# Implications of rising trade tensions for FDI projects*

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## Abstract

This paper offers preliminary evidence of the extent to which global FDI patterns have responded to the sharp increase in trade barriers since 2018, focusing in particular on the impact of new United States tariffs imposed on imports from China. Using detailed project-level data on new greenfield FDI as well as complementary research, this paper tracks the differential changes in FDI across countries and industries most affected by the trade tensions. There is some evidence of diversion to South-East Asia in specific industries, confirming findings of other research, but the aggregate effect on investment in China is limited and the overall effect on investment in South-East Asia is actually negative. A possible explanation lies in the importance of global value chain linkages as key determinants of firms' investment decisions.

**Keywords:** trade tension, FDI, greenfield investment, global value chains, GVCs, international production, tariffs, barriers to trade

**JEL classification numbers:** F13, F15, F21, F23

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## 1. Introduction

The COVID-19 challenge to an open global trading system arrives on top of trade and investment environment already under strain. Tariffs and other trade restrictions escalated in 2018, particularly between the United States and China, which raised average tariffs against each other nearly six-fold over the course of two years.[1] The increase in trade barriers has immediate and costly implications for all countries, given the deep economic linkages embedded in global value chains (GVCs). There is good reason to worry that the 2018 trade tension will continue to affect foreign direct investment (FDI) flows now and in the future (UNCTAD 2020a).

Building on complementary research (Blanchard et al., 2021a), this paper offers preliminary evidence on the extent to which the recent escalation of trade tensions threaten the profitability of trade-oriented investments, especially the FDI projects that are most integrated in GVC production and trade. New trade restrictions could also increase the potential returns for other investments, including "tariff-jumping" projects that produce goods for the local markets in which they operate. It is ultimately an empirical question whether trade tensions affect the overall magnitude of FDI flows, the composition of these flows or both. In this context, research has mostly focused on the effect of trade war on trade diversion, while the evidence on the effect on FDI is limited.

Although we cannot establish causal inference without further analyzing other (plausibly independent) determinants of investment decisions, the patterns in the data are consistent with concerns that the rise in protectionist trade policy may have pushed multinational enterprises (MNEs) to reconsider their international production networks, particularly in some manufacturing industries, which rely heavily on firms' ability to import components and supplies, and to export.

Our analysis uses project-level data on announced greenfield investment, which is ideally suited to capture early changes in companies' investment intentions. Importantly, these data offer unique features in terms of frequency (quarterly basis), industry and geography, allowing us to link FDI to tariff-exposed industries and countries. We can thus consider different samples of countries with varying degrees of integration across different markets and exposure to the tariff escalation. Moreover, the data set facilitates analyzing FDI diversion, as observed changes in greenfield FDI reflect companies' decisions to stop new projects in a country and invest in another, rather than divestment – i.e. the closure or sale of foreign affiliates. Adding to this, it should be noted that greenfield FDI decisions typically have a long incubation period, so any observed changes in greenfield FDI patterns are likely to capture only part of the underlying shifts in company-level reconfiguration strategies induced by trade tensions.

[1] See Bown (2020). Despite the change in the United States administration, the tariffs imposed in 2018 remain in place.

Even if the COVID-19 shock added a new layer of complexity, evidence on the pre-pandemic period (2018–2019) suggests that trade tensions may have had a significant and independent influence on the global FDI landscape. Observed changes in the number and composition of announced FDI projects offer clues. Although the overall change in the number of FDI projects in the manufacturing sector was relatively modest, there was a differential decline in trade-oriented FDI projects with greater exposure to tariffs in 2019. Trade tensions thus may have accelerated pre-existing underlying trends away from fragmentation of international production.[2]

The evidence points to a negative impact of trade tensions globally and for East and South-East Asian countries in particular. In the aggregate – considering all trade-exposed manufacturing projects – we find that all of Asia suffered of an investment slowdown in 2019 and that China's neighbors have seen the sharpest decline since 2018 in the number of new FDI projects with high trade exposure. This finding underscores the potential importance of regional production linkages: declining trade and investment in a major trading partner, especially one as large as China, may compromise the expected profitability of complementary investments in nearby countries.

A closer examination of trends by industry sheds light on diverse strategies across GVCs: MNEs in some industries appear to have diverted investment towards South-East Asian and Latin American countries (especially to Mexico), thus diversifying their supply chain. In industry-level analysis, our results also lend support to UNCTAD's predictions for international production trajectories towards some form of restructuring of GVCs (UNCTAD, 2020a and 2021). In particular, we find that after the onset of new trade tensions in 2018, some more agile (less capital-intensive) industries shifted towards investment that was oriented more to the local market, whereas long, complex and capital-intensive value chains proved harder to dismantle or divert. Tariffs mostly affected manufacturing industries, the most productive form of investment (UNCTAD, 2021). Preliminary evidence also suggests that some typical efficiency-seeking investment projects in textiles and apparel might have started moving away from traditional host economies at a faster pace after 2018, offering new opportunities to join GVCs to other less advanced economies.

The paper proceeds as follows. Section 2 reviews the literature. Section 3 explains the data and methodology. Section 4 discusses the empirical results. Section 5 discusses policy implications and presents concluding remarks.

[2] Greenfield project investment in the manufacturing sector across the developing world has been declining steadily for more than a decade, making it more difficult to discern a specific impact of trade tensions on investment (UNCTAD, 2019a).

## 2. Literature review: a brief look at the evidence

The importance of trade and investment as engines of global economic growth and development cannot be overstated. Since the 1990s, trade and FDI have been key drivers of global economic integration, growth and prosperity. The spread of GVCs accelerated the catch-up of developing countries' income levels and led to greater convergence between economies.

