While the association is negative for net equity flows, it is positive for debt flows.

Table 8 Government revenue and financial flows and GVC indicators

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	all countries				advanced countries				emerging and developing countries			
	gov. rev./GDP	gov. rev. (excl. SC and grants)/GDP	growth in gov. rev./GDP	growth in gov. rev. (excl. SC and grants)/GDP	gov. rev./GDP	gov. rev. (excl. SC and grants)/GDP	growth in gov. rev./GDP	growth in gov. rev. (excl. SC and grants)/GDP	gov. rev./GDP	gov. rev. (excl. SC and grants)/GDP	growth in gov. rev./GDP	growth in gov. rev. (excl. SC and grants)/GDP
a) Capital inflows												
GVC participation	0.24	0.18	0.01	0.03*	0.23	0.14	0.01	0.02	0.31	0.39	0.01	0.03
	(1.36)	(0.87)	(1.12)	(2.11)	(1.04)	(0.58)	(0.74)	(1.21)	(0.82)	(0.88)	(0.26)	(0.88)
GVC position	-3.93*	-0.03	0.00	0.07	-5.61+	-4.38	0.17	0.03	0.49	6.46	-0.10	0.21
	(-2.41)	(-0.02)	(0.01)	(0.48)	(-1.95)	(-1.30)	(1.17)	(0.15)	(0.16)	(1.71)	(-0.40)	(0.71)
Equity inflows/GDP	-0.00	-0.03	0.00	0.00	-0.00	-0.02	0.00	0.00	-0.26	-0.05	-0.01	0.00
	(-0.12)	(-1.29)	(0.25)	(0.14)	(-0.06)	(-0.71)	(0.61)	(0.88)	(-1.14)	(-0.19)	(-0.61)	(0.19)
Debt inflows/GDP	0.02	-0.02	0.00	0.00	0.02	0.00	0.00	0.00	0.50+	0.16	-0.00	-0.02
	(0.82)	(-0.59)	(0.93)	(0.64)	(0.79)	(0.12)	(1.47)	(1.70)	(1.83)	(0.44)	(-0.00)	(-0.65)
GDP PC (Initial)	-0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00
	(-0.91)	(-0.63)	(0.29)	(0.07)	(-0.81)	(-0.56)	(-0.28)	(-0.68)	(0.45)	(-0.95)	(0.12)	(-0.28)
Population (Initial)	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00
	(-0.26)	(-0.43)	(-0.22)	(-0.60)	(-0.39)	(0.09)	(0.73)	(0.70)	(-0.04)	(0.11)	(0.05)	(0.09)
Constant	24.07+	19.66	-0.93	-1.82+	32.38+	26.97	-0.72	-1.09	2.30	-4.34	-0.57	-2.13
	(1.73)	(1.23)	(-1.08)	(-1.93)	(1.95)	(1.48)	(-0.88)	(-1.10)	(0.08)	(-0.12)	(-0.20)	(-0.81)
Observations	113	110	111	107	74	70	74	70	39	40	37	37
R-squared	0.244	0.077	0.134	0.195	0.296	0.181	0.340	0.389	0.367	0.257	0.133	0.201
b) Capital net flows												
GVC participation	0.19	0.14	0.02	0.03**	0.14	0.04	0.01	0.02+	0.41	0.60	0.02	0.05
	(1.02)	(0.64)	(1.54)	(2.88)	(0.64)	(0.16)	(1.50)	(1.99)	(1.05)	(1.67)	(0.45)	(1.58)
GVC position	-3.94*	-0.43	0.04	0.12	-5.85+	-5.24	0.27*	0.15	-1.96	6.17*	-0.11	0.30
	(-2.40)	(-0.23)	(0.38)	(0.96)	(-2.04)	(-1.61)	(2.22)	(0.95)	(-0.70)	(2.35)	(-0.53)	(1.12)
Equity net flows/GDP	-0.03	-0.03	-0.00	-0.00	-0.03	-0.03	-0.00	-0.00	-0.21	-0.40+	-0.02	-0.03
	(-0.77)	(-0.71)	(-0.99)	(-0.57)	(-0.76)	(-0.80)	(-1.05)	(-0.77)	(-0.94)	(-1.84)	(-1.32)	(-1.61)
Debt netflows/GDP	-0.01	-0.01	0.00*	0.00**	-0.02	-0.02	0.00**	0.00**	0.41	0.76*	0.01	0.04
	(-0.24)	(-0.40)	(2.52)	(2.98)	(-0.56)	(-0.78)	(3.57)	(3.46)	(1.60)	(2.66)	(0.71)	(1.58)
GDP PC (Initial)	-0.00	-0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	0.00
	(-0.61)	(-0.65)	(0.37)	(0.04)	(-0.40)	(-0.32)	(-0.12)	(-0.48)	(0.05)	(-0.67)	(0.54)	(0.85)
Population (Initial)	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(-0.11)	(-0.51)	(-0.03)	(-0.45)	(-0.17)	(0.29)	(0.84)	(0.84)	(0.42)	(1.05)	(0.36)	(0.86)
Constant	26.83+	22.52	-1.25	-2.38*	35.49*	31.91	-1.23	-1.73+	-2.31	-24.60	-1.27	-4.33
	(1.86)	(1.35)	(-1.49)	(-2.65)	(2.07)	(1.70)	(-1.67)	(-1.92)	(-0.07)	(-0.85)	(-0.46)	(-1.68)
Observations	113	110	111	107	74	70	74	70	39	40	37	37
R-squared	0.228	0.054	0.222	0.316	0.282	0.177	0.498	0.523	0.328	0.514	0.199	0.329

