Does FDI in upstream and downstream sectors facilitate quality upgrading? Evidence from Russian exporters

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Abstract

This study examines whether foreign direct investment inflows facilitate upgrading of export quality in host countries. The analysis focuses on the Russian Federation and uses customs data merged with firm-level information from ORBIS. The results show a positive relationship between the quality of products exported by domestic firms and the presence of foreign affiliates in the upstream (input-supplying) industries. This relationship is present irrespective of export destination or FDI origin. The results are robust to using different proxies to measure product quality.

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I. Introduction

The past decade has witnessed a slowdown in global flows of foreign direct investment (FDI). This slowdown has had and will continue to have profound implications for global value chains, international trade centred around multinationals and technology transfer across international borders. However, there are also less visible implications, such as the impact of FDI inflows on domestic exporters in host countries, which is the topic of this study.

Foreign affiliates affect the performance of local firms in host countries in a variety of ways. For instance, their presence in the upstream (input-supplying) industries may have a direct effect on domestic firms by providing them with higher quality intermediates and capital goods, which results in increased productivity and higher product quality.[1] The presence of FDI may also have an indirect effect: by increasing the level of competition in the input-supplying sector it may induce local input producers to become more efficient or upgrade their production processes and thus offer more technologically advanced inputs.[2]

Moreover, the presence of foreign affiliates in the downstream (input-sourcing) industries may boost production quality among their local suppliers. This improvement might be achieved, for example, by knowledge transfer from foreign affiliates to their local suppliers to facilitate the production of cheaper or higher quality inputs.[3] Finally, domestic firms may learn from foreign affiliates that operate in the same industry by observing the practices of foreign affiliates or hiring workers trained by them.[4] In this way, local firms may learn how

[1]For instance, Javorcik et al. (2008) report that small Mexican producers meet with their input suppliers (usually foreign affiliates) every six months to learn about the possibilities of upgrading their products. Suppliers provide the necessary inputs and often prepare a new formula for the product based on these inputs.

[2]Several studies show that when firms have access to imports of high-quality and diverse inputs, there are significant gains in productivity (Amiti and Konings 2007), export quality (Bas and Strauss-Kahn 2015), and product scope (Goldberg et al. 2010).

[3]See a survey by Javorcik (2008) on Czech manufacturing firms showing that about 40% of domestic suppliers receive some assistance from their multinational customers. Interestingly, becoming a supplier was the incentive to improve product quality for nearly half of these domestic firms. Javorcik (2004) also shows spillovers from FDI to the supplying industries. Also, Javorcik et al. (2018) use the Hidalgo and Hausmann (2009) product complexity indicator to show that domestic firms are more likely to produce more complex products as a result of the increased FDI presence in the supplying sectors.

[4]Recent evidence from Russia show that firms with foreign affiliates have better management and better performance (Grover and Torre 2019).

to improve their product quality, use standardisation, improve marketing skills, and enhance the reliability of their shipments (see, for instance, Haskel et al. (2007), Keller and Yeaple (2009), Poole (2013), Balsvik (2011)). FDI inflows also increase competition in the domestic market, which may force local firms to either improve or to exit.

Domestic firms may learn about the profitability of various export opportunities by observing their foreign peers' exports, and this could make them invest in quality upgrading or developing new products. Thus, the presence of foreign affiliates may lead to a reduction of export costs (Aitken et al. 1997), an increase in the amount and unit value of trade transactions (Chen and Swenson 2007), help develop new export connections (Swenson 2008), and expand export varieties (Sheng and Yang 2016). Indeed, anecdotal and survey evidence, discussed in the Mechanisms section, suggest that managers of domestic firms, and especially suppliers, learn from their multinational peers, and this knowledge transfer often translates into quality upgrading of exports.

In this study, I examine the impact of FDI on the quality of products exported by local firms in Russia. I use detailed customs data recording Russia's exports at the level of the firm, 10-digit HS (Harmonized System) product classification, destination country and year. Due to the data I have at hand, the time period I examine is 2012-2016. The export data are combined with firm-level balance sheets and ownership information. Although the balance sheet information covers 2007-2016, the ownership information is available only for 2012 and 2015 in the data extract I use. Thus, I focus my analysis on a long difference. I measure quality upgrading, defined as within-product improvements in export quality, in two ways. First, I focus on unit values of exports.[5] Second, I use the approach in Khandelwal et al. (2013) which builds on the work of Khandelwal (2010).[6]

A further contribution of this study is examining the heterogeneity of the results across several dimensions, such as the destination of exports or the origin of the FDI. Regarding the

[5]Despite their shortcomings, export unit values have been extensively used as a proxy for quality, see, for example, Schott (2004), Hallak (2006), Bas and Strauss-Kahn (2015).

[6]The basic insight of this method is that, controlling for price, products that enjoy a higher market share are of higher quality.

destination of exports, I focus on the distinction between developed and developing countries, and neighbouring countries against the rest. As a recent study by Manova and Zhang (2012) suggests, exporters differentiate product quality by selling higher-quality products to richer and more distant countries, mainly by using inputs of different quality levels.[7] If such a mechanism is true for the Russian exporters, then an increase in FDI would be associated with greater gains for export quality towards developed countries and towards non-neighbouring countries. On the origin of FDI, I look at whether it matters if it is coming from developed as opposed to developing countries. If exports are boosted by FDI from developed countries, which in general are more high-skilled and R&D intensive, this would mean that FDI also transfers knowledge and technology and re-confirms the mechanism of knowledge spillovers leading to quality upgrade for domestic exporter firms. If on the other hand, origin does not vary the results, the increase of export quality for domestic producers would be through access to new markets and domestic competition among exporters.

The empirical analysis relates the change in the quality of product p exported by firm i to country c taking place between 2013 and 2016 and the change in FDI presence in the same, upstream and downstream sector between 2012 and 2015. In other words, measures of FDI presence are lagged by one year with respect to the export outcomes. The results show a positive and statistically significant relationship between the within-product quality upgrading in goods exported by Russian firms and the increased presence of foreign affiliates in the upstream (input-supplying) industries. I find that a one-standard-deviation increase in the change of foreign presence in the upstream industries is associated with a statistically significant 3% increase in the quality of exports of domestic firms. This increase is present irrespective of the origin of FDI (i.e. whether investment is originated from a developed or developing country) and the destination of exports (i.e. whether exports go to a developed or developing country; and neighbouring or non-neighbouring country). In addition, I find

[7]Manova and Zhang (2012) focused on the destinations' income and distance for Chinese exporters, but similar evidence exists for Portugal (Bastos and Silva 2010), France (Martin 2012), and Hungary (Görg et al. 2017).

a positive relationship between the number of new export flows and the foreign presence in the sectors supplied by Russian exporters.

