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Duration of WTO Membership and Investment-Oriented Remittances Flows

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Abstract

This article examines the effect of the duration of the membership in the World Trade Organization (WTO) on investment-oriented remittances inflows (i.e., the portion of total remittances invested by remittance-receiving households in business activities). The analysis covers 120 countries over the period 1996-2019, and employs the two-step system generalized methods of moments estimator. It provides support for the hypothesis that by improving the stability and predictability of the business environment (i.e., by reducing tariffs volatility, trade uncertainty and economic uncertainty) would provide strong incentives to remittance-receiving households to invest a fraction of their total remittances in business activities. This positive effect of the membership duration on investment-oriented remittances inflows appears to strong for less developed countries. Additionally, longstanding WTO Members enjoy higher investment-oriented remittances inflows when they have large populations (a proxy for larger amounts of total remittances inflows), and experience high trade volumes, and a higher economic growth performance. These findings complement previous works that highlighted the relevance of the WTO in promoting the development of the private sector in its member states (including developing members and the poorest among them).

Keywords: Duration of WTO membership; Investment-oriented remittances inflows; Tariffs volatility; Trade uncertainty; Economic uncertainty; Developing countries.

JEL Classification: D31; E22; O11; O16.

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This is a working paper, which represents the personal opinions of individual staff members and is not meant to represent the position or opinions of the WTO or its Members, nor the official position of any staff members. Any errors or omissions are the fault of the author.

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1. Introduction

The literature has now established that migrants' remittances inflows can play a critical role in the sustainable development process of developing countries². Remittances represent the largest capital flows to developing countries, when compared to foreign direct investment (FDI) inflows and development aid (i.e., official development assistance - ODA) inflows (World Bank and KNOMAD, 2019). For example, in 2021, remittance flows to low-and middle-income countries (LMICs) - excluding China - were expected to outweigh the sum of FDI and ODA inflows: remittances inflows are more than threefold above ODA levels and more than 50 percent higher than FDI (World Bank and KNOMAD, 2021: p11).

A strand of the literature has pointed out the investment motive of remittances inflows (e.g., Bettin et al., 2017; Cooray and Mallick, 2013; Giuliano and Ruiz-Arranz, 2009; Lueth and Ruiz-Arranz, 2008). Other studies have shown that remittances inflows contribute significantly to the expansion of existing businesses and the set-up of new ventures in the origin country of migrants³. Recent works have established that the 'investment-oriented remittances inflows' (i.e., the fraction of total remittances inflows used to finance the expansion of existing businesses or the creation of new ventures in the migrants' country of origin) fosters economic growth⁴ (e.g., Le and Bodman, 2011; Martinez et al., 2015) and enhances economic complexity, i.e., the production and export of more complex (sophisticated) products (Saadi, 2020). In light of the importance of investment-oriented remittances inflows for the development of the private sector, one may question how further encourage households to divert away a non-negligible portion of the remittances inflows from the default use of financing consumption towards investment in small businesses/entrepreneurship.

While the majority of existing studies (including among the afore-mentioned ones) have documented the usefulness of remittances for promoting the development of entrepreneurship and businesses in the recipient countries, less attention has been paid to the determinants (including the macroeconomic determinants) of the investment-oriented remittances inflows,

² See for example, Bahadir et al. (2018); Bettin et al. (2017); Buckley and Hofmann (2012); Chami et al. (2012); Ebeke and Combes (2013); European Parliament (2014); Giuliano and Ruiz-Arranz (2009); Le, 2011; Le and Bodman (2011); Piteli et al. (2019) and Saadi (2020).

³ These studies include for example, Amuedo-Dorantes and Pozo (2006); Buckley and Hofmann (2012); Le, 2011; Le and Bodman (2011); Martinez et al. (2015); Riddle et al., 2013; Saadi (2020); Shapiro and Mandelman (2016); Vaaler, (2011, 2013); Woodruff and Zenteno (2007); Yang (2008, 2011); Zheng and Musteen (2018).

⁴ However, Shapiro and Mandelman (2016) have demonstrated theoretically and empirically (using Mexican data) that utilizing remittances to finance the start-up costs microenterprises helps yet to improve households' income during economic downturns, but it also results in a fall in salaried labour supply. In turn, the latter generates offsetting upward pressure on wages during recessions and adversely affects the recovery of the economy.

although many studies have been performed on the determinants of entrepreneurship⁵. Building on the literature on the determinants of domestic private investments (e.g., Farla et al., 2016; Herzer and Grimm, 2012; Jongwanich and Kohpaiboon, 2008; Morrissey and Udomkerdmongkol, 2012; Nowak-Lehmann and Gross, 2021; Su et al., 2021), the present article is, to the best of our knowledge, one of the rare studies that investigate the determinants of investment-oriented remittances inflows, and in particular the role of the World Trade Organization (WTO) in this regard.

A wealth of studies has documented the benefits of the membership in the WTO and the strong positive impact of such membership on member-states' trade performance⁶ (e.g., Koopman et al., 2020), and economic growth (e.g., Brotto et al., 2021; Tang and Wei, 2009). One of these benefits is the stability and predictability of the trading environment - one of the founding principles of the WTO - that constrain WTO Member states' ability of raising arbitrarily trade barriers. The stability and predictability of the trading environment is achieved thanks to the most favoured nations (MFN) rule, which guarantees market access to all WTO Members, as well as through WTO Members' commitments to reducing and binding tariff rates on imported products and to enhancing transparency⁷ in trade policy. Aaronson and Abouharb (2014) have shown that the compliance with the transparency rule has helped both longstanding Members and new Members to improve governance. According to Drabek and Bacchetta (2004), WTO membership promotes good governance and the implementation of better economic policies. Basu et al. (2008) have found that the WTO membership helps to improve existing trade-related institutions, or to establish new ones. Hence, by enhancing the stability and the predictability of the business environment, WTO membership could stimulate domestic private investments.

