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MASTER THESIS

Impact of FDI on Export Concentration of Developing Economies.

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GLODEP 2020

Declaration:

I, Samuel Regasa, declare that the thesis titled 'Impact of FDI on Export Concentration of Developing Economies' is my original work. And all resources and datasets used in this thesis have been properly acknowledged and referenced.

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Date: 30 May 2020

UNIVERZITA PALACKÉHO V OLOMOUCI

Přírodovědecká fakulta

Akademický rok: 2019/2020

ZADÁNÍ DIPLOMOVÉ PRÁCE

(projektu, uměleckého díla, uměleckého výkonu)

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Osobní číslo:	**R180553**
Studijní program:	**N1301 Geography**
Studijní obor:	**International Development Studies**
Téma práce:	**Impact of Foreign Direct Investment on Export Concentration of Developing Economies.**
Zadávající katedra:	**Katedra rozvojových a environmentálních studií**

Zásady pro vypracování

Since export concentration entails considerable risk, most countries prioritize expansion of export bases to counter instability of foreign earnings and/or to improve overall trade performance in the global market. Arguably, export concentration highly characterizes preponderance of developing economies: by and large low income, landlocked, and primary commodity dependent nations. Having been restrained by shortage of finance domestically, many of these countries have resorted to attracting foreign capitals, among other Foreign Direct Investment (FDI), to complement internal investment gaps and needs to enhance productivity and output varieties for local use and export. For instance, only 2018, inflows of FDI to Africa increased by 11% (UNCTAD, 2019), though potential explanations around the impacts of FDI in the continent have been contentious. Thus, this study will particularly explore the impacts of FDI on export concentration (export diversification) of developing countries. It addresses question whether FDI (inflows and stocks) helps host economies combat concentration on few exports or not, using different indicators of export concentration and outcome. In addition, the study will identify other potential macro-level factors affecting concentration of export in trade. To this end, the project uses secondary data compiled by UNCTAD, CEPII, UN Comtrade, WB, and IMF.

Rozsah pracovní zprávy:	**20-25 tisíc slov**
Rozsah grafických prací:	**dle potřeby**
Forma zpracování diplomové práce:	**tištěná**
Jazyk zpracování:	**Angličtina**

Seznam doporučené literatury:

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List of Acronyms

CEMAC	Comunità economica e monetaria dell'Africa centrale
CEPII	Center d'Études Prospectives et d'Informations Internationales
FDI	Foreign Direct Investment
FE	Fixed Effects
FTA	Free Trade Area
GMM	Generalized Method of Moments
GDP	Gross Domestic Product
LDCs	Least Developed Countries
LSDV	Least Squares Dummy Variable
MNEs	Multinational Enterprises
OLS	Ordinary Least Squares
PWT	Penn World Table
SITC	Standard International Trade classification,
SSA	Sub-Saharan Africa
UNCTAD	United Nations Conference on Trade and Development

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Abstract

Export concentration is a fundamental concern, by and large to developing economies where a limited range of products (disproportionately) make export earnings up. Among other objectives, to expand export bases and activities, these countries have attracted a substantial amount of FDI by providing numerous incentives and easing stringent regulations. But little has been done in demonstrating whether FDI helps reduce export concentrations. Using highly disaggregated CEPII's exports data of 67 developing economies for the years 1995 to 2018, this thesis empirically examined the impact of FDI (stock and inflow) on export concentrations (by products and destination markets). I constructed a panel of Herfindahl-Hirschman indices of export concentrations —inverse measures of export diversifications— for each country in which FDI was modeled as a determinant. And the empirical analysis was accomplished by a Fixed Effects method. Empirical findings show that FDI does significantly and negatively affect overall export concentrations (both by products and destination markets) of host economies under the study, i.e., it promotes export diversifications. As such, attracting FDIs helps host economies combat dependency on a restricted set of export commodities and markets (trade partners).

Keywords: *FDI; Export concentration; Herfindahl index; Fixed Effects*

1. Introduction

Export concentration ('lack of export diversification' henceforth) is one of the development policy's concerns in many countries across the world, by and large in developing economies. *Primo*, unconcentrated exports have portfolio effects on a country's export earnings by buffering idiosyncratic (external) shocks, which in turn lead to less volatile export growth and growth (Agosin, 2009). In this sense, concentrated exports should be of high concern to countries, especially, exporting primary products that have unstable prices and low income and price elasticity. Because unpredictable and low export earnings engender underinvestment by risk-averse producers and unfavorable current account positions. *Secundo*, exporting a vast spectrum of products augment economic growth via knowledge externality (Herzer & Nowak-Lehnmann, 2006). The empirical observation is that firms gain knowledge through exporting as foreign buyers and firms advise them on possible productivity improvements (i.e. learning-by-exporting). *Tertio*, export diversification ensues the discovery of new foreign demands for domestically produced goods. By doing so, exporting firms reveal cost structures of exporting to other firms, which have positive externalities in an economy in the longrun. Thus, understanding the driver of exports concentration(diversification) is of significance for concerned bodies striving to augment export performance.

A plethora of previous studies examining determinants of export diversification focus on the effect of income, neglecting the impacts of FDIs (Cadot et al., 2009; Imbs & Wacziarg, 2003; Parteka & Tamberi, 2013). However, to expand export bases and activities, among other motives, developing countries have soberly targeted the attraction of FDIs by offering fiscal incentives and business facilitation to MNEs and liberalizing FDI regulations, wherein they have attracted, on average, about 40% and 29% of global FDI flow and stock, respectively since 1995 (UNCTAD, 2019). Yet, little is known about the export-diversifying effects of such massive investments. Those studies which directly or indirectly address the effects of FDIs on export concentration produce limited and heterogeneous results. While Jayaweera (2009) finds inward FDI dampens export concentration, Tadesse & Shukralla (2013) demonstrate all possible impacts (positive, negative, and even null) of inward FDI along the stages of exports concentration. Contrary to both, Cadot et al (2011) however reveal the positive effect of FDI on export concentration.

Past works on FDI and export concentration exhibit several limitations and are not comparable in many respects. First, apart from following different methodologies and analyzing different periods,

they use either restricted or highly heterogenous sample countries. Second, there are numerous indices of concentration, and most studies love to use simple export lines as a proxy of exports concentration. However, exports concentration (diversification) can occur through convergence in the shares even if export lines remain unchanged. Last, despite the importance of export markets diversification, existing literature also provides disproportionate emphasis to export products diversification, as a prime engine for sustained export performance.

Therefore, this study empirically explores the impact of inward FDIs on exports concentration (by products and markets), particularly, of developing economies. To this end, I construct Herfindahl-Hirschman export concentration indices (HHI) —the inverse measures of export diversification— for exported products and destination markets for each country, based on highly disaggregated CEPII's bilateral export database. The indices total the squared share of each product or partner's import in total domestic exports[1]. To empirically assess the impact of FDI on exports concentration, the thesis utilizes FE method by creating non-overlapping three-years average panel observations for all variables over the years 1995-2018. And, this thesis complements future empirical works, primarily, in two ways. First, the study, particularly, supplements prospective researches aim at probing further links between FDIs and exports compositions. Second, this work also identifies other drivers of exports concentration and hence complements future studies intend to distinguish comprehensive macroeconomic determinants of exports concentration, at large.

The rest of the thesis is organized as follows. The second chapter reviews related literature, which includes both theoretical and empirical literature. The third chapter presents the research methodology, comprising a source of data, export concentration measure, variables choice, and estimation technique. The fourth chapter, first, presents facts and trends on export concentration and FDI, and then proceeds with findings and discussions on the impact of FDI and other potential variables on both dimensions of export concentrations, basically from econometrics analysis. The last chapter presents a conclusion, the study's limitations and policy implication.

[1] Herfindahl concertation indices are preferred to their normalized counterparts: For example, Normalized Herfindahl indices do not identify the degree of concentrations when export products or destination markets have similar shares, i.e. they return zero values irrespective of the number of products or partners.

2. Related Literature

This section presents the theoretical and empirical literature. The theoretical literature section provides definitions, margins (dimensions) and the importance of diversifying exports. Empirical literature section surveys empirical studies as to how FDI could affect countries' export structure and reviews scholarly works as to what explains export concentration/diversification of countries in global trade at large. The section also presents the synthesis from existing literature at the end.

2.1. Theoretical Literature

2.1.1. Export Diversification (Concentration): Definition and Concept of

Export concentration commonly refers to dispersion (inequality) in the shares of, a narrow range of export-products and trading partners. Whereas, export diversification is the opposite —that it reflects the convergence of the shares of existing exports, the creation of new export lines and/or new trading partners, which are thought of as the remedy to current account instability in propelling economic growth. Theoretically, export diversification is of two types: Vertical and Horizontal Export diversification (Herzer & Nowak-Lehnmann, 2006). Vertical export diversification usually occurs when a country exports high-value processed goods such as manufactures instead of primary commodities (or goods in raw forms). Meaning, vertical export diversification entails a shift of exports from primary and traditional industrial goods to products containing relatively advanced skills and technologies. The underlying motive is that rapid manufacturing growth strongly correlates with growth acceleration in the development process. This form of diversification is usually accompanied by a structural change that needs resources adjustments between low- and high-productivity economic activities. On the other hand, horizontal export diversification refers to the rising of the export baskets of broad economic sectors. And policy targeting this type of diversification (exportation of a vast spectrum of products) may not emphasize certain sectors over others.

2.1.2. Export Concentration and Diversification: Margins

The literature distinguishes two common margins attribute to the growth of export: extensive and intensive margins. Diversification of exports at an extensive margin signifies an increasing number of export products and/or destination markets. Contrarywise, the concentration of exports at extensive margin indicates a few active export lines and/or trade partners. So, a country's export diversification (concentration) at extensive margin shows the discovery (or disappearance) of export products (or

trading partners) in a year. On the other hand, at the intensive margin, diversification subtly shows the convergence in existing export product or destination market shares while concentration represents dispersions (inequality) in the shares of export products or of destination market in a year (Cadot et al., 2013). The other dimension of export margin concerns sustainability (survival) of exports, the time horizon over which typical goods are exported bilaterally without interruptions. It captures the dynamic aspects of the margin of export so that the survival of the prevailing bilateral trade flows has a positive implication for entrant firms and overall export performance.

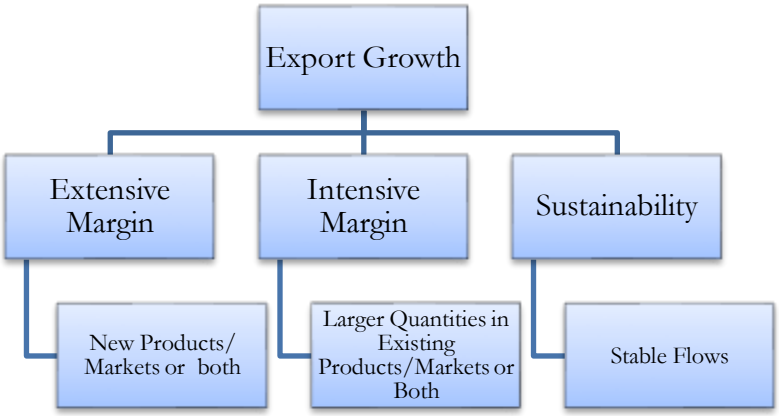


Figure 2.1: Margins of Export diversification and growth

Brenton and Newfarmer (2007) provide an alternative explanation for extensive margin as the ratio of the number country's actual exports to potential exports on a bilateral basis. It shows, given the potential demand for a specified set of goods by an importer country, how much proportion of these goods are supplied by an exporter country. The ratio indicates countries that service several foreign markets have higher index value. Nonetheless, this alternative definition of extensive margin ignores actual export values and uses only the number of exports for which values are greater zero.

The question, which margin of diversification is of importance for the growth export, has become both development policy and empirical puzzle. And the existing literature provides mixed conclusions as to which margin has contributed more to ever-growing global trade. According to Brenton & Newfarmer (2007) and Evenett & Venables (2002), for 23 DCs and 99 countries, respectively, the growth of export attributed to the expansion of long-standing products to existing destination markets (intensive margin) exceeds the export-growth contribution of the introduction of new products to new markets (extensive margin). From this view, intensive margin is more important than extensive

margin. The latter authors, however, reorganize the sizeable share of export growth arising from shipping existing products mix to new partners.

On the other hand, new product lines and trading partners (extensive margin) orientations yield a better outcome (Dutt et al., 2008; Hummels & Klenow, 2005), especially to developing countries (Cadot et al., 2009, 2011). The reason is that developing economies are concentrated and have a wider scope to do so. And advanced countries have been expanding export bases over time, and this achievement was accompanied by extensive margin, which is more effective than intensive margin to raise per capita income (Dutt et al., 2008). Despite the debates, due to reasons such as policy targets, trade restrictions (and costs), level of development, production capacity and political motive, countries may emphasize one margin compared to the other. But practically there exists no classic country that has grown its exports with a single margin. Thus, it is worth considering and constructing indices of overall export concentration, all margins being possible drivers of it.

2.1.3. Export Diversification: Importance of

In most developing countries, one of the main policy targets is large export bases. In 2019, the UN's 'dialogue on commodity markets', under resolution A/RES/72/205 ('commodities') adopted by the General Assembly in 2017, called on countries to stress on the transformation process through diversification, both vertically and horizontally. Since many developing countries rely on a limited set of exports with low price and income elasticities and at the same time depend on imported capital and technology for productions, the only way to generate large enough foreign exchange to finance these imports is export diversification (UNCTAD, 1999). It is obvious that a country's investment and productivity growth, in turn, depend on these imports.