Early theories on the relationship between FDI and trade identified two opposing outcomes depending on the type of FDI: market seeking versus efficiency seeking. In the first case, the proximity-concentration trade-off (Helpman et al., 2004) predicts that firms will tend to substitute FDI for exports when transport costs, trade costs and/or tariffs are high and plant-level returns to scale are small; the result is so-called tariff-jumping or "horizontal" FDI. In contrast, vertically integrated enterprises (Helpman, 1984), which engage in trade and seek to exploit international price differentials, complement FDI with exports, resulting in efficiency-seeking or "vertical" FDI. In reality, most MNEs are neither purely horizontal nor purely vertical; the rapid spread of GVCs hints at the importance of more complex integration strategies, including export-platform investment decisions that involve consideration of characteristics and policies of both host countries and their neighbors.[3] An increase in trade costs due to tariff escalation (or even *expected future* tariff escalation) can thus have a different effect on FDI, depending on the characteristics of the targeted investment host market, including the extent of its integration in global or regional value chains.

More recent literature specifically explores the impact of trade conflicts on GVCs and FDI both theoretically and empirically. The first strand of the literature focuses on establishing a framework to study the restructuring of GVCs following trade conflicts, looking closely at the responses of firms. Restructuring happens due to the strategic choices of multinationals that change supply chain partners or upgrade value chain activities to adapt to new trade rules (Gereffi et al., 2021; UNCTAD, 2020a). Such a view underscores the role of multinationals as the focal point of analysis. Using a model of multinational decision-making in the car industry, Head and Mayer (2019) also point out that the structure of multinational production has a pivotal role, as the origins and networks of production shape counterfactual outcomes. McGratten and Waddle (2020) analyse the case of Brexit using a multi-country growth model and find that producers substitute between exports and FDI depending on the policy responses from both the European Union (EU) and the United Kingdom.

[3] See for example Yeaple (2003); Neary (2002 and 2008); Elkholm et al. (2007); and Mukherjee (2012).

The second strand of the literature looks at the evidence of trade conflicts on the investment decisions of firms. During the United States–China trade conflict, studies find that firms from the United States have shied away from investment (Amiti et al., 2020) and have relocated their supply chains by increasing their foreign suppliers, which potentially incurred a substantial strategic cost (Charoenwong et al., 2020; Wu et al., 2021; Zhang and Shi, 2020). More specifically, Amiti, Kong and Weinstein (2020) analysed the effect of tariff actions through 2018 and 2019 and predicted that the investment growth rate of listed United States companies would be lowered by 1.9 percentage points by the end of 2020. Charoenwong et al. (2020) find that in response to uncertainties United States firms have relocated their supply chains by increasing foreign suppliers and decreasing domestic suppliers. For the case of Brexit, major studies unilaterally find negative effects on GVCs due to higher trade costs. Dhingra et al. (2017) argue that Brexit will reduce the participation of the United Kingdom in GVCs because of rising trade costs. Bruno et al. (2021), using a structural gravity model, study the impact of EU membership on FDI and find that FDI into the United Kingdom is predicted to fall by 37 per cent post-Brexit as a result of leaving the EU single market and customs union. This is because the United Kingdom is heavily involved in GVCs, as often it is the case that products cross the United Kingdom border multiple times (Ali-Yrkko and Kuusi, 2019).

The third strand of research underscores the diversion effect of trade conflicts. As highlighted by some papers, the trade conflicts between the United States and China have brought trade diversion effects on major trading partners of both China and the United States both near and far, such as Taiwan Province of China, Mexico, the EU and Viet Nam (Nicita, 2019; Bolt et al., 2017; Li et al., 2020). This is naturally a result of restructuring of GVCs, as firms aim to avoid excessive reliance on China by diversifying supplier bases in the context of the trade war (Javorcik, 2020). Recent studies examine the effect of diversion in countries neighbouring China. Pengestu (2019) studies the relocation of production capacity by firms that serve the United States market and argues that investment relocation and trade diversion will benefit ASEAN countries.[4] Moeller (2018) suggest that South-East Asian economies may benefit from the trade conflict between the United States and China, as they seek opportunities to replace Chinese goods in the United States market, as well as United States goods in the Chinese market. In a similar vein, Tham et al. (2019) study the effect on the Malaysian market and predict that Malaysia will benefit from the investment diversion effect in the medium term.

[4] ASEAN is the intergovernmental organization of 10 South-East Asian economies: Brunei Darussalam, Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam.

Given the very recent date of these sharp tariff escalation episodes, the empirical evidence on the impact of trade tensions on investment is inevitably scarce. This paper and its companion project (Blanchard et al., 2021b), represent a unique opportunity to contribute to the literature on how changes in trade policies impact MNEs' decisions and GVC structure.

## 3. Analyzing trade-exposed projects: Data and methodology

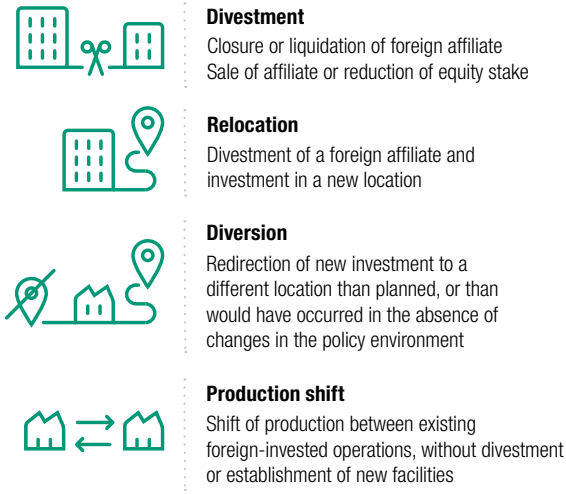
Following Blanchard et al. (2021b), we use data on announced greenfield projects as collected by fDi Markets from the *Financial Times Ltd* (www.fDimarkets.com). Greenfield project announcements are a key indicator of trends in cross-border investment; they encompass new projects as well as expansion of existing projects. Announcements have the advantage of offering the most reactive part of MNE's investment decisions; they are thus more likely to give evidence on early diversion trends. The recent trade tensions and pandemic crisis are likely to accelerate the reconfiguration of global production networks (UNCTAD 2020a and 2021) by shifting production capacity from one location to another less affected by trade and technology conflicts, including through divestment, relocation of foreign affiliates and diversion of new investments (figure 1).