In the present analysis, we argue that not only would the WTO membership benefit to member-states' business environment, but the duration of such membership would matter more for the business environment, and hence the behaviour of private agents in terms of domestic investments. In particular, we submit that as WTO Members spend more time as Member of the

⁵ Recent works on the determinants of entrepreneurship include for example, Afawubo and Noglo (2022); Audretsch et al. (2022); Dutta and Meierrieks (2021); Karaivanov and Yindok (2022); Munemo (2022); Nguyen et al. (2021); Roman et al. (2018) and Thai and Turkina (2014).

⁶ Koopman et al. (2020) have provided a recent literature on the various benefits of the WTO membership, and the literature review by Soukar (2019) has mainly focused on the trade impact of WTO membership.

⁷ The principle of transparency in trade measures requires that WTO Members disclose their trade regulations and policies by making publicly available notifications of all laws and regulations affecting trade. This enables governments and traders to keep up to date in a rapidly evolving trade landscape and provides much-needed clarity (see the WTO information note contained in document accessible online at: https://www.wto.org/english/tratop_e/covid19_e/transparency_report_e.pdf)

WTO, their trade policies (and more generally economic policies) are likely to improve over time (as they have to comply with WTO rules and meet their commitments at the WTO). Hence, the increase in the duration of membership can be considered as a way for a given member state to experience a continued improvement in its trade policies as well as in its trade-related institutions. In terms of trade policies, the WTO membership duration could reflect the cumulative (over time) of improvement in Member's trade policies and trade-related institutions. In turn, the latter would make the domestic business environment more stable and predictable for investors and foster domestic private investments. As a consequence, households would be incentivized to shift their remittances away from financing consumption towards venture investment.

The focus of the present study on the duration of WTO membership (rather than merely on the membership in WTO - which from an empirical perspective entails using a dummy variable to capture this membership) - allows accounting for both the membership in the WTO and the time spent by a member-state as a Member in the WTO. We expect that longstanding WTO members would experience a higher positive effect of the membership duration on investment-oriented remittances than relatively new Members.

From an empirical perspective, we test the hypothesis of the positive effect of the duration of WTO membership on investment-oriented remittances flows through the stability and predictability channels, by considering three factors of stability and predictability of the business environment: tariff volatility, trade uncertainty and economic uncertainty.

We also test whether the effect of the WTO membership duration on investment-oriented remittances inflows depends on trade performance, and economic growth rate performance. This is on the one hand, the WTO membership contributes to significantly expanding international trade (which is the ultimate objective of the WTO) and to promoting economic growth in its members states. On the other hand, trade policy volatility, trade uncertainty and economic uncertainty exert a negative impact on trade performance and economic growth.

Finally, we check whether the amounts of development aid that accrue to developing countries matter for the effect of the membership duration on investment-oriented remittances. We address this question because of the critical role of development aid in promoting entrepreneurship (e.g., Boudreaux et al., 2021; Jia, 2018) and strengthening productive capacities (e.g., Gnangnon, 2021) in beneficiary countries, which could potentially provide incentives for households to redirect a fraction of their received remittances from consumption and investment in human capital to investment in business activities, including the creation of new ventures.

The empirical exercise has been performed using an unbalanced panel dataset of 120 countries over the period 1996-2019. It has conveyed several messages. First, the duration of WTO

membership exerts a positive effect on investment-oriented remittances in countries that experience low levels of tariff volatility and, trade and economic uncertainties. Second, longstanding WTO Members with larger populations experience higher investment-oriented remittances inflows than relatively new WTO Members. Third, the magnitude of the positive effect of the membership duration on investment-oriented remittances inflows rises as Members improve their trade performance (notably in terms of export and import volumes), and enjoy a higher economic growth rate. Third and finally, we have uncovered that the higher the amounts of development aid received by a WTO Member, the greater is the magnitude of the positive effect of the duration of its membership on investment-oriented remittances flows.

The rest of the paper is structured around six sections. Section 2 presents the theoretical background for the analysis of the effect of the WTO membership duration on the investment-oriented remittances flows. Section 3 presents an analysis of data concerning the variables of key interest in the paper. Section 4 describes the model specification used to perform the empirical analysis, and discusses the appropriate econometric approach to conduct the empirical exercise. Section 5 interprets empirical results, and Section 6 deepens the analysis. Section 7 concludes.

2. Theoretical motivation

The main theoretical argument developed in this paper is that the duration of the membership in the WTO would influence investment-oriented remittances inflows through its positive effect on the business environment, i.e., via the enhancement of the stability and predictability of trade policy. We first provide the theoretical and empirical literature review on how the WTO membership could affect the stability and predictability of the trading environment. We, then, build on this literature review to lay out the theoretical hypotheses concerning the effect of the duration of WTO membership on the portion of the total remittances inflows invested in domestic business activities.

2.1. On the benefits of the stability and predictability principle of the WTO

According for example to Abel (1983), economic uncertainty can refer to unexpected changes that affect the economic ecosystem, and how changes in fiscal or monetary policies or any other government policies affect corporations. Bloom (2014) has argued that fluctuations in uncertainty often contribute to slowing hiring and investment because of the reluctance of companies to make essential or costly decisions in unpredictable regulatory environments. Uncertainty shocks limit the investments associated with firm's international expansion, i.e., the

investments needed for their participation in international trade (e.g., Handley and Limão, 2017; Novy and Taylor, 2020). Tajaddini and Gholipour (2021) have documented empirically that higher degrees of economic uncertainty have detrimental effects of the new business formation.

