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The effect of capital inflows on the imports of capital goods in developing countries

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ABSTRACT

This paper examines the relationship between capital inflows and import of capital goods to credit-constrained industries in developing countries. Using data of 11 industrial sectors in 57 countries for 2000–2020, we find that financially dependent industries import disproportionately more capital goods if they operate in countries that receive more foreign funds. A host of robustness tests, including instrumental variables estimation, confirm our main finding. We also document that: (i) the established nexus breaks down during the global financial crisis, (ii) the observed relationship is mainly due to the direct investment via equity, and (iii) host countries tend to import relatively more capital goods from G7 economies. Overall, our results suggest that one channel through which capital inflows affect economic growth is by alleviating firms' financial constraints, thereby enabling firms to acquire more advanced capital goods.

1. Introduction

If firms in developing countries are to remain competitive, they are often crucially reliant on importing advanced technology from developed countries (Mutreja et al., 2018). However, the process of importing and adopting foreign technology can be expensive (Bas and Berthou, 2012), which presents a challenge to financially-constrained firms. Capital inflows to emerging markets may increase investment resources by relaxing credit constraints (Anwar and Sun, 2015; Wang, 2017; Bose et al., 2020; Igan et al., 2020), particularly, in sectors that are intrinsically more reliant on external source of financing. Nevertheless, the role of credit constraints in explaining the relationship between capital inflows and imports of capital goods has been overlooked in the literature. Against this background, the current paper investigates whether and to what extent capital inflows assist financially-dependent industries in developing countries to import more capital goods.

Researchers and policy makers alike debate the impact of international financial integration on economic growth. Financial

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integration facilitates productive investment and foreign technology importation, but, with weak institutions and poor investment environments, it may lead to resource misallocation and financial crises (Alfaro and Hammel, 2007). Empirical studies have yielded mixed results – for an overview, see e.g., Prasad et al. (2003)[1] and Contessi and Weinberger (2009). Given the lack of consensus regarding the direct impact of financial integration on growth, recent studies have investiagted specific channels through which capital inflows affect growth, such as improvements in total factor productivity or capital allocation efficiency (Bonfiglioli, 2008; Bekaert et al., 2011). The presence of competing channels could explain the mixed evidence on the direct effect of financial integration.

By focusing on the relationship between capital inflows and capital goods imports, our study contributes to the continuing debate on how capital inflows affect economic growth. We argue that capital inflows increase industry's value added and a country's economic growth by enhancing imports of capital goods.[2] Hence, we go beyond a direct correlation between capital inflows and economic growth and analyse a specific microeconomic channel through which capital inflows can affect growth. Our study focuses on developing countries, as that is where, owing to underdeveloped financial markets, the demand for external financing and capital goods is much higher, and the presence of credit constraints is more pronounced than in advanced countries. In addition, emerging economies have more volatile output growth than their advanced counterparts, and therefore, they are in a better position to gain from international risk sharing. By restricting the sample to developing countries, we reduce heterogeneity yet maintain a sufficiently large sample size, both of which improve the accuracy of results.

To quantify the effect of access to external finance on imports of capital goods, we use a panel data set of 11 manufacturing sectors in 57 developing countries over the period 2000–2020. Our empirical approach is to test whether sectors that are more dependent on external sources of finance import more capital goods if they are located in countries which recieve significant levels of capital inflows. We argue that if access to external finance is a binding constraint to imports of capital goods, then we would expect capital inflows to have a larger effect on external-finance dependent industries. This follows the approach developed by Rajan and Zingales (1998), who examine whether external-finance dependent industries in countries with deeper financial sectors grow faster than less external-finance dependent sectors. To overcome the common identification problem that usually persists in cross-country regressions, Rajan and Zingales propose a novel specification by interacting a country characteristic (financial development) with an industry characteristic (external financial dependence). Similarly, we interact a country's capital inflows with a proxy for the sector's reliance on external financing.

Consistent with our prediction, we find that those sectors that are more dependent on external finance disproportionately increase capital goods imports if they are in a country that receives more foreign capital. This result is robust to a host of alternative specifications and estimation techniques. In particular, we deal with the omitted variable bias by controlling for numerous observable characteristics at the country and industry levels. To mitigate reverse causality, we exclude from the sample sectors and countries that are heavily reliant on external finance as they may dominate the market for external financial resources. We further account for endogeneity by implementing an instrumental variables technique, where a country's political proximity to G7 members is used as a novel instrument capturing the exogenous variation in our main regressor. The main empirical findings are robust to these modifications.

We perform two additional analyses. Firstly, recent studies find a great degree of heterogeneity in capital inflows across instrument and borrower types (Cerutti et al., 2015; Avdjiev et al., 2018), implying that not all forms of capital inflows may facilitate imports of capital goods. A significant portion of inflows, especially debt, may ultimately end up in the financial sector, which is not always the optimal channel for boosting foreign capital products in the manufacturing sector. By decomposing capital inflows, we indeed uncover that the results are sensitive to the types of capital inflows; the flow of direct investment via equity is the main driver of capital goods imports, whereas the flow of portfolio investment is not statistically significant. Secondly, we compare capital goods imports from the most advanced economies, G7, to those from the largest developing country, China. Chinese machinery and equipment are often criticized for their lower quality, lack of adherence to international standards, and an insufficient after-sales support. We find that the positive relationship between capital inflows and capital goods imports is much stronger for the G7 sample than for the full sample. This suggest that, to the extent that the overall quality of capital goods from G7 is higher, increasing capital inflows contributes to a higher quality of capital stock.

To place our research in the context of the related literature, the study by Alfaro and Hammel (2007) is the closest to our work. They show that foreign capital contributes positively to imports of capital goods, by alleviating the firms' financial constraints. We confirm their main conclusion. However, our work differs from Alfaro and Hammel (2007) as follows. Firstly, we add to the ongoing debate on the impact of cross-border capital flows on economic activities by investigating the role of credit constraints. Specifically, by taking account of the level of external financial dependence across industrial sectors, we show that the impact of financial inflows on capital goods imports is significantly larger for financially dependent industries, which is a novel finding. We also demonstrate that capital inflows augment the ability of credit-constrained firms to import capital goods from a few R&D-intensive countries.

Secondly, we go into further depth in the investigation of the relationship between the imports of capital goods and capital inflows by considering the global fragmentation. After enjoying decades of global economic integration, the risk of policy-driven geoeconomic fragmentation starts emerging across countries due to such factors as Brexit, Russia's invasion of Ukraine and the Covid-19 pandemic (DAVOS, 2023). This could lead to the long-term declines of global output, disrupting financial, food and energy supplies and the

[1] Prasad et al. (2003) argue that based on a review of the literature, it is difficult to detect a robust causal relationship between financial integration and growth in developing economies. For instance, some empirical evidence finds that the former appears to be more associated with increased consumption volatility than with growth in these countries.

[2] This is detailed in Section 2 of this paper.

reduction of capital flows and international cooperation. In particular, the adverse effect of global fragmentation is likely to be more severe among developing countries, where the growth-boosting 'technology spillovers' from the advanced economies may be jeopardized. By taking advantage of the effect of such fragmentation on capital inflows, we, innovatively, consider the use of the so-called ideal points distance (IPD) developed by Bailey et al. (2017) as an instrumental variable. Foreign policy preferences play a crucial role in international relations theory (e.g., Moon, 1985). The IPD gauges a difference between state ideal points (i.e., preferred foreign policy position) of two countries with a smaller value implying a greater similarity in the foreign policy preference. We calculate the difference between a country's ideal policy position and that of the most developed, G7, countries as our instrument for capital inflows. Our finding reveals that the correlation between the instrument (IPD) and capital inflows is statistically significant. This appears to support the relevance of the foreign policy preferences to the relationship between capital inflows and capital goods imports. This, at the same time, suggests the risk of fragmentation is likely to exert an adverse impact on the international trade.

Thirdly, another aspect that sets apart our paper is related to distinction between *de jure* and de facto measures of openness (Kose et al., 2011). The former refers to restrictions imposed on capital account transactions on cross-border capital movements and is utilized in most previous studies, including Alfaro and Hammel (2007). Capital controls are a policy tool, however, the degree of enforcement of such policy varies over time and across countries. Also, in analyzing how financial openness influences growth, what matters is how much an economy is actually integrated into international capital markets. It is pointed out that the collateral benefits of financial globalization are more likely to be perceived through de facto integration. Many developing countries have rigid capital controls but, at the same time, they are recipients of a significant amount of foreign inflows, indicating that relying on regulatory factor may result in a misleading result. Therefore, contrary to those of *de jure* based studies, we utilize de facto measures of capital inflows.

Fourthly, we focus on the manufacturing sector in developing countries: manufacturing firms produce tradable goods and, with capital goods being a crucial component of their assets, rely on external financing. Hence, analyzing industrial data provides a more precise understanding of the relationship between foreign capital inflows and growth. Finally, we examine the effect of global financial crisis, dig deeper into components of capital inflows through a decomposed analysis, and look into the effect of capital inflows on quality of foreign capital goods.

Our study is also linked to the following strands of literature. Empirical evidence suggests that imports of capital goods positively contribute to economic growth (Mazumdar, 2001; Eaton and Kortum, 2001; Herrerias and Orts, 2013). By acquiring foreign capital goods, developing countries can improve the quality of their capital stocks and boost their total factor productivity (Fauceglia, 2014). In addition, modern machinery and equipment that utilize cost-effective technologies can become sources of innovation, particularly in less developed countries (Bas and Berthou, 2012). However, a number of other studies fail to find a significant productivity gains from access to foreign inputs (see e.g., Van Biesebroeck, 2003; Muendler, 2004; Vogel and Wagner, 2010). As pointed out by Mo et al. (2021), a common feature among these studies is that they are based on the combined imported goods with no or little distinction between capital and intermediates goods imports.[3] We contribute to the literature by isolating the capital goods from other imported goods in examining their association with capital inflows.