Notes: Five year averages. Fixed effect regression with time and country fixed effects. ** $p<0.01$, * $p<0.05$; + $p<0.1$

5. Summary

This paper studies the link between international fragmentation of production and financial globalisation at the country level. We measure the impact of international fragmentation of production in each country by the degree and direction of integration into global value chains. More specifically we measure participation in global value chains by the domestic value added content of exports of intermediate goods used by importers in their exports (forward integration) and the foreign value added content of a country's exports (backward integration). The GVC participation is measured by the sum of both indicators and the GVC position the difference of log forward integration and log backward integration. Both GVC indicators are normalised by gross exports. Financial globalisation in turn is proxied by international capital inflows and capital net flows into a country normalised by GDP. Here we distinguish between equity capital and debt capital flows, as the literature suggests that equity and debt flows are quite different.

Our first finding is that financial and real globalisation are linked but not very closely. In fact, a higher integration into global value chains is associated with higher equity inflows and gross flows but it is

negatively associated with the debt flows. Debt flows were considerably higher than equity flows during the 1990s but are lower than equity capital flows since the financial crisis. However, these relationships are primarily driven by the sample of advanced countries. For emerging and developing countries we do not find a strongly negative relationship between GVC participation and debt inflows. This suggests that economic development might be important element determining the association between real and financial globalisation. Regarding the GVC position we find a positive association of forward linkages (exported value added used in importers exports) with equity inflows for the advanced countries. This suggests equity capital inflows (foreign direct and portfolio investment) by foreigners is much more prevalent in countries exporting many intermediate goods that are used in foreign exports. At the same time debt flows in advanced countries and in emerging and developing countries are negatively associated with a higher forward integration. Our results also show that the volatility of capital flows – both debt and equity flows - is more closely associated with financial globalisation than with GVC indicators. This holds true for both advanced and developing countries and confirms that the logic of the expansion of the fragmentation of production and financial globalisation are based on different rationales.

This is also confirmed by the regressions investigating the impact of our GVC indicators and financial flows with structural change: a higher GVC integration is associated with a comparatively better performance of manufacturing share compared to the services share. This is related to backward integration as the GVC position is positively associated with an increase in the service share in economies. However, we do not find evidence that R&D intensity and patent intensity are associated with GVC indicators. This result suggests that the functional specialisation associated with the trade in tasks also affects innovation activities and breaks the close link between manufacturing production and innovation.