FDI implies a long-term commitment to a market; the liquidation or sale of foreign affiliates entails operational and regulatory complexities, causing a delayed reaction to sudden changes in the economic environment. In the initial period after a "shock" (such as an unexpected increase in tariffs or an exogenous shock such as a financial or health crisis), early responses mostly take the form of shifts in production between existing facilities or repurposing of production for the domestic market rather than for exports.

Both anecdotal evidence and analysis of trends show indications of investment diversion as a result of the trade conflict between the United States and China (see for example, UNCTAD, 2020b). Table 1 lists selected cases of recent investment decisions of firms that are either implemented or under way. It is worth noting that many of these cases are investment diversion and relocation out of mainland China, mainly in reaction to the United States–China trade war.[5]

[5] Other reasons cited by firms for investment diversion or relocation include cost savings and competitive-advantage decisions – notably labour costs, and more recently, diversifying supply chains beyond China, after widespread disruption following the COVID-19 shock. Other companies, e.g. in the automotive industry, noted that the new North American trade agreement approved by the U.S. Senate ensures that automakers will still be able to build pickup trucks in Mexico without facing new punitive tariffs.

## Figure 1. MNEs reconfiguration mechanisms




*Source:* Authors' elaboration.

However, in many instances MNEs have cited the need to diversify their supply chain capabilities as main motivation for a new investment decision in another location in which case they might just add new locations to their network.

The greenfield projects database used for this paper covers only new investment. It does not record resizing or plant closures, nor does it contain information on projects that were cancelled or delayed. Thus, it does not consider divestment decisions and accounts only partially for relocations and production shifts. In this sense, our data captures only positive variations to FDI flows and is thus likely to provide a lower estimate of any diversion trends. That said, the extent to which MNE reconfigurations have led to divestments or liquidations of foreign affiliates is plausibly limited. To date, there is little evidence of substantial closures of facilities in China; this may be due in part to firms' ability to repurpose Chinese production facilities to serve the large domestic market rather than exports. Indeed, some electronics MNEs have effectively replicated their supply chains by opening new facilities outside China while still also investing heavily in the country to maintain market share in its fast-growing economy.[6]

[6] *Financial Times*, "Companies try to cut geopolitical risk from supply chains", 7 April 2021.

**Table 1. Relocation plans announced by multinational firms in relation to the trade conflict between China and the United States**

| Country of Origin | Relocation Country | Firm Name | Industry | Remarks |
|---|---|---|---|---|
| **United States** | Philippines | Ever Win International Corp. | Electronic components | Ever Win International opened a manufacturing facility in Laguna Technology Park, Philippines to assist customers with transitioning production outside of China. |
| | Malaysia | iRobot Corp. | Home and office products | iRobot Corp established manufacturing operations in Malaysia to diversify the firm's manufacturing and supply chain capabilities, as well as to decrease its exposure to the trade conflict between China and the United States. |
| | Viet Nam/ India | Hasbro | Leisure products | Hasbro Inc. shifted away from China in favor of new plants in Viet Nam and India. |
| | United States | Stanley Black & Decker | Machinery | Stanley Black & Decker Inc. plans to move production of Craftsman wrenches from China back to the United States; the manufacturer is looking to use automation to increase domestic output as tariffs raise the cost of imports from overseas. |
| | Viet Nam | Key Tronic | Technology hardware | Key Tronic added additional capacity in Viet Nam to diversify its global manufacturing base and provide an additional hedge against uncertainty given the trade war between China and the United States. |
| **China** | Thailand | Prinx Chengshan Shandong Tire Co. Ltd. | Automotive | Prinx Chengshan, a Chinese tyremaker, decided to build a $600 million plant in Thailand. |
| | Viet Nnam | HL Corp. Shenzhen | Leisure products | HI Corp, a Shenzhen-listed bike parts maker, announced to investors that hiking tariffs made the company decide to move production facilities to Viet Nam. |
| | Viet Nam/ United States | Zhejiang Hailide New Material Co. Ltd. | Apparel and textile products | Zhejiang Hailide New Material relocated much of its industrial yarns, tyre cord fabric and printing materials from its plant in eastern Zhejiang Province to the United States and other countries, such as Viet Nam. |
| **Japan** | Viet Nam | Kyocera | Technology hardware | Japanese electronics parts maker Kyocera Corp. has relocated part of its automotive camera modules and displays production from China to Thailand to avoid the possible imposition of higher United States tariffs. |
| | Thailand | Ricoh Co. Ltd. | Technology hardware | Ricoh Company, Ltd. announced that it will shift production of its key MFP portfolio destined for the United States market to Thailand, to hedge any risk associated with the United States–China trade issue. |

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**Table 1. Relocation plans announced by multinational firms in relation to the trade conflict between China and the United States** (Concluded)

| Country of Origin | Relocation Country | Firm Name | Industry | Remarks |
|---|---|---|---|---|
| **Taiwan Province of China** | Taiwan Province of China, United States and Mexico | Multiple tech companies | Technology hardware | • Quanta supplies data centre servers to United States technology giants including Facebook and Google. It now assembles parts made in China into products at factories in the United States or Mexico.<br>• Other tech companies such as Innolux Corp, AU Optronics, Yageo, Unimicron Technology, Pegatron and Giant are expanding production and R&D facilities within Taiwan Province of China. |
| | Thailand | Primax Electronics Ltd. | Technology hardware | Primax Electronics decided to set up a production base in Thailand outside of mainland China; production and shipment began in 2020. |

*Source:* UNCTAD from Bloomberg and Financial Times for the period 1 January 2018 to 31 March 2021.