A plethora of literatures suggest, export diversification enhances economic growth in several ways (Agosin, 2009; Al-Marhubi, 2000; Hausmann & Rodrik, 2003; Herzer & Nowak-Lehnmann, 2006; Mania & Rieber, 2019; Vettas, 2000). First, according to Herzer & Nowak-Lehmann, horizontal and vertical export diversification are linked to economic growth through *externalities*. They propose that via learning-by-exporting and learning-by-doing, exporters gain knowledge and become competent, having positive externalities on the rest of the economy. Indeed, exporting existing products that have not previously been exported also represents innovation per se. Additionally, while they argue that

export diversification with natural resources is possible, they however suggest vertical diversification into industrial exports for robust growth effects.

Again, according to Hausmann & Rodrik (2003), investment into new activities by entrepreneurs reveals a comparative advantage. Entrepreneurs undertake coast-discovery process to develop new goods, and the successful development of these new products creates social gains as it uncovers the underlying costs to other producers (to the general public) but failure's cost remains private. However, since entrepreneurs face cost-uncertainties in the production of new goods and such new goods can easily be copied (in most developing countries), they don not reap full benefits from their investments and hence tend to underinvest into new activities.

Second, a low degree of export concentration associates with low growth variance. According to Agosin (2009), diversified exports have *export-portfolio* effects, i.e., diversity lowers the volatility of export growth, which in turn reduces output volatility. In this sense, concentrated exports should be of great concern to developing countries, especially countries exporting primary products that have low-income elasticity and unpredictable prices contrary to manufacturing outputs. Such instability leads to the under-provision of investments by risk-averse producers. Additionally, according to the author, export diversification has a dynamic effect on the growth process. The observation is that growth can result from the introduction of a wide range of goods to export basket (not necessarily new to the rest of the world), as some new goods such as capital goods reveal production methods and result in technical change.

Third, the creation of new export sectors is seen as a *discovery of new foreign demand* for domestically produced products. Firms establish this foreign demand only when they make foreign customers aware of their product's features and characteristics by starting exporting (Vettas, 2000). As non-exporting firms of the same sector easily observe and imitate the demand discovery of incumbent exporting firms, because it is non-patentable, prospective growth of exports due to such externality will possibly be larger. Thus, exporting greater varieties of goods, in this sense, associated with greater growth.

Last, the introduction of new export lines facilitates the *creation of related sectors* or enterprises that use similar public goods and infrastructures. Access to the inputs helps related sectors to profitably

produce and export by centering around a production cluster where a country has already formed exports. As such, export diversification has growth-enhancing effects, again.

2.2. Empirical Evidence

2.2.1. FDI and Export Concentration (Diversification)

These days, MNEs are often assumed, especially by policymakers, of playing a critical role in economic growth. They engage in direct investments via establishing new foreign affiliates or through capitalizing existing plants in a host economy. Along with the actual investment, MNEs are expected to possess advanced management practice, know-how, marketing strategy and production techniques, which are transferable. So, these investments can create both *direct* and *indirect* benefits to the host's economy. Direct benefits encompass exports, labor employment, demand for intermediate goods, productive capacity and tax revenue. In the long run, FDI inflows help host economy integrate into international economy (UNCTAD, 1999). On the other hand, indirect benefits are in the form of spillovers, which are non-market externalities. Spillovers, because of the entry or presence of multinationals, occur horizontally through a demonstration effect, labor turnover, and competition whereas vertically via backward and forward linkages (Javorcik, 2008; Jordaan, 2012).

I what follows I will, first, discuss how FDIs link to exports structure at country level and second, describe how linkages between FDI, export decisions, and productivity have been discussed at firm or industry level from empirical perspectives.

2.2.1.1. FDI and Export concentration (Diversification): Macro-level

Previous studies, that consider per capita income as the main driver of export concentration, present mixed, limited and ambiguous results as to how FDI influence, as one factor, host economies' exports' structures. Despite the limitation, however, policymakers and governments generally conjecture that FDIs are both export- and growth-enhancing. Variations of results may be attributed to factors such as choice of indicators, estimation methods, countries choice, FDI types, stage of development, to name but a few. But what are the existing deliberations?

More often than not, the outcome of FDI on export concentration (diversification) depends on the type of investment per se. FDI can be made to simply serve host market (*market-seeking or horizontal FDI*). This type of FDI has zero effect on export concentration, given that it doesn't indirectly affect other sectors via inflating wage rate. Investor also undertakes FDI targeting low production costs

(*efficiency-seeking* or *vertical FDI*). If affiliate produces output for export, this form of FDI rises export diversification than a typical domestic firm does. Because, first, foreign firms possess ownership advantages such as advanced technology, marketing strategy, and skills, which put them on the edge in exporting products than domestic firms. Second, multinational firms know better about overseas' customers' preferences, distribution channels and products' standards as they often participate in international exchange and linkages. So, foreign firms capably export products at less fixed costs, where indigenous firms unable to. *Resource-seeking* FDI may introduce new products to the export bundle. For example, some resource-discoveries require relatively large outlay and technology, which is important particularly to financially and technologically constrained developing countries. However, many people conjecture FDIs into sectors other than primary sectors produce more promising results. This presumption has to do with the Prebisch-Singer Hypothesis (that suggests the price of primary products inherently declines over time relative to manufacturing outputs' price, leading to unfavorable terms of trade) and the notion of so-called 'enclave' industries. As such, FDI inflows into resource (primary) sectors may preclude the enlargement and diversification of exports in other sectors.

Dobdinga (2015) argues while FDI raises export varieties in some countries of CEMAC region, it detrimentally affects export diversification of others. For example, in Democratic Republic of Congo (DRC), FDI inflows concentrate exports. Alemu (2009) derives similar implications at regional level: while FDIs do have horizontally export-diversifying consequences in East Asian economies, the effect does not hold for SSA countries. These results are expectable as a significant amount of FDIs are oriented towards natural resource sectors (such as oil, gas and minerals) in many African countries while FDI into the sectors are minimal in developing Asia (UNCTAD, 2019). This implies FDI's effect on export diversification may be sensitive to direct investments types.

Though channels of natural-resource impact –resource curse, as they call it– in an economy are subject to controversy, some studies affirm the postulate that FDI could reinforce export concentration of recipient countries whose natural resources account for a significant proportion of their total exports. The expectation is that FDI is likely to be invested in primary sectors. For instance, in 29 low-income countries, while a $1billion increase in FDI results in the creation of 96 export lines, it is also found to reduce export diversification (by 10 and 19 export lines respectively) when it interacts with oil and mineral share (Jayaweera, 2009). So, fostering the primary sectors may in turn worsen other key sectors by appreciating exchange rate and rising costs (Sachs & Warner, 1995), which implies natural resources may preclude essential diversification out of their sectors and other tradable sectors.

Using quantile and semi-parametric regression, Tadesse & Shukralla (2013) disclose FDI has both positive and negative impacts on horizontal export diversification (proxied by the number of export lines) depending on the stages of diversification in 131 countries, that would lead to the non-linear relationship between FDI and diversification: FDI enhances the latter if a country's set of export products is relatively smaller, but when a country exports many varieties the formers adversely affect the latter. The implication raises an important question: since, most LDCs tend to export a limited range of products and they did so for many years, does FDI have an export-diversifying outcome? The study also points out other determinants, openness to international trade, country's percapita income, and currency depreciation, enhance export diversification (i.e., reduce the concentration of exports). However, the result fully relies on the number of active export products[2]. This very latter measure, as the indicator of export diversification, has its limitation: it does not account for the relative concentration within export baskets since the number of export products simply counts products for which export value exceeds a predetermined threshold.

Recent panel study by Osakwe & Kilolo (2018), that focuses on the least developed countries and infrastructure, again unveil that increase in FDI inflows (including population size, energy consumption and telephone subscriptions) reduces export concentration (stimulate diversification) using two-stage least squares and GMM estimation. While the paper also shows greater endowment with a natural resource (captured by Mineral share in GDP) leads to a higher concentration of exports; surprisingly, the absolute value of the estimate is the largest in all possible specifications. This result again suggests that natural resource-dependent countries, most if not all, may find it hard to diversify export baskets when primary products account for a substantial share of exports or national GDP, perhaps because of the 'Dutch disease effect'.

Nevertheless, contrary to Jayaweera (2009; Ouedraogo et al. (2018); (Fonchamnyo & Akame, 2017), FDI appears insignificant factor of export concentration as revealed in Rodrigo & Nkurunziza (2019) for 173 countries over the year 1995 to 2017, using GMM. However, many factors may lead to this conclusion. First, the study used a three-digits Standard International Trade Classification (SITC) system of export data –with only 261 product lines– to construct indices of export concentration. By construction, however, disaggregation of trade data at lower digits, as opposed to six-digits HS

[2] Over period, export diversification could increase even if a country does not add new products to existing export portfolio. For example, shares of export commodities can converge or concentrate when their values change from year t_0 *to* t_1, and the number of export lines doesn't capture this aspect.

classification containing over 5000 lines, may not properly reflect newly discovered and exported brands since different products are gleaned under broader categories. That means the resulting extensive dimension of diversification, of export or import, turns out to be small for relatively aggregated classifications. Second, heterogeneity across entities as the study encompasses all countries of different level of development, and hence choice of enough controls that explain such heterogeneity is essential to the result. Last, the relationship between FDI and export concentration/diversification may not be linear in nature (Tadesse & Shukralla, 2013), because the sample include both developed and developing ones.

There are also bodies of literature that find the adverse impact of FDI on export diversification. Cadot et al. (2011) and Giri et al. (2019) find a positive link between FDI on export concentration, using fixed effects for 87 countries and Bayesian Model Averaging(BMA) for 92 countries, respectively. Higher Foreign direct investment hinders the countries' export diversification, leading to a greater degree of specialization in the development process whereas this association is weaker particularly for emerging and developing countries sample groups according to the latter authors. They argue that FDIs are more likely to be attracted by the sectors that already established comparative advantage over others, hence it intensifies a specialization level in FDI receiving-sectors. Similarly, FDI inflow does have a depressing effect on Nigerian export diversification but domestic investments boost it (Arawomo et al., 2014). Overall, the pieces of evidence on the effects of FDI on export concentration are mixed at the macro level.

2.2.1.2. Productivity, Export decision, and FDI: Firm or Industry level

Focusing on the latter benefits (*indirect*), numerous scholars have tried to point out the existence of FDI externalities (spillovers) and the mechanisms. However, the empirical evidence on FDI's spillovers, which indeed depends on the level of analysis, type FDI and sample country, remains heterogeneous. The consecutive paragraphs discuss how the participation of MNEs affects domestics firms' productivity, fixed cost of exporting, and export structure in host economies from empirical perspectives.

a) Productivity and FDI

Whether they are the results of pure technological transfer or real externalities, MNEs can disseminate new technologies and knowledge, which are perceived to be productivity stimulating in many countries, especially in developing ones. However, the very latter aspects (externalities) of MNEs have gotten much attention in the literature searching for the effects of foreign enterprises' presence on local firms. For instance, Kugler (2006) shows the technological opportunities for Columbian manufacturers that result from FDI inflows. He depicts that MNEs' investments have a pronounced positive impact on domestic productivity of other sectors, not within the MNEs' subsidiary sectors. That is *inter-industry* diffusion of externalities is widespread across sectors through backward and forward linkages but MNEs control leakages of their technologies to domestic competitors. As for the absence of productivity benefits to host-economy firms from FDI inflows, Kugler mentions the lack of absorptive capacity (technological gap) as a limiting factor. However, it has been argued that the technological gap between MNEs and domestic producers as a direct inverse indicator of absorptive capacity could be misleading: a larger gap can be interpreted as space for FDI's effects to occur (Jordaan, 2012).

Detailed study on the relationship between FDI and backward linkage by Javorcik (2004) reveals the presence of foreign investors in input sourcing (downstream) sector improves the productivity of input supplying (upstream) sectors in Lithuania. Foreign investors are more likely to transfer knowledge to their input suppliers as they benefit from both quality and quantity improvement of intermediate goods. First, this productivity gain may result from a change in economies of scale when MNEs' demand for intermediate inputs grows. Second, a higher quality requirement for input by MNEs might pressure suppliers to use better technology and management practice. Similar benefits may accrue to firms in downstream (input sourcing) sectors when MNEs provides other industry with improved and less costly inputs. As such, FDI is a catalyst in changing productivity structure at least when enterprises are partially owned by foreign firms (Javorcik). According to the paper, however, no significant FDI externalities would arise within the same industry (*intra-industry)*. This is consistent with the argument that MNEs prevent horizontal dissemination of technologies to their domestic competitors(Kugler, 2006).

On the other hand, by disentangling productivity and efficiency of the Indonesian manufacturing industries, Sari et al. (2016) uncover FDIs do enhance outputs of domestic firms when foreign investor's output share increases in the same industry, showing the *intra-industry* effect of FDI.