Another area of research emphasizes a lack of access to credit as an obstacle to firms' imports of capital goods in developing countries (Tybout, 2000; Bas and Berthou, 2011; Fauceglia, 2014, 2015). Our findings that capital flows facilitate capital goods imports by easing financial constraints, especially in sectors with external financial dependence, fits within these strands of literature. Finally, Leblebicioğlu and Madariaga (2015) argue that the impact of financial inflows on the quality of capital stocks is stronger in developing countries since their production of capital goods is relatively small and is of poor quality, and they need to import better quality of capital goods from advanced economies. Consistent with their study, we find that capital inflows to developing countries have strong impact on imports of capital goods from G7 countries.

The rest of the paper is organised as follows. Section 2 develops the relevant hypothesis. Section 3 describes the study's methodology and data. Section 4 presents the primary empirical findings, followed by an array of rigorous robustness assessments. Concluding remarks are reported in Section 5.

2. Hypothesis development

Imports of capital goods can help firms in developing countries improve their long-term performance and growth (Fauceglia, 2014; Alfaro and Hammel, 2007). Imported capital can augment productivity and economic growth through several different channels. First, imported physical capital lifts total factor productivity (TFP) by enabling more efficient allocation of resources. Developing countries tend to be capital-poor, whilst industrialized countries are capital-rich enjoying a high TFP. Therefore, importing technologically advanced capital from industrialized to developing countries allows firms to improve the efficiency of factors of production. Second, access to foreign capital goods enhances the long-term investment in developing countries, by lowering its relative cost. The cost of investment is typically high in developing countries due to underdeveloped financial markets – leading to a high cost of domestically financed capital assets – and scarcity of domestic capital goods. Imports of capital goods are likely to bring about cost-saving enhancement in production, which raises the return to investment. Third, modern machinery and equipment that utilize cost-effective technologies can also become sources of innovation in less developed countries by transmitting technological advances and facilitating knowledge spillovers across borders (Bas and Berthou, 2012). Under neoclassical theory, improvements in technical

[3] Mo et al. (2021) investigated a large panel of Chinese manufacturing firms during 2000–2006. They find that capital import generates larger productivity gains than intermediates import and conclude that capital goods import is the more important channel of productivity gains from international sourcing.

progress are embodied in newly introduced machinery and equipment, which is key to long-run productivity movements (Li et al., 2023). Moreover, imports of capital goods promote skill-biased technical changes via the complementarity between capital and skilled labour, thereby boosting firms' demand for skills in production (Caselli, 2018). Bas and Paunov (2021) show that input quality upgrading through the imports of capital goods results in an increase in demand for skilled labour, which, in turn, improve the quality of output.

In this respect, the role of capital goods is distinct from other types of imports, such as intermediate goods or final consumer products imports. Intermediate goods are used in the production process, including in the production of technologically advanced final goods. However, there is minimal technology spillovers to the part of the production that takes place in the developing countries. For example, assembly of sophisticated products using imported chips and other goods in a developing country would entail little knowledge transfer to the country. Final consumer goods contribute even less to technological progress in developing countries, as the entire production process has taken place elsewhere. Indeed, studies show that imported capital goods have a greater growth-enhancing impact than intermediate ones (Eaton and Kortum, 2001; Caselli and Wilson, 2004; Busse and Groizard, 2008; Herrerias and Orts, 2013; Mutreja et al., 2018). According to Mo et al. (2021), the dynamic gain from the capital goods arises as a result of interactions between capital importers and suppliers. Prior to purchase, the importers initially learn the necessary techniques for the use of the imported capital. After the purchase of machines or equipment, there will be usually continued technical and maintenance support from foreign suppliers. In some cases, training is also provided. These interactions and procedures allow the importers to acquire foreign advanced knowledge, benefiting them in the long run. Their empirical finding indicates that such long-term effects are unlikely to be gained though the import of intermediate goods, such as materials, parts, and accessories.[4] Moreover, importing intermediates may not require sustained contacts with foreign suppliers, insofar as all imported intermediates are used up in the short period. Caselli (2018) reveals that not only more productive firms tend to import machinery and equipment rather than materials, but these firms also experience an increase in productivity, while the same does not occur when firms start importing materials.

Despite the enormous potential benefits from imported capital goods, firms in developing countries are often constrained by a lack of access to credit. In order to import the needed capital goods, firms require a substantial amount of financial resources. Foreign capital fills the savings gap in financially deficient economies and, by lowering the cost of borrowing, enables investment to grow. For example, equity market liberalizations that encourage capital inflows give firms in emerging economies access to new financing sources and decrease the cost of capital, thereby enhancing investment opportunities (Bekaert et al., 2005; Gupta and Yuan, 2009). An emerging field of research documents how credit constraints in developing countries diminish firms' capacity to import capital goods. Firms in less developed countries can import capital goods from advanced economies only at an extra cost (Tybout, 2000). Therefore, firms desiring to invest in sophisticated production technologies require a significant amount of external financing. This suggests that firms with limited domestic financial resources may be unable to upgrade their technology or add to their capital stock.[5] Evidence from India indicates that firms with low liquidity import fewer capital goods (Bas and Berthou, 2011), whereas firms with a high level of liquidity and/or a low level of leverage import more capital goods (Bas and Berthou, 2012).

Existing literature suggests that lack of financial resources is a barrier to capital goods imports for firms in developing countries. Therefore, we conjecture that foreign funds facilitate imports of capital goods by relaxing the credit restrictions that businesses in developing nations must contend with. Foreign capital can be an important source of long-term investment for these firms. Furthermore, foreign capital spurs the development of the recipient country's financial sector, contributing to increasing the liquidity and the efficiency of capital allocation. New financial techniques and practices can be adopted in the domestic financial markets of developing countries, as well. All of these imply that the benefit of capital inflows should be stronger for those industries that are inherently more external-finance dependent.

The benefits of capital inflows can go beyond increased liquidity. Capital inflows may also enhance productivity growth by transferring technology and managerial techniques via foreign investors' involvement in the investment projects' monitoring or supervising. Capital inflows can also impose discipline on macroeconomic policies of recipient countries, leading to more stable policies, improvements in institutions, and better governance. These so-called "collateral benefits" of foreign capital inflows could result in a high level of growth (Kose et al., 2009). However, the results of empirical studies on the direct link between capital inflows and growth are ambiguous (Aizenman et al., 2013). Accordingly, recent researchers examine the specific channels through which capital inflows may affect growth, and our study focuses on imports of capital goods.

In terms of productivity, the role of imports of capital goods, furthermore, is distinct from the potential role of exports. On the one hand, both imports and exports entail contact with the outside world, which could potentially lead to knowledge spillovers. Exporting firms tend to be more productive than firms that produce primarily or solely for the domestic market. However, the literature overwhelmingly shows that exporting does not increase productivity in a way that importing does. It is argued that a positive relationship between exports and productivity is merely correlational, driven by self-selection, where more productive and innovative firms self-select into becoming exporters (see Kunst and Marin, 1989; Wagner, 2007; Cassiman et al., 2010). For instance, the study by Bernard and Jensen (1999) on industry data uncovers causality running from productivity to exporting, but not the reverse. This is contrasted with the case for imports where a stronger *causal* association is observable with import of capital goods inducing productivity via several channels as aforementioned. Furthermore, most of the production and, hence, world exports of capital goods are concentrated

[4] Mo et al. (2021) also argue that the imports of capital goods may generate an augmented productivity effect, through an import-R&D synergy effect, or induce more R&D investment, leading to productivity growth in the long term. Such effects are found to be insignificant for intermediates import.

[5] See Fauceglia (2014) for empirical evidence.

in developed countries. On that account, for developing countries, imports of capital goods are a way to improve both the efficiency of capital accumulation and the efficiency of domestic production processes (Herrerias and Orts, 2013).[6] Lastly, in the extreme case of poverty-stricken countries, primary goods are their main source of export income. For these countries, engaging in exports of such primary products is unlikely to trigger productivity.

Overall, based on this literature review, we draw our central hypothesis as follows: *Industrial sectors that are more credit constrained import more capital goods if they are located in countries that attract larger capital inflows.*

3. Methodology and data

3.1. Model specification

We aim to investigate if industrial sectors that are financially more dependent and located in countries that receive higher levels of capital inflows exhibit a greater reliance on imported capital goods. To examine this, we specify the following regression equation:

$$ImportCG_{ict} = \beta_0 + \beta_1 . EFD_i \times CF_{ct-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict} \quad (1)$$

where $ImportCG_{ict}$ refers to the share of imports of capital goods in sector i for country c in period t, EFD_i is a measure of industry i's dependency on external financing, CF_{ct-1} denotes total capital inflow for country c in year t, and ε_{ict} stands for the error term. Dummy variables D_{ic}, D_{it}, and D_{ct} represent industry-country, industry-year, and country-year fixed effects, respectively. The interaction term $EFD_i \times CF_{ct-1}$ is our variable of interest. The coefficient β_1 measures the differences in the share of imports of capital goods in financially dependent sectors in countries attracting high or low foreign capital inflows. A positive and statistically significant point estimate of β_1 supports our hypothesis that the financially vulnerable industries in countries with higher cross-border capital flows import relatively greater amount of capital goods.

