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Development Aid, Remittances Inflows and Wages in the Manufacturing Sector of Recipient-Countries

Sèna Kimm GNANGNON¹

Abstract

This article has considered the effect of development aid and remittances inflows on wages in the manufacturing sector of the recipient-economies. The empirical analysis has used a sample of 95 countries over the period 1963-2016, and on the two-step system Generalized Methods of Moments (GMM). Results show for the full sample that while remittances influence positively wages, development aid exerts a negative effect on wages, although LDCs enjoy a positive effect of development aid on wages. Additionally, the effects of development aid and remittances on wages depend on the prevailing real exchange rate as well as the values of manufacturing exports.

Keywords: Development aid; Remittances inflows; Wages in the manufacturing sector; Real Exchange Rate; Manufactured exports.

Jel Classification: F35; J30; O14.

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1. Introduction

The decision to provide development aid (also referred to as the official development assistance - ODA) to developing countries dates back to the statement adopted by the Members of the United Nations General Assembly (UNGA) on November 19, 1970. In this statement, Members requested, *inter alia*, that each economically advanced country would increase its ODA to developing countries progressively so as to reach a minimum amount (as a net value) of 0.7% of its Gross National Product by the middle of the decade². This statement has been reiterated at several other important international meetings, and since then, the international community has been monitoring the implementation of this decision. The keen interest in the effectiveness of development aid (notably in recipient-countries) by policymakers in both donor-countries and recipient-countries has led researchers and scholars to perform several studies on the effectiveness of development aid. One strand of this literature has looked at whether development aid inflows hinder recipient-countries' exports, in particular their manufactured exports through the Dutch-Disease effect (e.g., Adenauer and Vagassky, 1998; Addison and Balamoune-Lutz, 2017; Adam and Bevan, 2006; Elbadawi, 1999; Issa and Ouattara, 2008; Laplagne et al., 2001; Li and Rowe, 2007; Mongardini and Rayner, 2009; Rajan and Subramanian, 2011; Vos, 1998; White and Wignaraja, 1992; Younger, 1992). Besides development aid flows, remittances inflows have also been considered as a major source of financing development in developing countries, and are even higher in amounts than development aid flows³. While the macroeconomic effects of development aid and remittances inflows have been the subject of an immense theoretical and empirical literature, little attention has been paid to the effect of these capital inflows on wages in the manufacturing sector in recipient-countries. Rather, a voluminous literature has been devoted to the effect of foreign direct investment (FDI) inflows on overall wages, notably wages in the manufacturing sector in developing countries (e.g., Aitken et al. 1996; Cragg and Epelbaum, 1995; Das, 2002; Girma et al. 2016; Hijzen et al. 2013; Lipsey and Sjöholm, 2004, 2006; Onaran, 2009; Pavcnik et al. 2004; Poole, 2013; Sharma, 2018). We are not aware of any study that has examined the effect of development aid and remittances inflows on wages in the manufacturing sector in the recipient-countries. The current study aims to fill this gap in the existing literature by investigating the effect of these two types of capital inflows on wages in the manufacturing sector of recipient economies. Even though development aid and remittances inflows can affect wages in the manufacturing sector through multiple avenues (e.g., real exchange rate, productivity, human capital, labor market), the present study focuses on how these resources inflows affect wages in the manufacturing sector through their effect on the real exchange rate in the recipient economies (the so-called Dutch Disease effects) and hence on manufacturing exports. The empirical analysis has been conducted using an unbalanced panel dataset of 95 countries over the period 1963-2016. Results show that while remittances inflows induce a rise in real wage in the manufacturing sector, development aid inflows appear to be negatively associated with real wages in the manufacturing sector. Moreover, both types of capital flows exert a negative effect on real wage in the manufacturing sector in the context of real exchange rate appreciation. Additionally, remittances inflows exert an increasing positive effect on real wages in the manufacturing sector as countries enjoy a higher income from manufacturing exports. Surprisingly, we obtain that the positive effect of development aid inflows on wages in the manufacturing sector decreases as countries experience a rise the income from manufacturing exports.

The rest of the article is organized as follows. Section 2 discusses the avenues through which development aid and remittances inflows can influence wages in the manufacturing sector in

² See the United Nations International Development Strategy for the Second United Nations Development Decade of 14 October 1970 ([https://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/2626\(XV\)\)](https://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/2626(XV)))).

³ See some figures online at: <http://blogs.worldbank.org/opendata/money-sent-home-workers-now-largest-source-external-financing-low-and-middle-income>

recipient-countries. Section 3 lays out the empirical strategy to address the issue at hand. Section 4 interprets empirical results, and Section 5 concludes.

2. Discussion on the effect of development aid and remittances inflows on wages in the manufactured sector

We argue in this section that development aid and remittances inflows can influence wages in the manufacturing sector, in particular through their effects on the real exchange rate (i.e., via the Dutch Disease channel), and consequently on manufactured exports. As noted above, while these two resource inflows could affect wages through various channels, the current paper primarily tests the effect of development aid inflows and remittances inflows on wages in the manufacturing sector, through the Dutch disease channel.

Our main argument is that if these resource inflows are associated with an appreciation of the real exchange rate, and eventually with lower manufacturing exports, then we can expect the latter to influence wages in the manufacturing sector, not only because lower income from manufacturing exports can lead firms in this sector to reduce wages, but also because the fall in the manufacturing export income can affect wage in the manufacturing sector through lower (labor) productivity.

In this section, we first discuss the effect of development aid and remittances inflows on real exchange rate, and hence indirectly on manufacturing exports (see Section 2.1). Second, we discuss how manufacturing exports could affect wages in the manufacturing sector, including through the labor productivity channel (see Section 2.2). Third, we present some discussion on how other channels than the real exchange rate and the manufacturing sector could play a role on the relationship between development aid and remittances inflows and wages in the manufacturing sector (see Section 2.3).

2.1. Discussion on the possible Dutch disease effect of development aid and remittances inflows

Theoretically, the real exchange rate appreciation effect of development aid and remittances is drawn from the standard Dutch Disease theory, which is a theory of demand-side impact of a capital inflow (e.g., Addison and Balamoune-Lutz, 2017). In its simplest form, the Dutch Disease theory considers two sectors, i.e., a tradables sector and a non-tradables sector, where the relative price of the non-tradables to tradables represents the real exchange rate (e.g., Bruno and Sachs, 1982; Corden, 1981, 1984; Corden and Neary, 1982; Wijnbergen, 1985, 1986). The model also assumes a small open economy that receives the capital inflow, which means that the economy is a price-taker in the world market. A rise in capital inflows (either remittances or development aid inflows) would be associated with an increase in the aggregate demand, depending on the extent to which the Central Bank allows these resource inflows to affect the monetary base. Two main effects would then arise from the capital inflows, including the resource movement effect and the spending effect. On the one hand, if significant part of the resource inflows is spent on non-tradable services - such as construction, health care, and education for which there is substantial unmet demand -, then for a fixed skilled labor supply in the short run, wages in that sector will increase. This would shift skilled labor into the non-tradable sector, and induce a rise in the wages throughout the whole economy, i.e., both in the tradable and non-tradable sectors. As the prices in the tradables market are by assumption fixed, while the prices in the non-tradables market are determined by the domestic supply and demand, it would result that further to capital inflows, the tradable market would clear by a quantity adjustment and the non-tradables market would clear by an upward price adjustment. It would follow an appreciation of the real exchange rate (i.e., the price of non-tradables to tradables), and a movement of productive factors away from the tradables sector to the non-tradables sector. The real exchange rate appreciation could be further strengthened if higher capital inflows were associated with the appreciation of the nominal

exchange rate. The rise in wages in terms of traded goods would translate into lower profitability of the tradable sector, and a loss of export competitiveness, which would ultimately result in lower exports. Corden and Neary (1982) have qualified this effect as the "resource movement effect". In turn, the rise in wages across the whole economy could induce higher spending in domestic consumption, which could lead to higher price of non-traded goods compared to the traded goods, and further undermine the competitiveness of the tradable sector, including exports. Corden and Neary (1982) have qualified this effect as the "spending effect". Nevertheless, if the capital inflows are used to augment the recipient-country's productive capacity and reduce its supply-side constraints, it would then contribute to expanding its production and exports. In this scenario, the capital inflows could lead to a greater expansion of the tradables sector compared to the non-tradables sector, and result in a depreciation of the real exchange rate (e.g., Addison and Balamoune-Lutz (2017).

However, as far as development aid inflows are concerned, the resource movement effect and the spending effect remain short term effects, as in the medium term, development aid inflows could have different effects on the recipient-country's export competitiveness. In fact, while development aid could induce the Dutch Disease effect in the short-run, in the medium to long term, it could lead to higher productivity and supply of non-traded goods - for example by enhancing human capital, and increasing the availability of higher skilled labor -, thereby offsetting its negative export competitiveness effect through higher prices. As a result, and as noted, for example, by Adams (2005), Addison and Balamoune-Lutz (2017), Rajan and Subramanian (2011) and Torvik (2001), the overall effect of development aid is an empirical issue. Adams (2005) has noted that a number of factors would determine the magnitude of the short-run effects. These effects would be higher, the greater is the share of non-tradable goods in consumption which is likely to be closely related to the proportion of the aid inflows directly spent by the public sector. The short-run effects will be weaker as the capacity of consumers (in both the public or private sectors) to substitute between domestic and imported goods in response to changes in relative prices increases. They would also be lower in the presence of substantial spare capacity in the economy in particular because in such a case, development aid could be used to increase the supply of labour-intensive domestic goods without inducing higher domestic prices, notably wages (i.e., the price of labour). Rajan and Subramanian (2011: 106-107) have noted that if development aid inflows are spent on traded goods and used to finance the supply of factors, such as imported capital goods and foreign consultants as well as on factors that are not in limited supply (unskilled labor), then changes in domestic prices (of which wages) will be so limited that they will likely not lead to real exchange rate appreciation in the medium term (see also Berg et al., 2005).