Similarly, the inefficiency of local firms goes down with higher participation of MNEs in the sector. It shows foreign firms' presence allows domestic firms to observe and imitate advanced exotic technology, which may reduce the cost of discovering innovations by local firms. Surprisingly, contrary to Javorcik (2004), the study however suggests a negative effect of FDI on outputs of intermediate input producers, arguing that MNEs may instead use imported inputs or unfavorably bargain local suppliers for input price. Despite this undesirable effect, forward externalities of FDIs on both productivity and efficiency are found to be positively robust. In sum, these productivity and efficiency improvement resulting from FDI may translate into export diversification and growth when firms in question export.

b) Export decision and FDI

Some studies link FDI to the probability of domestic firms being exporters. Aitken et al. (1997) explain that the presence of MNEs stimulates the indigenous firms' decision to export by easing market-specific (fixed) cost of exporting via *market access (information) externalities*. The reason is that subsidiaries have access to overseas markets information about product distribution, consumers' preference, and technology. They argue that this fixed cost of selling abroad decreases with the proximity of local firms to MNEs as a result of information spillovers, and hence proximate local firms are more likely to export. They confirm their prediction using Panel data from Mexican manufacturing firms.

In the same vein, Greenaway et al. (2004) test whether the existence of foreign direct investors affects the export behavior of local manufacturing firms in the UK. Through demonstration and competition effects, R&D and export activities of MNEs increase the probability that indigenous firms are exporting. Ruane & Sutherland (2011) also present a similar argument that the decision to start supplying foreign markets by domestic firms positively relates to foreign enterprises' participation in their sectors. These studies suggest that FDI induce, through different channels, exportation by non-exporting domestic companies, leading to export diversification.

Export growth and diversification can be linked to the three-country (two similar high-cost countries and a low-cost country) model of Ekholm et al. (2007) –export-platform FDI model. High-wage countries' foreign firms set up a plant in a low-cost country to serve not only third-country markets but also either home country or host market. Particularly, these multinational firms establish export-platform FDIs in low-cost (low-demand) country when other high-demand countries form an FTA with the low-cost, low demand country. Because FTA provides the affiliates access to the market.

And, the differences in the trade costs for final outputs compared to those for intermediate inputs determine whether insider or outsider firms of the FTA establish production assemblies in a low-cost country. For instance, if the input shipping cost to the production place is low compared to the output exporting cost, insider firms set up plants in that low-cost nation, otherwise outsider firms do.

However, Ekholm et al. (2007) find the strategy to serve third-country markets depends on whether parent establishments are inside or outside a free-trade bloc. Using USA manufacturing foreign affiliates, they illustrate that affiliates located in a major trading bloc (for example, in EU) concentrate their exports in third countries. Whereas, affiliates operating in a country that does not belong to a free-trade region (such as Southeast Asia) diversify their exports across the world, serving as a global export-platform FDI. Importantly, although the decision to serve back home, host market or third countries is strategic in a sense, the creation of export partners and products, as well as the growth of production capacity resulting from export-platform FDI, translate into higher export diversification.

2.3. Drivers of Export Diversification/Concentration

There seem no theoretical constructs available as to what drives export diversification. Nor do empirical consensuses exist as to what determines export concentration in a country's development process. But measuring and assessing the diversification level of productions or exports vis-à-vis income at sectoral (country) level have been the interest of scholars. Few studies, (Cadot et al., 2011; De Benedictis et al., 2009; Imbs & Wacziarg, 2003; Parteka & Tamberi, 2013), have critically scrutinized diversification patterns along counties' stages of development, considering income as a prime factor. In what follows, implied drivers of concentration (other than FDI) will be presented.

The sectoral models of production diversification proposed by Imbs & Wacziarg (2003), using shares in value-added and employment shares, convey diversification increases at initial stages of development, but re-specialization inevitably takes place after a certain level of income is attained. They argue this re-specialization (decline in diversification) begins quite late in the development process, specifically on average countries would experience re-concentration when income per capita reaches about US$9000, at 1985 constant price. The model also predicts countries that significantly open their economies to world trade tend to start the second phase of specialization at early sage (i.e. they attain minimum concentration level at lower per-capita income) compared to others. But, if such sectoral re-concentration itself begins late, the country should be rich. It suggests that per capita income and openness to trade are the substitute drivers of diversification, contrary to the literature

that considers income and openness as separate explanatory variables in modeling diversification(concentration). As such, productivity changes and trading costs interaction lead to a stage of diversification. However, the paper has been criticized for employing income per capita as a sole explanatory variable of diversification. Indeed, the model exclusively constructed on sectoral productions, not on exports.

Thus, empirically assessing diversification of export with respect to alternative covariates, along with per capita income, becomes appealing. Some studies (Cadot et al. (2011); Parteka & Tamberi (2013)) suggest the presence of a similar non-monotonic pattern of export concentration (as in production) at different points of a country's stages of development, whereby concentration shrinks when a country's per capita GDP is low and rises as a country grows. Yet, this is not the only case, others present competing arguments that economic development continuously broadens export bases (De Benedictis et al. (2009)) and worsens export diversification (Dobdinga (2015); Fonchamnyo & Akame (2017)).

Besides the level of development, diversification (concentration) of exports can be linked to factors such as trade costs (geographical characteristics), availability of human (physical) capital, trade liberalization, and increasing returns to scale due to the size of an economy.

Trade costs preclude bilateral transactions by artificially rising cost of exporting to foreign markets and hence limit the number of exporting firms. Parteka & Tamberi (2013) show, using two stages estimation method, this fact that concentration process of manufacturing exports in 60 countries is mainly driven by cross-country fixed effects. Particularly, they enunciate distance from major world markets, regional trade agreement and freedom to trade (such as tariffs, quotas, government restrains) are the main drivers of export concentration. More importantly, they reveal changes in these variables do not result in a proportional change to export diversification level: it responds slowly. Variability of the specialization process with countries' development path was also captured by income per capita.

Likewise, remoteness (distance from trading partners) and the absence of preferential market access affect varieties a country could export (Cadot et al., 2011; Dutt et al., 2008). As these barriers increase costs of exporting (such as transport cost, tariff), the threshold for exporting or cost of entering a foreign market will be inflated, which limits the number of potential exporters (to the most productive firms). In such circumstances, since exposure to trade further increase competition and a cutoff

productivity level, giant foreign firms may displace less productive domestic firms when the costs of exporting are high (Melitz, 2003), leading to less product variety in the domestic economy. Especially, this could be a case in developing countries where a considerable number of local firms tend to be less productive compared to international firms and the productivity gain due to reallocation of market shares towards more productive firms may not offset the loss. Line with this conjecture, Agosin et al. (2012) finds trade openness induces export to concentrate.

Limited bodies of empirical literature have also found that human capital accumulation is associated with less concentrated exports and productions. Availability of educated and specialized human capital allows a country to innovate and propagate knowledge. Especially vertical diversification, where a country moves upward a value-chain ladder from production of agricultural commodities to complex products of manufacturing sectors, is more likely in educated society (Agosin et al., 2011). In this sense, not only does human capital increase varieties a county exports, but it will also alter the sophistication (characteristics) associated with the country's export baskets. So, the accumulation of human capital increases the number of products the exporter could produce and export (Giri et al., 2019). And, while all levels of education are quite essential to successfully change the composition of the export structure, lower level of education influences more diversification and a higher level of qualification better explains sophistication (Cabral & Veiga, 2010). By the same token, endogenous growth theory postulates that productivity change requires human capital (educated population) who engage in the invention of new products or ideas, suggesting investment in knowledge-generating activities (like R&D) is of crucial importance.

The size of the economy (population) would also affect the composition of export and production through scale economies. Large countries tend to produce a vast spectrum of exports compared to small countries as large labor force allows productions at lower per-unit costs. According to (Krugman, 1979) an increase in labor force concurrently rises the number of goods and productivity of producers. Line with this, (Parteka & Tamberi, 2013) has found that the size of the country (population and GDP) is associated with higher export diversification (lower degree of concentration).

Table 2.1 summarizes empirically identified drivers of export concentration. The caveats with these determining factors are that they lack concrete theoretical underpinnings as to how they would affect a country's export composition. And, they rather stem from empirical motives.

Table 2.1:Summary of drivers of Export Concentration (diversification)

Author(s)	**Country(ies)**	**Method(s)**	**Finding(s)**
	FDI impact on Export Concentration		
(Tadesse & Shukralla, 2013)	131 countries	Quantile & Sem-Parametric	Negative, Null & Positive impact
(Cadot et al., 2011)	87 Countries	Fixed Effect (FE)	Positive impacts
(Jayaweera, 2009)	29 low income countries	FE, RE & IV	Negative impact
(Dobdinga, 2015)	4 CEMAC countries	Fractionalized logit	Negative & Positive impact
	Other Drivers		
(Giri et al., 2019)	92 countries	OLS & BMA	b, c, i, q
(Rodrigo & Nkurunziza, 2019)	173 countries	System GMM	a, k, j, q,
(Osakwe & Kilolo, 2018)	145 countries	2SLS	d, h, i, k, o
(Fonchamnyo & Akame, 2017)	32 African Countries	Fractionalized logit	a, b, l, m
(Parteka & Tamberi, 2013)	60 countries	OLS & 2SLS	a, j, k, m
(Agosin et al., 2011)	79 countries	System GMM	b, j, n
(Alemu, 2009)	41 SSA & East Asia	Random Effects (RE)	a, b, f, i, k, r
(Cadot et al., 2009)	141 countries	OLS, FE, Between-Estimation	a, c
(De Benedictis et al., 2009)	39 countries	Generalized additive regression	a
(Bebczuk & Berrettoni, 2006)	56 countries	FE & RE	a, c, i, o

(a) GDP per capita (b) Trade openness (c) Natural resource abundance (d) Manufacturing sector value added (e) FDI (f) Exchange rate (g) Capita Formation (h) Energy consumption (i) Infrastructures (j) Cost of trade & Remoteness (distance) between exporter and importer (k) Size of economy (population or GDP) (l) Value-added in Agriculture sector (m) Freedom to trade (n) Human capital (o) Financial Development (p) Inflation Rate (q) Quality institution & Political stability (r) Life Expectancy

2.4. Synthesizing the Literature

Previous studies present several limitations and gaps. First, while existing studies have made an attempt to identify determinants of export concentration or diversification (focusing on income-per-capita), the impact of FDI on export products concentration in developing economies has received little attention. Additionally, to my knowledge, no study seems to have explicitly explored influences that FDIs could have on market-wise export concentration. Even though both dimensions of exports concentration are the related concepts, expanding the range of export products and of trading partners derive different implications. So, this project simultaneously examines how FDI affects both dimensions of the exports structure in host economies. Second, in identifying drivers of exports diversification, only a few studies ((Cadot et al., 2011; Giri et al., 2019; Rodrigo & Nkurunziza, 2019) have controlled for trade barriers. Since countries' export compositions respond to roadblocks (such as tariffs), exclusion of such factors leads to different conclusions as to the magnitude and sign of the effect of FDI on a country's export structure, and this study will take this aspect into account as well.

Third, previous works on diversification-FDI nexus (Jayaweera, 2009; Tadesse & Shukralla, 2013) have made use of only count index (active export lines) on the left side of the equation. However, the index does not capture the relative values (or shares) of each export line and conspicuously overestimates the diversification level of exports, since it simply counts exports valued above certain threshold (e.g $10000 or above). In other words, the number of exports, as the proxy of diversification, neglects the intensive dimension of export diversification, i.e. the structure of exports within existing active lines. So, it is worth considering other concentration measures such as Herfindahl-Hirschman, Gini or Theil index, etc., which internalize both extensive and intensive dimensions exports at the same time.

Last, despite the importance of exports enlargement by markets (as by products), existing literature provides disproportionate emphasis to export varieties, as an engine of export growth. As a result, in many countries, especially in developing ones, export markets concentrations are larger than their export products concentrations. This positions an exporter in a pool of risk, for instance, if partners pass new trade regulations and barriers. According to Evenett & Venables (2002) developing countries that experienced noticeable diversification of exports were the ones that have been exporting existing products mix to new partners. Intuitively, this implies the need to also reach numerous trading partners to robustly dampen overall export concentration. As such, this paper will also construct an index that captures geographical diversification of exports, the aspect which is almost ignored in previous works.

3. Research Methodology

3.1. Nature and Source of Data

This study uses annual panel data between 1995 and 2018, collected from various sources, viz, CEPII, UNCTAD, World Bank, Fraser Institute and PWT 9.1[3]. Data are longitudinal in nature as panel data better captures unobserved heterogeneities (hence omitted variables) across countries and intertemporal dynamics than cross-sectional or time-series data does. Exports data are exclusively collected from CEPII, not from the UN Comtrade, because of two main reasons. First, unlike UN Comtrade, CEPII provides trade (import and export) data net of trade costs that would bias trade outcomes (such as concentration indices) otherwise, i.e., they report trade data at FOB (Free-on-Board) prices by estimating and removing CIF (cost, insurance and freight) costs through 'Fobization'. Second, CEPII uses mirror flows of trading partners' reports to compute export data for exporters reporting no export data to the UN (which is often a case in many developing countries). As a result, CEPII databases cover more countries than UN Comtrade. However, CEPII does not adjust for price changes over time and reports trade values in the current dollar. Since the study emphasizes exports concentration (and the general price change affects all exports), the absence of export value adjustments for price change would not be a prime concern. Again, exporting goods whose price grows up quickly show valuable discoveries than commodities whose prices decay (Klinger & Lederman, 2011). For the main explanatory variable (FDI) data, UNCTAD served as a sole source, due to its reliability in collecting FDI statistics. Table 3.2 depicts definitions and detailed sources of variables used throughout the analyses.