These results are essential for policymakers wishing to upgrade exports, as they quantify the potential benefits of policies promoting foreign direct investment, mainly when focused in sectors that supply inputs to domestic firms. This study is most closely related to Bajgar and Javorcik (2020) who find a positive relationship between the quality of products exported by Romanian firms and foreign affiliate presence in the upstream (input-supplying) industries and to a lesser extent in downstream (input-sourcing) industries and the same industry. Other evidence from Mexican manufacturing plants (Aitken et al. 1997) and Chinese firms (Swenson 2008) show that the presence of multinationals is associated with an increase in the likelihood of exporting for domestic firms, while Chen and Swenson (2007) also find an increase in unit value in export transactions in China. Apart for firm-level evidence, there is also evidence from cross-country analysis from Harding and Javorcik (2012) who find that sectors targeted by national investment promotion efforts tend to increase the unit values of exports subsequently. Based on FDI origin, there is some evidence of differential effects in terms of positive vertical spillovers on productivity to domestic firms (Javorcik and Spatareanu (2011); Ni et al. (2017)), but little is known in the case of exporters.

The rest of the paper is organised as follows. The next section introduces the data, and Section 3 outlines the empirical model. The results from the main and the heterogeneity analysis are presented in Section 4. Section 5 concludes with policy implications.

II. Data

Data sources

The primary source of data for this study is the commercial database ORBIS compiled by the Bureau van Dijk. The data set I use contains the main financial indicators for firms operating in Russia in the period 2007-2016. It also contains very detailed information on ownership,

which is however limited to the last available update. To obtain ownership information for the earlier points in time, I enhance the data set with two additional 'historical' exports from ORBIS. This includes a data export from 2012 (with ownership updated mostly in April and September of that year) and a data export from 2015 (with ownership updated mostly in July of that year) that are merged with the main data based on a unique firm identifier.

I combine the ORBIS data for manufacturing firms with detailed information on exports at the level of the firm, 10-digit HS product, destination country and year, available for 2012-2016 from the Russian Customs. Then, I merge the export data with the ORBIS data based on a unique firm tax reference number, common to both data sets.

I also use the Russian input-output table for 2011. The input-output table follows the 3-digit NACE classification, while the ORBIS data include 4-digit NACE codes. This allows me to match the firm-level data with information from the input-output table.

Variable definitions

Product quality

I use two proxies for the quality of exports. The first proxy is the unit value (i.e., the monetary value divided by the physical weight). I focus on a very narrow product definition, namely 10-digit HS products. Although unit values are a commonly used proxy for product quality, they may be contaminated by high markups.[8]

Therefore, I also use another proxy, a measure suggested by Khandelwal et al. (2013) which builds on the work of Khandelwal (2010). The latter paper combines information on prices and physical quantities to infer quality, based on the insight that ability of an exporter to sell a larger quantity at a given price should imply higher quality. Khandelwal et al. (2013) identify the relationship between quantity and price by assuming specific elasticities of substitution.

The quality measure is inferred from the OLS residuals obtained by regressing the

[8]In other words, high unit values may reflect high markups rather than superior quality.

weighted sum of the log quantity and the log price as follows:

$$\log q_{ipct} + \sigma \log p_{ipct} = \alpha_p + e_{ipct} \tag{1}$$

where q_{ipct} and p_{ipct} are the quantity and the price, respectively, of exports of product p by firm i to destination country c in year t, σ represents the assumed elasticity of substitution and α captures time-invariant product characteristics. The residuals $\hat{e}_{ipct}$ obtained from this regression are the second quality measure I use in this study.[9]

Both proxies are defined at the firm-product-destination-year level. The two measures of quality are closely related. Across the sample, their correlation is 0.90 in levels and 0.78 in differences. The relationship between the two measures is also illustrated in Figure 1 (see the left panel for levels and the right panel for first differences). Table A1 lists the top 20 and the bottom 20 products in terms of changes in unit values.

Figure 2 plots the distribution of unit values and the alternative quality measure among domestic and foreign exporters. It is visible from the plots that foreign affiliates tend to export products with higher unit values and higher quality measure.[10]

FDI presence

Given the timing of the export data and the limited ownership information in the data I use, I focus on ownership in 2012 and 2015. I define a firm as foreign-owned if the Global Ultimate Owner (GUO) reported by ORBIS is foreign.[11] If the GUO is reported to be domestic or the GUO nationality is missing, I use the information on shareholders of a given firm reported in ORBIS. I define a firm as foreign if it has at least one foreign shareholder with more than 10% equity share, which is a common practice in the literature on FDI spillovers (Demena

[9]Following the literature, I assume σ to be equal to 5.

[10]Differences in the distribution of unit values could be driven by differences in the composition of exports across products. This is, however, not true when the alternative measure is used, as it has been purged of product fixed effects.

[11]A company's GUO is the individual or entity at the top of the corporate ownership structure, controlling at least 25.01% of that company.

and Bergeijk 2017).[12] As a robustness check, I re-estimate the baseline specification using a continuous measure of foreign ownership instead of a discrete one based on a cutoff. The main conclusions remain the same, as coefficients are of similar magnitude, but with larger standard errors (Table A4 in the Appendix).

I define industry-level FDI presence based on the standard formula used in the literature:

$$Horizontal\ FDI_{st} = \frac{\Sigma_{i \in I_{st}} f_{it} Y_{it}}{\Sigma_{i \in I_{st}} Y_{it}} \tag{2}$$

where i denotes firm, s 3-digit NACE sector and t year. In addition, f_{jt} is an indicator variable for foreign owned firms and Y_{jt} is the operating revenue. Given the limited availability of the ownership information, I measure Own FDI at two points in time, namely in 2012 and 2015.