From an empirical perspective, a number of studies⁴ have tested the Dutch-Disease effect of development aid flows, i.e., whether these capital inflows have resulted in lower manufactured exports in recipient-countries. Some⁵ have reported that development aid inflows have been associated with an appreciation of the real exchange rate in the recipient-countries. Issa and Ouattara (2008) have found no significant Dutch disease effect of development aid in the short-run or long-run in developing countries. Some other studies have uncovered a real exchange rate depreciation effect of development aid inflows (e.g., Arhenful, 2013; Li and Rowe, 2007; Nkusu, 2004; Nyoni, 1998; Sackey, 2001; Selaya and Thiele, 2010). Adam and Bevan (2006) have shown that while the Dutch disease may materialize in the short-run, the correlation between increased aid inflows, real exchange rate and welfare could be much complex than suggested by simple

⁴ These include for example Adenauer and Vagassky (1998), Addison and Balamoune-Lutz (2017), Adam and Bevan (2006), Bourdet and Falck (2006), Elbadawi (1999), Issa and Ouattara (2008), Laplagne et al. (2001), Li and Rowe (2007), Prati and Tresselt (2006), Radelet (2006), Rajan and Subramanian (2011), Vos (1998), White and Wignaraja (1992) and Younger (1992).

⁵ These include Addison and Balamoune-Lutz (2017), Adu and Denkyirah (2018), Edwards and van Wijnbergen (1989), Elbadawi (1999), Ouattara and Strobl (2008), Rajan and Subramanian (2011), Van Wijnbergen (1984), Vos (1998), White (1992), White and Wignaraja (1992), and Younger (1992).

models. Other few studies such as Bandara (1995), Jemio and Jansen (1993), Jemio and Vos (1993) and Vos (1998) have used the Computable General Equilibrium (CGE) models and reported that productivity effects of development aid, and part of development aid allocated to the traded goods sector might have more than compensate any eventual Dutch disease effect of aid inflows, so that aid inflows ultimately result in an expansion of the traded goods sector in recipient-countries. Mongardini and Rayner (2009) have found that grants and remittances do not lead to the Dutch disease effect in sub-saharan African economies. They have, therefore, concluded that grants and remittances may be used to ease supply constraints or boost productivity in the non-tradable sector in these economies. Fielding and Gibson (2011) have reported for a set of 26 Sub-Saharan African countries that while there could be some real exchange rate appreciation and a Dutch Disease effect of aid inflows in some countries, in other countries, this negative effect could be mitigated and even be more than compensated by two factors: aid for investment in the traded goods sector as well as the possible deterioration of the real exchange rate thanks to the relatively high level of productivity in the non-traded goods sector.

Other studies have not looked directly at the relationship between development aid and recipient-countries' export sector (including via the Dutch Disease effect), but have rather explored for example, how real exchange rate misalignment affects exports in developing countries. For example, Sekkat and Varoudakis (2000) have shown empirically that the management of exchange rate policy is critical for manufactured export performance in Sub-Saharan African countries: exchange rate overvaluation hurts the competitiveness of these countries' manufactured exports in the international trade market. Along the same lines, Nourira et al. (2011) have obtained that undervaluation of real effective exchange rate fosters the price competitiveness of manufactured exports in developing countries. More recently, Sekkat (2017) has demonstrated that while undervaluation of the real exchange rate promotes the share of manufactures in total exports, no evidence has been found concerning the impact of misalignment (neither over nor under valuation) on exports diversification within manufactures.

The effect of remittances inflows on real exchange rate also depends on the utilization of these capital inflows, i.e., whether they are invested in the tradables or in non-tradables sectors. Many studies have considered this topic and reported evidence that remittances inflows are associated with a real exchange rate appreciation, which could, in turn, undermine the country's international competitiveness (e.g., Acosta et al. 2009; Amuedo-Dorantes and Pozo, 2004; Bayangos and Jansen, 2011; Bourdet and Falck, 2006; Chowdhury and Rabbi, 2014; Hassan and Holmes, 2013; Ito, 2019; Lartey et al. 2008; 2012; Nguyen et al., 2019; Tuanò-Amador, 2007; Vargas-Silva, 2009; Wahba, 1998). As noted above, Mongardini and Rayner (2009) have nevertheless obtained that remittances inflows do not result in the Dutch disease effect in sub-saharan African economies. In spite of the real exchange appreciation effect of remittances found in many studies, Efobi et al. (2019) have provided empirical evidence for African economies that remittances can promote industrialisation through the financial development mechanism, for certain initial levels of industrialisation.

Summing-up this discussion, we argue that both development aid and remittances inflows can lead to an appreciation of the real exchange rate, in particular if these resource inflows are used to finance investments in non-tradables relatively to tradables. In this scenario, these capital flows could result in lower manufacturing exports, and eventually in lower wages in the manufacturing sector. Therefore, the adverse effects of remittances inflows and capital inflows on wages in the manufacturing sector would increase as the induce degree of real exchange rate appreciation rises.

2.2. Discussion on the effect of manufacturing exports on wages in the manufacturing sector

The effect of manufacturing exports on wages in the manufacturing sector could take place through the productivity, including labor productivity channel. As far as remittances inflows are concerned, Al Mamun et al. (2015) have found that countries that experience a higher size of remittance inflows and abundant labor force enjoy a positive effect of remittances inflows on domestic labor productivity. However, the magnitude of this positive effect decreases after certain level. Additionally, the authors have not obtained the same result for countries with higher remittance-share of GDP. One can therefore postulate that if remittance inflows induced higher labor productivity, they might also affect directly and positively wages, including in the manufacturing sector. Chami et al. (2018) have shown evidence that remittances generate lower-wage and lower-productivity nontradables industries at the expense of high-productivity and high-wage tradables sectors. The same authors have also noted that to the extent that there is a positive correlation between remittances and emigration, higher remittances inflows can also coincide with lower labor force supply, which raises labor productivity⁶.

On the other side, development aid can affect wages in the manufacturing sector if it results in higher productivity⁷ in the whole economy, including in the manufactured sector. This positive effect could particularly take place through positive spillovers from foreign direct investment (FDI) inflows. This is because on the one hand, development aid can drive FDI inflows (e.g., Arazmuradov, 2015; Blaise, 2005; Bhavan et al., 2011; Harms and Lutz, 2006; Karakaplan et al. 2005; Selaya and Sunesen, 2012), and on the other hand, FDI inflows could affect wages, including manufacturing wages⁸ in the host countries (e.g., Aitken et al. 1996; Cragg and Epelbaum, 1995; Das, 2002; Girma et al. 2016; Hijzen et al. 2013; Lipsey and Sjöholm, 2004; Lipsey and Sjöholm, 2006; Onaran, 2009; Poole, 2013; Sharma, 2018). In light of the foregoing, we postulate that if development aid and remittances inflows result in higher labor productivity in the manufacturing sector, then they can be associated with higher wages in this sector, in particular as higher exports are positively associated with productivity. For example, Cassiman et al. (2010) have found for the manufacturing firms in Spanish that product innovation influences positively productivity and induces small non-exporting firms to enter the export market. Li (2018) has used data on firm-level production and transaction-level exports to Germany in the Chinese ceramics and glass industry to provide empirical evidence that productivity is the major driving force of export participation in experienced firms, whereas for newly created firms, demand learning plays a more important role. Kim et al. (2009) have used a panel dataset of 1335 firms from eight Korean manufacturing industries during 1997-2003, and reported that for three out of the eight industries, high productivity causes exporting, whereas exporting has appeared to induce productivity only in one industry.

We can also draw from the literature on the effect of exporting (including manufacturing exports) on productivity to establish the link between the export, productivity and wages. The argument here is that both remittances and development aid flows can affect manufacturing exports through the real exchange rate effect, and in light of the link between manufacturing exports and productivity on the one hand, and between productivity and wages on the other hand, these capital inflows can ultimately affect wages in the manufacturing sector.

⁶ Many works have reported that emigration reduces the size of labor force, and consequently increases wages (e.g., Docquier et al. 2013; Dustmann et al. 2015; Elsner, 2013a; Elsner, 2013b; Mishra, 2014).

⁷ The positive effect of development aid on productivity could take place through several avenues, including technology transfers and the build-up of absorptive capacity (e.g., Hoeckman et al. 2005; IMF, 2018; Kretschmer et al. 2013; Stockhammer, 2017; Tiruneh et al. 2017; Walley and Cushing, 2013), and investment for enhancing human capital, including education and health (e.g., Donabauer et al., 2014).

⁸ It is worth noting that even though FDI inflows generate higher wages in the non-manufacturing sector, this could spill-over onto the manufacturing sector and also result in higher wages in this sector.