3.2. Export Concentration(diversification) and its Measure

Empirical literature exhibits variant indices of concentration that inversely measure diversification level in productions ((Imbs & Wacziarg, 2003) or exports (Cadot et al., 2011, 2013; Dutt et al., 2008; Parteka & Tamberi, 2013). The commonly used concentration indices are Herfindahl, Gini, and Theil index, among others. These indices are usually used in income distribution literature, but they are all applicable to measure diversification or concentration of trade flows. Additionally, all these indices drive similar quantitative meaning on production or export concentration although some indices

[3] CEPII is French center for research, currently providing quality databases and macroeconomic analyses on international trade, migration and finance. Giant international organizations (such as UNCTAD) and many researchers have used these databases. http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp

possess extra features. For instance, the Theil index provides additional features when decomposition of inequality within and between export categories is desired, which is not of interest to this study.

I choose Hirschman-Herfindahl index (**HHI**) to construct the outcome variable because of three reasons. First, the index is straightforward to implement and can easily be adapted to other forms of concentration, like geographic diversification of exports, without losing its properties. Second, this study focuses on the overall concertation patterns in export composition, and there is no reason to choose the other index. Last, unlike other concentration indices, HHI has clear bounds —lower bound (1/N) signifies complete equality (diversification) of export shares among products or trading partners whereas upper bound (1) shows perfect concentration (the lowest degree of diversification). I construct both HHI for products and market concentration –the inverse measures of exports diversification by products and markets, respectively – based on the CEPII exports dataset. Products are categorized according to the first edition of Harmonized Commodity Description and Coding System (hereafter HS6) of trade nomenclature, which disaggregates products at 6-digits level[4]. This higher disaggregation level allows for the study of FDI and exports relationship at the product level.

HHI indices measure inequality among the shares of commodities and trading partners in the total export of a country. Particularly, HHI of export products measures the extent to which a country's exports concentrate on a limited range of products while HHI of export markets quantifies the degree to which a country's exports concentrate in few foreign markets. So, HHIs capture both intensive (export volume change in exiting products or partners) and extensive (introduction or disappearance of export products or partners) margins of exports concentration. As a direct measure of diversification, previous studies use the count index which simply sums a country's HS6 subheadings or trading partners up, irrespective of their shares in total export. However, this number of export products (or trading partners), measures only extensive margin of exports diversification.

[4] Harmonized Commodity Description and Coding Systems (HS) classifies import and export goods in 6-digits codes. The system has approximately 5300 articles as subheadings, with 21 sections and 99 chapters. First edition (H0) is chosen, because it is possible to extend study period to the year when HS was first introduced, 1988. Second, H0 provides consistent product codes over entire study period since these codes change in the subsequent revisions in the year 1996, 2002, 2007, 2012 and 2017.

Table 3.1: Export products and markets concertation indices

Calculated indices	Obs	Mean	Std. Dev.	Min	Max
Number of exported goods	1608	2089.551	1311.322	84	4922
Number of destination markets	1608	132.618	42.527	35	218
HHI for exported goods	1608	.173	.208	.003	.956
HHI for destination markets	1608	.153	.127	.032	.799

Source: own elaboration based on CEPII data, 2018

It is worth noting one limitation with HHI: it is subject to the product disaggregation level; indeed, other concentration indices are. A higher level of export disaggregation yields a lower HHI value, i.e. diversified export portfolio or importing partners. But CEPII reports only values equal to $1000 or above, which minimize HHI underestimations emerging from the inclusion of negligible export values. HHI for exported goods concentration is derived as.

$$\boldsymbol{HHI_{it}^{g} = \sum_{k=1}^{n} \left(\frac{x_{ikt}}{X_{it}}\right)^{2}, \qquad X_{it} = \sum_{k=1}^{n} x_{ikt}} \tag{1}$$

where x_{kit} represents the dollar value of export product *k* from country *i,* to any foreign markets in a year *t*, X_{it} is total export receipts in a year, and *n* is the number of country *i*'s exported goods. Similarly, HHI for export destination markets concentration can be computed as:

$$\boldsymbol{HHI_{it}^{d} = \sum_{j=1}^{m} \left(\frac{x_{ijt}}{X_{it}}\right)^{2}} \tag{2}$$

X_{ijt} is exports value from country *i* to destination market *j* in year *t,* and *m* is the number of country *i*'s export partners. *Note*: *HHIs* are linked inversely to exports diversifications and positively to exports concentrations.

3.3. Explanatory Variables Choice and Expected Signs

a) Foreign Direct Investment

FDIs have been regarded as foremost cross-border capital flow, containing new management practice, entrepreneurship, and production technologies along with. Through various mechanisms (directly or spillovers), FDIs do affect host economies' productivities, exports and exports concentration/diversification both at industry and country level. However, existing literature has

shown us the varying —negative, positive and even null— impacts of FDIs on exports concentration of the host country. Which is the rationale for exploring whether FDIs have improved or worsened developing economies' export concentration during the last two and half decades, using country-level data. FDI is defined as,

> *An investment made by a resident enterprise in one economy (direct investor or parent enterprise) to establish a lasting interest in an enterprise that is resident in another economy (direct investment enterprise or foreign affiliate). This lasting interest implies the existence of a long-term relationship between the direct investor and the direct investment enterprise and a significant degree of influence on the management of the enterprise. The ownership of 10% or more of the voting power of a direct investment enterprise by a direct investor is evidence of such a relationship (UNCTAD)*[5].

From the definition, the objective of FDI is different from portfolio investments and other forms of capital flows the fact that the latter do not influence the management of direct investment enterprises. However, the definition does not identify among associates, subsidiaries and branches FDI, in which between 10% and 50%, over 50% and 100% voting powers are, respectively, held.

The study follows the directional principle of inward FDIs. Inward FDI flow and stock are measured in the percentage of host country's GDP. Expressing FDI as a percentage of respective recipient counties' GDP help to condense the differential size of host economies. FDI flow signifies net capitals (equities, reinvested earnings and inter-company loans) provided by direct investors to foreign affiliates or capitals received by the investor from its foreign affiliate. So, in this case, net FDI inflows to reporting economy can be negative when disinvestment (for example, affiliates loans to the parent company) exceeds the investment. Inward FDI stock comprises total capital (and reserves) and net debt of direct investment enterprise to the parent company. Both investment flows do not identify whether investments in questions are Greenfield or Brownfield. Nor do they show separate direct investments in different industries or sectors.

[5] See https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx

b) Other Explanatory Variables

Other explanatory variables are grouped into five categories. The inclusion of the variables in model follows both empirical and theoretical suggestions. Further, I assess the variables against correlations, relevancy and availability of data for variables to be included in final specifications.

i. Level of development and Size of Economy:

It has been widely argued that low-income countries have comparative advantages in a limited set of goods due to paucity of skills and hence operate inside the production frontier. As countries develop (incomes rise), producers obtain new capabilities and the required complementary inputs to produce and export a wider range of outputs than they do before. Producers' ability to supply markets (both domestic and foreign markets) with greater varieties and volume may result from income effect wherein consumers afford differentiated products when income rises —Engel effect. Changes in such structural demand resulting from income changes then require production patterns adjust to diversified needs accordingly. The other link which associates level of development with diversification is that as countries grow, old cone of specialization in primary commodities inevitably disappears while advanced technology-content products (such as manufacturing goods) gradually take over old lines of specialization (Cadot et al., 2009).

For these reasons, it has been conjectured that per capita income monotonically reduces the concentration of outputs and exports. But this was not a case, export (Cadot et al., 2009, 2011) and outputs ((Imbs & Wacziarg, 2003) concentration declines at an early stage of development and reverts beyond certain income per capita level, having a U-shaped relationship. Contrary to this, according to De Benedictis et al. (2009), per capita income linearly expands the range of goods a country would export. So, the effect of income on export concentration seems to be an empirical matter. However, since this study comprises only developing economies, income per capita is expected to have a negative impact on export concentration. Additionally, to capture the effect of trading partners' level of income on export concertation (particularly on market concentration) of reporting country, average income per capita of all importing nations will be included.

The size of the market (usually proxied by national population or income) also plays a crucial role in diversifying exports. First, from a supply side, a country's population size represents the available markets to potential producers for factor input. This view enunciates countries that have significant

labor forces tend to experience increasing scale in production, leading average cost to decline. According to Krugman (1979) labor force growth necessarily amplifies both production scale and the number of goods available when markets are characterized by monopolistic competition. This translates into improved supplier's production aptitudes if trade were to take place to respond to domestic and foreign consumers 'loving varieties.' And again, on the demand side, a similar figure may emerge: the larger the market of trading partners, the more diversified are export baskets of exporting country. Second, for exporting countries with large population sizes, the *Rybczynski effect* can be in effect. At certain constant outputs' and factor' prices, increase in the labor force induces outputs of sectors that intensively use the labor to increase. This in turn may contribute to the intensive dimension of output and export diversification. To this study, the actual size of exporter's population proxies such a relationship as demographic data on working age (15-64) is missing for many countries. Thus, since concentrations of exports are less likely in the large markets, trading in few goods or with few partners most likely diminishes with population.

ii. Resource Endowment

Theories suggest that relative factors' abundance, under a certain state of technologies, determines a country's export structures. This view observes natural resources (such as petroleum, mineral and gas) abundant countries tend to concentrate on and trade in these commodities, which have been linked to the phenomenon of 'Dutch disease effect', as they call it. The seminal study of Sachs & Warner (1995) so far has suggested improvement in commodity prices may influence other sector's exports by appreciating the exchange rate. Subsequently, other tradeable sectors face higher inputs' cost as a considerable amount of inputs flows to primary sectors for which international prices are relatively growing. Recent study, Bahar & Santos (2018), further explains, through a theoretical framework, resource-abundant countries inhibit high concentration even in non-resource exports (capital intensive goods). The channel of effect is that revenue boom from resources pushes domestic wages up, cannibalizing labor-intensive sectors. So, at the expense of labor-intensive sectors, capital-intensive sectors, for which the international market autonomously determines capital's price because it is freely mobile, get a large share in non-resource exports by reducing overall diversification. Contrary to these views, one may hold a positive outlook on the expansion of primary sectors in the context of Melitz's (2003) model. Improvement in commodity price can be thought of as an increase in competences of firms engaging in the sectors since they accrue to the firms in the form profits; and, diversification would instead occur in this context.

To parameterize the abovementioned relationship, literature cites two measures of primary commodity dependence: share of primary commodity exports in total export or in GDP. Since data on these indicators are missing for many developing nations, this study instead uses total natural resources (Oil, Gas, Mineral and Forest) rents as a percentage of GDP. The presumption is that countries whose resource rents make up a substantial portion of domestic income tend to export large volumes of these resources.

iii. Macroeconomic Variable

To account the effect of the relative value of a country's currency on diversification episodes, exchange rate variable needs to be introduced. Theories and policies support that currency appreciation deteriorates export competitiveness and increases imports. They foresee devaluating currency rather boosts domestic production for exports and curtails expenditures on imports via price effect, improving current account position. While a substantial body of literature again presents devaluation stimulates exports, some studies contend that currency appreciation can be beneficial when country's exports contain high import contents. In this view, exchange rate appreciation provides domestic firms access to cheap imported inputs. This view usually points out East Asian experience such as Singapore as an example. Besides the relative currency value, variations of the exchange rate would also affect exports as it increases uncertainty, whereby only sufficiently productive and large firms decide to export by taking risks. Since the study takes nonoverlapping three-year average values on all variables, however, I assume such volatility vanishes through transformation.

Financial development can also determine degree export diversification. On the one hand, the availability of domestic credits to private sectors may be of high importance in easing liquidity constraints to producers. On the other hand, better performance of capital markets gives domestic firms an incentive to focus on specialization, to reap the benefits of a focused high-scale production. According to Osakwe & Kilolo (2018), credit provisions to domestic sectors dampen exports concentration, while the financial resources provided to private players appear to promote it in the case of Bebczuk & Berrettoni (2006). Thus, the effect of domestic credits, given to private sectors, is empirical matter.

iv. Trade Costs and Facilitations

In Melitz's (2003) heterogeneous firms' model, trade liberalization resulting from the decrease of variable (for example tariff and nontariff) and fixed trade costs induces an economy to be opened more to international trade. This exposure to trade ensues the upsurge of cutoff productivity level to producers, forcing the least productive firms to exit. And at the same time, the reduction of trade costs allows for new firms to join export markets since export productivity threshold lessens. As firms trade in differentiated products, such selection effect of new firms into the export market due to a decrease in trade barriers translate into greater export diversification. Empirically, (Beverelli et al., 2015; Dennis & Shepherd, 2011) confirm export costs (visible or hidden) coupled with laggard customs humper export diversification and freedom.

To capture these potential effects on export concentration, two variables will be used. Freedom of trading index, unweighted average scores for tariffs, non-tariff trade barriers, compliance costs, black market exchange rates and control of capital and human mobility on the scale of 0 to 10, will be employed. The variable is comprehensive that it contains many forms of restrictions. As the number of trading partners and/or accession to WTO under MFN principle determines 'how much' and 'what' a country exports, WTO dummy for active membership years will additionally be used. *A priori* the negative impact of both variables on export concentration is expected.

v. Geographical Characteristics and Location

Geographic characteristics and locations of counties have been named to have an influence on trade flows. Some of these variables are the physical distance between exporting country and its partners remoteness and lack of access to seaports. In the context of Melitz's (2003) model, all these variables artificially inflate trade (especially variable) costs, which reduce the number of exporters, export volumes and opportunities. Bodies of literature also present that countries that are characterized by these features tend to have concentrated export portfolios (Agosin et al., 2011; Cadot et al., 2011; Dutt et al., 2008). Thus, to capture these effects on export concentration, average distance between exporting nation and its trading partners (weighted), dummy variable for the landlocked countries and latitudinal locations (distance from the equator) will be included in the analysis[6]. It is important to

[6] $d_{ij} = \sum_{k \epsilon i} \left(\frac{pop_k}{pop_i}\right) \sum_{l \epsilon j} \left(\frac{pop_l}{pop_j}\right) d_{kl}$

Pop_k is population of principal cities in country i, pop_l is for those country j and d is the bilateral distance

note, however, that the latter two variables are time-constant, and only RE estimator can estimate their parameters.