Policy uncertainty (which contributes to the overall economic uncertainty) can be considered as the economic risk associated with undefined future government policies and regulatory frameworks. By introducing market uncertainty, the economic risk delays (or even leads to a postponement of) spending and investments decisions by both individuals and businesses (e.g., Al-Thaqeb and Algharabali, 2016; Baker et al. 2016; Hassler, 1996) as they experience respectively lower personal income and corporate profitability (e.g., Giglio et al., 2016). Baker et al. (2016) have shown, *inter alia*, that economic policy uncertainty discourages firms' investment in policy-sensitive sectors like defence, health care, finance, and infrastructure construction. According to Ahir et al. (2019a), developing countries experience a significantly higher level of uncertainty and less synchronised uncertainty spikes than advanced economies. Higher economic uncertainty is positively associated with economic policy uncertainty and stock market volatility, and negatively with economic growth.

Trade policy uncertainty (as part of economic policy uncertainty) is a major trade barrier that negatively affects firms' export decisions (e.g., Crowley et al., 2018; Handley and Limão, 2015; 2017; Matteo et al. 2020; Osnago et al., 2015; Pierce and Schott, 2016; Wang et al., 2021). For example, Ebeke and Siminitz (2018) have obtained that the investment-to-GDP ratio falls substantially for further to an increase in the level of trade uncertainty. Matteo et al. (2020) have provided that in the context of uncertainty about future demand, greater trade policy uncertainty discourages investment both at the aggregate and firm-levels, and induces precautionary increase in markups, as firms adopt a 'wait and see' attitude. Wang et al. (2021) have shown that greater trade policy uncertainty increases the operational risk and financial constraints faced by firms, and leads to lower risk-taking. China's accession to the WTO in 2001 has led to the reduction of trade policy uncertainty and encourages innovation (e.g., Liu and Ma, 2020). In addition, the reduction or elimination of trade policy uncertainty promotes innovation through risk-tolerance, financial, and information channels (William and Fengrong, 2022). It encourages firms' entry into new markets, the expansion of exports, and prices reduction, which improves consumers' welfare (e.g., Handley, 2014; Handley and Limão, 2015, 2017).

Trade policy volatility is associated with trade policy uncertainty, and deters domestic investments (e.g., Sudsawasd and Moore, 2006). For example, according to Caldara et al. (2020), news and increased uncertainty about higher future tariffs discourage investment and depress

economic activity. In the same vein, Chen et al. (2021) have shown that tariff uncertainty leads firms to delay irreversible investments, reduces imports and discourages innovation.

The economic theory has established that the desire to reduce trade policy uncertainty (as well as trade policy volatility) could be a motive for entering into a trade agreement. This is because commitment and credibility are critical in the trade policy area, and essential for inducing economic agents to make investments, particularly when these investments involve large irreversible costs (e.g., Handley, 2014). According to Rodrik (1991), even moderate amounts of policy uncertainty can act as a hefty tax on investment because a reform (e.g., trade policy reform) to stimulate investment may generate the opposite effects if there are doubts about the permanent nature of the reform. Maggi and Rodriguez-Clare (1998) have argued that the binding nature of trade policy commitments in an international agreement allows countries (in particular those with weak institutions) to borrow credibility. This is because through such an agreement, announcements of policy reform by governments can become more credible to the extent that domestic lobbies (that are against greater trade openness) would realize that the country could not renege on its commitments without incurring retaliation costs. Limão and Maggi (2015) have shown that trade agreements are particularly valuable for risk-averse governments in periods of uncertainty as they constrain governments' behaviour during such periods. This explains the widespread belief that entry into trade agreements increases the predictability of trade policy, and the World Trade Organization (WTO) - as the only international institution that negotiates and develop rules governing the cross-border movement of goods and services – and its multilateral trade agreements contribute to achieving this objective.

As founding principles of the WTO, the stability and predictability of trade policy are achieved through the commitment to reducing and binding tariff rates (and more generally, the binding of trade policy commitments), the commitment to limiting the utilization of non-tariff trade barriers, and the enhancement of transparency⁸ in trade policy (i.e., greater clarity in domestic trade policy). The main objective of the WTO (as well as of its predecessor, i.e., the GATT) is to liberalize and expand international trade. The rules underpinning trade liberalization are negotiated through rounds during which Members commit to reducing and binding tariff rates on imported products, and limiting the erection of non-tariff trade barriers (Chowdhury et al., 2021; Koopman et al., 2020; Mansfield and Reinhardt, 2008). As applied tariffs are implemented on the basis of the most favoured nations (MFN) rule, many benefits of the WTO rules accrue to both member and non-members countries alike (Koopman et al., 2020). Furthermore, a transparent trading system

⁸ Information on the founding principles of the trading system, including the WTO could be obtained online at: https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm

is achieved through the requirements that member countries disclose their trade regulations and notify changes to these regulations⁹ (e.g., Chowdhury et al., 2021). By laying out rules and procedures for settling trade disputes, the WTO helps not only to address trade problems faced by a complainant, but it also provides greater trade opportunities to other WTO Members by requiring that the respondent make its measures compliant with WTO rulings (e.g., Shin and Ahn, 2018; Koopman et al., 2020). This further contributes to enhancing the stability and predictability of the trading system.