Our empirical approach is as follow. We begin by estimating Eq. (1) with the fixed-effects estimator. One key advantage of our three-dimensional (industry–country–year) panel is that it allows us to use interacted fixed effects to control for a wide array of omitted variables (Hsu et al., 2014). Following Dell'Ariccia et al. (2008), our goal is to use the most rigid fixed-effects specification. In Eq. (1), D_{ic} rules out cross-industry and cross-country fixed effects, such as industrial policies in each country, D_{it} captures time-variant and industry-specific factors that influence cross-industry imports of capital goods, such as industrial R&D investment, and D_{ct} controls for time-variant and country-specific factors that might drive cross-country differences in investment, such as political and legal environments. Hence, the only uncontrolled unobservable shocks are those that vary simultaneously across sectors, countries and times. Consequently, we cannot separately estimate the effects of *EFD*, which varies only by industry, and *CF*, which varies only by country-year. We confirm the robustness of the results to different sets of fixed effects. The regression errors maybe correlated within clusters, thereby biasing statistical inference. We, therefore, cluster standard errors at a country-year level to account for correlation of errors and regressors over industries within a given country and year. We confirm the robustness of our results to different types of clustering.

Next, we implement a host of robustness checks to address the potential endogeneity issue. Endogeneity can confound our analysis for several reasons. Firstly, omitted variables may drive the relationship between capital goods imports and capital inflows. For example, industries in countries with a high level of capital openness, or in financially more developed countries, may attract more foreign capital and import more capital goods. Additionally, an unobserved macroeconomic policy in a country may affect both the country's capacity to absorb foreign capital and resident firms' ability to source capital goods from abroad. Our use of interacted fixed effects ameliorates the issue of omitted variable bias. If the effect of capital openness, which varies over time, does not change across industries, then the country-year fixed effects account for it. However, to the extent that such effects vary across industries, countries and years, the results could be biased. Therefore, to ensure that financial constraints is the relevant mechanism linking capital inflows to capital goods imports, we control for alternative potential channels through which capital inflows may affect imports of capital goods. Additionally, we control for observable characteristics, especially at the country/industry level, that may impact relative imports of capital goods and then use selection on these observable factors to determine the possibility that our estimates are being driven by unobserved heterogeneity across countries/industries (Altonji et al., 2005). Here, we rely on the recent development by Oster (2019), which takes into consideration both the movement of coefficients and R-squared values, and explicitly links bias to coefficient stability.

Secondly, the imports of capital goods may be one of the pull factors that cause foreign capital flows to a country, in other words, there is the possibility of reverse causality. In our empirical specification, capital inflows are lagged by one year to reduce the reverse causality concern. It is less likely that foreign capital would flow to countries in response to future growth in imports of capital goods in a specific industry. Furthermore, we provide a series of sensitivity tests for reverse causation in Section 4.2. Despite these efforts, the issue of endogeneity remains a concern. Therefore, we employ the instrumental variables (IV) technique by utilizing a measure of political affinity between countries interacted with *EFD* as a source of exogenous variation for our main independent variable, $EFD_i \times CF_{ct-1}$.

Finally, we investigate the sensitivity of our results to alternative measurements of our variables of interest. Following Alfaro and Hammel (2007), we use the share of capital goods import to the country's GDP as our main dependent variable. For the robustness

[6] The successful growth experienced by the emerging industrialized Asian countries in the 1960s was found to be mainly caused by the acceleration of investment by importing capital goods (Rodrik, 1995).

Table 1
Number of observations and the average shares of capital goods imports, capital inflows, ideal points distance, and external financial dependence over the period 2000–2020.

Panel A: by country

Code	Country	Obs.	ImportCG	CF			IPD_G7
				Total	Equity	Debt	
1	Algeria	79	0.58	0.25	1.29	−1.04	2.59
2	Angola	93	0.36	1.59	0.18	3.36	2.16
3	Argentina	211	0.21	3.20	1.89	1.58	1.42
4	Armenia	181	0.45	10.23	3.85	6.25	1.31
5	Azerbaijan	114	0.50	12.01	7.58	2.26	1.86
6	Bangladesh	100	0.29	1.97	0.70	1.28	2.41
7	Brazil	220	0.13	4.41	3.08	1.32	1.69
8	Cameroon	184	0.24	3.49	0.67	2.82	1.49
9	Chile	210	0.48	9.72	6.01	3.71	1.58
10	China	220	0.27	4.37	2.98	1.39	2.09
11	Colombia	217	0.28	5.91	3.50	2.41	1.65
12	Costa Rica	199	0.46	7.67	4.67	3.01	1.62
13	Côte d'Ivoire	135	0.38	2.18	1.02	0.88	1.63
14	Dominican Rep.	202	0.25	6.44	3.59	2.85	1.83
15	Ecuador	208	0.40	3.03	0.90	2.44	2.16
16	Egypt	135	0.28	6.55	0.29	6.06	2.76
17	El Salvador	195	0.44	5.44	2.08	3.37	1.73
18	Ethiopia	70	0.61	4.13	0.00	4.13	1.90
19	Georgia	194	0.56	13.88	7.47	6.27	0.64
20	Ghana	21	0.47	13.57	8.74	4.83	1.89
21	Guatemala	200	0.36	3.73	1.18	2.81	1.51
22	Honduras	164	0.50	5.64	4.54	1.09	1.51
23	India	130	0.18	5.44	2.38	3.06	1.88
24	Indonesia	231	0.23	2.40	1.69	0.75	2.48
25	Iran	9	0.23	−1.76	0.04	−1.80	2.89
26	Jamaica	116	0.40	19.30	5.18	13.43	1.95
27	Kazakhstan	209	0.51	11.22	3.37	7.51	1.73
28	Kenya	185	0.45	5.36	0.48	4.88	2.00
29	Korea Rep.	222	0.36	2.62	1.30	1.44	0.74
30	Kuwait	139	0.29	2.82	0.44	2.38	2.36
31	Lebanon	124	0.34	11.97	7.09	5.02	2.55
32	Malaysia	209	0.74	5.30	3.12	2.34	2.32
33	Mexico	221	0.40	4.46	2.24	2.22	1.61
34	Morocco	174	0.50	4.83	2.37	2.46	2.19
35	Nigeria	154	0.20	2.60	1.61	0.99	1.99
36	Oman	10	0.28	0.65	0.37	0.28	2.72
37	Pakistan	137	0.21	1.94	0.81	1.13	1.96
38	Panama	190	0.43	14.52	4.88	9.80	1.51
39	Peru	213	0.31	5.44	3.37	2.07	1.53
40	Philippines	206	0.29	2.61	1.16	1.46	1.95
41	Romania	199	0.55	6.68	2.77	3.91	0.52
42	Russia	187	0.35	3.19	1.65	1.57	1.39
43	Saudi Arabia	41	0.30	−0.53	0.00	−0.53	2.58
44	Senegal	176	0.43	5.94	1.60	4.30	2.10
45	South Africa	231	0.33	4.74	1.87	2.76	1.90
46	Sri Lanka	200	0.29	4.32	0.38	3.95	2.26
47	Tanzania	211	0.33	4.55	1.66	2.72	2.08
48	Thailand	217	0.66	2.70	2.74	0.02	1.85
49	Trinidad and Tobago	93	0.58	0.45	−0.17	1.39	2.03
50	Tunisia	66	0.67	6.73	2.50	4.23	2.25
51	Türkiye	214	0.34	4.89	1.68	3.21	0.88
52	Uganda	175	0.32	5.44	3.08	2.44	2.13
53	Ukraine	225	0.48	8.36	3.28	5.01	0.69
54	Uzbekistan	37	0.61	11.34	2.69	8.66	1.82
55	Venezuela	129	0.29	2.11	1.10	1.01	2.57
56	Viet Nam	78	0.81	9.74	5.50	4.25	2.70
57	Zambia	177	0.53	6.10	2.36	3.75	2.06

Panel B: by industry

ISIC (Rev. 3)	Sector	Obs.	ImportCG	EFD
17	Manufacturing of textiles	752	0.001	0.17

(*continued on next page*)

Table 1 (*continued*)

Panel B: by industry				
ISIC (Rev. 3)	Sector	Obs.	ImportCG	EFD
24	Manufacturing of chemicals and chemical products	506	0.02	−0.07
26	Manufacturing of other non-mettalic mineral products	913	0.002	0.09
27	Manufacturing of basic metals	484	0.002	0.19
28	Manufacturing of fabricated metal products, except machinery	919	0.16	0.24
29	Manufacturing of machinery and equipment n.e.c.	919	1.55	0.50
30F (30 + 32 + 33)	Manufacturing of office, radio, medical and related products	919	0.76	0.79
31	Manufacturing of electrical machinery and apparatus n.e.c.	918	0.37	0.39
34	Manufacturing of motor vehicles, trailers and semi-trailers	919	0.53	0.38
35	Manufacturing of other transport equipment	919	0.31	0.13
36	Manufacturing of furniture, manufacturing n.e.c.	919	0.15	−0.07

check, we use two alternative dependent variables. Our measure of *EFD* is computed using the US data for 1980–2006 (Laeven and Valencia, 2013). We further check the results by applying *EFD* proxies that are estimated with alternative time periods. In addition, we decompose the total capital flows into seven components and subcomponents and test their individual impacts.

3.2. Data

We obtain data for our variables from multiple sources and merge them to construct a three-dimensional panel dataset consisting of 11 industries in 57 developing countries for 2000–2020. All industries across developing countries that report capital goods imports are included in our empirical work. In this subsection, we describe our main variables: imports of capital goods, external dependence by industrial sectors, and capital inflows by country.

To construct our dependent variables, we obtain information on imports of capital goods from the OECD Bilateral Trade in Goods by Industry and End-use category (BTDIxE). The values of imports and exports of goods are presented by reporting and partner countries and are broken down by industrial activities and end-use categories. The database includes information for more than a hundred reporters and partners. The industries are arranged to two-digit classification according to Revision 4 of the International Standard Industrial Classification of All Economic Activities (ISIC). Our main dependent variable is the ratio of capital goods imports in an industry to the country's GDP, where data on GDP is drawn from World Bank. To conduct robustness checks with alternative dependent variables, we recalculate the share of industry's capital goods imports by replacing country's GDP with the industry's total imports or industry's value added. For the latter, we collect data on industry's value added from the United Nations Industrial Development Organization (UNIDO) Industrial Statistics Database.