Table 3.2: Variables, Expected sings and Sources

Variables	Description	Expected Sign	Data Sources
	Dependent Variables		
HHPro	Herfindahl-Hirschman index for export products concentration		
HHDest	Herfindahl-Hirschman index for export destination markets concentration		
	Explanatory Variables		
FDI stock **FDI inflow**	Inward FDI stock and net inflow as a percentage of GDP	-/+	UNCTAD
Trade Freedom	Index (for tariffs, regulatory trade barriers, black market exchange rates and control of the capital and people mobility) on the scale of 0 to 10 (higher value indicates a better degree of trade freedom)	-	Fraser Institute
NRR share	Natural resource rents (from oil, natural gas, coal, minerals and forest) percentage of GDP	-/+	WDI database
GDPpc	GDP per capita at constant $US price (2010)	-	UNCTAD
Exchange Rate	National currency per $US	-/+	PWT 9.1
Creditp/GDP	Domestic financial resources provided by financial corporations to private sectors, percentage of GDP	-/+	WDI database
Size	Midyear Population Size (total)	-	WDI database

between intercities.

WTO	Dichotomous variable, 1 for all years a country is member to WTO, 0 otherwise	-	GeoDist CEPII
Distw	Average distance between exporting country and its partners, weighted by population proportions of major cities in exporter and importer.	+	GeoDist CEPII
***Landlocked**	Dichotomous variable, 1 for landlocked state, 0 otherwise	+	GeoDist CEPII
***Latitude**	Latitude in degrees from equator	-	GeoDist CEPII
GDPcap_d	Average GDP per-capita of partners countries (in current $US). Note: **Distw**, and **GDPcap_d** variables are constructed after matching *Gravity* and *GeoDist* data with CEPII exports data.	-/+	Gravity CEPII
	Note: * shows time-constant variables.		

3.4. Sample Countries Choice

This thesis focuses on developing countries, those whose per-capita GNIs fall blow high-income threshold set by WB in July 2016[7]. However, I excluded Small Island and European developing economies from the analysis, because the lessons for these countries may not be generalizable with other countries. Apart from this, exclusion of the countries is driven by the availability of data: countries missing exports data for six consecutive years are excluded since the study makes use of non-overlapping 3-years averages, just to have at least three observations per countries. After eliminating countries falling under two exceptions, the sample includes 67 developing economies from three continents, Africa, Asia and Latin America (see Appendix No.1).

[7]https://datahelpdesk.worldbank.org/knowledgebase/articles/906519

3.5. Methods of Data Analysis

3.5.1. Model Specification and Estimation techniques

To examine empirically the effects of foreign direct investment (stocks or inflows) on recipient countries' export concentrations (by products and destination markets), specification (3) can be estimated by Pooled OLS. Pooled OLS might provide correct estimates for the effects of FDI and other variables on export concentration under the assumptions that unobserved heterogeneity across countries and correlation between explanatory variables and composite errors do not exist (all zero). Nonetheless, we may encounter omitted variable problems associated with unobservable individual effects, allowing error terms to correlate with at least one covariate, which render pooled OLS's estimates biased and inconsistent. Parteka & Tamberi (2013) showed that observed and unobserved country-fixed effects highly explain variation in exports concentration. Thus, it calls for other estimation techniques that consider unobserved components of the Panels. LSDV and time dimensional transformation of Fixed Effects Method (FE), among others, could deal with unobserved heterogeneities that are time-constant. While the FE model uses within-estimation method, classical least square dummy variable uses dummies to arrive the same results.

Imbs & Wacziarg (2003) demonstrated sectoral production concentration as a function of a country' level of development (income per capita is a proxy), by totally ignoring other factors. In uncovering the hump-shape relationship between export concentration and economic development, (Cadot et al., 2009) used the same variable but controlled for primary commodity exports. Similarly, Parteka & Tamberi (2013) regressed manufacturing export concentration on income per capita and economy size, emphasizing un(quantifiable) country-specific factors. Taking into consideration that income and economy size are frequently-cited factors (also summarized in table 2.1), the impact of FDI on export concentration can be modeled as;

$$HH_{it} = \beta_0 + \gamma FDI_{it} + \beta_1 GDPpc_{it} + \beta_2 Size_{it} + \sum_{a=1}^{n} \theta_i X_{a,it} + \sum_{l=1}^{n} \alpha_i Z_{l,i} + \phi_{it} \quad (3)$$

$$\phi_{it} = \mu_i + \delta_t + \epsilon_{it}$$

Where HH_{it} denotes HHI Products or Markets concentration indices for exports in country $i(i: 1, \dots, n)$ in year $t(t: 1, \dots, T)$; *FDI* is foreign direct investment (flow or stock); *GDPpc* is per capita

GDP and *Size* is economy or demographic size. X_a and Z_l are, respectively, time-varying (such as degree of trade liberalization and natural resource rents contribution to GDP) and time-invariant (like the average distance between an exporter and importers, and countries' latitudinal locations) explanatory variables; $\beta_s, \gamma, \theta_s$ and α_s are the parameters to be estimated; and ϕ contains countries' effects, time-effects and traditional error, respectively.

The period 1995-2018 is divided into seven subperiods of three years each. For each period t, average of all variables is computed. The reason is that, first, it is suitable to identify a long-run relationship between FDIs and exports concentrations. Second, the approach help to condense variations of the variables as some variables, for example, FDIs flows, inherently fluctuate over time, which might make the model in question unstable otherwise. Last, time-averaging also reduces the effect of extreme data points.

By estimating equation (3) via LSDV, it is possible to test jointly whether individual effects of countries in question are meaningfully different from zero, contrary to pooled OLS. To observe whether such effects exist, the null hypothesis, $\boldsymbol{u_1 =, \dots, = \mu_{i-1} = 0}$, is tested (by F-test) against the alternative hypothesis of at least one of them should be different from zero. If the test supports the alternative hypothesis, we conclude that there exist significant countries' specific effects, and hence the fixed effect model performs better. However, as LSDV suffers from the lose of the degrees of freedom, time demeaning is applied to equation (3) as in equation (4) to derive parameter estimates. Again, this approach provides consistent parameter estimates in the presence of time-invariant omitted variables that may randomly correlate with observable explanatory variables, which is not a case under Random effects methods (Wooldridge, 2001).

$$(\boldsymbol{y_{it}} - \overline{\boldsymbol{y}}_{\boldsymbol{i}}) = (\boldsymbol{x_{it}} - \overline{\boldsymbol{x}}_{\boldsymbol{i}})\boldsymbol{\beta} + (\boldsymbol{\phi_{it}} - \overline{\boldsymbol{\phi}}_{\boldsymbol{i}}) \qquad \textbf{(4)}$$

Where $\boldsymbol{y_{it}}$ is HHI and $\boldsymbol{X_{it}}$ is a vector of time-varying explanatory variables mentioned in equation (3), and ϵ_{it} is idiosyncratic errors.

FE method, however, has its limitation: it expunges all parameter estimates for observable time-constant variables from the equation if the underlying data contains time-invariant variables, which is a case in this study. To get the estimates for time-constant covariates, I estimate the same above equation (3) by Random effect (RE) and present them with FE estimates. Unlike FE, RE specification

however presumes the random effects should not correlate with and be independent of main covariates and traditional errors, which is unlikely oftentimes. In other words, the advantage of FE specification is the disadvantage of RE specification and vice versa. Thus, discussions of results rely on FE estimator. For transparency, I conduct the Hausman specification test of FE and RE. Finally, to make the estimation robust to heteroskedasticity or within-panel serial correlation in the traditional errors, robust standard errors are specified (in Stata).

4. Result and Discussion

4.1. Facts and Trends

Tables 4.1 shows trends of export concentration and FDIs for sample countries over the last two and half decades. The average number of export products and destination markets progressively increased (except in the last period with four years), indicating a continuous decline in export concentration, extensively. But such trends are nuanced, as introduction or death of an export line that accounts for 99% of export is of equal significance with a line that accounts for 1%. Average *Herfindahl* index (HHI) of export products concentration went-down in the first two and last periods and increased in 2005/2009 and 2010/2014. But there is a continuous reduction in the average *Herfindahl* concentration index for destination markets, except for the first period.

Table 4.1: Export concentration and FDI, five-year averages

Period	**1995/1999**	**2000/2004**	**2005/2009**	**2010/2014**	**2015/2018**
Number of Goods	1781.675	2056.215	2226.284	2231.078	2168.242
Number of Markets	107.597	129.194	140.6627	145.3672	142.1828
HHI for Goods	0.17648	0.171574	0.176258	0.178933	0.158026
HHI for Markets	0.154151	0.157391	0.154899	0.152591	0.146487
FDI inflow/GDP	2.711721	3.325288	3.738163	4.309742	3.692921
FDI stock/GDP	17.36828	27.39032	27.0533	33.38761	47.09474

Source: Own elaboration based on CEPII and UNCTAD data, 2018

Table 4.2 shows, high percapita-income regions (LA and Asia) relatively export more than twice as many goods as Africa does. Again, Africa economies exhibit highly concentrated export commodities (0.256 *HHI*). Surprisingly, LA countries have highly concentrated export destination markets (0.206 *HHI*) despite their numerous trading partners (146). The reason would be the majority of LAs' exports go to immediate trading partners, like USA and other countries within the region.

Table 4.2: Export concentration and FDIs by regions, averages

Regions	**Africa**	**Latin America**	**Asia**
Number of Goods	1307.974	2732.27	2717.121
Number of Markets	113.5444	146.4055	149.2273
HHI for Goods	0.255609	0.099486	0.110009
HHI for Markets	0.147533	0.205526	0.125797
FDI inflows/GDP	3.527663	3.399842	3.691106
FDI stock/GDP	28.96063	29.98079	30.77755
GDPpc $2010 price	1554.083	5674.279	3237.325

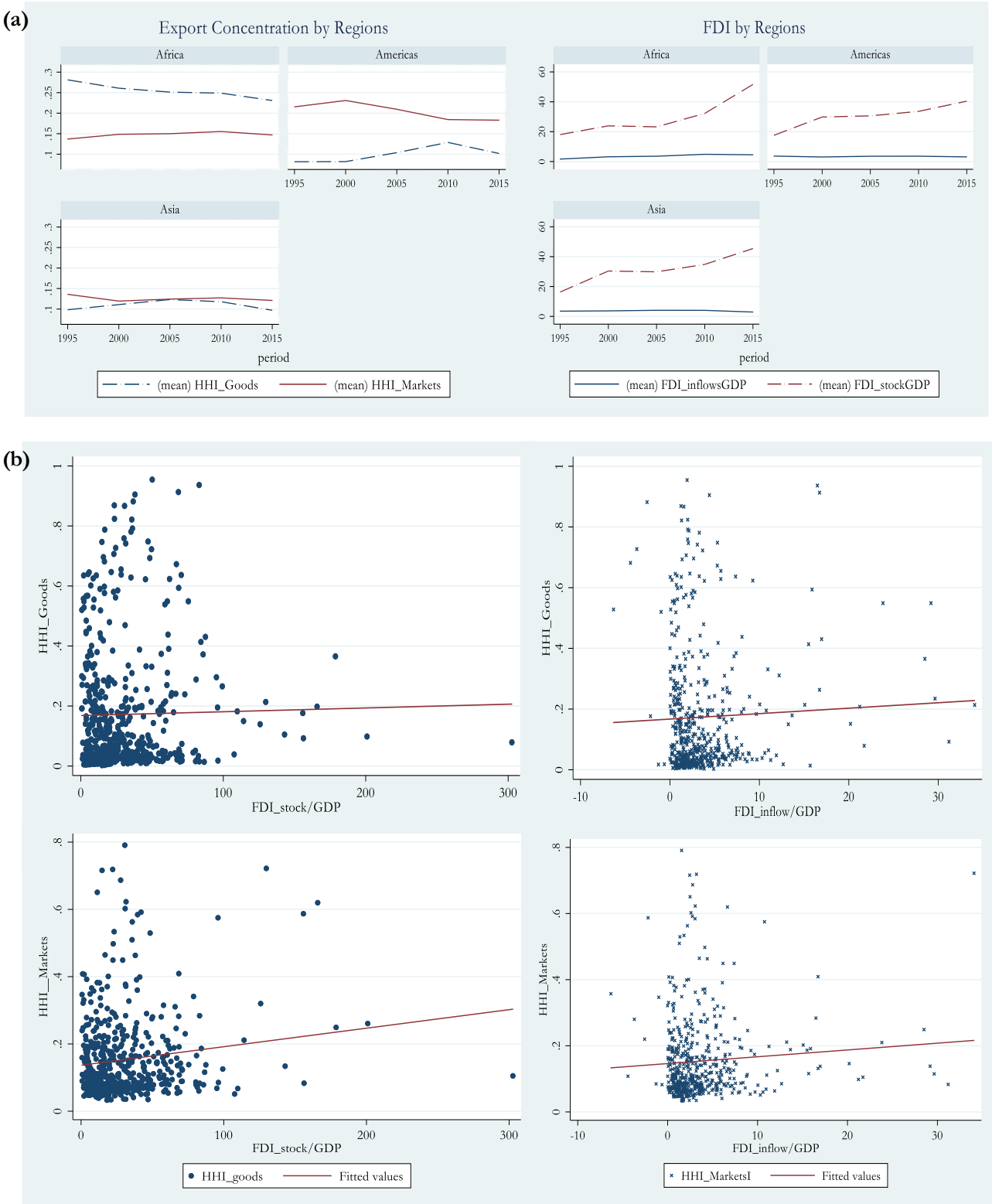
Source: Own elaboration based on CEPII and UNCTAD data, 2018

Panel (a) in Figure 4.1 shows the detailed evolution of export concentrations for different regions. *Herfindahl* indices reveal a low level of, similar and stable export products and destination markets concentration for developing Asia, compared to the other regions. However, the indices show a substantial gap between and a high degree of both export concentrations in Africa and Latin America (LA), with the exception that LA has very low export commodities concentration. Overall, decreases in commodities and markets concentrations are more pronounced in Africa and LA, respectively.