Through these various channels, multilateral trade agreements could affect the governance and institutional quality, and contribute to improving the business environment in WTO member states. Aaronson and Abouharb (2014: p548) have postulated that the adherence of WTO Members to three WTO's norms of good governance is instrumental in improving governance quality. These norms are even-handedness (i.e., 'non-discrimination' in the WTO jargon), access to information (or 'transparency' in the WTO jargon), and the administrative due process (i.e., the ability of members to review, comment upon, and challenge trade-related policies) (see Abouharb, 2014: p548). The authors have found empirically that longstanding WTO members have enjoyed a good performance on metrics of 'due process' and 'access to information', but experienced weaker performance on metrics of 'evenhandedness'. In contrast, while new members performed well in terms of 'access to information', their performance in terms of 'evenhandedness' is weak, and there is no significant effect of their membership on the 'due process' value of the WTO. In the same vein, Drabek and Bacchetta (2004) have shown that WTO membership promotes good governance and the implementation of better economic policies. Similarly, under certain conditions, joining the WTO can help countries establish or improve trade-related institutions (Basu et al. 2008). However, Ferrantino (2010) has obtained no significant effect of WTO accessions on governance, and Choudhury (2019) has found no significant effect of WTO membership on domestic corruption.

Overall, multilateral trade agreements help achieve the stability and predictability of trade policy not only by tying member states' hands (i.e., by constraining the introduction of new protectionist trade policies), but also by enhancing transparency and reducing information frictions (e.g., Chowdhury et al., 2021; Mansfield and Reinhart, 2008), and by possibly improving trade-related institutions and the quality of governance.

⁹ The Trade Policy Review Mechanism (TPRM) in the WTO has the responsibility of making the trade regime more transparent, i.e., to achieve greater transparency in, and understanding of, the trade policies and practices of Members (e.g., Collins-Williams and Wolfe, 2010; Ghosh, 2010). Basic information on the TPRM's role concerning the WTO's transparency objective can be found online at: https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm11_e.htm

Many empirical works¹⁰ have provided strong support for the argument that the WTO genuinely contributes to ensuring greater stability and predictability of trade policy in its member states. For example, Mansfield and Reinhart (2008) have demonstrated empirically that the WTO regime significantly dampen export volatility, which results in higher export levels. Dreher and Voigt (2011) have reported a strong positive link between GATT/WTO membership and government credibility, measured by lower country risk ratings. This shows that membership in the GATT/WTO improves the credibility of nation-state governments. In examining the pro-competitive effects of trade, De Blas and Russ (2012) have demonstrated that multilateral trade agreements limit the volatility of import and export prices. Groppo and Piermartini (2014) have uncovered that member states' commitments at the WTO of not increasing tariffs above a certain level, have contributed to significantly reducing trade policy uncertainty. Handley (2014) has shown that WTO binding tariff commitments help to reduce trade policy uncertainty, and encourages firms' entry into export markets. Cao and Flach (2015) have established empirically that the GATT/WTO membership has helped to reduce the volatility of prices over time for both import and export countries, with the effect being particularly acute for WTO Members that entered into the WTO through rigorous accession procedures. Feng et al. (2017) have used firm-product level data on Chinese exports to the United States and the European Union in the years surrounding China's WTO accession, and shown that the reduction in trade policy uncertainty (thanks to the predictability and stability of WTO market access rules) has led to higher market entries of firms that produce higher quality products at lower prices, and the exits of firms that produce low-quality products at higher prices. According to Osnago et al. (2018), the predictable trading environment created by the WTO has generated a rise in the number of products traded and the trade volume respectively by between 10% and 30%. In a similar vein,

Vietnam's accession to WTO has been instrumental in reducing significantly uncertainty faced by exporting firms, and promoting investment, employment, and productivity (Nguyen and Piermartini, 2018). Jakubik and Piermartini (2019) have demonstrated that WTO commitments reduce the overall trade policy uncertainty because more stringent tariffs bindings reduce the likelihood of raising tariffs in response to import shocks, and increase the likelihood of using contingent measures. A counterfactual exercise performed by the authors has shown that in the absence of current binding commitments, WTO members would have arbitrarily increase tariffs by 4.5 times more. Chowdhury et al. (2021) have documented that in a predictable and integrated

¹⁰ One of the exceptions here was the work by Rose (2005) who has examined whether the hypothesis membership in the GATT/WTO has increased the stability and predictability of trade flows. He has obtained no significant dampening effect of the GATT/WTO on trade volatility.

system, WTO members experience lower trade volatilities. This is exemplified by the positive comovement of trade volatilities across trading pairs, that appears to be more pronounced among WTO members than between WTO and non-WTO members. This contributes to stabilizing global trade.

2.2. Discussion on the effect of the duration of WTO membership on investment-oriented remittances flows

In light of this theoretical and empirical literature review provided above, we argue that the duration of a country's membership in the WTO would matter for investment-oriented remittances flows (that are ultimately private investments). This is because from the theoretical perspective, even though many benefits of the rules-based system underpinning the WTO accrue to both WTO Members and non-WTO Members (Koopman et al., 2020), the former are much more constrained in their trade policy design (in particular in erecting arbitrarily protectionist trade policies) than the latter. Thus, as well emphasized above, WTO Members are likely to enjoy a greater stability and predictability of trade policy than non-WTO Members. We can, therefore, expect that the mere membership in the WTO would exert a higher positive effect on investment-oriented remittances inflows compared to the non-WTO membership case. Furthermore, we hypothesize that it is not the mere WTO membership that could influence investment-oriented remittances inflows, but more importantly, the duration of that membership. This is because considering simply the effect of WTO membership on investment-oriented remittances flows disregards the time spent by each member state as WTO Member. In fact, as noted above, the duration of membership captures the likely continued improvement in the trade regime, and eventually economic policies, as well as eventually in the quality of governance and institutions¹¹ in a WTO member state. It follows that as the duration of membership varies across WTO Members, it will likely not affect in the same way the portion of remittances invested in business activities by countries. In particular, and in light of the discussion above, we submit that as the membership duration increases for a given member state, its trade policy regime would further improve, and its trade-related business environment would become more stable and predictable, and more friendly to business activities. The 'locking in trade policy' effects of the multilateral trade