This is confirmed by the analysis of capital flows, we find that net equity flows are positively associated with the (relative expansion) of the manufacturing share and negatively associated with the expansion of the service share, while for debt flows, we observe the opposite. This suggests that the participation in GVCs fosters the investment potential in manufacturing sectors. The interaction between the globalisation of fragmented production and domestic manufacturing shares is reinforced by equity capital flows. The results also show that there are differences between advanced and emerging and developing countries: The positive association of GVC participation and net equity flows on manufacturing is observed only for the advanced countries but not for the emerging and developing countries. In addition, we observe that per capita GDP growth is positively associated with GVC participation primarily in the emerging and developing countries. Here equity inflows are positively associated with medium-term and short-term GDP per capita growth. This relationship is not statistically significant for the advanced countries, here we find a short-term

relationship between capital inflows and economic growth that disappears in the medium term perspective. This is associated with the flows of capital after the financial crisis, which led to redirection to financial flows.

Our analysis also confirms the different role of debt and equity flows regarding the build-up of imbalances. However, again we find heterogeneity between the group of advanced and developing and emerging countries. Only for the group of advanced countries we find that higher debt inflows and net debt flows is associated with a tilt in the allocation of credit towards a higher share of mortgage credits compared to the share of credit to non-financial business, even if in both advanced and emerging and developing countries higher debt in- and net flows are associated with an increase in the share of mortgages in total credit. This shows that debt inflows in emerging countries tend also to increase business lending that tends to match the increase in mortgage credit. A similarly difference between advanced and emerging and developing countries we find for equity flows. While equity inflows and net flows are associated with both decreases in the mortgage and the business share in total credit in advanced countries, these tend to increase the share of credit going to businesses in emerging and developing countries. A higher GVC participation is associated with a lower share mortgage credit in emerging and developing countries, suggesting that GVC participation indicates investment opportunities for international capital. This suggests together with finding of a positive association of GVC participation with equity flows, that a higher GVC participation may be an indicator of investment opportunities for both international and national investors at the country level.

The relationship to government revenue suggests that countries with a higher GVC participation showed experienced a higher growth of government revenue compared to countries with a lower GVC participation. Interestingly, we observe that debt net flows are positively associated to higher government revenues. This is primarily an indication, that after the financial crisis debt flows were directed towards more safe countries.

Overall, the results in this paper show that financial and real globalisation are not driven by the same factors. Our results suggest a closer relationship between equity flows and GVC participation than for debt flows. This needs to be considered in the assessment of the impact of financial globalisation. The rise of equity flows over the past decade calls also for a more differentiated analysis of financial globalisation by considering equity and debt flows separately. However, it needs to be considered, that the time period covered by the analysis is a time period of (mostly) declining global debt flows following the financial crisis.

Further research should expand the time horizon in order investigate, whether our results regarding debt flows are driven by the declines of debt flows. Growth and decline often follow different

rationales. Our analysis documents associations, more detailed analyses considering sectors in terms of capital flows and industries in terms GVC integration might shed a clearer light on the direction of causality of the associations documented in the paper.