To capture vertical spillovers from FDI, given the absence of firm-to-firm transactions, I rely on product data at the industry level. Indeed, this is is a common practice in the literature on FDI spillovers and one of its main limitations (Havranek and Irsova 2011). To capture vertical spillovers from FDI in the input-sourcing sectors, I rely on the assumption that a domestic firm is more likely to supply foreign affiliates – and benefit from vertical spillovers – if foreign affiliates account for a larger share of downstream industries' output. As in Javorcik (2004), I do not include inputs' sales within the firm's own sector as the Own FDI variable captures this effect. Thus, this proxy will be capturing a lower bound on the effect of FDI in the input-sourcing industries. I define downstream FDI measure as

$$Downstream\ FDI_{st} = \Sigma_{d \in S, s \neq d} \alpha_{sd} Horizontal\ FDI_{dt} \tag{3}$$

[12] I exclude capital from 'tax havens' when defining foreign ownership. These are mostly Russian round-trip investments, often referred to as *phantom FDI*, which are not expected to contribute through knowledge transfer (Damgaard et al. (2019); see Ledyaeva et al. (2015) for a detailed examination of this phenomenon in Russia). I treat the following countries as 'tax havens': Anguilla, Aruba, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Cook Islands, Curacao, Cyprus, Dominica, Gibraltar, Guernsey, Guyana, Hong Kong, Isle of Man, Jersey, Liberia, Lichtenstein, Luxembourg, Macao, Malta, Marshall Islands, Mauritius, Monaco, Montserrat, Nauru, Samoa, San Marino, Seychelles, Singapore, St. Kitts & Nevis, St. Vincent & Grenadines, Taiwan, Turks & Caicos Islands, US Virgin Islands.

where α_{sd} is the share of intermediate inputs sold by industry s to industry d, according to the input-output matrix and S is the set of all manufacturing sectors.

Similarly, I proxy for access to inputs produced by foreign affiliates by assuming that a Russian firm is more likely to buy inputs from a foreign affiliate if foreign affiliates account for a larger share of output in the upstream industries. Thus, the upstream FDI measure is defined as

$$Upstream\ FDI_{st} = \Sigma_{u \in S, s \neq u} \alpha_{su} Horizontal\ FDI_{ut} \tag{4}$$

where α_{su} is the share of the intermediate inputs by industry s which is purchased from industry u. Similarly, I exclude input purchases within the same sector, making the coefficient on Upstream FDI a lower-bound estimate.

Sectors with the highest values of FDI presence proxies in 2012 are listed in the Appendix Table A2. In tobacco products, foreign affiliates account for almost all output. In pulp, wood pulp, paper and cardboard, they are responsible for three quarters of production. In household appliances; fruits and vegetables; soap, cleaning, perfumery and cosmetics, foreign affiliates account for around two thirds of production. Table A2 also lists sectors that saw the largest increase in FDI presence. These are flour and cereals; other electrical equipment; pharmaceuticals; furniture and machine tools.

III. Empirical model

The empirical model I employ relates the quality of 10-digit HS product p exported by firm j operating in sector s to country c in year t to the presence of foreign firms in the same, upstream and downstream sectors a year earlier. FDI variables typically enter with a one-year (or even a longer) lag because it takes time for the knowledge spillovers to take place. Using lags also mitigates some endogeneity concerns. However, results should be taken with care as I do not have a long panel that would allow taking longer lags, or using forward lags

as placebo tests. Thus, the empirical specification has the following form:

$$\begin{aligned}\ln(\text{Export Quality})_{ipct} = \ & \beta_1 \text{Horizontal FDI}_{st-1} + \beta_2 \text{Upstream FDI}_{st-1} \\ & + \beta_3 \text{Downstream FDI}_{st-1} + \beta_4 \text{Controls} + \gamma_{ipc} + \tau_t + \epsilon_{ipct} \end{aligned} \quad (5)$$

The specification controls for time fixed effects (τ_t) and firm-product-country fixed effects (γ_{ipc}) which means that it takes into account (i) the fact that an ounce of gold costs more than an ounce of steel, (ii) the possibility that some firms charge higher prices or export higher quality products than other firms, (iii) the possibility that firms may adapt product quality depending on the destination market. These fixed effects also take into account any time-invariant characteristics specific to the firm, product and destination combinations. I further control for two commonly-used measures: industry concentration using the Herfindahl-Hirschman Index for 2012; and relative quality of each export flow in 2013. The latter is calculated as the median unit value of exports of a given HS10 product by all firms over all destination countries and taking the ratio of the unit value of product p exported by firm j to country c relative to the average unit value of product p exported by all firms to country c. I transform this specification by differencing, which means that the fixed effect γ_{ipc} drops out. Following the literature, I include fixed effects for the region of the firm (κ_r), and the destination country of the exports (λ_c). Thus, I obtain the following specification:

$$\begin{aligned}\Delta \ln(\text{Export Quality})_{ipct} = \ & \theta_1 \Delta\text{Horizontal FDI}_{st-1} + \theta_2 \Delta\text{Upstream FDI}_{st-1} \\ & + \theta_3 \Delta\text{Downstream FDI}_{st-1} + \theta_4 \text{Controls} + \kappa_r + \lambda_c + u_{ipct} \end{aligned} \quad (6)$$

The data set I use is constrained in terms of foreign ownership information. Thus my final specification will relate changes in unit values between 2013 and 2016 to the changes in FDI presence between 2012 and 2015. Thus, the time fixed effects also drop. As I am interested in knowledge spillovers from foreign affiliates to domestic firms, I estimate the above specification on the sample of domestic firms. More precisely, I restrict the sample to

firms which are domestic in both 2012 and 2015. Finally, I cluster the standard errors by industry, the level of aggregation of the FDI variables.

IV. Results

Baseline results

The baseline results, presented in Table 1, show a positive and statistically significant at the 1% level relationship between improvements in the quality of products exported by Russian firms and the increasing presence of foreign affiliates in the supplying sectors. In other words, the greater the change in the foreign output share in industry s, the greater the quality improvement in Russian firm exports in industries supplied by s. This relationship is statistically significant when the proxy for foreign presence enters by itself as well as in the full specification including all three FDI proxies (both at the 1% level). This result holds both when the quality of exports is proxied with unit values and when proxied by the residuals from the OLS estimation of Equation (1), as in Khandelwal et al. (2013)), although the latter only at the 5% level.