In this paper we use as variable of interest the number of announced projects rather than their value since the number of projects is a better reflection of possible diversion trends. Also, the value reported refers to the total cost of the project and is likely deployed over some years; and project costs vary widely across industries and types (expansion versus new plant), adding considerable volatility to the data.

Projects are classified by the primary industry code of the investor following the ISIC (rev. 4) two-digit classification and by the actual activity envisaged by the project, termed the project's "function". For example, more than a third of manufacturing companies' investments in developing and transition economies are actually business activities (which comprise setting up local sales and marketing support services) and retail operations, rather than manufacturing activities. Similarly, almost all of the projects by hotels and restaurants actually imply the construction of an accommodation structure. Combined, a project's industry and function define the project's *destination activity* (which, it should be noted, need not coincide with the industry of the investor). This is important because not all manufacturing investment is directly affected by trade tensions; functions thus can help to identify market-oriented versus trade-exposed FDI projects.[7]

Although GVCs tie together companies belonging to a potentially wide range of industries in many economies, we anticipate that trade tensions will differentially affect the most tariff-exposed projects. To first outline the possible impact of trade

[7] For more details, see Blanchard et al. (2021b).

tensions on investment we define greenfield projects with high tariff exposure as those belonging to an industry affected by tariff escalations. Specifically, we use data on tariffs at the 10-digit HS level between the United States and China, from Blanchard et al. (2021a), and construct a more aggregated industry-level variable consistent with the two-digit definitions of industries available for greenfield data. We identify *trade-exposed* projects with a dummy variable equal to 1 if any product line associated with the industry was targeted in the 2018 tariff escalation (high tariff exposure), *and* if the project function includes manufacturing, logistics and wholesale operations. Tables A.1 and A.2 show the share of investment projects affected and the tariffs raised by the United States on imports from China by industry.

## 4. Trade tensions and FDI

The global number of announced FDI projects declined in 2019, consistent with the onset of new trade tensions. The number fell by 1.3 per cent between 2018 and 2019; in value terms, the decline was 16.5 per cent. Although this observed fall in the number of FDI projects is modest, it marks an unusual divergence from the change in global GDP, which rose by 2.3 per cent during the same period. As shown in figure 2, the number of announced and opened greenfield FDI projects has generally tracked overall global economic activity, particularly since 2015, making the 2019 divergence noteworthy. Focusing specifically on trade-exposed FDI projects, two more facts stand out: first, the growth of trade-exposed FDI projects had started to plateau relative to the growth in overall FDI projects before 2019; and second, the 2019 decline in high trade-exposed FDI projects was particularly stark.

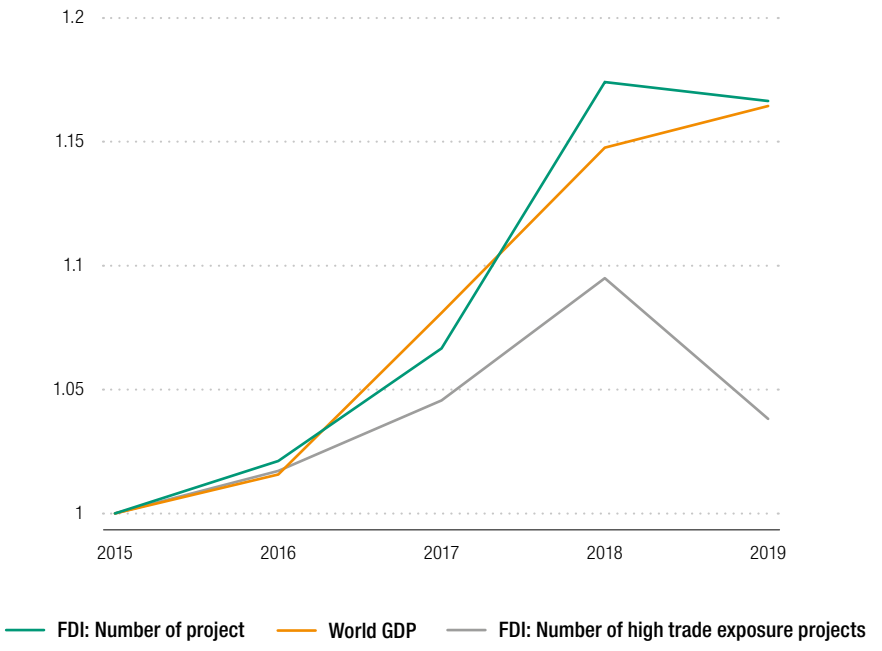
These patterns are consistent with previous evidence. Foreign investment in the manufacturing sector across the developing world has been declining steadily for more than a decade. The *World Investment Report 2019* analyses the long-run structural change in FDI flows (see chapter 1, UNCTAD, 2019a). Matching the decline in manufacturing, UNCTAD (2019a) documents the rising importance of FDI in the services sector and in intangibles.[8]

The decline in FDI projects accelerated existing trends in manufacturing and in Asia. Over the past decade, the growth rate of manufacturing projects has been slowing down in East and South-East Asia, driven largely by slower expansion in China.[9] Both trends accelerated between 2018 and 2019. By 2019, the share of

[8] UNCTAD (2021) confirms the reinforcing of this trend during 2020.

[9] Between 2013 and 2017, the number of announced investment projects in the manufacturing sector was lower than in the preceding five years, across all developing regions. This negative trend briefly reversed in 2018, which posted a one-year 35 per cent increase from 2017, but even then, the *share* of manufacturing among new FDI project announcements remained flat. See UNCTAD (2019b).