Let us first consider the effect of manufacturing exports on productivity. Many studies have shown that exports (of which manufacturing exports) raise productivity. For example, Van Biesebroeck (2005) has obtained for a panel of manufacturing firms in nine African countries that exporters in these countries are more productive and enjoy a higher productivity advantage after entry into the export market. Loecker (2007) has used Slovenian manufacturing firms operating in the period 1994-2000 to demonstrate empirically that once they start exporting, export entrants become more productive, and the productivity gap between exporters and their domestic counterparts rise further over time. Furthermore, firms that export towards high income regions enjoy a higher productivity gain than other firms. Greenaway and Kneller (2008) have analysed the exporting behaviour of manufacturing firms in the United Kingdom and shown that spillovers associated with agglomeration can raise the probability of export market entry. Moreover, additional productivity benefits may arise once entry has occurred. Du et al. (2012) have utilized a comprehensive dataset from China's manufacturing industries to provide a strong empirical evidence that domestic firms displayed significant productivity gains (losses) upon export entry (exit), whereas foreign affiliates showed no productivity changes. Interestingly, export starters in high- and medium-technology industries experience higher productivity gains than those in low-technology industries. Yang and Chen (2012) have taken into account the endogenous choice of R&D when studying the link between productivity and exports in Indonesian manufacturing firms, and obtained that R&D has exerted a positive impact on both productivity and exports. More importantly, they have found a two-way causality between productivity and exports, which signifies that self-selection and learning-by-exporting effects co-exist in Indonesian manufacturing sector. Kasahara and Lapham (2013) have used Chilean plant-level data for a set of manufacturing industries, and reported that trade has induced large aggregate productivity and welfare gains. Using large-scale firm-level data from the French and Japanese manufacturing industries, Bellone et al. (2014) have found that international productivity gaps are sensitive to the export status of firms. Yang and Mallick (2014) have used a meta-analysis to investigate the role of country-level macroeconomic factors in explaining the inconclusiveness of existing evidence on the so-called learning-by-exporting hypothesis, i.e., the firm-level productivity-exporting relationship. They have reported, inter alia, a strong positive effect of exporting on productivity in countries with bigger external demand (measured by distance-weighted global GDP for each country) and higher competitiveness (i.e., with lower relative prices). Xuefeng and Yaşar (2016) have used industrial firms in China from 2000 to 2006 to examine the effect of firms' export market diversification on their productivity. They have uncovered a U-shaped relationship between export markets diversification and firms' productivity, and explained this finding by the fact that as firms start exporting, they initially face higher costs (and thus lower productivity) due to the lack of knowledge and experience. However, as they increase their level of diversification, and eventually move beyond a certain threshold (and as investments cumulate), their export market expand, which results in a fall in long-run average costs and consequently induces higher productivity owing to the learning curve and economies of scope, as well as economies of scale. Nevertheless, the U-shaped relationship is less pronounced for firms with higher share of intermediate products in total exports, for firms engaged in processing trade, and for firms exporting to Hong Kong. Bai et al. (2017) have found that direct exporting by firms is associated with higher productivity dynamics, although the fixed/sunk costs of this option are higher. However, according to the findings by Coad and Vezzani (2019), the relationship between manufacturing and exports or productivity is elusive, although manufacturing value added share may lead to an overall higher R&D intensity. Using 17,168 small and medium-sized firms (SMEs) in Austria, during the period 1995-2011, Falk and de Lemos (2019) have obtained that labor productivity strengthens the relationship between R&D activities and exports. Additionally, for a given level of labor productivity, the link between R&D and export behaviour is relatively pronounced for manufacturing SMEs, larger and older SMEs, while the Young, micro, or born global SMEs are less affected.

Let us now turn to the literature on the effect of productivity on wages. The neoclassical labor economics has established that for a given worker, the wage is equal to the marginal product of labor in equilibrium. Thus, under perfect competition and the assumption of diminishing marginal returns, and in the event a market wage is below productivity, a firm would hire workers until their marginal product fell below the wage rate. On the other side, a market wage higher than productivity would lead the firm to fire workers until remaining employees' marginal product rose sufficiently to restore equilibrium. In the event the firm is a price-maker under imperfect competition, the behavior of the firm's hiring and firing with respect to the market wage would only amplify this equilibrating tendency (Biesebroeck, 2015; Cahuc et al., 2014). However, in practice, wages diverge from productivity levels for several reasons (Katovich and Maia, 2018 have provided a good literature review on this matter). One reason is that as wages represent a small fraction of total employee compensation (which may include additional benefits such as pension or insurance), an increase in total employee compensation may disguise stagnating real wages in particular if the proportion of these additional benefits in total compensation increases (e.g., Feldstein, 2008). Another reason is attributed to the existence of information asymmetries in markets, which make difficult for firms to assess workers' true productivity and effort levels. Spence (1973) has argued that in this context, firms pay workers according to productivity signals (for example their education level), which may not truly reflect those workers' genuine productivity. Additionally, productivity and wages can temporarily diverge if firms design compensation and promotion schedules that incentivize high productivity at the outset of a worker's career, and promises of a higher compensation at the end of the career (Biesebroeck, 2015). Another reason is the discrimination by firms among workers that show the same level of productivity but different characteristics. In fact, firms may impose wage penalties on the basis of workers' characteristics (e.g., race, gender) and hence pay different wages to discriminated workers compared to non-discriminated ones (e.g., Barigozzi et al., 2018; Sakamoto and Kim, 2014; Fryer, 2011). On another note, as labor markets are imperfect and characterized by the existence of rents for firms and employees, both firms and employees would be facing high search costs, and might therefore be willing to close employment agreements at wage rates divergent from productivity rates (see Manning, 2010). Last but not least, the recent literature has underlined the important role played by globalization and skill-biased technological progress in explaining the rising share of total income going to capital (i.e., the declining labor shares of income or in other words, divergence between labor productivity and wages) across industries and countries (e.g., Acemoglu et al. 2016; Autor et al. 2016; Bourguignon, 2018; Feenstra; Hanson, 1999; Findlay and Jones, 2000; Hogrefe and Kappler, 2013; Karabarbounis; Neiman, 2013). Katovich and Maia (2018) have reported, inter alia, evidence that in Brazil, productivity is associated with higher wage levels in all economic sectors.

Some works have also been undertaken on the (direct) relationship between exports and wages. For example, Brambilla et al. (2015) have shown for developing countries that exporting is not necessarily associated with higher wages. Frias et al. (2012) have found empirically no evidence for Mexico that exporting does not affect wages at the bottom of the distribution (the 10th percentile) or at the top (in the top quartile). However, in between, the wage effects of exporting increase with earnings.

In light of the whole discussion laid out in this section (section 2), we postulate that if development aid and remittances inflows were to affect wages in the manufacturing through the real exchange rate (and hence the manufacturing exports) channel, it is likely that these resource inflows lead to lower wages, with the magnitude of this negative effect rising as the degree of real exchange rate appreciation increases or as the income from the manufacturing exports decreases. However, remittances and development aid inflows could also affect positively wages in the manufacturing sector through various other channels that we do not explicitly explore in the present analysis. Even though we do not explicitly test how the effect of development aid and

remittances flows through other channels materialize, we lay down in the following section some discussion on these possible other channels.

2.3. Discussion on other factors through which development aid and remittances inflows can influence wages in the manufacturing sector

Development aid can also affect wages in the manufacturing sector through its positive effect on human capital⁹. In connection to this, Munch and Skaksen (2008) have documented empirically the existence of an export wage premium only in firms where the skill intensity is sufficiently high (i.e., highly educated workers), which could be the case for the manufacturing sector. Likewise, remittances inflows can affect wages in the manufacturing sector through their positive effects on human capital, including health outcomes¹⁰, and educational outcomes (e.g., Acharya and Leon-Gonzalez, 2014; Acosta et al. 2007; Acosta, 2011; Alcaraz et al. 2012; Amuedo-Dorantes et al., 2010; Amuedo-Dorantes and Pozo, 2010; Azizi, 2018; Bargain and Boutin, 2015; Bouoiyour and Miftah, 2016; Calero et al. 2009; Edwards and Ureta, 2003).

The literature has also emphasized that remittances inflows can affect the recipient-country's competitiveness through other channels, notably the labour market channel. Bayangos and Jansen (2011) have argued that the outmigration of workers that is associated with remittances inflows also induces the fall in the domestic labor force. On the other hand, recipient-households of remittances may use the additional income to reduce labour supply and increase leisure¹¹ or education¹². The combination of these two effects on labour supply would lead to higher wages in recipient economies, and consequently result in lower export competitiveness, even though this negative effect might be mitigated by the rise in labour productivity. Bayangos and Jansen (2011) have performed simulations for the case of Philippines and shown that remittances inflows have raised the unit labor costs.

3. Empirical strategy

This section presents the model specification that helps examine the effect of development aid and remittances on wages in the manufacturing sector of recipient-countries (section 3.1) and then discusses the econometric strategy to estimate this model (section 3.2).

3.1 Model specification

To explore empirically the effect of development aid and remittances inflows on wages in the manufacturing sector, including through the real exchange rate and the manufactured exports channels, we draw on many insights from previous studies that have examined the determinants of wages (e.g., Onaran, 2011; Stockhammer, 2017; Hijzen et al. 2013), including the determinants of wages in the manufacturing sector in developing countries (e.g., Aitken et al. 1996; Cragg and Epelbaum, 1995; Das, 2002; Girma et al. 2016; Hollweg et al. 2016; Lipsey and Sjöholm, 2004, 2006; Onaran, 2012; Pavcnik et al. 2004; Sharma, 2018; Shendy, 2010).

⁹ Development aid inflows contribute to the accumulation of human capital through its positive effect on educational outcomes (e.g., Birchler and Michaelowa, 2016; Dreher et al. 2008) and health outcomes (Kotsadam et al. 2018; Pickbourn and Ndikumana, 2016; Yogo and Mallaye, 2015).

¹⁰ See for example, Ambrosius and Cuenca (2013), Amuedo-Dorantes and Pozo (2011), Azizi (2018), Kanaiaupuni and Donato (1999), Terrelonge (2014), Valero-Gil (2009) and Zhunio et al. (2012).

¹¹ However, Posso (2012) has obtained a positive effect of remittances inflows on the labor force participation of men, including those who do not receive remittances.

¹² See for example, Abdulloev et al. (2014), Airola (2008), Amuedo-Dorantes and Pozo (2006), Acosta (2006), Acosta et al. (2008), Azizi (2018), Bourdet and Falck (2006), Chami et al. (2018), Cox-Edwards and Rodriguez-Oreggia (2009), Gubert (2002), Funkhouser (1992), Guha (2013), Grigorian and Melkonyan (2011), Hanson (2007), Kim (2007), Lokshin and Glinskaya (2009), Mishra (2014), Nguyen and Purnamasari (2011) and Rodriguez and Tiongson (2001).