The magnitude of the estimated effect is economically meaningful. Based on the results from column 4 in Table 1, a one-standard-deviation increase in the change in FDI presence in upstream sectors is associated with a 3.5% increase in the unit value of exports. The corresponding magnitude for the alternative quality measure is 2.1%. As for the other proxies for FDI presence, although the estimated coefficients are positive, they do not reach conventional significance levels.

As a robustness check, I repeat the baseline specification on a full sample, including exports by both Russian firms and foreign affiliates. My conclusions are confirmed, with the estimated magnitudes for the full specification being slightly larger (see Table A3 in the Appendix).

Heterogeneity by export destination and FDI source

In this section, I explore whether results are driven by the destination of the exports, or by the origins of the FDI. I differentiate between export destinations by separating the sample into exports to developed and developing countries.[13] The results are presented in Table 2. As before, I find that the presence of foreign affiliates in the input-supplying industries matters for the quality of products exported by Russian firms. This relationship holds for both developed and developing markets. Indeed, looking at the full specifications (columns 4 and 8) the result is statistically significant at the 1% level when using unit values and at the 5% level when using the measure a la Khandelwal et al. (2013). The estimated magnitudes are very similar to those found in the baseline specification, albeit slightly higher in the case of exports towards developed countries compared to those towards developing countries. This is line with the mechanism suggested by Manova and Zhang (2012), even if this is not statistically significant. Overall, this suggests there is no differentiation of the results in terms of destination in this respect.

Another result that emerges from this analysis is that the presence of foreign affiliates in the same industry matters, but only for the quality of goods exported by Russian firms to developed countries. The result holds for both measures of export quality, and the estimated coefficients in the full specifications are statistically significant at the 1% level. A one-standard-deviation increase in the change in FDI presence in the same sector is associated with a 3.5% and 5.2% increase in the quality of exports when the quality is proxied with unit values and the Khandelwal et al. (2013) measure, respectively.

Table 3 distinguishes between exports to neighbouring countries and other destinations.[14] The estimated coefficients of Upstream FDI using only exports to non-neighbouring countries

[13] Although there is no one widely accepted definition of developed countries, I use the following list, based on the World Bank classification from the early 2010s, including Austria, Australia, Belgium, Canada, Denmark, France, Finland, Germany, Greece, Iceland, Ireland, Italy, Israel, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States.

[14] The neighbouring countries include: Azerbaijan, Belarus, China, Estonia, Finland, Georgia, Kazakhstan, North Korea, Latvia, Lithuania, Mongolia, Norway, Poland, Ukraine.

are more than twice as large as the coefficients when using exports to bordering countries. This suggests that the vertical FDI spillover effect on domestic firms' quality upgrading is larger for exports towards more distant destinations rather than neighbouring countries.

The ORBIS database contains information on the nationality of investors, which allows me to classify FDI as originating from developed countries versus the rest. Germany, the US and the UK are the top three source countries of FDI accounting for about 21%, 12% and 10% of foreign affiliates from developed countries, respectively. They are followed by the Netherlands with about 9% and Finland with 7%. The presence of FDI originating from non-developed countries is much smaller. Among them, China, Turkey and Belarus are the largest investors, representing about 11% each. They are followed by North Korea and Poland with about 9% each.

I recalculate the FDI proxies separately for the two types of FDI and include all of them in the estimating equation. Table 4 shows this augmented specification. I find a positive and statistically significant relationship (at the 1% level for unit values (column 4) and the 5% level using the estimated quality (column 8)) between the change in Upstream FDI from developed countries and the quality of exports. The coefficients on Upstream FDI from other countries bear positive, but insignificant, coefficients. This means that the spillover effect in the input-supplying sector is driven mainly by developed-origin investment, which is consistent with the hypothesis of FDI upgrading exports quality through knowledge transfer. However, the F-test cannot reject the equality between the two. Thus, I cannot reject the hypothesis that the increase in all FDI, and not just FDI from developed countries, is associated with improving the quality of exports.

FDI and other outcomes

In this section, I consider other outcomes that can be affected by the presence of foreign affiliates. First, I look at the changes in the number of flows between 2013 and 2016 within a 4-digit HS product grouping, where a flow is defined as an exporter-product-destination

combination. As visible in the top panel of Table 5, I find a positive and statistically significant at the 1% level relationship between the change in the foreign affiliate presence in the input-supplying industries and the change in the number of trade flows. This finding is suggestive of availability of better inputs, supplied by foreign affiliates, being associated with an increased ability of Russian firms to export.

Next, I consider the number of new flows explicitly, i.e., flows that were observed in 2016, but that did not exist in 2013. I find that an increase in foreign presence in the input-sourcing industries is associated with a larger number of new flows (see the middle panel of Table 5). This is consistent with the possibility that Russian firms that become suppliers to foreign affiliates start exporting new products (perhaps the same products they supply to foreign affiliates) or start exporting their existing or new products to new destinations (perhaps to supply sister companies of the foreign affiliate they serve in Russia). In the bottom panel of Table 5, I consider the number of discontinued flows, i.e. the difference between the two previous outcomes, number of flows and number of new flows. Similarly, with the number of new flows, downstream FDI is associated with more discontinued flows. Together, the increase in new flows and discontinued flows suggests that firms are reorienting their exports, either due to changes in product or destination.

In order to further decompose the results on the number of export flows, I look at the associations with firms, products and destinations, separately. So, from the previous changes in exporter-product-destination combination used in Table 5, I create three new variables, each containing the number of exporters, products, and destinations, respectively. This will help clarify whether the results are driven by more firms exporting, by exporters exporting more different products, or by exporters exporting given products to more destinations. The results of this decomposition are presented in Table 6. Looking at the association of the change in Upstream FDI across the three panels, I find that there is an increase in the number of firms and an increase in the number of products, but not in the number of destinations. This suggests that when Russian firms are exposed to a more foreign presence on their

input-supplying industries, they are more likely to become exporters, and current exporters to export more products, but the data cannot explain whether exporters are producing new products or decide to export products that were sold in the domestic market. The fact that there is no relationship with the number of destinations suggests FDI did not help on creating new trade channels to new countries, which might be affected by factors such as geopolitical interests and bilateral agreements or sanctions. Thus all new export flows are directed to existing trade country partners.