## Figure 2. Number of Announced FDI Projects globally and world GDP, 2015–2019

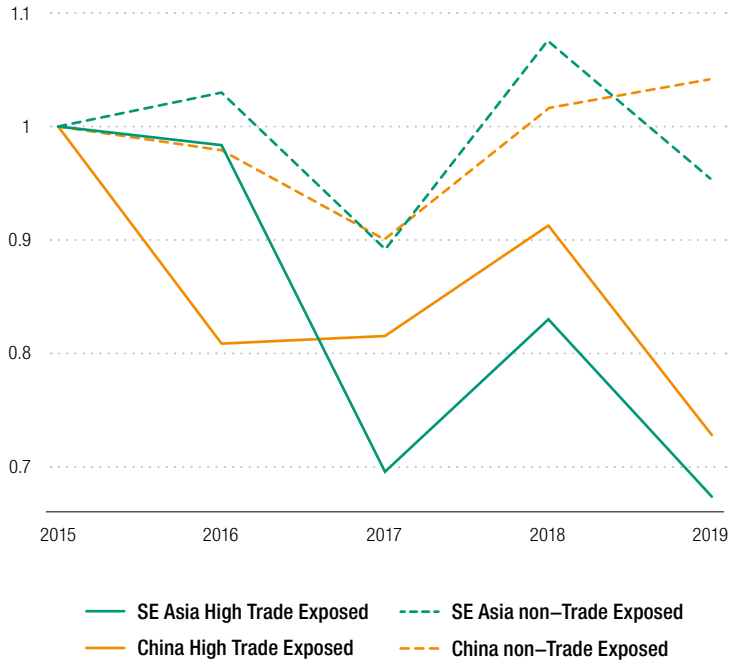



*Source:* UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com).
*Note:* The numbers of FDI projects and the world GDP in the figure are normalized by their respective levels in 2015.

announced and opened FDI projects in manufacturing had reached a new nadir of 16 per cent, compared with 33 per cent in 2003. Similarly, the share of announced FDI projects in East and South-East Asia (including China) fell to 14 per cent from 25 per cent in 2003. There are a number of reasons for these changes, including the recent increase in tariffs. For instance, UNCTAD (2020b) documents that rising factor costs in China have driven a gradual shift of production facilities from higher- to lower-income economies in South-East Asia and argues that this process was accelerated by the trade tensions.

Figure 3 tracks the change in the number of FDI projects that face the greatest direct exposure to higher tariffs or non-tariff barriers since trade tensions began to escalate in January 2018 in China and South-East Asian countries. Since the first quarter of 2018, the number of high-trade-exposure FDI projects fell by about 20 per cent worldwide. In China, the trend has been more volatile;

**Figure 3. Change in the number of announced and opened high-trade-exposure FDI projects, 2015–2019, yearly** (Indexed to 2015)




*Source:* UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com).

the average number of projects decreased only in 2019 and on average by less than 15 per cent with respect to the first quarter of 2018. In contrast, the number of new high-trade-exposure FDI projects in East and South-East Asia plummeted by nearly 30 per cent over the same period, with the steepest declines in late 2019.

These patterns run counter to some predictions that higher United States tariffs against China would cause investment projects to be diverted away from China in favor of its South-East and East Asian neighbors. At least in the aggregate, there is no evidence to suggest that this has happened. Quite the opposite: the data indicate that China's neighbors saw the sharpest decline in the number of new high-trade-exposure FDI projects after 2018. This finding underscores the potential importance of regional production linkages: declining trade and investment in a major trading partner, especially one as large as China, may compromise the expected profitability of complementary investments in nearby countries.

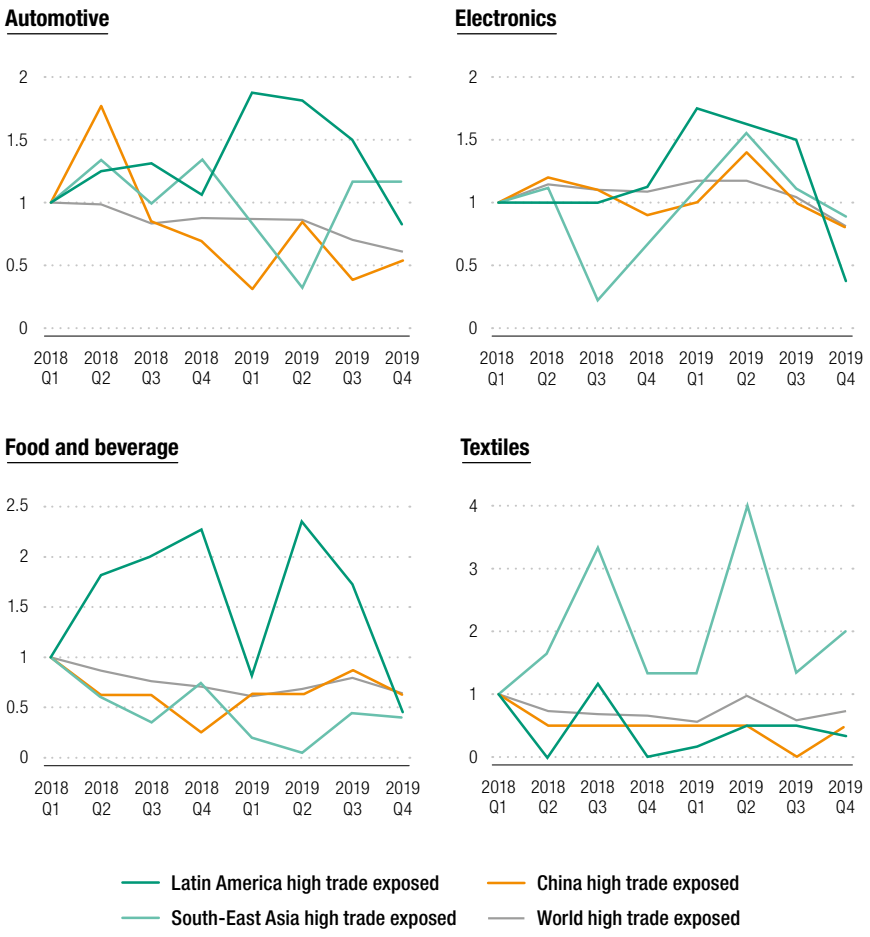
Figure 3 portrays aggregate trends for all trade-exposed projects and thus conceals important differences across industries. Yet patterns of FDI restructuring are likely to differ across industries, depending on the characteristics of industries' GVCs, including the degree of GVC length, complexity or fragmentation; the geographical distribution of value added production; and the degree of internationalization (UNCTAD, 2020a). Moreover, FDI diversion will likely differ across destination countries too, shaped not least by the political economy between the potential host market and the protagonists in the 2018 trade war, the United States and China. In light of these considerations, we now look at selected industries (those most trade exposed) across the host economies most likely to be affected, to explore the potential differential impacts of the 2018 tariff escalation.