¹¹ The duration of WTO membership can affect investment-oriented remittances through the institutional channel (see our discussion above concerning the effect of WTO membership on institutions), insofar as the institutional quality can affect private investment (e.g., Farla et al. 2016; Morrissey and Udomkerdmongkol, 2012; Su et al. 2021). While Farla et al. (2016) have obtained no significant effect of good governance on private investment, Morrissey and Udomkerdmongkol (2012) and Su et al. (2021) have observed that the improvement in institutional quality stimulates domestic private investment.

agreements (as noted above, the monitoring function of the TPRM plays a key role in this regard), are likely to exert a higher positive effect on the stability and predictability of the trade policy in longstanding WTO Members than in members with a relatively lower membership duration.

All in all, we postulate the following **hypothesis 1** that longstanding WTO Members would experience higher investment-oriented remittances inflows (i.e., a higher part of remittances inflows in business activities) than members with a relatively lower duration of WTO membership, and even more so than non-WTO members (those whose membership duration is zero). Specifically, the positive effect of the membership duration on investment-oriented remittances inflows would take place through lower trade policy volatility. This leads to the expectation that the duration of WTO membership would dampen the potential adverse effects of trade policy volatility on investment-oriented remittances inflows: the lower the degree of trade policy volatility, the lower (greater) would be the negative (positive) effect of the membership duration on investment-oriented remittances. The magnitude of the positive effect of the duration of WTO membership on investment-oriented remittances inflows would increase as the degree of trade policy volatility declines (**hypothesis 2**).

On the other hand, as trade policy volatility is likely associated with greater trade uncertainty and more generally with greater economic uncertainty, we submit that the duration of WTO membership would contribute to lowering trade uncertainty and economic uncertainty¹², and consequently promoting a business environment favourable to the development of domestic private investment. In so doing, it would encourage the investment of part of remittances inflows on productive activities. It ensues that the membership duration (which likely reflects continued improvements in domestic trade policies – and other economic policies - over time by a WTO Member) would induce greater investment-oriented remittances inflows in countries that experience lower trade uncertainty (**hypothesis 3**) or lower economic uncertainty (**hypothesis 4**).

¹² The concepts of 'trade uncertainty' and 'economic uncertainty' refer here respectively to external measures of uncertainty shocks related to trade, and uncertainty economic shocks in general (Ahir et al., 2018). Ahir et al. (2018) refer to these concepts respectively to as 'world trade uncertainty' and 'world economic uncertainty'. World trade uncertainty captures "*uncertainty related to trade (for example 'uncertainty over the renegotiation of the North American Free Trade Agreement', or 'market uncertainty over future trade policy will weigh on investor sentiment')*" (see Ahir et al., 2019b). World economic uncertainty captures the uncertainty related to economic and political developments, regarding both near-term (e.g., uncertainty created by the United Kingdom's referendum vote in favour of Brexit) and long-term concerns (e.g., uncertainty engendered by the impending withdrawal of international forces in Afghanistan or tensions between North and South Korea) (Ahir et al., 2019a). Ahir et al. (2019a) have shown the existence of a positive association between the level of uncertainty and the degree of economic policy uncertainty. Likewise, an increase in the level of trade uncertainty is positively associated with trade policy uncertainty.

3. Empirical strategy

This section presents the baseline specification used to test empirically the hypotheses 1 to 4 set out above (sub-section 4.1). Next, it presents data on the key variables of interest in the analysis (sub-section 4.2). Finally, it discusses the appropriate econometric approach to perform the empirical analysis (sub-section 4.3).

3.1. Model specification

To investigate empirically the effect of the duration of WTO membership on investment-oriented remittances flows, we build on the literature on the determinants of domestic private investment (e.g., Farla et al., 2016; Herzer and Grimm, 2012; Jongwanich and Kohpaiboon, 2008; Nowak-Lehmann and Gross, 2021) and consider a baseline model that includes the key variable of interest, namely the duration of WTO membership, and a set of control variables derived from this literature. This set of variables are those that are likely to influence the effect of the duration of WTO membership on investment-oriented remittances flows. They include the real per capita income, which acts as a proxy for the development level denoted "GDPC"; total development aid, that is, the total official development assistance, denoted "ODA"; the real effective exchange rate, denoted "REER"; the level of financial development proxied by the share of domestic credit to private sector by banks in GDP, denoted "FINDEV"; and the population size, denoted "POP".

The real per capita income has been introduced in model (1) to capture differences across countries (depending on their real per capita income) in terms of investment-oriented remittances inflows. It is well established in the literature that a small change in the aggregate demand has an accelerated effect on private investment (e.g., IMF, 2015; Acosta and Loza, 2005). At the same time, one could argue that the business environment could be more conducive to private investment in advanced developing countries than in relatively less advanced countries, given that the economies of the former are likely to be more sophisticated than the economies of the latter. In this context, the real per capita income would be positively associated with investment-oriented remittances inflows. It is also possible that despite their weak regulatory environment, low-income developing countries may adopt measures such as tax incentives to encourage entrepreneurship /small scale enterprises. This could incentivize remittance-receiving households to devote a higher fraction of their remittances to finance projects on productive activities. In this scenario, an increase in the real per capita income would result in a higher investment-oriented remittances flows in low-income countries.