Mechanisms

There are several ways in which the presence of foreign affiliates might affect quality upgrading for domestic exporters, with several anecdotal evidence indicating the ways this can be achieved. For example, the arrival of the Indian diamond trader KGK Group in Russia was initiated by the need to be closer to its Russian supplier of rough diamonds Alrosa. This collaboration led to the creation of the Eurasian Diamond Centre in the Vladivostok Free Trade Zone, aiming at uniting companies in the industry by providing a platform for the dissemination of new manufacturing technologies, holding exhibitions and boosting export operations.[15] Another example in the dairy industry is the collaboration of the French Danone with the Russian Damate, a major exporter, to construct dairy farms to supply the former with raw milk. Such a deal brings "knowledge and expertise" to Damate according to its CEO, who noted that "Danone brings not only financial support to this project, but also participates in its design and management".[16] Another real-world example can be found in the beer industry in Russia, where the arrival of international leaders was coupled by investment in infrastructure and modernization of the production process. For example, the foreign-owned malthouse Malteries Soufflet Saint-Petersbourg supplies not only international brewers, but also Russian breweries, in a sector that has seen a massive boost in

[15]Russia Briefing, 2017, Eurasian Diamond Trading Centre Opens in Vladivostok, available at `https://www.russia-briefing.com/news/eurasian-diamond-trading-centre-opens-vladivostok.html`

[16]Naum Babaev, 2013, just-food.com, Danone, Damate sign co-finance dairy deal, available at `https://www.just-food.com/news/danone-damate-sign-co-finance-dairy-deal_id124998.aspx`

exports.[17] Benefits can also be merely monetary, as in the case of large retail chains, such as the French Auchan or the German Metro Cash and Carry, who are "interested in financing suppliers because, in the event of a supplier's bankruptcy, it is often difficult to find a good replacement".[18]

There is also recent survey evidence. For example, using a survey of 978 small and medium-sized manufacturing businesses in Russia, Grover and Torre (2019) find that those businesses that supply foreign firms have a higher management score (a composite index of managerial practices based on an adapted version of the MOPS[19] instrument) than those who did not supply to a foreign firm. Similar results were found for businesses that supply exporter firms. There are potential mechanisms for FDI in the same sector, but also in the input-supplying and the input-sourcing, that can affect quality upgrading of exports.

V. Conclusions

The results presented in this paper suggest that FDI inflows may facilitate the upgrading of the export structure in the host country. In particular, I show that Russian firms experience an export quality improvement after an increase in foreign presence in their input-supplying industries. This conclusion is consistent with the cross-country evidence in Harding and Javorcik (2012) showing that sectors targeted by investment promotion agencies in their efforts to attract FDI inflows experience an improvement in the export quality.

This export quality upgrading for domestic firms holds irrespective of the origin of FDI in the input-supplying industries and the destination of the exports in terms of income. However, I do find a higher increase for exports towards non-neighbouring countries compared to those towards neighbouring countries, which amplifies the stylised fact of firms exporting

[17]The Moscow Times, 2019, Russians and Alcohol: When Beer Replaced Vodka, available at `https://www.themoscowtimes.com/2019/10/29/a67946`

[18]Interview with Viktor Nosov, Expert RA, 2015, available at `https://www.raexpert.ru/editions/nosov_factoring_1h2015`

[19]For more information on the US Census Management and Organizational Practices Survey (MOPS), see `http://bhs.econ.census.gov/bhs/mops`.

higher quality products to more distant destinations (Manova and Zhang 2012). When I decompose the flows of exports, I find that this increase is coupled by an increase in the number of firms exporting, and an increase in the number of exported products, but not in an increase in the number of destinations. Overall, the results suggest a robust relationship of FDI presence in upstream industries and quality upgrading for local Russian exporters through positive spillovers.

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TABLE 1
Baseline results

	(1)	(2)	(3)	(4)
	Change in ln(Unit Values)			
Change in Horizontal FDI	0.094			0.147
	(0.102)			(0.089)
Change in Upstream FDI		0.976***		1.109***
		(0.223)		(0.245)
Change in Downstream FDI			0.391	-0.180
			(0.668)	(0.696)
Observations	9,876	9,876	9,876	9,876
R-squared	0.089	0.092	0.089	0.093
	Change in quality estimated via Equation (1)			
Change in Horizontal FDI	0.074			0.109
	(0.077)			(0.080)
Change in Upstream FDI		0.624**		0.671**
		(0.290)		(0.309)
Change in Downstream FDI			0.449	0.110
			(0.567)	(0.589)
Observations	9,876	9,876	9,876	9,876
R-squared	0.137	0.138	0.137	0.138
Region Fixed Effects	Yes	Yes	Yes	Yes
Destination Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: Product quality is proxied by two measures: unit values, defined as the monetary value divided by the physical weight; quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1). Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. Controls include: Herfindahl-Hirschman Index in 2012; and relative quality of each export flow in 2013. The estimating sample includes only exports of domestic firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

TABLE 2
Results by exports to developed countries and exports to developing countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in ln(Unit Values)							
	Exports to developing countries				Exports to developed countries			
Change in Horizontal FDI	0.027			0.068	0.261**			0.419***
	(0.109)			(0.096)	(0.116)			(0.117)
Change in Upstream FDI		0.890***		1.029***		1.491***		1.696***
		(0.236)		(0.257)		(0.358)		(0.349)
Change in Downstream FDI			0.034	-0.516			1.892**	1.053
			(0.679)	(0.687)			(0.859)	(0.998)
Observations	7,784	7,784	7,784	7,784	2,092	2,092	2,092	2,092
R-squared	0.086	0.089	0.086	0.089	0.131	0.136	0.133	0.146
	Change in quality estimated via Equation (1)							
	Exports to developing countries				Exports to developed countries			
Change in Horizontal FDI	-0.023			0.005	0.383**			0.537***
	(0.069)			(0.070)	(0.156)			(0.167)
Change in Upstream FDI		0.657**		0.691**		1.305***		1.639***
		(0.325)		(0.322)		(0.460)		(0.474)
Change in Downstream FDI			0.218	-0.162			1.816**	1.078
			(0.650)	(0.625)			(0.801)	(0.936)
Observations	7,784	7,784	7,784	7,784	2,092	2,092	2,092	2,092
R-squared	0.136	0.136	0.136	0.136	0.167	0.166	0.165	0.174
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Product quality is proxied by two measures: unit values, defined as the monetary value divided by the physical weight; quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1). Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. Controls include: Herfindahl-Hirschman Index in 2012; and relative quality of each export flow in 2013. The sample includes only exports of domestic firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