Depending on their orientation towards exports and exposure to the costs of a trade conflict, MNEs can either decide to relocate and diversify their value chain to mitigate their risks or can increase their investment footprint, seeking to gain local market share. Figure 4 shows trends for selected industries that are particularly vulnerable to an increase in trade risks for various reasons: they are the most often targeted with tariff hikes because of their political sensitivity, they are GVC intensive and they are concentrated in East and South-East Asian economies.[10]

As shown in figure 4, trends differ notably across these industries. Investment in the tradable automotive industry slowed down in China and neighboring countries and increased significantly in Latin American economies. Here the concomitant ratification of the United States–Mexico–Canada Agreement (to replace the then-imperiled North American Free Trade Agreement) may also have contributed to attracting more investment in Mexico. For electronics, investment remained resilient in China and increased in neighboring countries as well as in Latin America, consistent with anecdotal media reports of certain multinational firms' efforts to diversify their supply chains. Investment in the food and beverages industry was already on a downward trajectory in East and South-East Asian economies; the associated increase in Latin America in 2019 was probably unrelated to FDI diversification strategies, given the dominance of local resources and regional tastes in this sector. For textiles, investment in China had already been decreasing for a number of years, with the drop accelerating after the second quarter of 2018. Some of these production facilities seem to have been relocated to South-East Asian economies, corroborating reports of the gradual shift of labor-intensive industries out of China to lower-wage locations such as Viet Nam.

[10] Studies show that the major beneficiaries of the United States–China conflict are likely to be certain neighbors of mainland China and the United States, including not only ASEAN members but also Mexico, Colombia, Costa Rica and Mexico in Latin America as well as India and Taiwan Province of China (in line with the findings on trade diversion as documented by – for example – Nicita, 2019; Ferraro and Van Leemput, 2019; Subbaraman et al., 2019; LaScaleia, 2019; and Chiang, 2020).

**Figure 4. Number of high-trade-exposure FDI projects: selected industries and host economies, 2018–2019, quarterly**




*Source:* UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com).

To further validate the patterns observed in figures 3 and 4, we now estimate a fixed-effects model. In the following simple regression model, the dependent variable is FDI, defined as the natural log of the quarterly number of projects in country *i*, industry *s*, at time *t* in the period 2015–2019.

$$FDI_{ist} = \beta_0 + \beta_1 HighExp + \beta_2 TW + \beta_3 HighExp * TW + \gamma_i + \gamma_s + \gamma_t + \varepsilon_{ist}$$

The main explanatory variable is the interaction of *HighExp*, a dummy variable equal to 1 for the tradable industries affected by the trade conflict (as defined in section 3), and *TW*, a dummy variable that takes the value of 1 after the second quarter of 2018. We also control for the uninteracted terms plus time, industry and country fixed effects, which account for idiosyncratic as well as country- and industry-specific characteristics. In auxiliary regressions, we add triple interaction terms by country (in table 2) – or by industry (in table 3) – to test for differential trends across specific countries or regions or industries of interest. To account for possible serial correlation of residuals, we cluster standard errors at the level of industry and country.

Table 2 presents the results from estimating the interaction between the coefficient capturing the dummies for all tradable sectors with a country or region to assess whether the impact of trade tension differs systematically across these economies.

**Table 2. The impact of trade war on the number of high-trade-exposure projects worldwide and by host economies**

| | Dependent variable : ln (Number of projects) | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| High trade exposed | 0.204<br>(0.172) | 0.204<br>(0.172) | 0.204<br>(0.172) | 0.204<br>(0.172) | 0.203<br>(0.172) |
| High trade exposed * TW | -0.0251<br>(0.0188) | -0.0263<br>(0.0170) | -0.0249<br>(0.0191) | -0.0385**<br>(0.0173) | -0.0330*<br>(0.0175) |
| High trade exposed * TW * China | | 0.0548*<br>(0.032) | | | |
| High trade exposed * TW * SEA | | | -0.00319<br>(0.0394) | | |
| High trade exposed * TW * MEX | | | | 0.465***<br>(0.03) | |
| High trade exposed * TW * IND | | | | | 0.401***<br>(0.036) |
| Obs. | 25761 | 25761 | 25761 | 25761 | 25761 |
| Time FE | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes |
| Country FE | yes | yes | yes | yes | yes |

*Source:* Based on multiple data sources (see tables A.1 and A.2).
*Note:* TW = trade war, SEA = South-East Asia, MEX = Mexico, IND = India. Standard errors in parentheses clustered by country and industry: *** significant at p < 1%, ** significant at p < 5%, * significant at p < 10%.

The regression results, relying on the panel data estimations presented in table 2, support the trends shown in figure 3. While China's tradable industries saw minimal changes after the onset of the trade war, the South-East Asian economies saw negative – but not statistically significant – reductions in the number of trade-exposed FDI projects. In fact, the marginally statistically significant positive coefficient in column (2) for the interaction of highly trade-exposed projects in China after 2018 is consistent with the possibility that some MNEs may have reinforced productive capacity in the country in response to higher tariffs.

Conversely, the results in columns (4) and (5) demonstrate a statistically and economically significant increase in the number of trade-exposed FDI projects in Mexico and India following the 2018 tariff escalation. Although these economies are not highly integrated with China, they are closer to important final consumers in the United States.