Development aid can affect investment-oriented remittances through multiple avenues, including for example the development of productive capacities and economic infrastructure, the enhancement of human capital, the alleviation of the tax burden borne by private sector's agents, and the regulatory policies quality. In fact, part of total development aid is allocated for the enhancement of productive capacities in developing countries. This type of aid aims to support trading firms in the private sector to exploit its comparative advantages and diversify exports. It helps them build the productive and competitive capacities that they need to meet the demand of goods and services in the international markets, expand and benefit from trade (e.g., Alonso, 2016; OECD/WTO, 2011). Such an aid is particularly critical for developing countries and LDCs among them, given their weak productive capacities (e.g., Alonso, 2016; Hynes and Lammersen, 2017; UN, 2010; UNCTAD, 2020). In a recent study, Gnanngnon (2021) has established empirically that higher development aid inflows contribute to strengthening productive capacities in recipient-countries. Against this background, we postulate that this type of aid would leverage households' investments on business activities (including thanks to the remittances received). Similarly, the portion of development aid allocated for the strengthening of economic infrastructure (hard and soft infrastructure) contributes significantly to reducing trade costs and expanding exports (e.g., Cali and te Velde, 2011; Vijil and Wagner, 2012; Tadesse et al., 2021). Ultimately, through their trade costs¹³ reduction effect, both aid for building productive capacity and aid for strengthening economic infrastructure help to improve the business environment and connect local firms to regional and global value chains (Hynes and Lammersen, 2017). Thus, both types of aid could drive-in private investments through their positive externalities, notably in terms of productivity enhancement of the capital invested by private agents (e.g., Abiad et al., 2016; Barbosa et al., 2016; Herzer and Grimm, 2012; Mitra, 2006). However, some studies (e.g., Farla et al., 2016; Herzer and Grimm, 2012; Jongwanich and Kohpaiboon, 2008) have cautioned that limited physical and financial resources can lead to a crowding-out effect of public investment (financed by development aid) on private investment. In such a case, development aid may discourage investment-oriented remittances flows.

Development aid allocated for education and health can contribute to the accumulation of human capital in recipient-countries (e.g., Birchler and Michaelowa, 2016; Kostova et al., 2021; Kotsadam et al. 2018; Miningou, 2019; Yogo and Mallaye, 2015), and reduce the need for remittance-recipient households to finance education and health. As a result, these households

¹³ The rise in trade costs generates a higher uncertainty about firms' future profits, while also reducing their current profits, by raising production costs (e.g., Deardorff, 2014). As a result, higher trade costs would discourage private investments.

could redirect their health and education related spending financed by remittances towards investment in business activities.

Part of development aid could also be utilized by governments in the recipient countries to alleviate the tax burden borne by economic agents (e.g., Herzer and Grimm, 2012). This would encourage private investments, including the investment of a higher share of remittances inflows in productive activities. Finally, the institutional quality is an important channel through which development aid can stimulate investment-oriented remittances inflows. Dzhumashev and Hailemariam (2021) have identified a strong positive effect of foreign aid on the quality of economic institutions. Gnangnon (2020) has established empirically that development aid helps to improve the quality of regulatory policies. In light of the importance of economic institutions and regulatory policies for private investment (e.g., Morrissey and Udomkerdmongkol, 2012; Su et al., 2021), we can expect higher development aid flows to be associated with a higher fraction of total remittances inflows allocated for financing business activities.

The positive effect of development aid on entrepreneurship reported by authors such as Jia (2018) and Boudreaux et al. (2021) supports the argument that development aid can encourage investment-oriented remittances inflows. Jia (2018) has examined whether total development aid encourages or deters entrepreneurship, and reported that aid encourages only necessity-driven early-stage entrepreneurship and benefited low-income entrepreneurs. Additionally, aid allocated for infrastructure development promotes entrepreneurship, and fosters competition with homogeneous products. More recently, Boudreaux et al. (2021) have reported empirical evidence that development aid helps to mitigate the adverse effects of natural disasters on entrepreneurship.

Overall, in light of the above discussion, we can expect that the possible positive effect of development aid on investment-oriented remittances would dominate the negative ones so that the net effect of total development aid on investment-oriented remittances would be positive.

The effect of the real exchange rate on investment-oriented remittances flows is a priori undetermined. On the one hand, a depreciation of the real exchange rate could improve export opportunities and export flows (e.g., Fung and Liu, 2009; Li et al., 2015; Sekkat, 2016), and consequently provide incentives for investment in the tradable sector. On the other hand, the real exchange rate depreciation could raise the real costs of imported capital goods and other intermediate imported inputs, thereby discouraging private agents' investments on business activities (including trade-related ones) (e.g., Jongwanich and Kohpaiboon, 2008). Overall, the net effect of the real exchange rate on investment-oriented remittances inflows would depend on whether the positive effect dominates the negative one.

The availability of financing influences significantly the investment behaviour, regardless of the cost of capital. The easy access to domestic credit provided by the banking sector to finance business-related projects (for example through lower interest rates) can incentivize households to allocate part of their own financial resources, including remittances, to these projects. In general, the availability of credit to the private sector fosters private investment (e.g., Acosta and Loza, 2005; Bontempi et al., 2010; Jongwanich and Kohpaiboon, 2008; Misati and Nyamongo, 2011), and we expect an increase in this credit will affect positively investment-oriented investment flows.

Finally, the population size variable has been introduced in the analysis as a determinant of investment-oriented remittances so as to control for the country's size. In fact, the population size of a remittance-receiving country matters for the total remittances received by that country, and could therefore, influence the portion of total remittances invested in business activities. This is because the degree of a country's reliance on remittances sent by migrants depends on the population size of that country: countries with larger populations are likely to have a high number of emigrants and are consequently larger recipients of remittances flows (e.g., Adenutsi and Ahoritor, 2021; Freund and Spatafora, 2012; Kakhkharova et al., 2017). Yet, the increase in the population size could positively or negatively affect investment-oriented remittances depending on the existence of incentives to invest a portion of the total remittances inflows received on business activities. But we argue that countries with larger populations would likely invest a substantial portion of their total remittances on business activities than countries with relatively small populations.