The UNIDO reports disaggregated yearly data on industrial sectors where industries are at two-digit classification according to ISIC, Revision 3. The database contains information on value added, output, number of establishments, gross fixed capital formation, and employment numbers. Note that we also use some of these measures to construct control variables. A measure of the degree of financial dependence of each industry comes from Laeven and Valencia (2013), which is constructed using data on U.S. firms. The underlying assumption is that financial markets in the United States are relatively frictionless and informative and, consequently, industry characteristics based on U.S. firm data reflects only technological characteristics rather than U.S. industry norms. The external financial dependence of each industry is computed by using the share of investment not financed with internal cash flows.

In order to combine capital goods data (classified at the ISIC Rev. 4 level), the UNIDO industry data and the external-finance dependence data (typically classified at the ISIC Rev. 3 level) together, we regroup the 14 industries of ISIC Rev. 4 to the 11 industries of ISIC Rev. 3, using the Annex VIII of UNIDO Industrial Statistic Database User's Guide. In some cases, we also have to manually match them. We obtain data on annual growth of capital inflows from the IMF's Balance of Payments Statistics. This database allows us to split the gross capital inflows into three main categories of direct (equity and debt) investment, gross portfolio (equity and debt) investment, and other debt inflows. This enables us to perform disaggregated analyses for each component of inflows. Other country-level data are retrieved from standard databases and other publicly available sources. Appendix Table A1 describes all variables and data sources.

3.3. Summary statistics

Panel A, Table 1 shows the number of observations, the average values of the share of capital goods imports to the country's GDP (ImportCG) and the total capital inflows (CF) and its components – equity and debt – as % of GDP over 2000–2020 for 57 countries. The last column reports the ideal points distance (IPD) index, which we will explain in Section 4.2.3. Viet Nam and Malaysia have the highest average share of capital goods imports to their GDP at more than 70%, whereas Brazil and India record the lowest average share at less than 20%. It appears that the two fast-growing emerging economies, Brazil and India, are well-facilitated with own capital goods in producing the manufacturing output with less need of imported ones. With respect to CF, it is noteworthy that the oil-rich countries of Algeria, Iran and Saudi Arabia have recorded almost zero or negative capital inflows. For these countries, the debt inflow share is negative and for Iran and Saudi Arabia, the equity investment share is negligible. This is indicative of the self-sufficiency in capital, *albeit* for Iran it may be ascribed to the economic sanctions imposed by Western countries.

The average share of capital goods and the external financial dependence (EFD) at the industry level are presented in Panel B,

Table 1 for 11 classified manufacturing sectors. Not surprisingly, the machinery and equipment sector (ISIC 29) relies heavily on imports. Its averaged share is 1.55, which is the highest among the reported manufacturing sectors, and implies that the value of the capital goods imports well exceeds the GDP. The lowest need for capital goods import is found in textiles industry (ISIC 17) with the share being only at 0.001. Considering EFD, office, radio, medical and other related products (ISIC 30F) is the industry most heavily dependent on external finance scoring at 0.79, followed by the machinery and equipment sector at 0.50.

We report the summary statistics for the main variables used in the regression analysis in Table 2. It is noteworthy that the standard deviations of CF are extremely high relative to the means reflecting the large variations in this variable across countries.

Fig. 1 plots the annual average of capital inflows (CF) against the average share of capital goods imports (ImportCG) for 57 developing countries over the period 2000–2020. The trend-line has an upward slope and many developing countries tend to cluster around the line. This demonstrates that ImportCG increases in tandem with the increased CF to developing countries. This appears to validate the hypothesis that CF induces capital goods imports. We next examine whether this correlation depends on the degree of sectors' financial dependence. Fig. 2 displays the scatter diagram of ImportCG and CF for each country, where based on median values, individual industries for each country are divided into those with high external-finance dependence, i.e. EFD $>$ Mdn., and those with low dependence, i.e. EFD $<$ Mdn. The figure clearly indicates that the level of share of capital goods and the level of CF are positively correlated for high EFD industries. This is contrasted with the low EFD sectors where the two variables appear to be independent from each other. The heterogeneity across industries with varying degree of external-finance dependence is consistent with our conjecture that if CF were to help industries to import more capital goods, then the impact should be more pronounced for sectors that are more dependent on external finance. Next, we rigorously test this observed relationship using regression analysis to ensure that the association is not spurious.

4. Empirical findings

4.1. Baseline results

Table 3 reports the baseline results. Our main variable of interest is the interaction between EFD and CF, which allows us to explore whether the external-finance dependent industries benefit more from capital inflows in increasing capital goods imports. In columns 1 and 2, we add Industry x Country, Industry x Year and Country x Year fixed effects with the standard errors clustered at the country-year level and the country level, respectively. Columns 3–8, utilize various combinations of individual and/or interactive fixed effects.[7] Following Rajan and Zingales (1998), we also control for the share of value added (*Share*) of each industry to total value added of all industries in an economy, but this reduces the number of observations substantially owing to missing values. Therefore, we present the baseline results with the variable *Share* in Appendix (Table A2) and show that the results are robust.

The important finding is that sectors with a higher level of external-finance dependency import disproportionately larger amount of capital goods if the sectors are located in a country that receives more foreign capital. This is robust across all specifications (columns 1–8). Although the size of coefficients somewhat varies ranging from 0.012 to 0.023, all coefficients are highly statistically significant at the 1% level. CF indeed induces more imports of the capital goods to external-finance dependent sectors. The variation in the magnitude of the effect across models indicates that some unobserved factors are correlated with the main variable of interest. The result largely accords with the existing literature (e.g., Alfaro and Hammel, 2007; Bas and Berthou, 2012; Leblebicioglu and Madariaga, 2015). For example, Ding et al. (2019) argue that international capital flow networks enhance the trade networks in the short run perspective, supporting the close association between capital flow and trade, though not vice versa.

The observed correlation between capital inflows and share of capital goods also holds economic significance. Our analysis provides an estimation of the disparity in capital goods imports between industries with high and low external finance dependence. Using the interaction term coefficient for the baseline regression (Table 3, Column 1), we find that, on average, an industry located in a country at the 90th percentile of external finance dependence has roughly 8.45% greater share of imports of capital goods compared to an industry located in a country at the 10th percentile of external finance dependence, ceteris paribus.

However, such effects appear to fade away during the financial crisis. In columns 9–11, we re-run the regressions by splitting the sample into pre-, during and post-global financial crisis periods. The column 10 shows that the impact of interaction term is not statistically significant during the subprime crisis. The crisis severely hit the economy worldwide and the economic activities stagnated due to the sudden decline of function in financial intermediaries. The insignificant effect of CF on imports of capital goods clearly indicates the contraction of investment as an inevitable consequence of the crisis.

Note that we also checked the effect of capital inflows on imports of intermediate goods and found a statistically insignificant relationship (the results are available upon request). Although it is a preliminary test, this implies that capital inflows are mostly used for long-term investments rather than supplying working capital.

4.2. Addressing the endogeneity issues

The key challenges to the empirical analysis are the endogeneity problems associated with omitted variable bias and reverse causality. We conduct several exercises to address them.

[7] Note that in columns 4–8, we include CF and in column 6, we add EFD because of the relaxation of fixed effects, though the results are not reported to save space.

Table 2
Summary statistics of the three main variables used in this study over the period 2000–2020.

Variable	Obs.	Mean	Std	P25	Mdn	P75	Min	Max
ImportCG	9087	0.39	0.56	0	0.16	0.52	0	2.97
CF (total)	1197	5.67	5.69	2.57	4.84	7.84	−10.15	27.11
Equity	1197	2.56	2.38	0.92	2.08	3.62	−2.61	14.06
Debt	1197	3.10	4.47	0.86	2.70	4.99	−15.51	25.00
EFD	11	0.27	0.24	0.09	0.24	0.39	−0.07	0.79
IPD_G7	1197	1.78	0.55	1.48	1.83	2.14	0.42	3.25

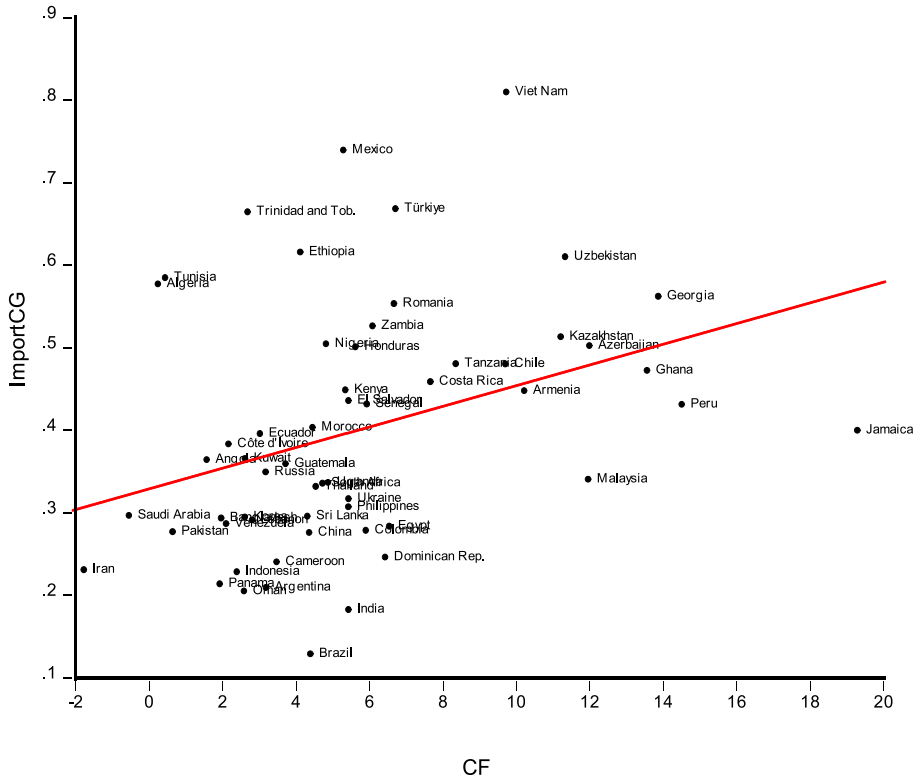

Fig. 1. Average of total capital inflows (CF) versus average share of capital goods imports (ImportCG) for 57 developing countries over the period 2000–2020.