Table 3 presents the marginal effect of high trade exposure on the relevant sector of projects (i.e. the interaction terms between high exposed projects, the trade tension dummy and the relevant sector) in regressions repeated for China, South-East Asia and Latin America. Results are broadly in line with figure 4.

**Table 3. The impact of the trade war on selected industries worldwide and by host economies**

| | World (1) | China (2) | SEA (3) | LAC (4) |
|---|---|---|---|---|
| High Trade Exposed | 0.22<br>(0.173) | 0.421<br>(0.6) | 0.446<br>(0.293) | 0.206<br>(0.153) |
| High Trade Exposed * TW | -0.0393**<br>(0.0132) | -0.227**<br>(0.0976) | -0.136<br>(0.0852) | -0.0976***<br>(0.0279) |
| High Trade Exposed * TW * Auto | 0.243*<br>(0.119) | 1.019<br>(0.764) | 0.002<br>(0.161) | 1.351**<br>(0.498) |
| High Trade Exposed * TW * Electronics | 0.530**<br>(0.221) | 0.0506<br>(0.682) | 0.416*<br>(0.229) | 0.456*<br>(0.226) |
| High Trade Exposed * TW * Food | -0.197*<br>(0.0905) | -1.690**<br>(0.561) | -0.324*<br>(0.176) | -0.230***<br>(0.0308) |
| High Trade Exposed * TW * Textile | -0.0487<br>(0.19) | | 0.962***<br>(0.213) | -0.243<br>(0.242) |
| Constant | 0.602***<br>(0.0674) | 1.058***<br>(0.146) | 0.527***<br>(0.0565) | 0.459***<br>(0.0605) |
| Obs. | 25767 | 680 | 2760 | 2763 |

*Source:* Estimations based on multiple data sources (see tables A.1 and A.2).

*Note:* Standard errors in parentheses clustered by industry and country: *** significant at $p < 1\%$, ** significant at $p < 5\%$, * significant at $p < 10\%$. Columns 2 to 4 show results for regions or country.

There is some evidence of diversion to South-East Asia in specific industries, confirming findings of other research, but the aggregate effect on investment in China is limited and the overall effect on investment in South-East Asia is actually negative. This seems to be the case for the number of projects in electronics industries that have been diverted to South-East Asian and Latin American economies. This result is consistent with the idea that less capital-intensive industries (i.e. excluding battery production and semiconductors in the electronics industry) may be more flexible and able to diversify their international production networks, opening possibilities to capture additional location cost advantages.

Projects in the automotive industry exhibit less clear-cut patterns following the start of the trade war, which could be indicative of stronger tariff-jumping motives.[11] Cost considerations tied to economies of scale and deeply integrated GVCs might also play a role in MNEs' apparent decisions to simultaneously maintain investment in China while also replicating the value chain in outside regions (such as Latin America).[12]

Investment in food processing industries decreased in the whole region, possibly because the pressure of increased costs may have been pushing margins too low. Investment in the textile industries had already been shifting from high-cost to low-cost locations since well before the recent tariff war.

A closer examination of trends by industry sheds light on the diverse strategies across GVCs: MNEs in some industries appear to have diverted investment towards South-East Asian and Latin American countries. The analysis by industry confirms UNCTAD's predictions for international production trajectories towards some form of restructuring of GVCs (UNCTAD, 2020a and 2021). In particular, trade tensions may have contributed to a shift towards more market-oriented investment, as long and complex value chains proved harder to dismantle or divert. There are also signs that some MNEs have been trying to build resilience by diversifying their supply chain, especially among geographically concentrated industries such as electronics. This trend accelerated after 2018 but was already evident in the preceding decade.

The implications of these trends are especially important for developing countries. Tariffs affected primarily manufacturing industries, which are critically important for developing productive capacity and trade. Nevertheless, preliminary evidence suggests that some typical efficiency-seeking investment might have started moving away from traditional host economies, particularly after the 2018 tariff escalation, offering other less advanced economies new opportunities to join GVCs.

[11] The concomitant increase of investment in Latin American economies might be driven by the ratification of the North American free trade agreement and the subsequent increase of automotive investment in Mexico.

[12] See also *Financial Times*, "In charts: Asia's manufacturing dominance", March 21, 2021.

## 5. Concluding remarks and policy implications

This research contributes to the literature on the impact of trade conflicts on FDI, and specifically on international production. This study focuses on the pre-pandemic period because the drivers of the trade tensions might bear on investment differently when compared with the multifaceted COVID-19 shock. While causal inference cannot be established without further analyzing other determinants of investment decisions, the patterns are consistent with concerns that the rise in protectionist trade policies may have pushed MNEs to reconsider their international production networks, particularly in some manufacturing industries, which rely heavily on firms' ability to import components and supplies, and to export. At the same time, tariffs and trade restrictions appear to have disproportionately – and negatively – affected East and South-East Asia, particularly in the most export-oriented industries. Conversely, investment in projects in China's tradable sectors showed resilience in 2019.

Importantly, the impact of trade tensions on cross-border investment projects varied considerably across industries: the results for GVC-intensive but less capital-intensive industries such as electronics and textiles and apparel showed some evidence of diversion towards South-East Asian and Latin American economies. Investment in the automotive industry showed no clear-cut trend in China, whereas some other industries suffered a regional setback.

The industries most exposed to trade tensions represent about 30 to 40 per cent of all manufacturing investment in developing economies and play a key role in the industrialization strategies of many developing economies. Hence, the reconfiguration of the international production network of these industries resulting from the trade tensions has important development implications; more importantly, in the current crisis a slowdown of manufacturing investment can imply a delay in the recovery.

Policies to cope with the new trends will vary depending on the industrial strength of the economy and its integration in regional and global value chains. For economies highly reliant on export-led strategies, investment diversion or relocation might threaten their development path; at the same time new locations can benefit from this same trend and thus need to be ready to attract new investors. The emergence of market-seeking FDI will make regional integration an important element in the development strategy, especially for smaller economies.