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Appendix

Table A1: Variable Definitions and Data Sources

Variables	Description	Source
Net financial flows to GDP	debt, equity and total financial net flows (inflows - outflows) in percent of GDP	Alfaro et al. (2014), based in IFS data. updated data up to 2019 available at http://sovereign-to-sovereign-flows.com/
Financial inflows to GDP	debt, equity and total financial inflows (inflows - outflows) in percent of GDP	Alfaro et al. (2014), based in IFS data. updated data up to 2019 available at http://sovereign-to-sovereign-flows.com/
Gross financial flows to GDP	debt, equity and total financial gross flows (inflows - outflows) in percent of GDP; Gross flows are defined as the sum of inflows and outflows	own calculation based on Alfaro et al. (2014), based in IFS data. updated data up to 2019 available at http://sovereign-to-sovereign-flows.com/
Total Assets and liabilities to GDP	sum to total assets and liabilities in percent of GDP	IMF
GVC participation	sum of foreign value added in exports (backward integration) and value added in intermediates that are exported by the importing country (forward integration) in percent of total exports	based on the OECD TIVA database
GVC position	log difference between forward integration and backward integration. A positive value indicates higher forward integration than backward integration, a negative value the opposite.	based on the OECD TIVA database
Chinn-Ito index	The Chinn-Ito index is an index measuring a country's degree of capital account openness.	Chinn-Ito (2006), updated data is availabe at http://web.pdx.edu/~ito/Chinn-Ito_website.htm .
GDP per capita		World development Indicators (World Bank)
GDP per capita growth		World development Indicators (World Bank)
World GDP per capita growth		World development Indicators (World Bank)
inflation	Inflation measured by the GDP deflator	World development Indicators (World Bank)
GSMF - mean	annual mean value (aggregated) of the global stock market factor, which is a measure of global risk that summarizes the comovement of stock market returns in 63 economies	aggregation based on the monthly global risk index developed by Habib and Venditti (2019), data available at: https://sites.google.com/site/fabriziovendittiecon/
GSMF - standard deviation	annual standard deviation of the global stock market factor, which is a measure of global risk that summarizes the comovement of stock market returns in 63 economies	aggregation based on the monthly global risk index developed by Habib and Venditti (2019), data available at: https://sites.google.com/site/fabriziovendittiecon/
mortgage credit share in total credit		Bezemer et al. (2020)
nonfinancial sector share in total credit		Bezemer et al. (2020)
allocation of credit	credit to nonfinancial enterprises to mortgage lending	based on Bezemer et al. (2020)
Total Credit /GDP		Bezemer et al. (2020)
R&D expenditures to GDP		World development Indicators (World Bank)
Patent applications (residents) per million		World development Indicators (World Bank)
Human capital index		World bank
manufacturing share	share of manufacturing value added in total value added	National Accounts Dataset (United Nations Statistics)
services share	share of services value added in total value added	National Accounts Dataset (United Nations Statistics)
growth in government revenue to GDP	Total government revenue including taxes, non-tax revenue, grants and social contributions	ICTD/UNU-WIDER government revenue dataset (GRD)
growth in government revenue (excl. Social contributions and grants) to GDP	Total government revenue, excluding grants and social contributions.	ICTD/UNU-WIDER government revenue dataset (GRD)
Population		World development Indicators (World Bank)

Table A2: Country coverage and classification

iso code	Name	advanced country	emerging and developing country	missing in Table 5	missing in Table 6	missing in table 8
ARG	Argentina		X			X
AUS	Australia	X				
AUT	Austria	X				
BEL	Belgium	X				
BGR	Bulgaria		X			
BRA	Brazil		X			
CAN	Canada	X		(X)		
CHE	Switzerland	X			X	
CHL	Chile		X		(X)	
CHN	China		X			
COL	Colombia		X			X
CRI	Costa Rica		X	X		
CYP	Cyprus	X		(X)		
CZE	Czech Republ	X				
DEU	Germany	X				
DNK	Denmark	X				
ESP	Spain	X				
EST	Estonia	X				
FIN	Finland	X				
FRA	France	X				
GBR	United Kingd	X				
GRC	Greece	X				
HKG	Hong Kong, C	X				
HRV	Croatia	X				(X)
HUN	Hungary	X				
IDN	Indonesia		X			
IND	India		X		X	
IRL	Ireland	X			X	
ISL	Iceland	X				
ISR	Israel	X				(X)
ITA	Italy	X				
JPN	Japan	X				
KAZ	Kazakhstan		X			(X)
KOR	Korea, Rep.	X				
LTU	Lithuania	X				
LVA	Latvia	X		(X)		
MAR	Morocco		X		(X)	
MEX	Mexico		X			(X!)
MLT	Malta	X				
MYS	Malaysia		X			
NLD	Netherlands	X				
NOR	Norway	X				
NZL	New Zealand	X				
PER	Peru		X		(X)	
PHL	Philippines		X			
POL	Poland	X				
PRT	Portugal	X				
ROM	Romania		X			(X)
RUS	Russian Federation		X			
SAU	Saudi Arabia		X	X	(X)	(X!)
SGP	Singapore	X				
SVK	Slovak Repub	X				
SVN	Slovenia	X				
SWE	Sweden	X				
THA	Thailand		X			
TUN	Tunisia		X			
TUR	Turkey		X			
USA	United States	X				
VNM	Vietnam		X	X	(X)	
ZAF	South Africa		X	X		

Notes: for missing in table 5 X indicates country data is missing, (X) indicates some observations are missing; for table 6 X indicates country data is missing, (X) only the second time period is covered; for table 7 X indicates observations for both government revenue indicators is missing, (X) indicates data for government revenue excl. grants and social security is missing; (X!) indicates data for government revenue incl. grants and social security is missing.