TABLE 3
Results by exports to neighboring countries and exports to other destinations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in ln(Unit Values)							
	Exports to neighboring countries				Exports to other destinations			
Change in Horizontal FDI	-0.019			0.007	0.175*			0.270***
	(0.128)			(0.122)	(0.101)			(0.098)
Change in Upstream FDI		0.628**		0.684**		1.260***		1.533***
		(0.312)		(0.322)		(0.226)		(0.249)
Change in Downstream FDI			0.079	-0.294			0.583	-0.165
			(0.859)	(0.874)			(0.668)	(0.691)
Observations	4,042	4,042	4,042	4,042	5,834	5,834	5,834	5,834
R-squared	0.08	0.082	0.08	0.082	0.106	0.11	0.105	0.113
	Change in quality estimated via Equation (1)							
	Exports to neighboring countries				Exports to other destinations			
Change in Horizontal FDI	-0.092			-0.083	0.174**			0.247***
	(0.143)			(0.149)	(0.085)			(0.092)
Change in Upstream FDI		0.259		0.2		0.927***		1.107***
		(0.470)		(0.472)		(0.304)		(0.283)
Change in Downstream FDI			0.235	0.118			0.659	0.147
			(0.853)	(0.806)			(0.632)	(0.608)
Observations	4,042	4,042	4,042	4,042	5,834	5,834	5,834	5,834
R-squared	0.116	0.116	0.116	0.116	0.157	0.158	0.157	0.159
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Product quality is proxied by two measures: unit values, defined as the monetary value divided by the physical weight; quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1). Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. Controls include: Herfindahl-Hirschman Index in 2012; and relative quality of each export flow in 2013. The sample includes only exports of domestic firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

TABLE 4
Results by FDI originating in developed versus other countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change in ln(Unit Values)				Change in quality Equation (1)			
Change in Horizontal FDI developed	0.082			0.143*	0.069			0.097
	(0.101)			(0.084)	(0.073)			(0.077)
Change in Horizontal FDI developing	-0.097			-0.065	0.132			0.061
	(0.117)			(0.119)	(0.158)			(0.150)
Change in Upstream FDI developed		0.994***		1.267***		0.660**		0.735**
		(0.224)		(0.261)		(0.289)		(0.312)
Change in Upstream FDI developing		6.775		8.471		12.651		13.337
		(6.643)		(7.758)		(7.884)		(8.513)
Change in Downstream FDI developed			0.620	-0.036			0.334	-0.161
			(0.661)	(0.716)			(0.604)	(0.622)
Change in Downstream FDI developing			-1.704	-3.417			1.494	0.493
			(2.121)	(2.149)			(2.558)	(2.599)
Observations	9,876	9,876	9,876	9,876	9,876	9,876	9,876	9,876
R-squared	0.089	0.092	0.089	0.095	0.137	0.138	0.137	0.138
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coefficient of Change in Upstream FDI developed = Coefficient of Change in Upstream FDI developing:								
F-statistic		.763		.872		2.328		2.218
p-value		.386		.354		.132		.141

Notes: Product quality is proxied by two measures: unit values, defined as the monetary value divided by the physical weight; quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1). Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. Controls include: Herfindahl-Hirschman Index in 2012; and relative quality of each export flow in 2013. The sample includes only exports of domestic firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

TABLE 5
Results for other outcomes

	(1)	(2)	(3)	(4)
	Change in ln(N of flows)			
Change in Horizontal FDI	-0.295**			-0.135
	(0.120)			(0.125)
Change in Upstream FDI		1.641***		1.570***
		(0.321)		(0.346)
Change in Downstream FDI			0.417	-0.108
			(0.562)	(0.587)
Observations	1,522	1,522	1,522	1,522
R-squared	0.004	0.020	0.000	0.021
	ln(N of new flows)			
Change in Horizontal FDI	-0.063			-0.262
	(0.417)			(0.426)
Change in Upstream FDI		-0.896		-1.892
		(1.482)		(1.588)
Change in Downstream FDI			7.501***	8.122***
			(1.934)	(2.087)
Observations	1,551	1,551	1,551	1,551
R-squared	0.000	0.000	0.010	0.011
	ln(N of discontinued flows)			
Change in Horizontal FDI	0.264			-0.121
	(0.406)			(0.416)
Change in Upstream FDI		-2.778*		-3.730**
		(1.442)		(1.546)
Change in Downstream FDI			7.199***	8.440***
			(1.776)	(1.942)
Observations	1,527	1,527	1,527	1,527
R-squared	0.000	0.004	0.009	0.017

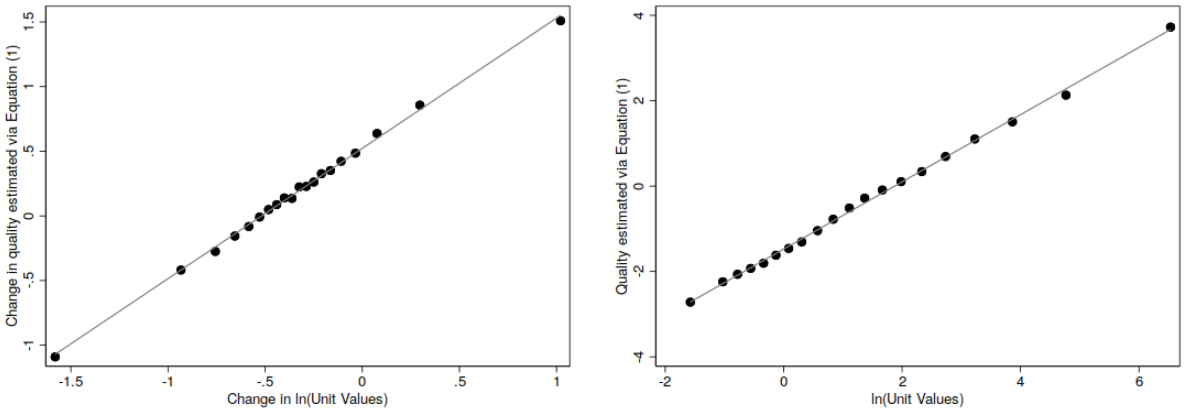
Notes: Log of new flows Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. The sample includes only exports of domestic firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