We consider the following model:

$$\text{Log}(WAGE)_{it} = \alpha_0 + \alpha_1 \text{Log}(WAGE)_{it-1} + \alpha_2 \text{Log}(\text{REMIT})_{it} + \alpha_3 \text{NAT}_{it} + \alpha_4 \text{Log}(\text{GDPC})_{it} + \alpha_5 \text{OPEN}_{it} + \alpha_6 \text{EDU}_{it} + \alpha_7 \text{SHPOP}_{it} + \mu_i + \vartheta_t + \omega_{it} \quad (1)$$

where the subscripts i and t stand respectively for a given country's index and the time-period. The panel dataset contains 95 countries over the period 1963-2016. Following the empirical macroeconomic literature, we have used non-overlapping sub-periods of 6-year average data with a view to smoothing out the effect of business cycles on variables. These sub-periods include 1963-1968; 1969-1974; 1975-1980; 1981-1986; 1987-1992; 1993-1998; 1999-2004; 2005-2010; and 2011-2016. α_0 to α_7 are coefficients to be estimated. μ_i stand for countries' fixed effects; ϑ_t are time dummies, and capture global shocks that affect together all countries' manufacturing sector wages. ω_{it} is an idiosyncratic error-term.

The variable "WAGE" is the measure of the annual real wages and salaries in the manufacturing sector (constant 2010 US\$). It has been calculated by multiplying the wages and salaries in the manufacturing sector (current US\$) by the GDP deflator. The one-period lag of this variable has been introduced in model (1) so as to capture its state dependence nature, i.e., the persistence of wages over time.

"REMIT" is the variable capturing remittances inflows. It represents the real values of remittances inflows (constant 2010 US\$) (i.e., the amounts of remittances received in the migrants' home countries). It has been calculated as the ratio of the personal remittances (current US\$) received by a given country to the GDP deflator of this country.

"NATCST" is the variable measuring the total development aid inflows received by a given country (see Appendix 1). It is the Net Aid Transfers (NAT) (in constant 2015 US\$), computed as the net Official Development Assistance (ODA) from which are subtracted principal payments received on ODA loans, interest received on such loans and debt relief. As this variable contains negative values, it has been transformed using the following formula (see Yeyati et al. 2007): $\text{NAT} = \text{sign}(\text{NATCST}) * \log(1 + |\text{NATCST}|)$ (2), where $|\text{NATCST}|$ refers to the absolute value of the variable "NATCST". Thus, the development aid variable used in model (1) is the transformed "NAT" variable. The description and source of all variables used in model (1) are contained in Appendix 1. Descriptive statistics on these variables are provided in Appendix 2, and the list of countries contained in the full sample is reported in Appendix 3.

With respect to the expected effects of control variables included in model (1), the variable "GDPC", which represents the real per capita income, aims to capture countries' development levels. It has been introduced in model (1) so as to take into account the difference across countries of wages in the manufacturing sector. Similarly, the variable "SHPOP" represents the share of the working age population in total population. It has been introduced in model (1) in order to take into account how the working age population influences wages in the manufacturing sector. Incidentally, concerning the effect of education on wages, Zhang et al. (2014) have underlined that a sustained rise in real wages trend is critical for structural transformation and, well-designed public investments in education and more generally in human capital development are critical in this regard. Munch and Skaksen (2008) have shown empirically that there exists an export wage premium (i.e., an educated labour premium) only in firms where the skill intensity is sufficiently high. This is consistent with the literature on wages in export firms initiated by Bernard and Jensen (1995) who have provided evidence of the existence of productivity and wage premia in exporting firms. Another related literature (e.g., Battu et al. 2003; Martins, 2004) has emphasized the existence at the work place level of human capital externalities, whereby firms using more educated labour enjoy a wage level higher than the wage level explained by the individual educational attainment. In light of the foregoing, we expect a better education level to be positively associated

with real wages in the manufacturing sector. Finally, with respect to the variable capturing the openness to international trade, the Stolper-Samuelson theorem has provided that since developing countries are generally abundant in unskilled labour, trade liberalization (or trade openness) would translate into higher wage rate of unskilled workers. However, this result does not hold when one calls into question one of its underlying assumptions, which is free mobility of labour across sectors. In fact, when labour is sector-specific - i.e, in the absence of movement of labour across sectors - and enjoys a higher wage in protected manufacturing sectors, trade liberalization, which involves the removal of protection of the manufacturing sectors would rather reduce workers' wages (see also Hollweg et al. 2016). Hollweg et al. (2016) have reported empirical evidence that trade liberalization accompanied with structural reforms such as macroeconomic stabilization, privatisation and deregulation provide a better macroeconomic environment and economic incentives, which induce higher productivity and hence higher wages and employment. Nevertheless, the authors have underlined the short-run adjustment costs (related to the temporary negative consequences for labour market outcomes) of shifting to a better environment. From an empirical perspective, Goldberg and Pavcnik (2005) have obtained for Colombia that reductions in output tariffs have resulted in lower industry wage premiums. Pavcnik et al. (2004) have found for Brazil that trade liberalization (through lower output tariffs) has not exerted a significant effect on industry wage premiums (i.e., wages between skilled and unskilled workers). Amiti and Davis (2011) have examined whether the effect of final and intermediate input tariff cuts on workers' wages depends on the firm's export and import orientation. Their theoretical model, which assumes homogenous labour and perfect labour markets, predicts that exporting firms benefit from higher wages further to reduction of output tariffs, while the latter leads to lower wages for import-competing firms. Likewise, in the context of lower input tariffs, import-using firms enjoy higher wages than firms that only source inputs locally. These findings particularly apply to the Indonesian manufacturing sector over the period 1991-2000. Jayadev (2007) and Stockhammer (2015) have reported a negative effect of trade openness on the wage share. Among other results, Onaran (2009) has obtained empirical evidence for Korea, Mexico and Turkey that the effect of openness to international trade depends on the existing industrial policy structure. In particular, while the rise in the export intensity has resulted in no significant effect on wage share in Korea, it has led to a fall in wage share in Mexico and Turkey. According to Bassanini and Manfredi (2012), the negative effects of trade openness on the wage share found by some country-level studies is explained by the process of reallocation of production towards sectors that have experienced lower wage share due to the increasing competition from abroad.

To get a first insight into the relationship between development aid inflows, remittances inflows, and wages in the manufacturing sector, we present in Figure 1 the cross plot between these variables over the full sample. Figure 2 plots the correlation pattern between these variables over sub-samples of least developed countries (LDCs¹³) and NonLDCs (i.e., countries in the full sample that are not classified as LDCs). It could be observed from Figure 1 that remittances inflows are positively correlated with real wages in the manufacturing sector (see the left-hand graph), while development aid inflows are negatively correlated with real wages in the manufacturing sector (see the right-hand graph). Similar patterns are obtained for NonLDCs. In contrast, for LDCs, both remittances and development aid inflows are positively correlated with real wages in the manufacturing sector.

¹³ LDCs have been defined by the United Nations as the poorest and most vulnerable countries in the world to economic and environmental shocks. The list of these countries could be obtained online at: <http://unohrrls.org/>.

3.2 Estimation's strategy

To start with, we estimate model (1) without the one-period lag of the dependent variable as a regressor (i.e., a static version of this model) using four standard econometric estimators. The first two estimators are the pooled ordinary least squares (denoted "POLS") and the within fixed effect estimator (denoted "FE") where standard errors have been corrected by means of the Driscoll and Kraay (1998) technique¹⁴. The two other estimators include the random effects estimators (where standard errors are clustered at the country level), and the cross-section weighted feasible generalized least squares (FGLS), initially introduced by Zellner (1962). The outcome of the estimations using these four estimators are displayed in Table 1. However, these results are likely biased because of the potential endogeneity of some regressions, including the capital flows variables. To address these endogeneity concerns, we estimate model (1) (in its dynamic form) using the two-step system Generalized Methods of Moments (GMM) estimator, which has been developed by Arellano and Bover (1995) and Blundell and Bond (1998) for dynamic panels with a small-time dimension and large cross-section. This estimator is appropriate when time series exhibit high persistence over time, and helps address the endogeneity bias related to the correlation between the unobserved country-specific effects and the lagged dependent variable. In addition to addressing the endogeneity problem arising from the omitted variable bias and the Nickell bias (Nickell, 1981) introduced by the correlation between the one-period lag of the dependent variable and countries' specific effects, this estimator also helps overcome the endogeneity concerns associated with the bi-directional causality between regressors and the dependent variable. Its validity is checked using the Arellano-Bond test of first-order serial correlation in the error term (denoted AR(1)) and no second-order autocorrelation in the error term (denoted AR(2)); as well as the Sargan test of over-identifying restrictions, which determines the validity of the instruments used in the estimations. Furthermore, we perform the Arellano-Bond test of no third-order serial correlation in the error term (denoted AR(3)), as failure to reject the null hypothesis can reflect the the existence of an omitted variable bias. Finally, we report the number of instruments used in the regressions, as the rule of thumb requires that a higher number of instruments than the number of countries would reduce the power of the afore-mentioned tests (Bowsher, 2002; Roodman, 2009; Ziliak, 1997).