4.2.1. Omitted variable bias

We find support to our hypothesis that the increased CF promotes the imports of capital goods in industries that are more dependent on external financing. However, the interaction between CF and EFD may pick up the effects of some sectoral-level and/or country-level latent variables that could also affect capital goods imports. For instance, countries that are more open to cross-border capital flows are likely to be more open to trade and may be well positioned to import capital goods. This may generate a potentially spurious positive association between capital imports and the interaction variable. We have incorporated an extensive array of interactive fixed effects to account for unobserved differences. However, if the unaccounted factors exhibit simultaneous variations across countries, industries, and time, the outcomes may be subject to bias. To address the omitted variable bias, we evaluate the significance of our result after controlling for observable characteristics that may affect capital goods imports.

Firstly, following the existing literature, we control for market share and competition at the industry-level. We expect that industries with more market share have a better position in importing capital goods. As a proxy for market share, we use the share of value added (*Share*) of each industry to total value added of all industries in an economy (Rajan and Zingales, 1998). Competition is an important determinant of a sector's capital allocation contributing to overall economic growth (Cetorelli and Strahan, 2006). It has the

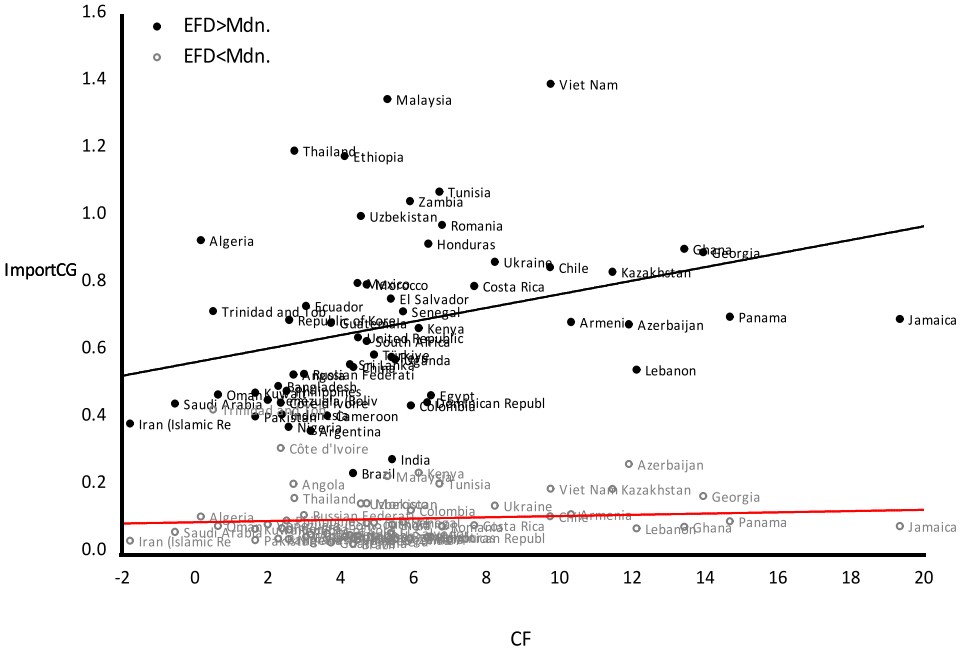

Fig. 2. Averages of share of capital goods imports (ImportCG) and total capital inflows (CF) for 57 developing countries in sectors more dependent on external finance (EFD > Mdn.) and less dependent on external finance (EFD < Mdn.) over the period 2000–2020.

potential to boost a firm's efficiency and stimulate firms to invest in both research and development activities and foreign technology (Aghion et al., 2005). The higher competition may, therefore, influence the imports of capital goods. In the model, *Competition* is industry competition measured as price-cost margins (PCM).[8] Both variables are specified in columns 1 and 4 of Table 4.

Secondly, we control for the durability of goods and intangible assets at the industry level (Kroszner et al., 2007). *Durable* is an indicator that takes a value of one if the sector manufactures predominantly durable goods, and a value of zero if it produces mostly nondurable goods. The former is, surely, more likely to boost the imports of capital goods than the latter. *Intangibility* is the median level of the ratio of intangible assets to fixed assets of an industry. While an intangible asset does not have the observable physical value of a machine or equipment, it can prove to be valuable for a firm and its long-term success. For example, brand recognition or reputation is not a physical asset, yet it has a significant impact on the sale of products, thereby affecting the level of production. The variables of *Durable* and *Intangibility* are interacted with the CF in columns 2 and 4 of Table 4.

Thirdly, the inclusion of the country level indicators in columns 3 and 4 of Table 4 permits us to control for factors that are unique to each country. The literature (e.g., Rajan and Zingales, 1998) confirms that the financial development of a country affects industry growth through firms' financial dependence, whilst also recognizing the effects of credit constraints on capital goods imports (Fauceglia, 2014). Furthermore, trade liberalization can facilitate imports of machinery and equipment and hence investment. Therefore, we control for overall availability of domestic credit and a potential change in trade liberalization policy by adding the domestic credit, capital openness, exchange rate regime and tariff, each interacted with EFD. We also capture the general macroeconomic growth and stability of a country by including GDP growth and inflation interacted with EFD. The definition and sources of these variables are reported in Appendix Table A1.

Consistent with the baseline findings in Table 3, the effect of *EFD* × CF on capital goods imports is positive and statistically significant, although the magnitude of the coefficient reduces when country specific indicators are included in columns 3 and 4.

With respect to the control variables, market share (Share) exhibits a positive effect, *albeit* at the 10% significance level, indicating that large firms are in a privileged position to acquire more capital goods from abroad (column 1). It is noteworthy that the production of durable goods and a high ratio of intangible assets to fixed assets promote more capital goods imports – see columns 2 and 4. The latter indicates that strong intangible assets such as goodwill, brand recognition and intellectual property boost the production and sales of the manufacturing goods. This, in turn, requires more capital goods. Among the country indicators, the macroeconomic indicators, including inflation, appear to exert a positive and statistically significant effect. Inflation may be a cause of economic instability, yet it often enhances the production of goods, as firms are able to set up a better price strategy by increasing markup.

Despite our efforts to control for country- and sector-specific effects, some relevant factors may remain unaccounted for. Hence, our

[8] Several other studies also use price-cost margin as an indicator for industry competition. See for example Braun and Raddatz (2008) and Boulhol (2008). The price cost margin is computed using industry data as follows: $PCM = \frac{Value\ of\ Sales - Payroll - Cost\ of\ Materials}{Value\ of\ Sales} = \frac{Value\ Added - Wages}{Output}$. It indicates the ability of firms in an industry to set prices above marginal costs.

Table 3
Capital inflows and imports of capital goods – Baseline results.

	Baseline								Pre-GFC	GFC	Post-GFC
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
$EFD_i \times CF_{ct\text{-}1}$	0.012***	0.012***	0.023***	0.021***	0.015***	0.023***	0.023***	0.012***	0.014**	−0.008	0.008**
	(3.92)	(3.32)	(5.96)	(5.41)	(4.65)	(5.95)	(5.93)	(3.93)	(2.00)	(−1.07)	(2.05)
Industry FE	No	No	Yes	No	No	No	Yes	No	No	No	No
Country FE	No	No	No	Yes	No	Yes	Yes	No	No	No	No
Year FE	No	No	No	No	Yes	Yes	Yes	No	No	No	No
Industry × Country FE	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes
# Countries	57	57	57	57	57	57	57	57	57	57	57
# Industries	11	11	11	11	11	11	11	11	11	11	11
N	8638	8638	8668	8668	8638	8668	8668	8638	3114	876	4523
Adj. R^2	0.906	0.906	0.716	0.722	0.890	0.370	0.722	0.893	0.923	0.948	0.926

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 . EFD_i \times CF_{ct-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods to the country's GDP in sector i in country c in the period t. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is total capital inflow for country c in year $t-1$. All specifications, unless otherwise specified, contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level, unless otherwise specified. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020.

Table 4
Addressing omitted variable bias.