We postulate the following baseline model specification:

$$RINVGD\dot{P}_{it} = \alpha_0 + \alpha_1 RINVGD\dot{P}_{it-1} + \alpha_2 DURWTO_{it} + \alpha_3 GDPC_{it} + \alpha_4 ODA_{it} + \alpha_5 POP_{it} + \alpha_6 REER_{it} + \alpha_7 FINDEV_{it} + \alpha_8 DUMOUT_{it} + \mu_i + \delta_t + \epsilon_{it} \quad (1)$$

On the basis of data available, an unbalanced panel dataset of 120 countries over the period 2002-2019 has been used to estimate the baseline model (1) as well as its different variants described in the next section. Non-overlapping sub-periods of 3-year average have been used to dampen the effect of business cycles on the majority of variables contained in model (1). Overall, we have 8 sub-periods, which are 1996-1998; 1999-2001; 2002-2004; 2005-2007; 2008-2010; 2011-2013; 2014-2016; and 2017-2019. The subscripts i and t act respectively for a country and a time-period.

The natural logarithm has been applied to all variables (with the exception of two variables) model (1), starting from the dependent variable "RINVGD", which is the share of investment-oriented remittances in GDP (not expressed in percentage). The two exceptions are the dummy "DUMOUT", and the variable "DURWTO", which as explained below has been transformed using the approach by Yeyati et al. (2007) given that it contains many zeros and has a skewed distribution.

The variables expressed in terms of ratios are not in percentage because they have been logged using the natural logarithm.

The variable "RINVGD" has been computed as the share of total remittances received by a given country (in a given year) in GDP multiplied by the annual investment rate (investment as a share of GDP, not expressed in percentage) (see Le and Bodman, 2011; Saadi, 2020). As a matter of fact, to calculate the fraction of total remittances allocated to business investment, we would ideally need data on the rate of such investment per country and year. Unfortunately, this data is not available for many countries. To circumvent this data limitations, we follow the approach proposed by Le and Bodman (2011) and recently utilized by Saadi (2020) and compute the fraction of total remittances allocated to business investment by using the investment rate out of GDP as a proxy for the investment rate out of total remittances inflows. Data on the annual investment rates (i.e., the share of investment in GDP) is collected from the Penn World Table (version 10.0) (see Appendix 1).

The one-period lag of the variable "RINVGD" has been introduced as a right-hand side regressor in model (1) so as to account for the persistence of this variable over time. The literature on the determinants of private investment has well established the existence of a state dependence nature of domestic (private) investment (e.g., Farla et al., 2016; Morrissey and Udomkerdmongkol, 2012).

The key variable of interest in the analysis is the duration of WTO membership, which after being transformed, is denoted "DURWTO". It represents the time elapsed since a country has joined the WTO. Let us denote "DURWTO1" the duration of WTO membership for a given country. This variable takes the value of 0 for years during which the country was not a WTO Member. It takes the value of 1 for the first year the country had become a WTO Member (i.e., the year it acceded to the WTO), and is incremented by 1 for every subsequent (additional) year of WTO membership. Note that for any country that had joined the WTO before 1996 (which is the first year of the period under analysis), the value of "1" has been attributed to 1995 (as the WTO was established on 1 January 1995) and then incremented by "1" for every additional year, until the last year of the period under analysis. For example, for countries that joined the WTO in

1995, the variable "DURWTO1" takes the value of "1" in 1995, and hence "2" in 1996, "6" in 2000,...and "25" in 2019. For a given country, the higher the value of the indicator "DURWTO1", the greater the duration of the WTO membership. As the variable "DURWTO1" contains many zeros, and has a skewed distribution, it has been transformed using the following formula (see Yeyati et al. 2007): $DURWTO = \text{sign}(DURWTO1) * \log(1 + |DURWTO1|)$, where $|DURWTO1|$ refers to the absolute value of the variable "DURWTO1".

The variable "DUMOUT" is a dummy variable for outliers identified in the analysis. In the present case where the dependent variable is the share of investment-oriented remittances in GDP, this dummy is denoted "DUMOUT1" and takes the value of 1 for outliers identified in the graph situated at the left-hand side of Figure 3, and 0, otherwise.

All other variables contained in model (1) have been briefly described in Appendix 1, and the details on their computation as well as their source are provided in the same Appendix. Appendix 2 shows the list of the 120 countries in the full sample and the LDCs among them, along with their WTO membership duration. Appendix 3 contains standard descriptive statistics on all variables used latter in the analysis.

α_0 to α_8 are coefficients to be estimated. μ_i represent time invariant specific characteristics of each country in the panel dataset. δ_t are sub-period dummies that help account for global shocks that affected together all countries' investment-oriented remittances inflows. ϵ_{it} is a well-behaving error-term.

3.2. Data analysis

This section analyses data on the key variables of interest in the analysis, namely the share of investment-oriented remittances in GDP, and the duration of WTO membership. To that effect, we use the panel dataset of 120 countries over the period 1996-2019 where data has been averaged over non-overlapping periods of 3 years. The investment-oriented remittances inflows considered here is the share of investment-oriented remittances in percentage¹⁴ of GDP (denoted).