Turning to FDIs, the first Table 4.1 shows both inward FDI stock and flow have been on rise, except stock and inflow were mildly decreased in the periods 2005/2009 (during which export products concentration climbed) and 2015/2018, respectively. Compared to the FDI stock, FDI-inflow slowly evolves as it represents net transactions between direct investors and their foreign affiliates. Additionally, table 4.2 highlights FDIs variations across the regions: both average inward FDI flow and stock to GDP are considerable in Asia, thanks to favorable investment climate (such as the expansion of SEZs) and economic outlook (such as the growth of manufacturing and service sectors). Finally, figure 4.1, panel (a) depicts trends of inward FDIs that are almost similar across the regions although FDIs to GDP are dissimilar in three regions. Appendix.4 provides detailed averages by 5-years, for each region.

To inspect the correlations pattern between exports concentrations and FDIs, I show the scatterplots in figure 4.1, panel (b). The scatterplots tell the slightly positive correlations between exports concentration outcomes and FDIs. However, these preliminary positive correlations do not necessarily mean FDI stock or inflows increase export concentrations, because panel nature of the data and other potential covariates are all disregarded.

Figure 4.1: FDIs and *HHI* for commodities and markets concentration



Note: non-overlapping three-years mean values have been used for scatterplots

Source: own elaboration based on CEPII and UNCTAD, 2018

Furthermore, to show evidence on two-dimension export performances, I construct the concentration-diversification matrix of countries based on *Herfindahl* median thresholds of export products and destinations (Table 4.3). The first quadrant of the table shows concentrated export commodities and destination markets for countries, of which the majority are natural resource-dependent and low-and low-middle income nations. This group of countries is the most vulnerable to both internal and external shocks. Countries in the top-right quadrant are those which still have concentrated export markets but have differentiated export portfolios. For instance, more than 60% of the export of Nepal and Mexico serves India and USA respectively[8].

Looking at the bottom-left cell, we observe the group of countries exporting (unproportionally) a limited set of export products to diversified trading partners. In these countries, for example, Algeria, Iran, and Kazakhstan, mineral fuels and oils category itself account for more than 50 up 90 percent of total export. The last bottom-right cell depicts developing countries that have exports diversified both by products and geography, having *HHI*s less than the thresholds. Even though developing Asia usually take a lead in exporting numerous products to many partners, some LA and African countries appear to have virtuous export performance as well.

[8]https://wits.worldbank.org/CountryProfile/en/Country/MDG/StartYear/2000/EndYear/2015/TradeFlow/Export/Partner/BY-COUNTRY/Indicator/XPRT-PRTNR-SHR

Table 4.3: Concentration-diversification matrix of Exports for products and destination markets

HHI median thresholds**: 0.1035** (export products) and **0.1146** (export markets)

	Concentrated by Products	***Diversified by Products***
Concentrated by Markets	Angola Azerbaijan Bolivia Myanmar Burundi Central African Republic Chad Colombia Congo Ecuador Gabon Kyrgyz Republic Mali Mauritania Mongolia Niger Nigeria Rwanda Sierra Leone Burkina Faso Venezuela Zambia	Bangladesh Armenia Sri Lanka Costa Rica El Salvador Guatemala Honduras Madagascar Mexico Nepal Nicaragua Tunisia
Diversified by Markets	Algeria Cameroon Benin Ghana Iran Cote d'Ivoire Kazakhstan Malawi Mozambique Paraguay Syria Uganda	Argentina Brazil China Georgia India Indonesia Jordan Kenya Malaysia Morocco Pakistan Panama Peru Philippines Senegal Vietnam Thailand Togo Turkey Egypt Tanzania

Source: Own elaboration based on CEPII data.

4.2. Econometrics results

4.2.1. Does FDI affect Export products concentration?

Table 4.4 reports parameter estimates of FE and RE model for all determinants of export products concentration, under heteroskedastic and serial-correlation consistent standard errors[9]. And, the parameter estimates generally have the hypothesized sings.

Starting with the discussion of the main research objective, FDIs negatively and significantly affect export products concentration of a host economy (i.e. they positively impact exports diversification), as revealed in both estimation methods. A one-percentage-point increase in inward FDI stock to GDP reduces export products concentration, on average, by 0.5 percent, *ceteris paribus*. Similarly, FDI inflow exerts a negative and significant effect (at 10% level) on export concentration: a one-percentage-point increase in net FDI inflow to GDP is associated with a 1.1 percent decrease in export products concentration, which is economically significant. But FDI inflows may take relatively longer time to cause expected outcomes and externalities and are adjusted of all reverse investments by the affiliates in a host country, which possibly reduces a benefit that gross FDI inflows would bring. These results are consistent with (Jayaweera, 2009; Tadesse & Shukralla, 2013) and different to (Cadot et al., 2011). Thus, the results support the arguments that FDI i) may directly help host economy develop and export new portfolios through initiating greenfield projects or via capitalizing existing exporting firms and ii) may indirectly induce export diversification via enhancing efficiency and overseas market-access externalities to local firms.

Turning to the estimates of other explanatory variables, freedom of trading index negatively and significantly affects export products concentration. By this index, countries that have low tariff and non-tariff barriers, export compliance costs, black-market transactions and capitals movement restrictions tend to have low export concentration. In particular, similar with the results of (Beverelli et al., 2015; Dennis & Shepherd, 2011), this study finds a 10% increase in the freedom of trading index reduces export product concentration by 2% in FE and 2.7% in RE. So, this result confirms the

[9] Before running the regressions for results, I inspected variables' shape of distribution and their correlations. Measure of the shape of distribution, coefficient of skewness (*Appendix.2*), shows some variables do not have normal distribution, suggesting transformation of data to account for a possible variation. Thus, natural logarithm is used to transform variables, except FDI, dummy and time-constant variables. Correlation analysis (*Appendix.3*) shows all regressors do not have perfect representations of one another since their pairwise correlation coefficients are significantly small. As such, any models involving these explanatory variables will pass test of multicollinearity.

theoretical suggestions that trade cost reduction plays crucial role in stimulating export diversification, and hence overall export growth.

Natural resource rents positively and significantly engender export products concentration. A 0.18 percent rise in the export product concentration is attributable to a 1% increase in the proportion of natural resource rents in GDP, and this estimate is larger in RE. The classical channel of effect, Dutch disease effect, can justify this result. Expansion of primary sectors can crowd out other sectors of the economy, mainly by inducing resources reallocations toward natural-resource industries from other industries and by appreciating national currency. Again, primary commodities have volatile prices, which ensue exchange rate instability and uncertainty to the economy. All these effects dwindle the competitiveness of other tradable sectors. Previous studies (Bebczuk & Berrettoni, 2006; Giri et al., 2019; Jayaweera, 2009) also document natural resource rents limit export diversification, mostly in developing economies.

In this study, variables exchange rate, per capita GDP and credits to the private sector are however found to be insignificant determinants of export products concentration though they have theoretically suggested signs, except exchange rate. The result shows a positive association between exchange rate deprecation/devaluation and concentration of export products. GDP per capita coefficient confirms export concentration declines with the countries' development levels. The coefficient of squared GDP per-capita however affirms such negative relationship is not monotonic; re-concentration of export products should occur after certain level of income per capita is achieved (the hypothesis made by Imbs & Wacziarg (2003)). Domestic financial resource provided to private sectors also exert no significant effect on export commodities concentration but still has a positive association with export diversification. With respect to population size, I do not find a consistently significant effect from FE estimator but do find a significant negative effect of population size on export commodities concentration from RE estimator.

The coefficient on the WTO dummy variable is statistically significant, indicating successful accessions by the countries to WTO enhance export diversification. By the agreements, member countries' exporters not only reduce their trade costs, but they will also get new exporting opportunities as any concessions granted by a country equally apply to all member countries, under non-discriminatory principle though this isn't always a case when it comes to FTA. The result confirms this effect: a

country's export products concentration, on average, is reduced by about 54.5 percent following accession to WTO, which is economically highly significant.

Table 4.4: FDI and Export Products Concentration
Regresssand: *HHI of export products concentration*

	(1) Within Fixed_Effects	(2) Within Fixed_Effects	(3) Random Effects	(4) Random Effects
FDI_stock/GDP	-.005**		-.005***	
	(.002)		(.002)	
lnTradeFreedom	-.204**	-.203**	-.266***	-.271***
	(.094)	(.102)	(.088)	(.095)
lnNRR_Share	.182***	.159***	.268***	.238***
	(.057)	(.057)	(.054)	(.057)
lnExchangeRate	.02	.023	.048*	.049*
	(.064)	(.066)	(.027)	(.028)
lnGDP_pc	-.773	-.437	-.198	-.113
	(1.38)	(1.405)	(1.063)	(1.099)
lnsqGDP_pc	.079	.058	.03	.024
	(.086)	(.088)	(.069)	(.071)
lnPopulation	-.406	-.519*	-.286***	-.274***
	(.287)	(.291)	(.071)	(.068)
lnCreditP/GDP	-.043	-.055	-.089	-.118*
	(.075)	(.08)	(.068)	(.067)
WTO	-.545**	-.608**	-.462*	-.516**
	(.268)	(.267)	(.252)	(.262)
Distw	.069***	.091***	.0002***	.0003***
	(.018)	(.022)	(0)	(0)
Landlocked			.605***	.595***
			(.204)	(.205)
Latitude			-.015**	-.016***
			(.006)	(.006)
FDI_inflows/GDP		-.011*		-.011*
		(.006)		(.006)
Constant	-571.783***	-752.734***	4.837	4.538
	(151.395)	(179.379)	(4.44)	(4.576)
Observations	**431**	**432**	**431**	**432**
No of countries	**67**	**67**	**67**	**67**
R-squared	**.176**	**.16**	**0.65**	**0.64**
F-Stat	**3.51*** **	**9.21*** **		
Wald Chi^2	**.**	**.**	**209.543*** **	**216.49*** **
Hausman (model with FDI stock)	**42.33*** **	**.**		
Hausman (model with FDI inflow)		**71.64*** **		

Note: Robust Standard errors are in parentheses
*Significance levels, ***p<0.01, **p<0.05, *p<0.1*
Time-effects are jointly insignificant; Time trend is also insignificant, nor does it change the significance of others

The weighted average distance between an exporter and its partners is another significant deterrent to export diversification. I find that a one unit change in the average distance (km) is associated with 6.9 percent change in export products concentration. Meaning, countries that are remote from their partners tend to have concentrated export commodities. Indeed, gravity equation empirics also suggest distance (being a proxy for trade barrier) inversely relate to bilateral trade flows.

When it comes to the time-invariant variables, RE estimator shows landlocked countries have less diversified export portfolios, compared to countries that have access to sea. Again, RE depicts commodities concentrations are larger for equatorial countries, perhaps their environments are unfavorable for diverse economic activities or they are distant from major world markets. However, RE estimator may be inconsistent, as the Hausman specification test suggests the presence of correlation among covariates and fixed effects, so I rely on the FE estimator.

2.2.1.3. Does the effect of FDI on exports concentration depend on resource abundance level?

To observe whether the impact of FDIs on export concentration depends on countries' resource abundance level, I estimate variants of FE models by introducing interaction variables between FDIs and natural resource rents in percentage of GDP. The reason is that resource-rich countries may attract FDIs into existing primary sectors and may end up exacerbating their exports concentration. Table 4.5 shows this possibility that the *negative marginal effects* of both FDIs on export product concentration diminish with the increase of the natural resource rents. As such, there exist certain levels of natural resource rents beyond which the impacts of FDIs on export products concentration become positive: these levels are, respectively, $105 = e^{0.008401/0.001805}$ and $74.6 = e^{0.027304/0.006332}$ for the model with FDI-stock and FDI-inflow. However, since the sample' percentage of natural resource rents in GDP ranges from 0.8 to 55.5 percent (see appendix.2) and hence this range lies below the thresholds, the net effects of FDIs on export-commodities concentration remain negative. Thus, I note that FDI-stock and inflow have export-diversifying effects regardless of countries' natural resource rents levels.

Other explanatory variables, trade freedom, natural resource rents, WTO dummy and distance, remain significant determinants of export products concentration with the introduction of the interaction variables. From now on, I discuss *only* models with FDI-stock variable.