	[1]	[2]	[3]	[4]
$EFD_i \times CF_{ct-1}$	0.013***	0.013***	0.008**	0.009**
	(3.14)	(4.06)	(2.31)	(2.10)
Controls for sectoral factors				
$Share_{ict-1}$	0.156*			0.147
	(1.72)			(1.62)
PCM_{ict-1}	−0.052			−0.060
	(−0.96)			(−1.13)
Controls for other channels				
$Durable_i \times CF_{ct-1}$		0.003***		0.002**
		(2.87)		(2.40)
$Intangability_i \times CF_{ct-1}$		0.051***		0.054***
		(4.52)		(3.41)
Controls for other country factors				
$EFD_i \times Domestic\ Credit_{ct-1}$			0.003	0.003
			(1.47)	(1.36)
$EFD_i \times Capital\ Openness_{ct-1}$			0.003	0.010
			(0.17)	(0.49)
$EFD_i \times FXR_{ct-1}$			0.001	0.033
			(0.04)	(1.14)
$EFD_i \times Tariff_{ct-1}$			0.020	−0.015
			(1.06)	(−0.68)
$EFD_i \times GDP\ Growth_{ct-1}$			0.013***	0.010**
			(2.97)	(2.17)
$EFD_i \times Inflation_{ct-1}$			0.005***	0.006***
			(2.77)	(3.62)
Industry × Country FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes
# Countries	57	57	57	57
# Industries	11	11	11	11
N	5295	8638	8004	5115
Adj. R^2	0.933	0.906	0.905	0.934

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 .EFD_i \times CF_{ct-1} + \nabla .X_{ict-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods to the country's GDP in sector i in country c in the period t. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is total capital inflow for country c in year $t-1$. X_{ict-1} is a vector of industry, country and/or their interactions control variables (one year lag wherever possible). All specifications contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020. Sample size varies across regression specifications because not all variables are available for all industries, countries or years.

results may still be influenced by unobservable variables that are correlated with both cross-border capital inflows and imports of capital goods. To measure the significance of this omitted variable bias, we adopt an approach proposed by Altonji et al. (2005), which involves testing the extent to which coefficients of interest are affected by the inclusion of additional regressors (unobservable factors). This approach helps to quantify the influence of unobservable factors that would be needed to completely explain the positive relationship between our main variable of interest ($EFD \times$ CF) and the imports of capital goods. If this needed influence is large, we can be more confident in proposing a causal interpretation of the estimated relationship.

Following Oster (2019), we scale the coefficient movements by the observed increase in R^2 as a measure of change. We use two types of regressions: a restricted regression with a limited set of control variables from baseline Table 3 (column 1) and a full regression with a full set of country and sector controls from Table 4 (column 4). In implementing Oster's (2019) method, two important pieces of information must be determined. The first is δ, which reflects the relative degree of selection on observed and unobserved variables. The second is R^{max}, which is derived from a hypothetical regression of the treatment variable on observed and unobserved factors. The value of δ is set to one, indicating that the selection on observed and unobserved variables is identical. This means that the

unobservables and observables are equally related to the variable of interest. We let R^{max} be equal to 1, where R^{full} can be obtained from the full model with control variables. The changes in R-square and coefficients serve as valuable indicators to evaluate the robustness of the estimates. The estimated Oster delta is 1.47.[9] It shows that the unobservables need to be 1.47 times as important as the observable factors in order to eliminate the estimated effect of capital flows. It is above the threshold of unity and we can conclude that our baseline result is robust to the omitted variable test proposed by Oster (2019).

4.2.2. Reverse causality

The CF variable is lagged by one year to mitigate the reverse causality issue, but the endogeneity problem remains. For instance, if sectors or countries that are heavily reliant on external finance accrue more capital goods imports, then they may be the ones to play a dominant role in receiving more financial resources from overseas. To deal with this endogeneity concern, we apply four strategies, which are reported in Table 5. Firstly, we exclude the top quartile (75% and above) of financially dependence sectors (column 1). Secondly, we drop the top quartile of countries with high share of financial dependence to GDP (column 2). It is plausible to expect a larger reverse causality bias in countries where the financially vulnerable sectors constitute a significant portion of GDP. We quantify this proportion as the product of each sector's EFD and its value added in each country divided by the country's GDP. We also exclude countries with capital inflows exceeding the 10% of GDP (column 3). Finally, we remove both the top and bottom 10% of countries in terms of capital goods imports (column 4).

The results are broadly similar to those in Table 3. Removing potentially influential sectors and countries in determining the effect of CF on capital imports does not alter the original finding.

4.2.3. Instrumental variables strategy

Our final approach to address endogeneity issues is the instrumental variables (IV) strategy. To construct our external instrument, we obtain data on ideal points distance (IPD) from Bailey et al. (2017). The IPD is an absolute difference between estimated state ideal points, or most preferred foreign policy positions, of two countries. We acquire state ideal points of each sample country and G7 member countries. For example, the United States' ideal points distance index (IPD_US) represents the absolute difference between a sample country's preferred foreign policy position and that of the United States; a larger value indicates a greater dissimilarity in states' foreign policy preferences. Alternative measures of political ties exist. For example, the S-score measure of political proximity is based on the UN votes cast by a country relative to a comparison country. A drawback of S-score measure is that it assumes a perfect match between two country's foreign policy preferences and how frequently they vote in line with each other. Hence, it fails to distinguish changes in the UN's agenda from shifts in state policy preferences. Bailey et al. (2017), in contrast, developed IPD measure using information about the content of the UN's agenda. This index better distinguishes changes in the UN's agenda from state foreign policy shifts and is more suitable to intertemporal comparisons.

Our aggregated political affinity measure, IPD_G7, is the average of individual G7 ideal points distance indices. The interaction between IPD_G7 and EFD is used as an external instrument. We also check the robustness of results using IPD of individual G7 member countries. The average values of IPD_G7 at the country-level and its summary statistics are shown in Table 1 (Panel A) and Table 2, respectively. For example, Iran, Oman, and Egypt are among countries whose preferred foreign policy position differ greatly from foreign policy position of G7 counties, indicated by large IPD_G7 values exceeding more than 2.70. On the other hand, Georgia, Romania, and Ukraine have close political alignment with G7 countries.

For our instrument to be relevant it should be correlated with capital inflows. We argue that stronger political alignment with G7 countries facilitates more foreign capital inflows. Political proximity to G7 countries sends a signal of stability and lower political risk to potential investors. Also, such political ties increase capital inflows directly from G7 member countries, which are the top providers of capital worldwide. Evidence suggest that investor's political ideology influences international capital allocation (Kempf et al., 2023). Adarkwah et al. (2021) find that political alignment leads to a raise in multinational firm's foreign subsidiary investment. Furthermore, political alliance is found to be an important determinant of bilateral foreign aid (Alesina and Dollar, 2000). For instance, Table 1 (Panel A) shows that Algeria, which has a large value of IDP_G7, has a small value of capital inflows. Georgia is closely aligned with G7 and has the largest capital inflows among these countries. Capital inflows to the largest developing country, China, which has a relatively large IDP_G7 magnitude, is below the sample average at 4.37%. It appears that China's attractiveness to foreign funds did not fully offset the negative effect of foreign policy disagreements with G7 countries. We will empirically show that our instrument is indeed relevant.

The exclusion condition requires that the interaction between IPD_G7 and EFD influences capital goods imports only through capital inflows. It is conceivable that the political proximity affects the imports of foreign capital goods through socioeconomic and political conditions in an importing country. We control for any unobserved factors that vary over industry and country, industry and year, and country and year by adding industry-country, industry-year, and country-year interactive fixed effects. Note that these fixed effects account for independent effects of IPD_G7 and EFD so that only their interaction term is used as an instrument. Furthermore, the

[9] Note that in the restricted model, the value of β^2 is 0.012, and the associated R-square is 0.924, whereas in the full model, the value of β^2 is 0.009, and the associated R-square is 0.949. The Oster Delta statistic (δ) measures the extent of selection bias on unobserved variables compared to observed ones, where the maximum R-squared (R^{max}) is determined by setting R^{max} equal to 1. It is important to note that R^{max} represents the R-squared for a hypothetical regression that includes unobserved confounding factors. We then compute the ratio of selection on the observables to the unobservables as $\delta = \frac{(0.009)*(0.949-0.924)}{(0.012-0.009)*(1-0.949)}$.

Table 5
Addressing reverse causality.

	Excluding top 75th percentile of financially dependence sectors	Excluding top 75th percentile of countries with high share of financially dependence to GDP	Excluding countries with capital flows higher than 10% of GDP	Excluding top and bottom 10% of countries with regard to capital goods imports
	[1]	[2]	[3]	[4]
$EFD_i \times CF_{ct-1}$	0.009***	0.012***	0.006*	0.014***
	(3.14)	(3.36)	(1.78)	(4.29)
Industry × Country FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes
# Countries	57	49	48	45
# Industries	8	11	11	11
N	6892	5878	7241	6954
Adj. R^2	0.771	0.904	0.909	0.890

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 .EFD_i \times CF_{ct-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods to the country's GDP in sector *i* in country *c* in the period *t*. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is total capital inflow for country *c* in year $t-1$. All specifications contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020.

dependent variable is now the share of capital goods imported from non-G7 countries. Our identification strategy is based on the conjecture that any omitted relevant variables are not simultaneously correlated with both IPD_G7 and EFD.

In Table 6, we report the IV results based on IPD_G7 (column 1) and IPD of individual G7 countries (columns 2–8). The first-stage regression output shows that our instrument is relevant; the correlation between excluded instrument and capital inflows is statistically

Table 6
IV strategy.

	Dependent variable: the share of capital goods imported from non-G7 countries							
	IV = $EFD_i \times IPD\_X_{ct-1}$							
	IPD_G7	IPD_US	IPD_CA	IPD_UK	IPD_GR	IPD_FR	IPD_IT	IPD_JP
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$EFD_i \times CF_{ct-1}$	0.084**	0.081**	0.090*	0.081**	0.102*	0.081**	0.075**	0.081**
	(2.03)	(2.02)	(1.90)	(2.02)	(1.93)	(2.02)	(2.13)	(2.02)
Industry × Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Countries	57	57	57	57	57	57	57	57
# Industries	11	11	11	11	11	11	11	11
N	8258	8258	8258	8258	8258	8258	8258	8258
Instruments relevance (LM $\chi 2$*)*	11.32***	11.57***	9.21***	11.57***	8.30***	11.57***	14.24***	11.57***
1st Stage results								
$EFD_i \times IPD\_X_{ct-1}$	−0.860***	−0.858***	−0.858***	−0.727***	−0.858***	−0.962***	−0.858***	−0.767***
	(−3.03)	(−3.06)	(−3.06)	(−2.59)	(−3.06)	(−3.40)	(−3.06)	(−2.73)
F test	9.16***	9.36***	7.45***	9.36***	6.71***	9.36***	11.53***	9.36***

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 .EFD_i \times CF_{ct-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods from non-G7 countries to the country's GDP in sector *i* in country *c* in the period *t*. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is total capital inflow for country *c* in year $t-1$. All specifications contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level. We instrument $EFD \times CF$, using the absolute distance between a country's most preferred foreign policy position and that of country X interacted with *EFD* as instrumental variable ($EFD \times IPD\_X$). ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020.

significant – see also the first-stage F-statistics. Consistent with our hypothesis, a greater foreign policy disagreement with G7 is associated with smaller EFD × CF. The second-stage results support our main conclusion of positive relationship between capital inflows and capital goods imports. The magnitude of the coefficients of the interaction term, EFD × CF, ranges from 0.075 to 0.102, which is much larger than 0.012–0.023 reported in columns 1–8 of Table 3. Although we cannot completely rule out potential threats to the validity of our instrument, these results provide further assurance that our finding is robust.