TABLE 6
Decomposition of new flows

	(1)	(2)	(3)	(4)
Change in ln(Number of firms exporting)				
Change in Horizontal FDI	-0.465***			-0.249
	(0.157)			(0.169)
Change in Upstream FDI		2.109***		2.121***
		(0.472)		(0.526)
Change in Downstream FDI			-0.864	-1.574*
			(0.775)	(0.827)
Observations	1,522	1,522	1,522	1,522
R-squared	0.005	0.018	0.001	0.023
Change in ln(Number of products for exporters)				
Change in Horizontal FDI	-0.193			0.041
	(0.170)			(0.173)
Change in Upstream FDI		2.084***		2.289***
		(0.520)		(0.551)
Change in Downstream FDI			-0.959	-1.721**
			(0.740)	(0.775)
Observations	1,522	1,522	1,522	1,522
R-squared	0.001	0.015	0.001	0.018
Change in ln(Number of destinations for exporters exporting given products)				
Change in Horizontal FDI	0.097			0.072
	(0.083)			(0.088)
Change in Upstream FDI		-0.254		-0.252
		(0.313)		(0.349)
Change in Downstream FDI			0.312	0.397
			(0.510)	(0.550)
Observations	1,522	1,522	1,522	1,522
R-squared	0.001	0.001	0.000	0.001

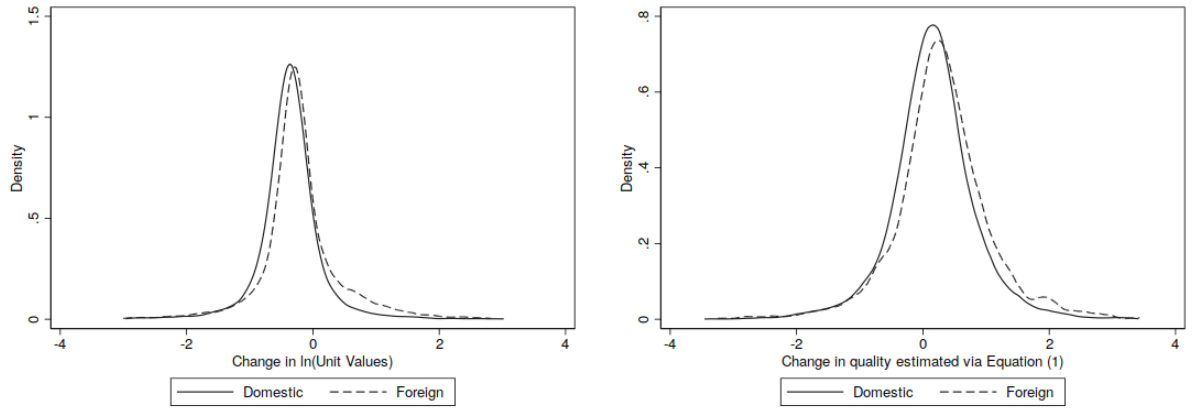
Notes: Log of new flows Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. The sample includes only exports of domestic firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

Figure 1: Unit values vs. the alternative quality measure



Notes: Both figures present binned scatter plots of the two measures of product quality: unit values, defined as the monetary value divided by the physical weight (x-axis); and quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1) (y-axis). The left-hand side plot presents the cross-sectional values and the right-hand side plot presents the changes. Changes in both variables are calculated as the differences between years 2013 and 2016. All values are divided into 20 equal-sized groups with each dot representing the mean value within each bin. In each plot, the line shows the best linear fit estimated via OLS.

Figure 2: Distribution of unit values and quality among domestic and foreign exporters



Notes: Both figures present kernel density plots of the change between 2018 and 2016 in the two measures of product quality: unit values, defined as the monetary value divided by the physical weight (left-hand side plot); and quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1) (right-hand side plot). The estimates are based on the Epanechnikov kernel function using a kernel bandwidth equal to 0.10. In both plots, the solid line represents the density for the domestic firms, while the dashed line represents the density for the foreign firms.