For regressions based on the two-step system GMM approach, we display in column [1] of Table 2 the outcomes of the estimation of model (1) as it stands (i.e., the dynamic model (1)). In columns [2] and [3] of this Table, we report the estimations' results that allow examining the effect of remittances on wages in LDCs versus NonLDCs (see column [2]) and the effect of development aid on wages in LDCs versus NonLDCs (see column [3]). The outcomes displayed in columns [2] and [3] of Table 2 are obtained by introducing in model (1) a variable that captures the interaction between the dummy "LDC" (which takes 1 for LDCs, and 0, otherwise) and either the remittances variable or the development aid variable. Each interaction variable is introduced once in model (1) along with the "LDC" dummy. Table 3 contains results that allow investigating the extent to which the effect of remittances and development aid on wages depends on the level of the real effective exchange rate. These results are obtained by estimating two different variants of model (1) that contain respectively the interaction between the variable "REMIT" (in Logs) and the real effective exchange rate variable ("REER") (see column [1] of Table 3), and the interaction between the variable "NAT" and the real effective exchange rate variable ("REER") (see column [2] of Table 3). Table 4 contains estimates that allow examining the extent to which the effect of remittances and development aid on wages depends on the real values of manufacturing exports. These results are obtained by estimating two different other variants of model (1) that contain respectively the interaction between the variable "REMIT" (in Logs) and the real manufactured exports (denoted "EXPMAN") (see column [1] of Table 4), and the interaction between the variable "NAT" and

¹⁴ This technique is useful in handling the presence of cross-sectional dependence, autocorrelation and heteroscedasticity in the dataset.

the variable ("EXPMAN") (see column [2] of Table 4). In the regressions based on the two-step system GMM, the variables "REER" and "EXPMAN" have been considered as endogenous in light of the reverse causality issue of these variables with respect to the dependent variable.

4. Empirical results

For the sake of simplicity, in this section, we refer 'remittances inflows' to as 'remittances', 'development aid inflows' to as 'development aid', and 'real wages in the manufacturing sector' to as 'wages'. The estimations' results displayed in Table 1 show that remittances are positively and significantly (at the 1% level) associated with wages. At the same time, development aid exerts a negative and significant effect (at the 1% level) on wages only for regressions based on the POLS and FGLS estimators (see columns [1] and [4]), as in the two other columns, there is no significant effect of development aid on wages at the conventional level. Higher real per capita income and trade openness are positively associated with wages across the four columns, while the share of the working population appears to affect significantly (although positively) wages only for estimations based on the POLS and FGLS estimators.

Before interpreting the empirical results based on the two-step system GMM approach (see results in Tables 2 to 4), it is important to say a few words about the validity of the GMM for conducting the empirical analysis. We note from all three Tables (Tables 2 to 4) the positive and statistically significant (at the 1% level) coefficient of the lagged dependent variable. This suggests that the wages variable exhibits a high persistence over time, which confirms the relevance of considering the dynamic specification of model (1). Furthermore, we observe at the bottom of all three Tables that the p-values associated with the AR(1) test are always, at least, lower than 0.05 (the 5% level); the p-values of the AR (2) and AR(3) tests are higher than 0.10, i.e, the 10% level of statistical significance; and the p-value relating to the Sargan test are always higher than 0.10. Finally, the rule of thumb concerning the number of instruments is met. Against this background, we conclude that the two-step system GMM estimator is appropriate for the empirical analysis.

Turning now to results in Table 1, we note that the coefficient of both "REMIT" and "NAT" variables are respectively positive and negative, and statistically significant at the 1% level. These suggest that higher remittances induce a rise in wages, while higher development aid is associated with lower wages. Over the full sample, a 1 percentage increase in remittances generate a 0.109 percentage increase in real wages. Similarly, a rise in development aid by 1 per cent is associated with a 3.05 percentage decrease in real wages. It is worth emphasizing that the estimate of these two variables are different from those reported in Table 1. Results in column [2] of the Table 2 indicate that the interaction term of the variable "[Log(REMIT)]*LDC" is not significant at the conventional levels, while the coefficient of "REMIT" is positive and significant at the 1% level. These two results suggest that the magnitude of the positive effect of remittances on wages is the same in LDCs and NonLDCs alike. Results in column [3] of the same Table suggest that the interaction term of the variable "NAT*LDC" is positive and significant at the 1% level, and the coefficient of "NAT" is negative and significant at the 1% level. Taken together, these two outcomes suggest that the net effect of development aid on wages in LDCs amount to +0.1314 (= 0.161-0.0296). Therefore, we conclude that development aid influences positively and significantly wages in LDCs, but negatively and significantly wages in NonLDCs. With regard to results of control variables, we obtain from column [1] that at least at the 5% level, the rise in real per capita income and in the share of the working population generates a higher wage, while greater trade openness reduces wages. Education exerts no significant effect on wages.

Taking up now the outcomes in Table 3, we obtain a positive and statistically significant coefficient (at the 1% level) of the variable "[Log(REMIT)]", but a negative and significant interaction term associated with the variable ("[Log(REMIT)]*[Log(REER)]"). The combination of these two results indicates that while remittances lead to higher wages, there is a turning point of the real effective exchange rate above which this effect becomes negative. This turning point

amounts to $301.3 = [\text{exponential}(1.056/0.185)]$. As per statistics reported in Appendix 2, values of the real effective exchange rate range between 1.36 and 10791.1. This interval contains the threshold value found above. Therefore, we conclude that for values of the real effective exchange rate lower than 301.3, remittances induce higher wages, and the lower the values of the real effective exchange rate (i.e., the greater the degree of the real exchange rate depreciation), the higher is the magnitude of the positive effect of remittances on wages. However, for real exchange rate values higher than this threshold, remittances are associated with lower real wages, and the higher the values of the real effective exchange rate (i.e., the greater the degree of the real effective exchange rate appreciation), the higher is the magnitude of the negative effect of remittances on real wages. Similar patterns are observed for the effect of development aid on wages, as the interaction term associated with the variable (" $\text{NAT} * [\text{Log}(\text{REER})]$ ") is negative and significant at the 1% level, while the coefficient of " NAT " is positive and significant at the 1%. These findings are clearly illustrated in Figures 3 and 4. Figure 3 shows at the 95 per cent confidence intervals, how the marginal impact of remittances on wages evolves for varying degrees of real exchange rate appreciation, and Figure 4 indicates at the 95 per cent confidence intervals, the evolution of the marginal impact of development aid on wages for varying degrees of real exchange rate appreciation. Both Figures show similar patterns: the magnitude of the positive effect of remittances and development aid on wages decreases as countries experience a higher level of real exchange rate appreciation, and becomes negative above a level of real exchange rate appreciation.

Turning now to results in Table 4, we find from column [1] of this Table that the coefficient of the variable " $[\text{Log}(\text{REMIT})]$ " is negative and significant (at the 1% level), whereas the interaction term of the variable (" $[\text{Log}(\text{REMIT})] * [\text{Log}(\text{EXPMAN})]$ ") is positive and significant at the 1%. The combination of these two results indicates that the total effect of remittances on wages becomes positive beyond a threshold of values of manufacturing exports, as below this threshold, this effect becomes negative. This threshold amounts to $\text{US\$ } 68432.5 = [\text{exponential}(0.275/0.0247)]$. To recall, values of remittances range between $\text{US\$ } 2478.4$ and $\text{US\$ billion } 3.37$, and this threshold of values of manufacturing exports (i.e., $\text{US\$ } 68432.5$) falls within this interval. We subsequently conclude that below $\text{US\$ } 68432.5$ of value of manufacturing exports, remittances exert a negative effect on wages, while above this threshold, remittances influence positively wages. Overall, the effect of remittances on wages increases as income from manufacturing exports rises. In particular, above income of manufacturing exports amounting to $\text{US\$ } 68432.5$, the magnitude of the positive effect on wages increases as the value of manufacturing exports rises. Figure 5 provides at the 95 per cent confidence intervals, the evolution of the marginal impact of remittances on wages for varying amounts of manufacturing exports. Figure 5 indicates that the marginal impact of remittances on wages increases as the value of manufacturing exports rises. However, this marginal impact is statistically significant only for values of manufacturing exports higher than $\text{US\$ } 97469 [= \text{exponential}(11.48729)]$. Thus, for manufacturing exports higher than $\text{US\$ } 97469$, remittances influence positively and significantly wages, and the greater the amount of manufacturing exports, the higher the magnitude of the positive effect of remittances on wages.

Results in column [2] of Table 4 show a positive and significant coefficient of " NAT ", but a negative and significant of the coefficient of the interaction variable (" $\text{NAT} * \text{EXPMAN}$ "), both at the 1% level. These two results tend to suggest that, on average over the full sample, the effect of development aid on wages is positive for lower values of manufacturing exports, but becomes negative for higher values of manufacturing exports. Figure 6 provides at the 95 per cent confidence intervals, the development of the marginal impact of development aid on wages for varying amounts of manufacturing exports. We observe that the marginal impact of development aid on wages is almost always positive and significant, but decreases as the incomes from manufacturing exports rise. This signifies that development aid exerts a higher positive effect on wages in countries that experience a lower manufacturing export income. In other words, while we have found previously that real exchange rate appreciation reduces the magnitude of the

positive effect of development aid on wages, it appears that development is substitutable with manufacturing exports in positively influencing wages in recipient-countries. The finding concerning the effect of development aid on wages through real exchange rate seems to contradict to some extent the effect of this capital flow on wages through the manufacturing exports. This may reflect the fact – as outlined in section 2 - other factors than the real exchange rate could play a role in influencing the effect of development aid on wages, including through the manufacturing exports.