To sum up, our exercises in section 4.2 confirm that omitted variable bias and reverse causality are not likely to explain the unveiled association between capital goods imports and EFD × CF.

4.3. Robustness tests

We probe the baseline results (Table 3) with several further robustness tests, which are presented in Table 7. First, we consider two alternative indicators for the dependent variable: the share of capital goods imports in an industry to total imports by that industry (ImportCG (2)) and the share of capital goods imports in an industry to its value added (ImportCG (3)). Second, we measure the variable EFD in three ways: i) original measure of industry's EFD for the period 1980–1990 by Rajan and Zingales (1998), ii) alternative EFD proxy for the period 1980–1989 by Kroszner et al. (2007) and iii) EFD proxy for the period 1996–2013 by Larrian and Stumpner (2017). The results are found in columns 1 and 2 in Table 7 for the alternative share of capital goods imports, and in columns 3–5 for the alternative EFD. Third, in column 6, we replace total inflows with *net* capital flows (i.e., inflows – outflows). Our main conclusion holds; the coefficients on the interaction term are all positive and statistically significant.

Finally, we use an alternative data source – BIS cross-border flows database – to compute total CF and its components: inflows to banks and inflows to non-banks. We focus on locational statistics from the BIS Data portal and aggregate quarterly data into yearly to construct annual series. Although we only have bank flows, the advantage of using the BIS data is that we can distinguish between cross-border flows to banks and to nonbanks. Columns 7–9 present the regression results. Consistent with our findings, the effect of total CF interacted with EFD is positive and statistically significant. The decomposed analysis, however, shows that this result is driven by inflows to non-banks (column 9). When CF is measured as inflows to banks, the sign of the coefficient for EFD × CF remains positive, but the impact is statistically indistinguishable from zero. Only the cross-border inflows to non-banks that could land directly to the business sector appear to increase capital goods imports for industries that are dependent on external finance.

4.4. Heterogeneity analysis

4.4.1. Decomposing capital flows

In this subsection, we investigate whether the components of CF have heterogeneous impacts on the imports of capital goods, which is of great interest and importance. In Table 8a, the capital inflows are decomposed into 'Direct investment', 'Portfolio investment' and

Table 7
Other robustness tests.

	Alternative dependent variable		Alternative external financial dependence			Total net inflows (Inflows - Outflows)	Alternative CF data (BIS cross-border flows)		
	ImportCG (2)	ImportCG (3)	EFD (2)	EFD (3)	EFD (4)		All inflows	Inflows to banks	Inflows to non-banks
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
$EFD_i \times CF_{ct-1}$	0.172**	0.028**	0.005***	0.003**	0.009***	0.011***	0.028***	0.015	0.042***
	(2.24)	(2.18)	(2.65)	(2.12)	(3.39)	(3.25)	(4.07)	(1.34)	(3.72)
Industry × Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Countries	57	57	57	57	57	57	57	57	57
# Industries	11	11	11	11	11	11	11	11	11
N	8638	5607	8638	8638	8638	7615	10,547	10,547	10,547
Adj. R^2	0.923	0.957	0.906	0.905	0.906	0.900	0.894	0.894	0.894

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 .EFD_i \times CF_{ct-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods to the country's GDP in sector i in country c in the period t, unless otherwise specified. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is total capital inflow for country c in year $t-1$. All specifications contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020. Sample size varies across regression specifications because not all variables are available for all industries, countries or years.

Table 8
Decomposing flows by instrument.

8a: Capital inflows

	Total inflows						
	Direct investment			Portfolio investment			
	Total	Equity	Debt	Total	Equity	Debt	Other debt
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
$EFD_i \times CF_{ct-1}$	0.026***	0.041***	0.000	0.000	0.004	−0.001	0.015***
	(3.20)	(3.70)	(0.03)	(0.06)	(0.22)	(−0.13)	(3.40)
Industry × Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Countries	57	57	57	57	57	57	57
# Industries	11	11	11	11	11	11	11
N	8638	8638	8638	8638	8638	8638	8638
Adj. R^2	0.906	0.906	0.905	0.905	0.905	0.905	0.906

8b: Net capital flows

	Total (net) inflows						
	Direct investment			Portfolio investment			
	Total	Equity	Debt	Total	Equity	Debt	Other debt
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
$EFD_i \times CF_{ct-1}$	0.031***	0.044***	−0.001	−0.005	−0.005	−0.005	0.012***
	(3.82)	(3.98)	(−0.07)	(−0.99)	(−0.53)	(−0.71)	(3.45)
Industry × Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Countries	57	57	57	57	57	57	57
# Industries	11	11	11	11	11	11	11
N	8115	8115	8115	7615	7891	7740	8115
Adj. R^2	0.900	0.900	0.899	0.899	0.900	0.899	0.900

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 .EFD_i \times CF_{ct-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods to the country's GDP in sector i in country c in the period t. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is a component of total capital inflow for country c in year $t-1$. All specifications contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020.

'Other debt'. The direct investment is further divided into Total, Equity and Debt in columns 1–3, respectively. *Equity* in this context implies inflows of direct equity capital as % of GDP. It is considered as 'direct' because the investor has a degree of managerial control with the ownership of more than 10% of the firm. *Debt* is the inflows via lending from banks or non-bank sources. The portfolio investment is also decomposed into Total, Equity and Debt in columns 4–6, correspondingly. *Equity* indicates the inflows of portfolio equity capital, whereas *Debt* denotes the inflows of portfolio debt, e.g., bonds. *Other debt* in column 7 is the other types of debt inflows such as deposits by non-residents, trade credit and official government flows. Table 8b is specified similarly to Table 8a except that CF and its components are replaced with net capital inflows as a robustness check.

Table 8a reveals that capital goods imports increase with the inflows of direct investment, which is driven by direct equity capital inflows. Note that direct borrowing is not statistically significant. Other types of debt inflows also positively contribute to the capital goods imports, albeit to a lesser degree than direct investment given the smaller size of the coefficient at 0.015. In contrast, there is no evidence that portfolio investment and its sub-components influence the imports of capital goods. The results remain unchanged, in terms of sign, magnitude, and statistical significance, if net capital inflows are used (see Table 8b).

Alfaro and Hammel (2007) investigate the relationship between stock market liberalization and the capital import goods and find that equity liberalization episodes are followed by an increase in the share of capital goods imports to total imports. They argue that stock market liberalization incentivizes firms to buy more machinery. To the extent that market liberalization stimulates equity investment, our result that equity investment enhances capital imports complements the finding by Alfaro and Hammel (2007). This result also supports the study by Leblebicioglu and Madariaga (2015), who provide evidence for the positive effects of financial flows on the capital stock's quality, with the largest impact coming from equity inflows.

Increased equity inflows may enhance capital goods imports through several channels. Equity investment leads to a higher equity

price, which increases the firms' market value. This allows firms to acquire working capital through bank loans more cheaply or with less collateral, thereby stimulating capital goods imports. The resulting increase in wealth of stockholders may also affect firms' investment behaviour. For instance, the shareholders may promote allocation of resources into productive investments, such as capital goods for future growth opportunities, which increases the share prices even further. Other potential channel is new equity issues. New equity investments directly inject cash flow for investment into the issuing firm, hence investment is expected to rise with new equity issues (Alfaro and Hammel, 2007).

These channels are applicable to equity inflows in general. However, we find that CF raises capital goods imports primarily through *direct* equity investment in developing economies; the inflows of portfolio equity capital and debt have no statistically significant effect. Unlike debt holders or portfolio investors, a direct equity investor possesses some degree of a firm's ownership. Therefore, it is conceivable that international investors develop closer connections with domestic firms and advocate these firms to import foreign machinery and equipment to improve productivity and efficiency. The portfolio investors, on the other hand, may often be myopic and irrationally sell and buy shares in response to the volatility of emerging market rather than firms' future growth opportunities. In this respect, portfolio investment is not a reliable finance resource for the capital goods imports in developing countries.

4.4.2. Quality of capital goods imports

We now investigate the effect of CF on capital goods imports by focusing on imports from the most advanced (G7) economies relative to those from China, which provides insight into the quality of imported capital goods. Our focus is on China for two reasons. Firstly, its economy is the largest among the developing countries. Developing countries often purchase capital goods from China thanks to its competitive pricing. Secondly, imports of intermediate and capital goods have played a significant role in the process of growth and development in China (Shi, 1998). Herrerias and Orts (2013) find that, from 1965 to 2007, the imports of intermediate and capital goods in China accounted for more than 80% of total imports. Hence, China stands out as an important case in the study of the relationship between imported capital and CF in developing countries.

If firms in developing economies generate enough internal cash flows or have access to domestic and foreign financial resources, they are likely to purchase the capital goods from industrialized nations, particularly the G7. Industrialized nations' products are recognized as being of high-quality and reliable because of tough regulations and high-quality control processes in place. This may not be the case in China, where such standards are often not met or adequately enforced.