Appendix A Additional tables

TABLE A1
Top 20 and bottom 20 products based on changes in unit values

Code	Name	$\bar{x}_w \Delta$UV
8539219200	Glow lamps halogen with tungsten thread on tension more than 100 in	2.24
7224901800	Semi-finished products from other alloy steels, rectangular cross-section, forged	1.87
2804300000	Nitrogen	1.76
2834294000	Other nitrates of copper	1.70
8708505509	Bridges leading with differential assembled or separately from other elements of transmission and bridges not leading; their parts, stamped of steel, other	1.66
6406101000	Preparations of top of footwear and their detail, except for backs and rigid internal and intermediate details from skin	1.43
3912201900	Other nitrate celluloses (including collodions) unplasticized	1.42
2827392000	Iron chlorides others	1.38
6203391100	Jackets and blazer production and professional, men's or for boys from artificial threads	1.36
2907220000	Hydrochinone and its salts	1.24
9018199000	The other equipment electrodiagnostic (incl. equip. for functional diagnostic testings)	1.23
2930909900	Connections organosulfur: others	1.23
8907100000	Rafts are inflatable	1.2
8467920000	Parts of pneumatic tools	1.19
7311001100	Tanks for the compressed or liquefied gas, from ferrous metals, seamless, designed for pressure of 165 bars or more, with a capacity less than 20l.	1.05
8532220000	Condensers of constant capacity aluminum electrolytic	1.04
2912410000	Vanillin (4-hydroxy-3-metoksibenzaldegid)	1.01
7318230009	Products without carving, rivets other	1.01
8483405900	Other variable speed gears including hydrotransformers	0.99
8512309009	Chime devices, other	0.90
Code	Name	$\bar{x}_w \Delta$UV
3910000002	Silicon resins in primary forms, other	-2.37
2846100000	Compounds of cerium	-1.92
4802568000	Paper and cardboard uncoated, used for press weight 1sq.m 40g or more, but no more than 150g	-1.89
8423821000	Control units of weight and device control automatic with maximum weight of weighing more than 30kg, but less than 5000kg working at achievement of previously set weight	-1.86
6805100000	Natural or artificial abrasive powder or grain only on the woven textile basis cut or sewed	-1.81
3702430000	The film is other, nonperforated more than 610 mm wide and no more than 200 m long	-1.67
5310900000	Other fabrics from jute or bast fibers classified in commodity position 5303 excluding unbleached	-1.64
2827398500	Chlorides other	-1.39
1704905100	Pastes and masses, including marzipan, in primary packings net - weighing 1 kg or more, not containing some cocoa	-1.38
6207290000	Nightgowns and pajamas men's or for boys from other textile materials	-1.27
6201131000	Coat, short coat, capes, raincoats and similar products, men's or for boys, except products of commodity position 6203, from man-made yarns, weighing one product less than 1kg	-1.25
7013990000	Glassware are others	-1.23
7508100000	Fabric, lattices, and grids from nickel wire	-1.23
9607209000	Other parts of fasteners of "lightnings"	-1.22
8510900000	Parts of electrorazors, machines for hairstyle and depilation with built-in to electric motors	-1.21
6305900000	Bags and packages packaging of other textile materials	-1.19
7306699009	Welded other pipes, not round cross-section,	-1.15
8542323900	Schemes are electronic integral, memory devices, dynamic operational memory devices (dose): with memory size more than 512 Mbit	-1.13
3909200000	Melamine resins, in primary forms	-1.08
5209310000	The cottons containing on weight not less than 85 and of cotton, painted, calico weave, with area density more than 200 g/m2	-1.07

Note: Weighted Average: $(\Delta \log(UV) \times w)/w$; share in product exports: $w = UV/UV_p$

TABLE A2
Top 5 sectors in terms of FDI presence

Horizontal FDI		Change in Horizontal FDI	
Tobacco products	0.97	Flour and cereals	0.18
Pulp, wood pulp, paper and cardboard	0.73	Other electrical equipment	0.13
Household appliances not incl. in other groups	0.68	Pharmaceutical products	0.10
Fruits and vegetables	0.68	Furniture	0.10
Soap, cleaning, perfumery and cosmetics	0.64	Machine tools	0.10
Upstream FDI		**Change in Upstream FDI**	
Cast iron and steel pipes	0.20	Petroleum products	0.00
Polygraphic activity	0.20	Meat and meat products	0.00
Other primary processing of iron and steel	0.16	Insulated wires and cables	0.00
Metal structures and its parts	0.15	Clothes and accessories	0.00
Products by a method of powder metallurgy	0.14	Wholesale trade (except vehicles)	-0.01
Downstream FDI		**Change in Downstream FDI**	
Wooden containers	0.30	Veneer sheets, plywood, slabs, panels	0.03
Flour and cereals	0.28	Glass and glass products	0.02
Glass and glass products	0.26	Rubber products	0.02
Paper and paperboard products	0.24	Textile	0.01
Artificial and synthetic fibers	0.24	Castings	0.01

TABLE A3
Baseline results based on domestic and foreign exporters

	(1)	(2)	(3)	(4)
	Change in ln(Unit Values)			
Change in Horizontal FDI	0.130			0.179*
	(0.112)			(0.106)
Change in Upstream FDI		0.781**		1.252***
		(0.315)		(0.274)
Change in Downstream FDI			-0.931	-1.588*
			(0.797)	(0.820)
Observations	13,485	13,485	13,485	13,485
R-squared	0.104	0.105	0.104	0.109
	Change in quality estimated via Equation (1)			
Change in Horizontal FDI	0.148			0.178
	(0.145)			(0.139)
Change in Upstream FDI		0.331		0.761*
		(0.441)		(0.391)
Change in Downstream FDI			-1.012	-1.408
			(0.915)	(0.963)
Observations	13,485	13,485	13,485	13,485
R-squared	0.125	0.125	0.125	0.127
Region Fixed Effects	Yes	Yes	Yes	Yes
Destination Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: Product quality is proxied by two measures: unit values, defined as the monetary value divided by the physical weight; quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1). Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. Controls include: Herfindahl-Hirschman Index in 2012; and relative quality of each export flow in 2013. The sample includes exports of domestic and foreign firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.

TABLE A4
Baseline results using continuous FDI

	(1)	(2)	(3)	(4)
	Change in ln(Unit Values)			
Change in Horizontal FDI	-0.092			-0.071
	(0.106)			(0.109)
Change in Upstream FDI		0.987**		0.944*
		(0.489)		(0.512)
Change in Downstream FDI			0.067	0.102
			(0.653)	(0.659)
Observations	9,876	9,876	9,876	9,876
R-squared	0.089	0.090	0.089	0.090
	Change in quality estimated via Equation (1)			
Change in Horizontal FDI	-0.097			-0.085
	(0.118)			(0.124)
Change in Upstream FDI		0.772		0.720
		(0.571)		(0.612)
Change in Downstream FDI			0.212	0.258
			(0.668)	(0.647)
Observations	9,876	9,876	9,876	9,876
R-squared	0.137	0.137	0.137	0.137
Region Fixed Effects	Yes	Yes	Yes	Yes
Destination Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Notes: Product quality is proxied by two measures: unit values, defined as the monetary value divided by the physical weight; quality estimated via Equation (1), defined as the OLS residuals obtained from estimating Equation (1). Changes in both variables are calculated as the differences between years 2013 and 2016. FDI refers to Foreign Domestic Investment. The FDI variables refer to the FDI shares in the respective sectors, calculated as in Equations (2), (3), and (4). Changes in FDI variables are calculated as the differences between years 2012 and 2015. Controls include: Herfindahl-Hirschman Index in 2012; and relative quality of each export flow in 2013. The sample includes only exports of domestic firms. Standard errors, clustered at industry, the level of aggregation of the FDI variables, are presented in parentheses. ***, **, * denote significance at the 1%, 5% and 10% level, respectively.