5. Conclusion

Using a panel dataset of 95 countries over the period 1963-2016, the current article has examined the effect of development aid and remittances inflows that accrue to recipient-countries on the manufacturing sector wages in these countries. The empirical analysis shows for the full sample that while remittances inflows affect positively wages in the manufacturing sector, development aid flows result in lower wages in the manufacturing sector in recipient-countries. The positive effect of remittances inflows on wages appears to be similar in LDCs and NonLDCs alike. However, development aid influences positively wages in the manufacturing sector in LDCs, but negatively wages in the manufacturing sector in NonLDCs. Furthermore, and interestingly, the effect of development aid on wages in the manufacturing sector depends on the level of appreciation of the real effective exchange rate in the recipient-countries. Specifically, the appreciation of the real exchange rate erodes the eventual positive effect of both development aid and remittances inflows on wages, so that this effect becomes negative for higher levels of real effective exchange rate appreciation. Thus, the effect of remittances inflows on wages increases as countries enjoy higher values of manufacturing exports. In contrast, while development aid almost always exerts a positive effect on wages for different amounts of manufacturing exports, the magnitude of this positive effect decreases as countries experience a higher amount of manufacturing exports. The latter finding shows that development aid tends to substitute with manufacturing exports in positively affecting wages, as the manufacturing sector improves its performance, i.e., as the incomes from manufacturing exports rise.

From a policy perspective, this analysis shows that both development aid and remittances inflows affect manufacturing sector wages in recipient economies. It highlights the important role of development aid and remittances inflows in positively affecting wages in the manufacturing sector, when countries manage in an appropriate way their real exchange rate. As for the effect of these two capital inflows on wages through the manufacturing exports, the evidence is clear for remittances inflows, but development aid appears to be substitutable with manufacturing exports in positively influencing real wages in the manufacturing sector.

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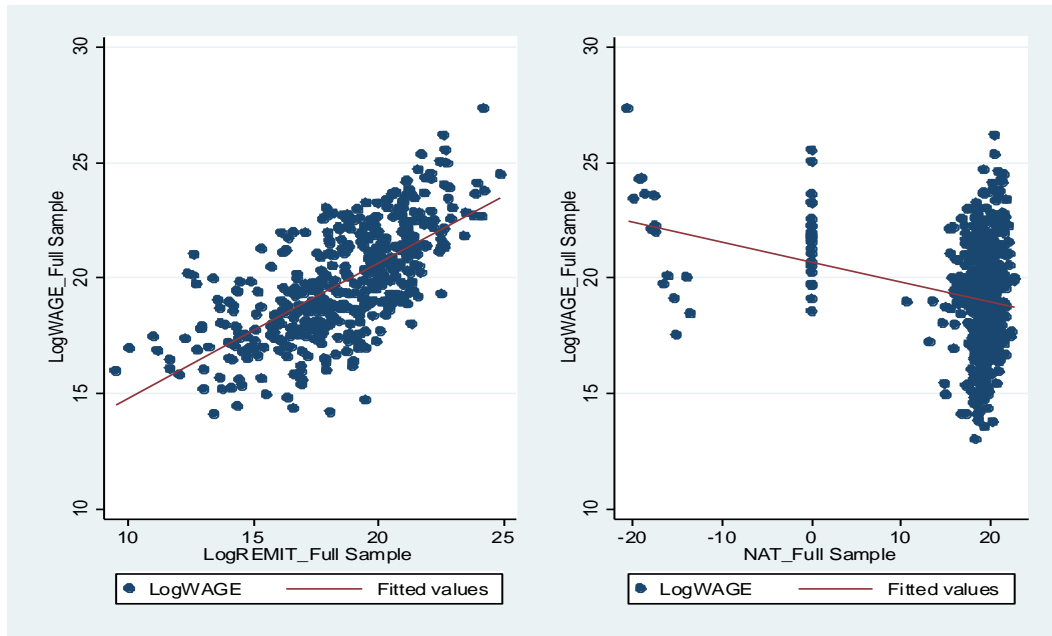
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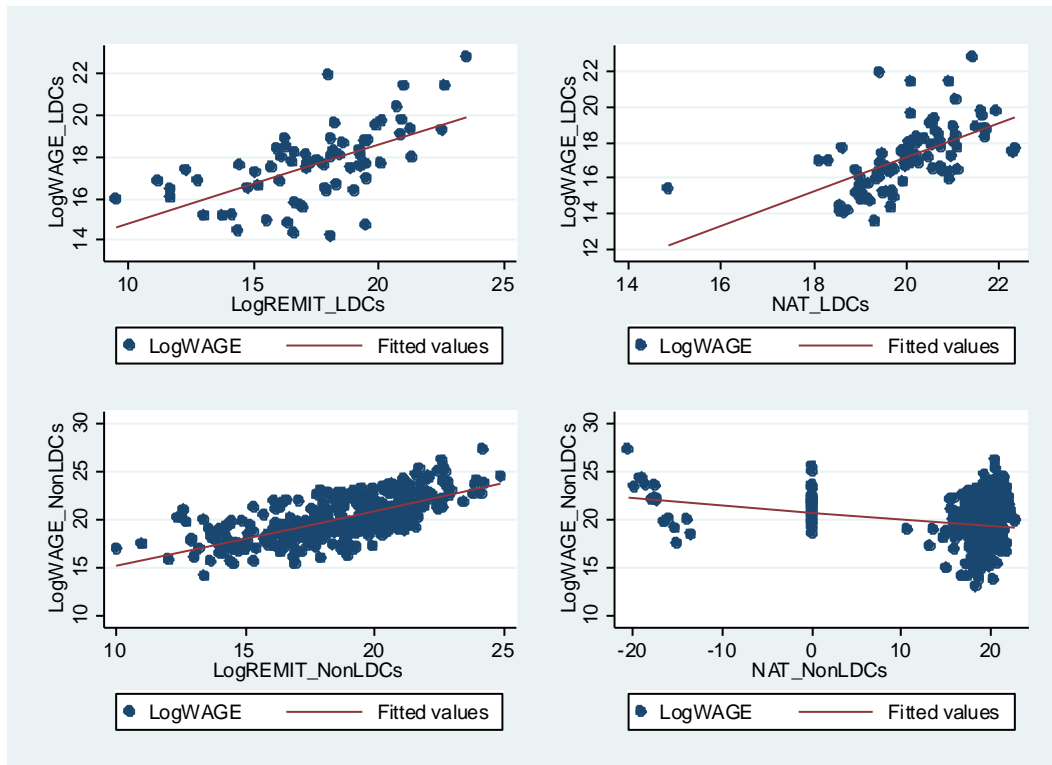
FIGURES

Figure 1: Correlation pattern between remittances inflows, development aid inflows and real wages



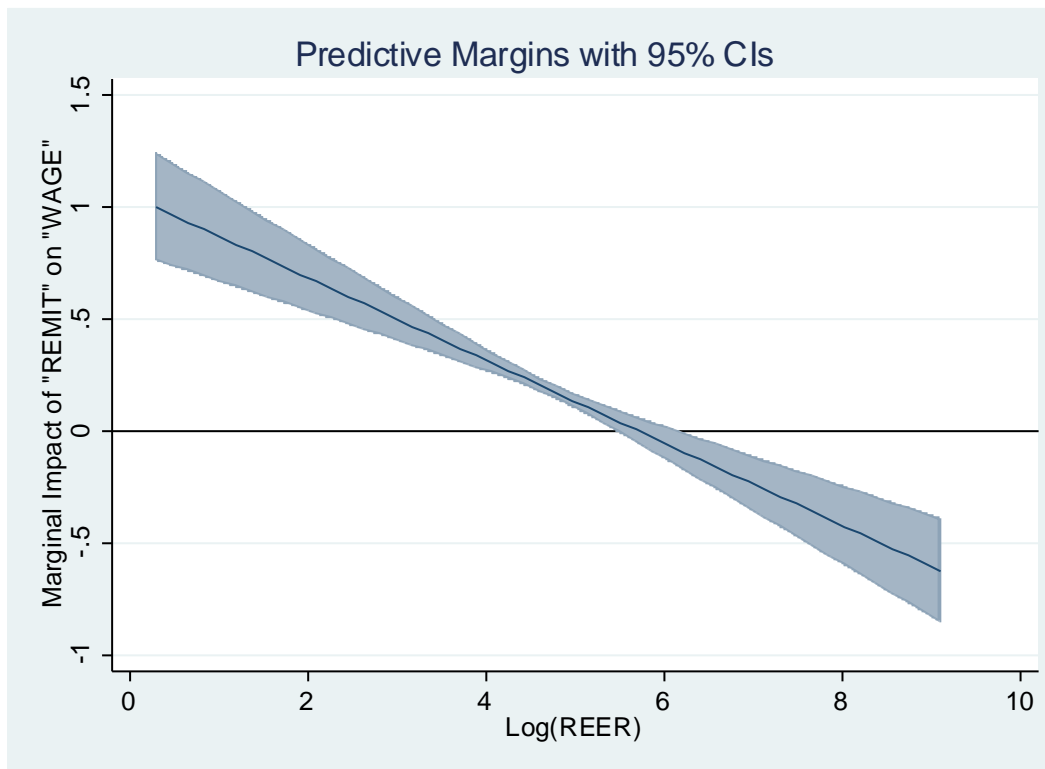
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Figure 2: Correlation pattern between remittances inflows, development aid inflows and real wages_Over LDCs and NonLDCs