The results are shown in Table 9 where the response variable is the share of capital goods imported from G7 countries relative to that from China. Consistent with our main finding, the impact of the interaction between EFD and CF is positive and statistically significant. However, compared to the aggregate results in Table 3, the effect of capital goods imports from G7 (relative to capital goods imports from China) is much stronger; the magnitude of the coefficient is 4.83 (column 1). Decomposed analysis shows that this result is mainly driven by imports of capital goods from the United States and Canada (columns 2 and 3). Since the quality of capital goods from G7 is generally higher than that from other countries, this result – i.e., a positive relationship between *EFD* × CF and the relative capital goods imports from industrialized countries – implies that ever increasing capital inflows is associated with a higher quality of capital stock.

Table 9
Quality of imported capital goods.

	Dependent variable: the share of capital goods imported from G7 countries to that from China							
	G7/China	US/China	CA/China	UK/China	GR/China	FR/China	IT/China	JP/China
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$EFD_i \times CF_{ct-1}$	4.834**	1.432*	0.069***	0.046	0.040	0.224	−0.016	0.126
	(2.13)	(1.73)	(3.18)	(0.79)	(0.22)	(1.48)	(−0.36)	(1.47)
Industry × Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Countries	57	57	57	57	57	57	57	57
# Industries	11	11	11	11	11	11	11	11
N	7204	7112	6291	6806	7031	6785	6871	6601
Adj. R^2	0.408	0.386	0.372	0.392	0.516	0.310	0.468	0.528

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 .EFD_i \times CF_{ct-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods from G7 to that from China in sector i in country c in the period t. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is total capital inflow for country c in year $t-1$. All specifications contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020.

5. Conclusion

The adoption of foreign technology can enhance a firm's efficiency and productivity. However, the ability to acquire foreign capital goods depends on access to financial resources. Capital inflows enhance credit availability and reduce borrowing costs, which helps developing nations to alleviate credit restrictions and increase investment resources. Consequently, we expect that industries that rely heavily on external financing are expected to import disproportionately more capital goods, if they operate in countries that receive substantial amount of capital inflows. Our empirical data supports this conjecture.

Our analysis reveals three additional findings that are noteworthy. Firstly, our key finding of a positive relationship between capital inflows and capital goods imports breaks down during the global financial crisis. This indicates that the association between our two interest variables is not stable and may vary over time depending on the prevailing economic and financial conditions. Secondly, when capital inflows are decomposed in the analysis, we find that the documented relationship between capital inflows and economic growth is driven by equity direct investment and, to a lesser degree, certain types of debt inflows. This result clearly points to the non-trivial role of foreign, even if it is a partial, ownership. Furthermore, a preliminary test did not discern a statistically significant impact of capital inflows on intermediate goods. These findings signify that capital inflows are mostly a source of long-term investment rather than funds to meet the need for working capital. Finally, our study also uncovers that recipient countries tend to import relatively high-quality capital goods from top industrialized economies with the increased capital inflows.

While foreign investments are usually recognized as an important driver of long-term economic growth and development for developing nations, there is still an ongoing debate about the mechanisms that link foreign funds to economic growth. Our empirical study sheds light on the specific channel through which capital inflows affect economic growth, that is, via assisting firms in importing capital goods.

Data availability

Data will be made available on request.

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Appendix A

Table A1
Variables definition and sources.

Variable	Definition	Source
Dependent Variable		
ImportCG$_{ict}$	The share of capital goods (e.g. machinery and sophisticated equipment) imports in an industry, as % of the country's GDP.	OECDs Bilateral Trade in Goods by Industry and End-use database (BTDIxE), and own calculation.
Alternatives		
ImportCG (2)	The share of capital goods imports in an industry to total imports by that industry.	BTDIxE, and own calculation.
ImportCG (3)	The share of capital goods imports in an industry to that industry value added.	BTDIxE, the UNIDO database, and own calculation.
Capital Inflows		
CF$_{ct}$	Flows of capital (both equity and debt) from foreign countries to a host country, as % of GDP.	IMF - Balance of Payments and International Investment Position Statistics, and own calculation.
Components		
Direct investment	Inflows of direct equity capital and direct debt, as % of GDP.	"
Equity	Inflows of direct equity capital, as % of GDP. Equity investment is considered "direct" when the	"

(*continued on next page*)

Table A1 (*continued*)

Variable	Definition	Source
	investor has a degree of managerial control over the firm in question. The threshold for this is usually set at 10% of ownership. Below this threshold, the investment is considered "portfolio" investment.	
Debt	Inflows via commercial bank lending and lending from non-bank sources.	"
Portfolio investment	Inflows of portfolio equity and portfolio debt.	
Equity	Inflows of portfolio equity capital, including reinvestment of earnings on portfolio equity investment.	"
Debt	Inflows of portfolio debt (e.g. bonds).	"
Other debt	Other types of debt inflows such as deposits in local banks by nonresidents other than banks, trade credits, and official government flows.	"
Industry Characteristic		
EFD_i	External financial dependence of U.S. firms by 2-digit ISIC codes. This is an industry-level median of the ratio of capital expenditures minus cash flow over capital expenditures. Cash flow is defined as the sum of funds from operations, decreases in inventories, decreases in receivables, and increases in payables. Capital expenditures include net acquisitions of fixed assets. The index is obtained for the period 1980–2006.	Laeven and Valencia (2013).
Alternatives		
EFD (2)	Original measure of an industry's dependence on external finance over the period 1980–1990.	Rajan and Zingales (1998).
EFD (3)	Alternative proxy for EFD over the period 1980–1989.	Kroszner et al. (2007).
EFD (4)	Alternative proxy for EFD over the period 1996–2013.	Larrain and Stumpner (2017).
Other Variables		
$Share_{ict}$	The value added of each sector as a share of the total value added of all sectors in an economy. Source: UNIDO database, and own calculation.	UNIDO database, and own calculations.
PCM_{ict}	The difference between sales and variable costs over sales, variable costs being the expenditure on labor and materials (Boulhol, 2008).	"
$Durable_i$	An indicator of whether the industry manufactures predominantly durable goods.	Kroszner et al., 2007).
$Intangibility_i$	An industry ratio of intangible assets to fixed assets.	"
$Domestic\ Credit_{ct}$	The ratio of domestic credit to private sector to GDP.	World Bank: World Development Indicators Database.
$Capital\ Oppenness_{ct}$	The Chinn-Ito index (KAOPEN) which measures a country's	Chinn and Ito (2006).

(*continued on next page*)

Table A1 (*continued*)

Variable	Definition	Source
	degree of capital account openness.	
FXR_{ct}	The exchange rate regime of a country based on the de facto classification. The classification ranges from 1 to 6, with 6 being the most freely floating regime.	Ilzetzki et al. (2019).
$Tariff_{ct}$	Tariff is a proxy for trade restrictions, constructed based on tariff rates and the revenue from trade taxes (% of trade).	Economic Freedom of the World: 2022 Annual Report.
$GDP\ Growth_{ct}$	GDP growth (YOY) of a country.	World Bank: World Development Indicators Database.
$Inflation_{ct}$	GDP price deflator.	"
IPD_X_{ct}	IPD_X is the deal point difference, which is the absolute distance between a country's most favored policy position and that of country X. Smaller value means smaller difference (or more agreement).	Bailey et al. (2017).

Table A2
Baseline results (including $Share_{ict-1}$ as a control variable)

	Baseline							
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$EFD_i \times CF_{ct-1}$	0.011***	0.011**	0.020***	0.019***	0.014***	0.016***	0.020***	0.012***
	(2.95)	(2.14)	(3.85)	(3.41)	(3.94)	(2.81)	(3.86)	(3.07)
$Share_{ict-1}$	0.074	0.074	0.202***	0.185***	0.037	−0.168***	0.186***	0.040
	(0.86)	(0.61)	(3.30)	(3.08)	(0.46)	(−3.16)	(3.08)	(0.49)
Industry FE	No	No	Yes	No	No	No	Yes	No
Country FE	No	No	No	Yes	No	Yes	Yes	No
Year FE	No	No	No	No	Yes	Yes	Yes	No
Industry × Country FE	Yes	Yes	No	No	Yes	No	No	Yes
Industry × Year FE	Yes	Yes	No	Yes	No	No	No	Yes
Country × Year FE	Yes	Yes	Yes	No	No	No	No	No
# Countries	57	57	57	57	57	57	57	57
# Industries	11	11	11	11	11	11	11	11
N	5699	5699	5699	5699	5699	5699	5699	5699
Adj. R^2	0.932	0.932	0.761	0.767	0.921	0.401	0.768	0.924

The table presents the results from the regression:
$ImportCG_{ict} = \beta_0 + \beta_1 . EFD_i \times CF_{ct-1} + Share_{ict-1} + D_{ic} + D_{it} + D_{ct} + \varepsilon_{ict}$.
$ImportCG_{ict}$ is the share of imports of capital goods to the country's GDP in sector i in country c in the period t. EFD_j is the Rajan and Zingales's (1998) proxy for each industry's dependency on external financing. CF_{ct-1} is total capital inflow for country c in year $t-1$. $Share_{ict-1}$ is the share of value added by each industry in total value added by all industries in a country, with a one-period lag. All specifications, unless otherwise specified, contain a full set of industry-country (D_{ic}), industry-year (D_{it}) and country-year (D_{ct}) fixed effects. For detailed definition of variables, see Appendix, Table A1. The statistical inferences are based on robust standard errors (associated t-values reported in parentheses) clustered at the country-year level, unless otherwise specified. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Our sample includes 11 industries with two-digit ISIC, Rev.3 for 57 developing countries over the period 2000–2020.

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