Table 4.5 Do impacts of FDIs on exports concentration depend on the resource abundance of exporting country?

Regressand: *HHI of export products concentration*

	(1) Within Fixed_Effects	(2) Within Fixed_Effects
FDI_stock/GDP	-.008401***	
	(.002658)	
lnNRR_Share* FDI_stock/GDP	.001805*	
	(.000968)	
lnTradeFreedom	-.195922**	-.199118*
	(.09557)	(.101263)
lnNRR_Share	.137274**	.132485**
	(.06634)	(.059057)
lnExchangeRate	.023448	.024509
	(.06378)	(.065674)
lnGDP_pc	-1.018375	-.534115
	(1.423494)	(1.410956)
lnsqGDP_pc	.097573	.065711
	(.088619)	(.088152)
lnPopulation	-.435627	-.528705*
	(.277833)	(.289514)
lnCreditP_GDP	-.035961	-.04973
	(.074122)	(.079671)
WTO	-.512659*	-.586761**
	(.260581)	(.264902)
Distw	.058792***	.077454***
	(.019597)	(.024769)
Landlocked		
Latitude		
FDI_inflows/GDP		-.027304**
		(.010474)
lnNRR_Share* FDI_inflows/GDP		.006332*
		(.003585)
Constant	-481.8808***	-637.30726***
	(163.52451)	(206.42106)
Observations	**431**	**432**
No of countries	**67**	**67**
R-squared	**.184648**	**.165004**
F-stat	**31.87*** **	**6.32*** **

Note: Robust Standard errors are in parentheses
*Significance levels, ***p<0.01, **p<0.05, *p<0.1*

4.2.2. Does FDI affect export destination markets concentration?

Literature suggests, MNEs influence directly exports by establishing export-platforms FDI(or other types) and indirectly export decisions of domestic firms by reducing foreign markets supplying costs (via information spillover), plummeting production costs (via competition spillover) and inducing innovation activities (via demonstration effects)(Aitken et al., 1997; Ekholm et al., 2007; Greenaway et al., 2004; Kugler, 2006; Ruane & Sutherland, 2011). These influences translate into export enlargement extensively when firms export their products to new trading partners and intensively when firms trade with existing partners. By construction, export markets concertation (HHI) can inversely relate to these two dimensions. It is, therefore, worth examining whether FDI help lessen export destination markets concentration, too.

Table 4.6 reports coefficients on FDI and other variables, wherein Herfindahl export destinations concentration is an outcome. But in these models, I drop the squared per-capita income of exporters and introduce the average per-capita income of trading partners. The motive of removing the first variable is that no empirical reasonings justify that countries undergo export markets re-concentration process after they attain certain income-per-capita levels, perhaps for some other reasons market concentration might increase or decreases. Rationale for introducing the latte variable is, HHI of market concentration sums up the share of each country's import in the export of exporter. As such, it is likely that a country's export markets concentration (diversification) is also driven by demand-side factors. Income per-capita of trading partners would capture at least the effects of their development stages: more developed countries tend to import larger varieties than less developed countries do. It is also recognizable that other factors (such as import policy and political regime of partners) may affect export markets concentration, but such factors can only be captured in bilateral trade analysis.

The table shows an FDI, natural resource rents and population size are statistically significant at 10 percent while distance and partners' average income per-capita are significant 1 percent. Particularly, the result suggests FDI dampens export markets concentration: a one-percentage point increase in FDI to GDP roughly corresponds to a 0.34% decline in export markets concentration, other things are held constant. This export-markets-diversifying impact of FDI is, nonetheless, smaller compared to export-products-diversifying impact. This may be explained as MNE may not induce robust information externalities that enable domestic firm to break into new trading partners, outside existing bilateral agreements. It would also be a case that export-platform FDIs are likely to follow existing bilateral chains of trade a country already has. So, the channel of FDI's effect on export markets

diversification is more likely to work via reducing the dispersion of export share going to each partner (i.e. via intensive margin). Overall, the impact of FDI on export markets concentration is still in effect.

Table 4.6: Export destination markets concentration and FDI
Regressand: *HHI of Export destinations concentration*

	(1) Within Fixed_Effects	(2) Random_Effects
FDI_stockGDP	-.003391*	-.002264
	(.001765)	(.001522)
lnTradeFreedom	-.083633	-.006241
	(.111889)	(.086203)
lnNRR_Share	.119283*	.120821***
	(.063644)	(.044746)
lnExchangeRate	-.048495	.00728
	(.073167)	(.0238)
lnGDP_pc	.148595	-.027758
	(.236598)	(.082976)
lnPopulation	.771804*	-.160208***
	(.445488)	(.045766)
Distw	.098201***	.000237***
	(.012023)	(.000063)
WTO	.132763	.191138
	(.1561)	(.126145)
Landlocked		.203715
		(.175963)
Latitude		.010943***
		(.003966)
lngdpcap_d	-.598194***	-.183532*
	(.199081)	(.102963)
Constant	-828.19584***	.036052
	(99.864935)	(1.384804)
Observations	**431**	**431**
No of countries	**67**	**67**
R-squared	**.122**	**.296**
F-stat	**2.41****	**.**
Wald Chi^2	**.**	**48.64*****
Hausman test	**23.21*****	**.**

***NB**: Robust Standard errors are in parentheses*
*Significance levels, ***p<0.01, **p<0.05, *p<0.1*
Time-effects are jointly insignificant and time trend is also insignificant

Turning to the remaining covariates, natural resource rents proportion to GDP (significantly) leads to export markets concentration, as before. A positive 0.12-percentage change of the export markets concentration is associated with a one percent change in the share of natural resource rents.

Population size significantly determines export markets diversification. Unfortunately, it does not possess the expected signs in these specifications. A 0.77 percent increase in export markets concentration is attributable to a one percent increase in population. The result may support the theory that population growth provides producers incentive to focus on the production and export of goods that intensively use labor while reducing exports of outputs that use other inputs intensively. This in turn changes export share in each destination market differently unless all resulting exports are evenly distributed across markets, which are less likely. However, the caveat with this coefficient is the variability of signs in different estimators per se.

The average distance between exporting country and partners is negatively and significantly associated with export markets concentration. Far-off country may find it difficult to proportionally ship domestically produced commodities to all partners, rather they would unevenly ship goods to different foreign markets. In particular, a one percent increase in average distance is expected to result in roughly 9.8% decrease of markets diversification. And, the coefficient is economically significant —shows how critical the distance is in diversifying exports across potential foreign markets.

The coefficient on the partner's income per capita is negative and is statistically significant, consistent with the result reported by Jayaweera (2009). A one percent increase in the average income per-capita of importers is associated with a 0.6 percent increase in export markets diversification. The result suggests when the exporting country services the markets of richer trading partners, its export markets get diversified. First, more developed partners enable the exporting country to generate higher trade revenue through importing a broader range goods, which in turn allows the exporter to spread goods (longstanding or new) further into new markets. Second, a county may also export products uniformly to each destination market to reduce competition when export partners are comparatively rich, because high-income countries tend to import numerous substitutable goods from different countries.

Other variables, namely, exchange rate, income per-capita and WTO dummy have been found to be insignificant in FE. Exchange rate depreciation inversely relates to trade partners' concentration, supporting the macroeconomic fundamentals that currency depreciation eases exportations into new destinations. (Agosin et al., 2011; Giri et al., 2019) also report the insignificant effect of exchange rate overvaluation. Concerning income per-capita, the coefficient assumes a positive sign, similar with the result reported by Bebczuk & Berrettoni (2006). And, coefficient on the WTO dummy is positive. This may imply, not only does agreement to WTO upsurge trade opportunities, but it will also increase

exposure to international competition by domestic firms. So, if the former effect does not offset the adverse effect of the latter, uncompetitive domestic firms would leave some destinations, which leads to market concentration.

4.3. Further checks

As I stated earlier, concentration indices are intrinsically sensitive to trade data disaggregation level and hence may underestimate export concentrations at 6-digits HS products-classification. For this reason, one would think the impacts of FDI on exports concentrations may likewise vary depending on export data classification. To witness if this is the underlying cause of the significant impact of FDI on exports concentration, I rebuilt *HHIs* based on 4-digits SITC revision.3 from WITS (World Integrated Trade Solution) datasets[10]. For this data, I report the results of FE and RE specifications in *Appendix.5* and *Appendix.6*. The results assert, even at less disaggregated level, the effect of FDI on export concentrations remains statistically significant, with the slight change in the coefficients' magnitudes.

The impact of FDIs on both types of export concentration would depend on countries' development stages. For instance, relatively more developed countries tend to have required complementary inputs (sector-specific skills) with which FDI operates in various sectors. Similarly, advancing-countries could attract much more foreign investments into sectors showing high productivity growth (like manufactures in Asia) than do less-developed nations, relatively. This, in turn, can change the export structures of countries. In order to test these postulates, I create dummy variable for each income level (low, low-middle and upper-middle income) and interact them with FDI in separate specifications. If, indeed, the differential impacts of FDI on exports concentration exist across development stages/path, the interaction variables should statistically be significant. Results for export products and markets concentration are, consecutively, presented in *Appendix.7* and *Appendix.8*. The finding reveals that none of the interaction variables is significant, and no strong evidence emerges. Thus, we may conclude that the positive impact of FDI on export diversification is not conditional on development levels.

[10] https://wits.worldbank.org/module/ALL/submodule/ALL/reporter/ALL/year/ALL/tradeflow/ALL/pagesize/50/page/1

5. Conclusion and Limitations

Using a highly disaggregated export dataset of developing countries during the last two and half decades, this study uncovers how FDI impacts exports concentration (diversification) by commodities and across geographies by constructing *Herfindahl indices* of specialization. Indeed, the study concurrently explores the roles played by other explanatory variables, besides. The empirical probe makes use of FE (while displaying alternative estimates from RE method) because, FE method controls for unobserved omitted variables, which are likely in diversification studies as previous empirics and current test show.

This study confirms that FDI enhances overall exports diversification (i.e. it reduces exports concentration) both by products and destination markets in developing countries under the study. The results are robust to several checks: level of export products disaggregation, of natural resources wealth and of countries' developments (structural change). The findings suggest FDI may lessen exports concentration of host economy, directly through investing in exporting enterprises or indirectly via exerting positive externalities on domestic firms. Additionally, the study identifies other variables driving exports concentration. Among others, freedom of trading internationally, natural resources rent, bilateral distances and accession to WTO are found to be the significant factors of export commodities concentration. While, natural resources rent, population size, bilateral distances and development levels of trading partners significantly explain export markets concentration in FDI-receiving economies. And, these understandings of the link between FDI (and other determinants) and exports concentration contribute to the constructions of theoretical literatures that explore drivers of export concentration, which are critically at lack nowadays.

This empirical analysis, however, has limitations: First, although concentration indices conceptually demonstrate similar degrees of the countries' exports specialization/diversification, discrepancies unavoidably remain because, each specialization index has its own advantages and limitations. To curb possible inconsistencies arising from the concentration indices per se, several indices (such as Thiel and Gini) would have concurrently been constructed and compared. Second, different impacts of FDIs on exports concentration would emerge if the indices were decomposed into within and between export categories. For instance, FDIs might have much more effect on intensive margins (longstanding exports or partners) than on extensive margins (new exports or partners) of exports concentration. And unfortunately, these aspects were not captured in this study as well. Last, FE

model reveals that a substantial portion of the error component is explained by countries' unobserved effects. Even if FE method remains consistent in this circumstance, those individuals' fixed-effects may at last partially be identified for a deeper understanding and effectual policy development on export concentration.

Despite the limitations, the study has important implications: first, developing economies endeavoring to reduce exports concentration need to form conducive environments for direct investments' attraction. This requires host countries to improve overall policy frameworks and business facilitation of FDIs. In other words, the reduction of export concentration (diversification) via FDIs needs improvements in the determinants of FDI inflows per se. Additionally, all FDIs may not necessarily lessen exports concentration. As such, recipient countries may target particular FDIs, which are expected of changing exports structures, favorably.