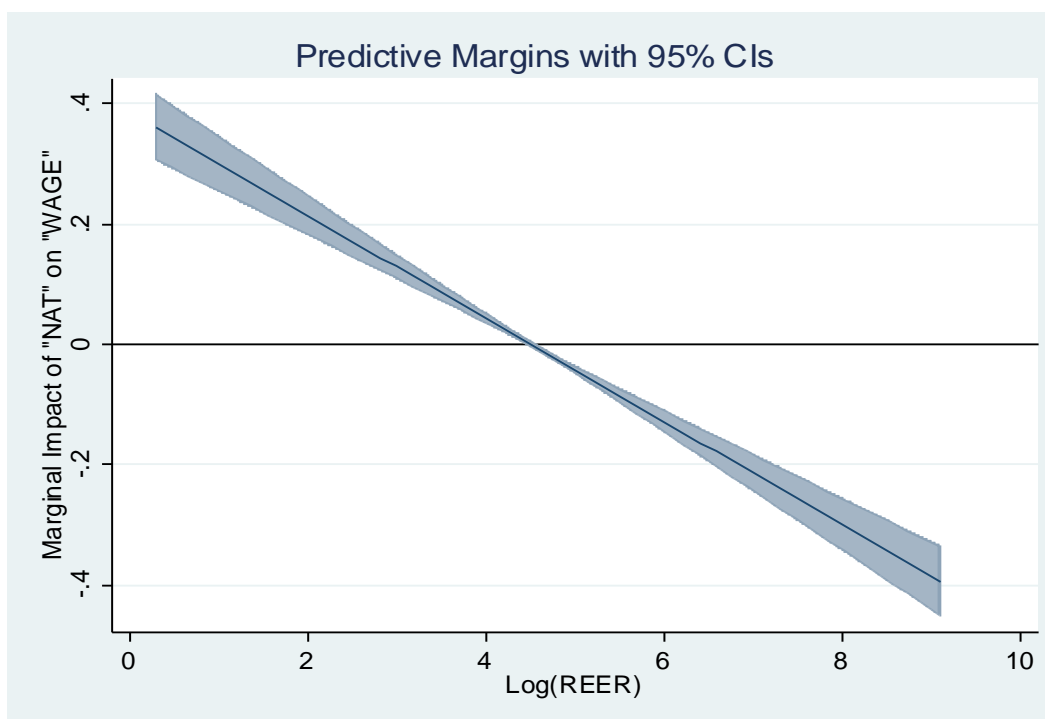
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Figure 3: Marginal Impact of "REMIT" on "WAGE", for varying levels of the real effective exchange rate



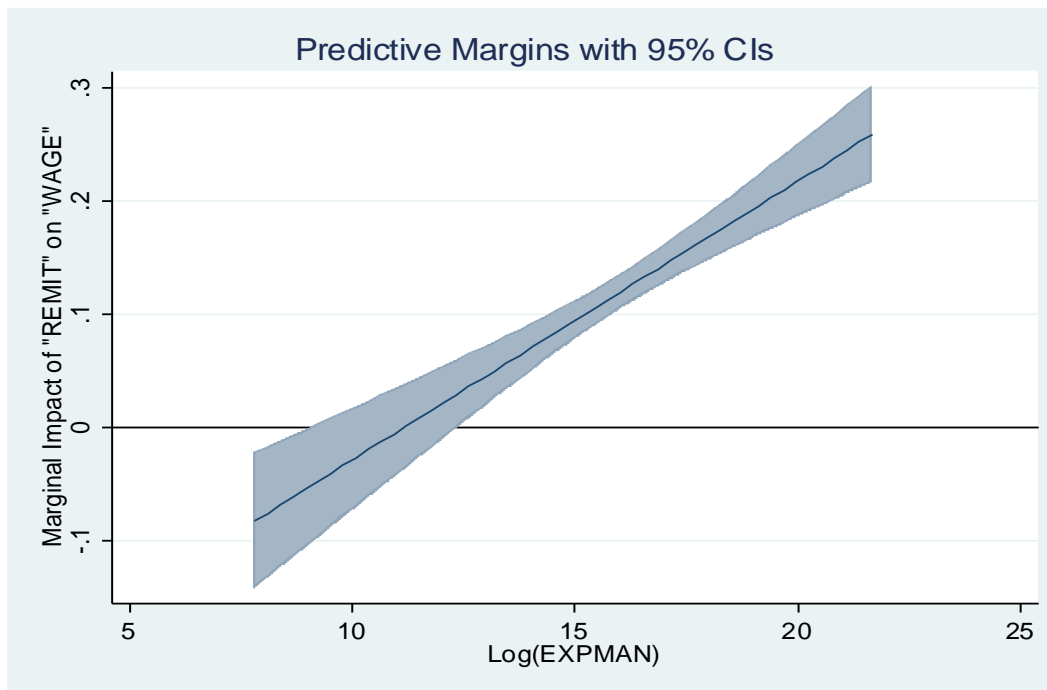
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Figure 4: Marginal Impact of "NAT" on "WAGE", for varying levels of the real effective exchange rate



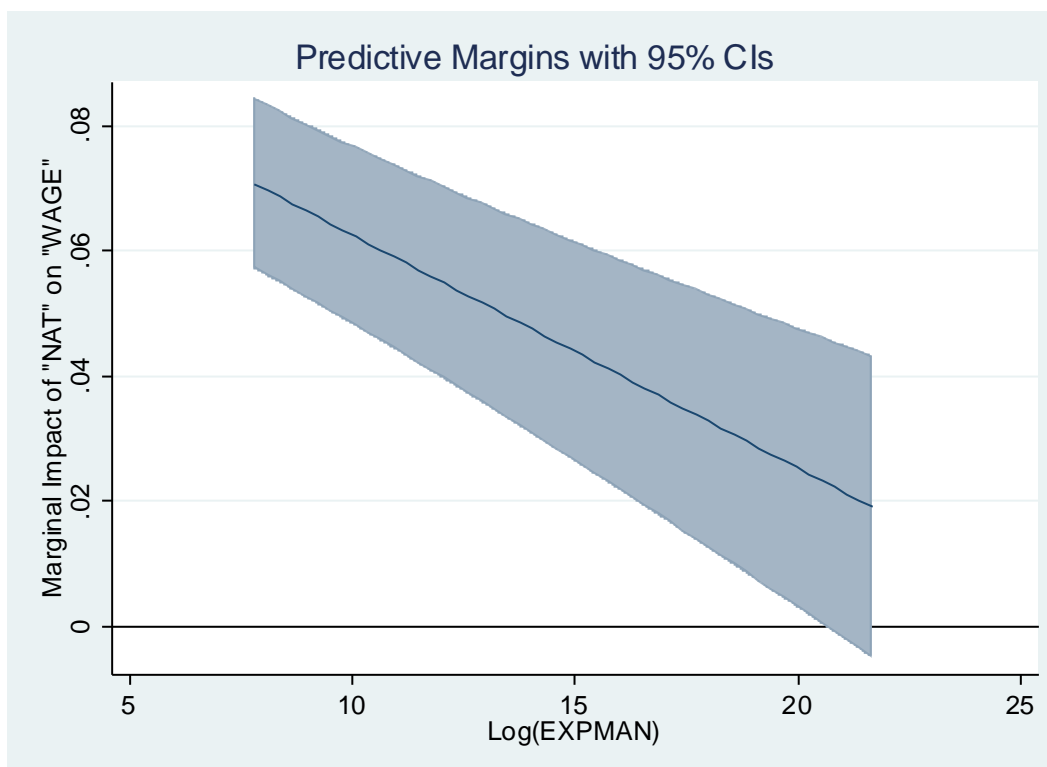
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Figure 5: Marginal Impact of "REMIT" on "WAGE", for varying amounts of manufactured exports



Source: Author

Figure 6: Marginal Impact of "NAT" on "WAGE", for varying amounts of manufactured exports



Source: Author

TABLES and APPENDICES

Table 1: Impact of remittances inflows and development aid inflows on wages in the manufactured sector

Estimators: POLS, FE, RE and FGLS

	POLS	FE	RE	FGLS (with panel-specific first order Autocorrelation)
Variables	Log(WAGE)	Log(WAGE)	Log(WAGE)	Log(WAGE)
	(1)	(2)	(3)	(4)
Log(REMIT)	0.409*** (0.0543)	0.226*** (0.0224)	0.199*** (0.0471)	0.331*** (0.0132)
NAT	-0.0232*** (0.00639)	0.000520 (0.00216)	-0.00150 (0.00510)	-0.00681*** (0.00252)
Log(GDPC)	0.521*** (0.0622)	1.090*** (0.0702)	0.737*** (0.157)	0.559*** (0.0238)
OPEN	-0.0164*** (0.00368)	-0.00411** (0.00196)	-0.00807*** (0.00232)	-0.0176*** (0.000661)
EDU	0.00592*** (0.00219)	0.0113*** (0.00229)	0.00655*** (0.00231)	0.00470*** (0.000557)
SHPOP1564	0.0580*** (0.0176)	0.0235 (0.0162)	0.0291 (0.0227)	0.0614*** (0.00521)
Constant	5.034*** (1.094)	3.617*** (0.645)	6.247*** (1.166)	4.753*** (0.315)
Observations/Countries	362/95	362/95	362/95	355/88
R-squared	0.679			
Within R ²			0.7912	
Between R ²			0.6190	
Overall R ²			0.6015	
Pseudo R ²				0.8256

Note: Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. The Pseudo R² has been calculated for the regression based on the FGLS estimator, as the correlation coefficient between the dependent variable and its predicted values. For the random effects-based regression, standard errors have been clustered. Time dummies have been included in the RE-based and FGLS-based regressions.

Table 2: Impact of remittances inflows and development aid inflows on wages in the manufactured sector in LDCs versus NonLDCs

Estimator. Two-step System GMM

Variables	Log(WAGE)	Log(WAGE)	Log(WAGE)
	(1)	(2)	(3)
Log(WAGE) _{t-1}	0.734***	0.732***	0.702***
	(0.0233)	(0.0176)	(0.0217)
Log(REMIT)	0.109***	0.132***	0.110***
	(0.0171)	(0.0187)	(0.0130)
NAT	-0.0305***	-0.0226***	-0.0296***
	(0.00374)	(0.00253)	(0.00347)
[Log(REMIT)]*LDC		-0.00692	
		(0.0384)	
NAT*LDC			0.161***
			(0.0379)
LDC		0.504	-3.243***
		(0.692)	(0.778)
Log(GDPC)	0.203***	0.250***	0.312***
	(0.0691)	(0.0576)	(0.0473)
OPEN	-0.00476***	-0.00510***	-0.00455***
	(0.000927)	(0.000816)	(0.000734)
EDU	-0.00181*	0.00216**	-0.000833
	(0.00105)	(0.00109)	(0.000890)
SHPOP1564	0.0290***	0.0253***	0.0171**
	(0.00903)	(0.00807)	(0.00760)
Constant	1.603**	0.475	1.627**
	(0.671)	(0.593)	(0.762)
Observations/Countries	329/95	329/95	329/95
Number of Instruments	63	75	77
AR1 (P-Value)	0.0009	0.0005	0.0009
AR2 (P-Value)	0.7903	0.8280	0.8112
AR3 (P-Value)	0.8399	0.6710	0.9569
Sargan (P-Value)	0.2422	0.2537	0.3514

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step system GMM estimations, the variables "REMIT", "NAT" and the interaction variables have been considered as endogenous. Time dummies have been included in the regressions. The regressions have used 3 lags of the dependent variable as instruments and 2 lags of endogenous variables as instruments.