Further research (Blanchard et al., 2021b) will develop a more comprehensive empirical framework for analysing the extent to which the recent escalation of trade tensions may have induced investment diversion or aggregate level-changes in foreign investment. In future work, extending this model to include the effect of COVID-19 on the restructuring of international production networks, and post-pandemic recovery, will be valuable from both research and policy standpoints.

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**Table A.1. Exposure to tariff by industry, 2018–2020**

| Industry classification | Average tariff charged against China (%) | US Import Share affected (%) | Share of HS10 affected (%) |
|---|---|---|---|
| Textile (313) | 8.93 | 89.34 | 80.69 |
| Paper (322) | 9.35 | 81.92 | 80.48 |
| Furniture (337) | 8.03 | 80.25 | 80.12 |
| Metal (331) | 12.42 | 87.73 | 78.10 |
| Petrol products (324) | 6.69 | 66.69 | 76.92 |
| Transportation equipment (336) | 11.60 | 91.00 | 75.13 |
| Machinery (333) | 13.54 | 79.40 | 74.44 |
| Fabricated Metal (332) | 9.01 | 68.22 | 72.84 |
| Plastics (326) | 5.92 | 49.33 | 72.19 |
| Non-metal (327) | 5.93 | 58.50 | 69.74 |
| Electrical (313) | 9.34 | 68.07 | 69.64 |
| Oil/Gas (211) | 9.54 | 95.41 | 66.67 |
| Wood (321) | 6.18 | 61.76 | 61.10 |
| Mining (212) | 2.87 | 28.66 | 59.77 |
| Chemical (325) | 6.12 | 48.53 | 58.80 |
| Fishing (114) | 7.39 | 73.89 | 54.13 |
| Crop (111) | 7.18 | 71.80 | 53.36 |
| Food manufacturing (311) | 7.58 | 75.85 | 53.31 |
| Computer (334) | 4.75 | 35.60 | 50.09 |
| Textile products (314) | 1.38 | 13.84 | 39.75 |
| Forestry (113) | 0.84 | 8.40 | 31.37 |
| Leather (316) | 2.63 | 26.33 | 25.89 |
| Animal (112) | 0.50 | 5.01 | 25.00 |
| Beverage (312) | 5.61 | 56.11 | 24.39 |
| Printing (323) | 1.83 | 18.29 | 21.54 |
| Miscellaneous manufacturing (339) | 0.36 | 2.89 | 16.39 |
| Apparel (315) | 0.74 | 7.43 | 4.21 |

*Source:* Blanchard et al (2021a).
*Note:* Industry classification is based on NAICS3 codes.

**Table A.2. Number of tariff-exposed greenfield projects by industry, 2018–2020**

| NAICS3 industry classification | Total projects | Affected projects | Share of affected projects (%) |
|---|---|---|---|
| Fishing (114) | 5 | 5 | 100.00 |
| Animal (112) | 42 | 36 | 85.71 |
| Non-store Retailers (454) | 199 | 169 | 84.92 |
| Wood product (321) | 44 | 34 | 77.27 |
| Paper manufacturing (322) | 124 | 93 | 75.00 |
| Forestry and logging (113) | 8 | 6 | 75.00 |
| Furniture (337) | 33 | 23 | 69.70 |
| Nonmetallic mineral product (327) | 260 | 177 | 68.08 |
| Food manufacturing (311) | 696 | 457 | 65.66 |
| Textile (314) | 47 | 30 | 63.83 |
| Primary metal (331) | 248 | 157 | 63.31 |
| Food manfacturing (311) | 105 | 65 | 61.90 |
| Merchang wholesalers (424) | 44 | 27 | 61.36 |
| Mining (212) | 75 | 46 | 61.33 |
| Beverage and tobacco (312) | 150 | 87 | 58.00 |
| Plastics and rubber (326) | 583 | 331 | 56.78 |
| Electrical equipment (335) | 323 | 177 | 54.80 |
| Fabricated metal (332) | 252 | 135 | 53.57 |
| Oil and gas (211) | 43 | 23 | 53.49 |
| Printing (323) | 29 | 15 | 51.72 |
| Petroleum and coal (324) | 142 | 73 | 51.41 |
| Chemical (325) | 1375 | 609 | 44.29 |
| Transportation equipment (336) | 1568 | 668 | 42.60 |
| Machinery (333) | 1384 | 432 | 31.21 |
| Electronics/Appliance store (443) | 171 | 48 | 28.07 |
| Motor vehicle and parts dealer (441) | 73 | 19 | 26.03 |
| Building material dealers (444) | 138 | 34 | 24.64 |
| Computer (334) | 1109 | 262 | 23.62 |

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**Table A.2. Number of tariff-exposed greenfield projects by industry, 2018–2020**
(Concluded)

| NAICS3 industry classification | Total projects | Affected projects | Share of affected projects (%) |
|---|---|---|---|
| Furniture store (442) | 549 | 83 | 15.12 |
| Miscellaneous manfacturing (339) | 730 | 101 | 13.84 |
| Food and Beverage (445) | 750 | 78 | 10.40 |
| Merchang wholesalers (423) | 264 | 27 | 10.23 |
| Health and personal care (446) | 552 | 56 | 10.14 |
| Miscellaneous store (453) | 194 | 17 | 8.76 |
| Leather (316) | 487 | 29 | 5.95 |
| Apparel (315) | 2746 | 120 | 4.37 |
| Mining support activity (213) | 30 | 1 | 3.33 |
| General merchandising (452) | 143 | 3 | 2.10 |
| Gas station (447) | 82 | 1 | 1.22 |
| Total | 15797 | 4754 | |

*Source:* UNCTAD.
*Note:* Affected sectors are defined as highly exposed based on the designated function (extraction, manufacturing, distribution and logistics) and sector (ISIC 1–2, 5, 10–11, 13–14), manufacturing (ISIC 15–22, 24–36), or wholesale/retail (ISIC 51–52).