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Appendices

Appendix 1: Tabulation of Sample countries

	Continents			
Country	Africa	Americas	Asia	Total
Algeria	8	0	0	8
Angola	8	0	0	8
Argentina	0	8	0	8
Armenia	0	0	8	8
Azerbaijan	0	0	8	8
Bangladesh	0	0	8	8
Benin	8	0	0	8
Bolivia	0	8	0	8
Brazil	0	8	0	8
Burkina Faso	8	0	0	8
Burundi	8	0	0	8
Cameroon	8	0	0	8
Central African Republic	8	0	0	8
Chad	8	0	0	8
China	0	0	8	8
Colombia	0	8	0	8
Congo	8	0	0	8
Costa Rica	0	8	0	8
Cote d'Ivoire	8	0	0	8
Ecuador	0	8	0	8
Egypt	8	0	0	8
El Salvador	0	8	0	8
Gabon	8	0	0	8
Georgia	0	0	8	8
Ghana	8	0	0	8
Guatemala	0	8	0	8
Honduras	0	8	0	8
India	0	0	8	8
Indonesia	0	0	8	8
Iran	0	0	8	8
Jordan	0	0	8	8
Kazakhstan	0	0	8	8
Kenya	8	0	0	8
Kyrgyz Republic	0	0	8	8
Madagascar	8	0	0	8
Malawi	8	0	0	8
Malaysia	0	0	8	8
Mali	8	0	0	8
Mauritania	8	0	0	8
Mexico	0	8	0	8
Mongolia	0	0	8	8
Morocco	8	0	0	8
Mozambique	8	0	0	8
Myanmar	0	0	8	8
Nepal	0	0	8	8
Nicaragua	0	8	0	8
Niger	8	0	0	8
Nigeria	8	0	0	8
Pakistan	0	0	8	8
Panama	0	8	0	8
Paraguay	0	8	0	8

Peru	0	8	0	8
Philippines	0	0	8	8
Rwanda	8	0	0	8
Senegal	8	0	0	8
Sierra Leone	8	0	0	8
Sri Lanka	0	0	8	8
Syria	0	0	8	8
Tanzania	8	0	0	8
Thailand	0	0	8	8
Togo	8	0	0	8
Tunisia	8	0	0	8
Turkey	0	0	8	8
Uganda	8	0	0	8
Venezuela	0	8	0	8
Vietnam	0	0	8	8
Zambia	8	0	0	8
Total	**240**	**120**	**176**	**536**

Appendix 2: Summary Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max	Skew.	Kurt.
HHPro	536	.173	.204	.003	.955	1.753	5.468
HHDest	536	.153	.123	.033	.791	2.283	9.129
FDI_stockGDP	535	29.73	29.282	.644	302.549	3.227	21.757
FDI_inflow~P	534	3.541	4.308	-6.319	34.065	3.38	19.077
TradeFreedom	503	6.354	1.315	0	9.11	-1.218	6.239
NRR_Share	531	9.696	10.088	.085	55.501	1.655	5.729
ExchangeRate	536	998.548	3089.985	.093	32070.58	5.674	41.158
GDP_pc	536	3029.221	3122.531	205.923	14652.04	1.561	4.726
Population	536	7.11e+07	2.11e+08	1110000	1.39e+09	5.19	29.494
CreditP_GDP	529	30.806	28.682	1.6	158.576	1.956	7.083
distw	469	8272.518	1269.489	6603.411	10575.01	.445	1.705
WTO	469	.863	.34	0	1	-2.099	5.457
landlocked	536	.269	.444	0	1	1.044	2.09
latitude	536	11.752	19.414	-34.667	47.9	-.132	2.452

Appendix 3: Matrix of Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) HHPro	1.000														
(2) HHDest	0.277	1.000													
(3) FDI_stockGDP	0.018	0.132	1.000												
(4) FDI_inflowsGDP	0.038	0.072	0.623	1.000											
(5) TradeFreedom	-0.380	-0.013	0.196	0.151	1.000										
(6) NRR_Share	0.719	0.234	0.213	0.202	-0.387	1.000									
(7) ExchangeRate	-0.012	-0.084	-0.015	-0.015	-0.075	0.063	1.000								
(8) GDP_pc	0.015	0.061	0.069	-0.043	0.208	0.026	-0.029	1.000							
(9) Population	-0.165	-0.151	-0.150	-0.098	-0.029	-0.148	0.010	0.013	1.000						
(10) CreditP_GDP	-0.381	-0.180	0.175	0.025	0.331	-0.302	0.129	0.317	0.344	1.000					
(11) distw	-0.342	0.150	0.030	-0.029	0.385	-0.324	0.139	0.298	0.125	0.322	1.000				
(12) WTO	-0.106	0.018	-0.023	-0.092	0.198	-0.231	-0.201	-0.010	0.013	0.074	0.198	1.000			
(13) landlocked	0.257	0.196	0.043	0.043	-0.046	0.151	-0.051	-0.279	-0.171	-0.248	-0.212	-0.124	1.000		
(14) latitude	-0.087	0.081	0.066	0.032	-0.081	-0.041	0.003	0.009	0.195	0.214	-0.414	-0.396	0.012	1.000	
(15) gdpcap_d	0.157	0.171	0.288	0.212	0.047	0.257	0.010	0.027	-0.118	0.004	-0.038	0.044	0.231	-0.001	1.000

Appendix 4: Export Concentration and FDIs, 5-years averages by regions

GEO	period	Number of Goods	Number of Markets	HHI for Goods	HHI for Markets	FDI inflow/GDP	FDI stock/GDP
Africa	1995/99	1004.913	89.92	0.281223	0.136909	1.652565	18.05538
Africa	2000/04	1215.247	108.3067	0.260887	0.148441	3.188796	23.90516
Africa	2005/09	1424.767	121.3333	0.251347	0.150024	3.572315	23.22287
Africa	2010/14	1488.607	126.8733	0.248777	0.155265	4.855661	32.23583
Africa	2015/18	1430.925	123.225	0.230862	0.146901	4.526782	51.63948
Americas	1995/99	2591.027	125.76	0.081616	0.215408	3.653588	17.569
Americas	2000/04	2750.827	140.9333	0.081956	0.230887	3.045044	29.80149
Americas	2005/09	2859.627	153.32	0.103827	0.209483	3.549416	30.59664
Americas	2010/14	2796.267	157.9333	0.128725	0.184391	3.585499	33.59531
Americas	2015/18	2646.433	156	0.10176	0.182945	3.111349	40.42869
Asia	1995/99	2289.064	119.3182	0.098329	0.135896	3.515437	16.30697
Asia	2000/04	2729.391	149.6727	0.110886	0.119485	3.700007	30.39402
Asia	2005/09	2887.436	158.3909	0.123247	0.124332	4.09301	29.86071
Asia	2010/14	2858.182	162.0182	0.117925	0.127264	4.052083	34.81661
Asia	2015/18	2847.636	158.6136	0.097068	0.121065	2.9171	45.44239

Appendix 5: Is the impact of FDI on export product concentration sensitive to the level of Product disaggregation? Estimates are generated using SITC export classification, from WITS.

Regressand: *HHI of Export products concentration*

	(1) Within Fixed_Effects	(2) Within Fixed_Effects	(3) Random_Effects	(4) Random_Effects
FDI_stock/GDP	-.003523**		-.004342***	
	(.001464)		(.001224)	
lnTradeFreedom	-.171602*	-.17793*	-.272031***	-.288513***
	(.095975)	(.106195)	(.088467)	(.098527)
lnNRR_Share	.094682**	.078444*	.122717***	.100616***
	(.043101)	(.042975)	(.036928)	(.036732)
lnExchangeRate	.043819	.044994	.000981	.00172
	(.066585)	(.067303)	(.019048)	(.01912)
lnGDP_pc	.37307	.684554	.449987	.611457
	(1.056098)	(1.140621)	(.767763)	(.824337)
lnsqGDP_pc	-.029323	-.048385	-.030994	-.042087
	(.067962)	(.073203)	(.05046)	(.053957)
lnPopulation	-.711989***	-.786712***	-.226244***	-.213054***
	(.249112)	(.24849)	(.055968)	(.05493)
lnCreditP_GDP	.004794	-.008813	-.111349	-.1366**
	(.082676)	(.08162)	(.068652)	(.068729)
WTO	-.141622	-.187482	-.231546*	-.276044**
	(.172179)	(.158179)	(.120195)	(.113167)
distw	.048349***	.05518***	-.000106	-.000116*
	(.01177)	(.011842)	(.000068)	(.000069)
landlocked			.228026	.222082
			(.178522)	(.177491)
latitude			-.00592	-.007166
			(.004704)	(.004539)
FDI_inflow/GDP		-.009609		-.012978*
		(.008874)		(.007191)
cons	-395.66553***	-452.68197***	2.340777	1.750406
	(99.158508)	(100.48667)	(3.010687)	(3.247654)
Observations	401	402	401	402
No of countries	66	66	66	66
R-squared	.197617	.183604	.z	.z
Wald Chi^2	.z	.z	126.81977	123.28254

Note: Robust Standard errors are in parentheses
*Significance levels, ***p<0.01, **p<0.05, *p<0.1*

Appendix 6: Is the impact of FDI on export markets concentration sensitive to the level of Product disaggregation? Estimates are generated using SITC export classification, from WITS.

Regressand: *HHI for markets concentration*

	(1) Within Fixed_Effects	(2) Within Fixed_Effects	(3) Random_Effects	(4) Randam_Effects
FDI_stock/GDP	-.000576*		-.00049*	
	(.000296)		(.000262)	
lnTradeFreedom	-.01718	-.017293	-.018799	-.01989
	(.019338)	(.020067)	(.021885)	(.022725)
lnNRR_Share	.010982*	.008052	.012123**	.010087**
	(.006432)	(.006569)	(.004868)	(.004978)
lnExchangeRate	.023144**	.022588**	.01044**	.010512**
	(.01034)	(.010484)	(.004494)	(.004494)
lnGDP_pc	-.024478	-.024305	-.001945	-.00325
	(.025175)	(.026442)	(.013803)	(.013997)
lnPopulation	-.018348	-.023514	-.028568***	-.027328***
	(.043194)	(.040885)	(.007088)	(.007044)
Distw	.0278***	.029117***	.000032***	.00003***
	(.001872)	(.0018)	(.000011)	(.000011)
WTO	.052367**	.045029*	.047888*	.042999*
	(.024755)	(.022942)	(.025613)	(.023874)
Landlocked			.023546	.022549
			(.029854)	(.029127)
Latitude			.001701**	.001553**
			(.000749)	(.000727)
lngdpcap_d	-.030583	-.030155	-.030319*	-.031888*
	(.028512)	(.029592)	(.016612)	(.016721)
FDI_inflow/GDP		-.002438**		-.002155*
		(.001203)		(.001133)
cons	-233.43412***	-244.30637***	-.798196***	-.776495***
	(15.623205)	(15.06586)	(.201848)	(.196519)
Observations	401	402	401	402
No of countries	66	66	66	66
R-squared	.169086	.164894	.z	.z
Wald Chi^2	.z	.z	66.137389	67.510909

Note: Robust Standard errors are in parentheses
*Significance levels, ***p<0.01, **p<0.05, *p<0.1*

Appendix 7: Regression results, With the inclusion of income-level dummies and FDI interaction (a)

Regressand: *HHI for products concentration*, Within Fixed Effect method

	(1)	(2)	(3)
	Low_income	Low_middle_income	Upper_middle_income
FDI_stock/GDP	-.00466**	-.00595***	-.0039*
	(.00219)	(.00218)	(.00228)
lnTradeFreedom	-.20479**	-.20195**	-.19281**
	(.09368)	(.09299)	(.09156)
lnNRR_Share	.18107***	.18718***	.19201***
	(.05649)	(.05691)	(.05514)
lnExchangeRate	.02003	.0195	.02202
	(.06378)	(.06305)	(.06293)
lnGDP_pc	-.75265	-.71632	-.87628
	(1.39545)	(1.3781)	(1.38081)
lnsqGDP_pc	.07757	.07441	.08552
	(.08688)	(.0859)	(.08628)
lnPopulation	-.40361	-.39387	-.41624
	(.28176)	(.28273)	(.28703)
lnCreditP_GDP	-.0423	-.03862	-.04714
	(.075)	(.07509)	(.07409)
WTO	-.54702**	-.54292**	-.52489**
	(.27243)	(.26303)	(.26118)
Distw	.06951***	.0682***	.06762***
	(.01826)	(.01798)	(.01778)
Landlocked			
Latitude			
Low*FDI_stock/GDP	-.00039		
	(.00401)		
LowMiddle*FDI_stock/GDP		.00156	
		(.0017)	
UpperMiddle*FDI_stock/GDP			-.00104
			(.0012)
cons	572.51406***	-561.9186***	-556.14461***
	(152.47461)	(150.10325)	(148.54676)
Observations	431	431	431
No of countries	67	67	67
R-squared	.17636	.17945	.17907
F-stat	.	.	.

***NB**: Robust Standard errors are in parentheses*
*Significance levels, ***p<0.01, **p<0.05, *p<0.1*

Appendix 8: Regression results, With the inclusion of income-level dummies and FDI interaction (b)

Regressand: *HHI for markets concentration*, Within Fixed Effects method

	(1)	(2)	(3)
	Low_income	Low_middle_income	Upper_middle_income
FDI_stock/GDP	-.003	-.00343*	-.0037*
	(.00205)	(.00192)	(.00203)
lnTradeFreedom	-.08542	-.0835	-.08654
	(.11296)	(.11177)	(.11262)
lnNRR_Share	.11743*	.11949*	.11563*
	(.06494)	(.06454)	(.06717)
lnExchangeRate	-.05003	-.04856	-.04944
	(.07464)	(.07374)	(.07338)
lnGDP_pc	.15024	.14837	.15223
	(.23711)	(.23618)	(.23554)
lnPopulation	.79215*	.77294*	.78146*
	(.46165)	(.4487)	(.4524)
Distw	.09837***	.09815***	.09879***
	(.01204)	(.01211)	(.01238)
WTO	.12542	.13279	.12541
	(.16306)	(.15624)	(.16148)
Landlocked			
Latitude			
lngdpcap_d	-.60345***	-.59847***	-.60079***
	(.19994)	(.19987)	(.19973)
Low*FDI_stock/GDP	-.00111		
	(.00267)		
LowMiddle*FDI_stock/GDP		.00006	
		(.00145)	
UpperMiddle*FDI_stock/GDP			.00036
			(.00098)
cons	829.88531***	-827.8097***	-833.27708***
	(100.23883)	(100.52448)	(103.1344)
Observations	431	431	431
No of countries	67	67	67
R-squared	.12276	.12219	.12268
F-stat	.	.	.

***NB**: Robust Standard errors are in parentheses*
*Significance levels, ***p<0.01, **p<0.05, *p<0.1*