Table 3: Impact of remittances inflows and development aid inflows on wages in the manufactured sector for varying levels of real effective exchange rate

Estimator. Two-step System GMM

Variables	Log(WAGE)	Log(WAGE)
	(1)	(2)
Log(WAGE) _{t-1}	0.701***	0.742***
	(0.0199)	(0.0155)
Log(REMIT)	1.056***	0.152***
	(0.132)	(0.0124)
NAT	-0.0183***	0.386***
	(0.00238)	(0.0305)
[Log(REMIT)]*[Log(REER)]	-0.185***	
	(0.0274)	
NAT*Log(REER)		-0.0857***
		(0.00661)
Log(REER)	4.143***	2.535***
	(0.496)	(0.135)
OPEN	-0.00171**	-0.00105**
	(0.000738)	(0.000508)
EDU	-0.00185**	0.00405***
	(0.000764)	(0.000665)
Log(GDPC)	0.267***	0.161***
	(0.0516)	(0.0317)
SHPOP1564	0.0473***	0.0220***
	(0.00780)	(0.00690)
Constant	-21.17***	-12.56***
	(2.412)	(0.662)
Observations/Countries	322/92	322/92
Number of Instruments	76	78
AR1 (P-Value)	0.0069	0.0062
AR2 (P-Value)	0.2740	0.4872
AR3 (P-Value)	0.8797	0.2908
Sargan (P-Value)	0.5714	0.2123

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step system GMM estimations, the variables "REMIT", "NAT", "REER" and the interaction variables have been considered as endogenous. Time dummies have been included in the regressions. The regressions have used 3 lags of the dependent variable as instruments and 2 lags of endogenous variables as instruments.

Table 4: Impact of remittances inflows and development aid inflows on wages in the manufactured sector for varying values of manufacturing exports

Estimator. Two-step System GMM

Variables	Log(WAGE)	Log(WAGE)
	(1)	(2)
Log(WAGE) _{t-1}	0.534***	0.592***
	(0.0114)	(0.00850)
Log(REMIT)	-0.275***	0.0998***
	(0.0582)	(0.00815)
NAT	-0.0218***	0.0554***
	(0.00149)	(0.0123)
[Log(REMIT)]*[Log(EXPMAN)]	0.0247***	
	(0.00360)	
NAT*[Log(EXPMAN)]		-0.00373***
		(0.000671)
[Log(EXPMAN)]	-0.248***	0.353***
	(0.0741)	(0.0162)
OPEN	-0.00521***	-0.00356***
	(0.000587)	(0.000411)
EDU	0.00107**	-0.00108**
	(0.000463)	(0.000476)
Log(GDPC)	0.186***	0.0983***
	(0.0359)	(0.0376)
SHPOP1564	0.0289***	0.0259***
	(0.00649)	(0.00571)
Constant	8.246***	-0.803*
	(1.048)	(0.488)
Observations/Countries	317/95	317/95
Number of Instruments	84	86
AR1 (P-Value)	0.0034	0.0020
AR2 (P-Value)	0.7719	0.7250
AR3 (P-Value)	0.9906	0.7589
Sargan (P-Value)	0.2989	0.4097

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step system GMM estimations, the variables "REMIT", "NAT", "EXPMAN" and the interaction variables have been considered as endogenous. Time dummies have been included in the regressions. The regressions have used 3 lags of the dependent variable as instruments and 2 lags of endogenous variables as instruments.

Appendix 1: Definition and Source of variables

Variables	Definition	Source
WAGE	This is the measure of the total real annual wages and salaries in the manufacturing sector for a given country. It has been calculated as the ratio of wages and salaries values (current, US dollars) of a given country to the GDP deflator of this country.	Author's calculation using the wages and salaries values (current, US dollars) and GDP deflator data (Constant 2010 US\$) (computed as the ratio of the GDP Current, US dollars divided by the GDP Constant 2010 US\$). Data on GDP has been collected from the Word Development Indicators (WDI) of the World Bank. Data on wages and salaries has been computed from the database of the United Nations Industrial Development Organization (UNIDO).
REMIT	This variable represents the real values of remittances inflows (constant 2010 US\$) (i.e., the amounts of remittances received in the migrants' home countries). It has been calculated as the ratio of the personal remittances (current US\$) received by a given country to the GDP deflator of this country.	Author's calculation using data from the WDI
NAT	This is the transformed measure of the Net Aid Transfers (NATCST), in Constant 2015 US\$ prices. This is the net Official Development Assistance (ODA), from which are subtracted principal payments are received on ODA loans, interest received on such loans and debt relief. In fact, as the variable "NATCST" contains negative values, it has been transformed using the following formula (see Yeyati et al. 2007): $NAT = sign(NATCST) * \log(1 + NATCST)$ (2), where $ NATCST $ refers to the absolute value of the variable "NATCST".	NAT data (in current prices) are extracted from the database compiled by David Roodman (see online: http://davidroodman.com/data/)
REER	This is the index measuring the Real Effective Exchange Rate. The REER is computed using a nominal effective exchange rate based on 66 trading partners. An increase in the REER index indicates an appreciation of the real effective exchange rate, i.e., an appreciation of the home currency against the basket of currencies of trading partners.	Bruegel Datasets (see Darvas (2012a, 2012b)). The dataset could be found online at: http://bruegel.org/publications/datasets/real-effective-exchange-rates-for-178-countries-a-new-database/

EXPMAN	<p>This the real values of manufactured exports (constant 2010 US\$).</p> <p>This variable has been computed as the ratio of manufactured exports (current US\$) to deflated by the United States Consumer Price Index for all urban consumers (converted in constant 2010 prices).</p>	<p>The variable measuring the total manufactured exports (in current prices US dollar) is obtained from the UNIDO database, while the United States Consumer Price Index for All Urban Consumers is obtained from https://fred.stlouisfed.org</p> <p>It is worth noting that the Author has converted the United States consumer price index for all urban consumers into constant 2010 prices.</p>
GDPC	GDP per capita (constant 2010 US\$)	WDI
OPEN	This is the measure of trade openness (de facto trade openness). It is calculated as the sum of exports and imports, in % GDP	WDI
EDU	This is the average of the gross primary school enrollment (%), gross secondary school enrollment (%), and gross tertiary school enrollment (%).	WDI
SHPOP1564	Share (%) of the population ageing 15-64 (% of total population)	WDI

Appendix 2: Standard Descriptive statistics on the variables used in the analysis

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
WAGE	573	4.53e+09	3.37e+10	451778.3	7.41e+11
REMIT	539	1.33e+09	4.54e+09	13228.09	6.42e+10
NAT	743	4.74e+08	7.36e+08	-9.22e+08	7.32e+09
EXPMAN	681	4.13e+07	1.73e+08	2478.377	3.37e+09
REER	733	145.590	409.013	1.356	10791.110
OPEN	716	71.131	43.658	0.211	413.689
EDU	627	172.183	62.074	13.694	299.844
GDPC	727	5573.285	8033.586	153.704	68939.040
SHPOP1564	855	58.786	6.944	46.985	85.342

Appendix 3: List of countries in the full sample and sub-sample of LDCs

Full Sample			LDCs
Afghanistan	Estonia	Nepal	Afghanistan
Albania	Ethiopia	Nicaragua	Bangladesh
Algeria	Fiji	Niger	Benin
Argentina	Gabon	Nigeria	Burkina Faso
Azerbaijan	Georgia	Oman	Burundi
Bangladesh	Ghana	Pakistan	Cambodia
Barbados	Guatemala	Panama	Central African Republic
Benin	Honduras	Papua New Guinea	Eritrea
Botswana	Hungary	Paraguay	Ethiopia
Brazil	India	Peru	Lesotho
Bulgaria	Indonesia	Philippines	Madagascar
Burkina Faso	Iran (Islamic Republic of)	Poland	Malawi
Burundi	Israel	Qatar	Mozambique
Cambodia	Jamaica	Republic of Korea	Myanmar
Cameroon	Jordan	Republic of Moldova	Nepal
Central African Republic	Kazakhstan	Romania	Niger
Chile	Kenya	Russian Federation	Senegal
China	Kuwait	Saudi Arabia	Uganda
China, Hong Kong SAR	Kyrgyzstan	Senegal	United Republic of Tanzania
China, Macao SAR	Latvia	Slovakia	
Colombia	Lesotho	Slovenia	
Congo	Lithuania	South Africa	
Costa Rica	Madagascar	Sri Lanka	
Côte d'Ivoire	Malawi	Tajikistan	
Croatia	Malaysia	The f. Yugosl. Rep of Macedonia	
Cyprus	Malta	Tunisia	
Czechoslovakia	Mauritius	Turkey	
Dominican Republic	Mexico	Uganda	
Ecuador	Mongolia	United Republic of Tanzania	
Egypt	Morocco	Uruguay	
El Salvador	Mozambique	Venezuela (Bolivarian Republic of)	
Eritrea	Myanmar		