Figure 1 presents the development (over time) of the share of investment-oriented remittances flows, respectively over the full sample, and the sub-samples of Least developed countries (LDCs) and countries in the full sample that are not in the category of LDCs (i.e., NonLDCs). The choice of the sub-samples of LDCs versus NonLDCs is dictated by the fact that

¹⁴ Note that for the sake of data analysis, the share of investment-oriented remittances in GDP is expressed in percentage. However, it is not expressed in percentage in the empirical analysis, as it has been taken in natural logarithm.

the category of LDCs is considered by the United Nations¹⁵ as the poorest and most vulnerable countries to exogenous and environmental shocks in the world. Countries in this group are likely the most in need of remittances inflows (including for business investment), given their limited financial resources, productive capacities and their weak institutional capacity, compared to NonLDCs. In light of these structural weaknesses, LDCs receive special flexibilities from the international community, including from the WTO in the course of their accession process to the WTO (see United Nations and WTO, 2021). These flexibilities could, in turn, help LDC governments encourage the use of remittances to finance small businesses.

Figure 2 shows the duration of WTO membership in LDCs and NonLDCs.

The left-hand graph of Figure 3 displays the correlation pattern (in the form of scatter plot) between the share of investment-oriented remittances in GDP and the duration of WTO membership. The right-hand graph of the same Figure provides the correlation pattern between the duration of WTO membership and the real per capita income, the idea being here to examine graphically how the membership duration is correlated with countries' development level., proxied by their real per capita income.

[Insert Figure 1, here]

We observe in Figure 1 that the share of investment-oriented remittances in GDP experienced some fluctuations over the period under analysis. This share slightly fell from 0.77% in 1996-1998 to 0.72% in 1999-2001, and substantially increased to reach 1.08% in 2005-2007. It then steadily declined to 0.99% in 2014-2016, and subsequently rose to 1.07%. This share fluctuated over the period for LDCs and NonLDCs. Over the sub-periods of 1996-1998 and 1999-2001, LDCs enjoyed a higher share of investment-oriented remittances in GDP than NonLDCs. This share amounted to 0.72% in 1996-1998 for LDCs (and 0.71% for NonLDCs) against 1.01% in 1996-1998 for LDCs (and 0.7% for NonLDCs). Then, from 2002-2004 to 2008-2010, the NonLDCs' share of investment-oriented remittances in GDP outweighed that of LDCs. For LDCs, the share moved from 0.86% in 2002-2004 to 1.04% in 2008-2010, while it was 1.05% in 2008-2010 and 1% in 2002-2004 for NonLDCs. Over the rest of the period, i.e., from 2011 to 2019, we observe that the pattern reversed as the share of investment-oriented remittances in GDP became higher in LDCs than in NonLDCs. This share slightly declined from 1.24% in 2011-2013 to 1.12% and then rebounded to 1.22% in LDCs. For NonLDCs, it also slightly fell from 0.95% in 2011-2013 to 0.93% and then rebounded to 1.01%.

¹⁵ Further information on the group of LDCs could be found online at: <https://www.un.org/ohrlls/content/least-developed-countries>

[Insert Figure 2, here]

[Insert Figure 3, here]

Figure 2 indicates that over the entire period under analysis, the 'average' duration of WTO membership has been higher for NonLDCs than for LDCs (it reached 19.38 years for NonLDCs and 17.85 years for LDCs over the sub-period 2017-2019). This pattern is confirmed by the right-hand graph in Figure 3, which shows a positive correlation pattern between the duration of WTO membership and the real per capita income. The left-hand graph in Figure 3 shows no clear correlation pattern between the share of investment-oriented remittances and the duration of WTO membership. Moreover, this graph indicates the presence of some outliers that would be accounted for in the empirical analysis.

2.3. Econometric approach

We start the empirical exercise by estimating the baseline model (1) using the pooled ordinary least squares (POLS) estimator and the within fixed effects approach (denoted FE). When using each of these estimators, we correct standard errors of estimates using the Driscoll and Kraay (1998) technique. The latter is a non-parametric approach, which assumes that the error structure is heteroskedastic, autocorrelated up to some lag, and eventually correlated between the countries in the full sample. The results of these estimations are provided in column [1] of Table 1.

However, the main problem with the outcomes obtained by means of the POLS and FE estimators is that the estimates are likely biased because of well-known endogeneity concerns between explanatory variables (including both the lagged dependent variable¹⁶ and other regressors) and the error term in the dynamic specification. To address these endogeneity concerns, we make use of the two-step system generalized method of moments (GMM) estimator (see Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). The two-step system GMM estimator is particularly useful for dynamic panel datasets featured by a large cross-sectional dimension and a small-time dimension. It helps to handle the above-mentioned endogeneity problems, as well as omitted variables and measurement errors. It performs better than the difference GMM estimator, in particular when the panel dataset has a short time-period and variables display a strong persistence (e.g., Alonso-Borrego and Arellano, 1999; Bond et al., 2001; Bond, 2002).

¹⁶ The lagged dependent variable is likely to be correlated with the fixed effects in the error term if the model were estimated using the within fixed effects estimator. The magnitude of this bias increases as the time dimension of the panel dataset becomes lower (e.g., Nickell, 1981).

The use of the two-step system GMM estimator consists of estimating a system of equations, which contains an equation in differences and an equation in levels. The instruments used for the equation in levels are the lagged of the variables taken in first difference, and the lags of the variables in levels are used as instruments of the first-difference equation. The use of lagged variables as instruments in the regressions help to reduce the imprecision and potential bias that characterize the difference GMM estimator.

All regressors (except for the population size variable) contained in model (1) are treated as endogenous. In particular, investment-oriented remittances indicators, the outlier-dummy variable, the real per capita income, development aid, the real exchange rate and the level of financial development are treated as endogenous.

As for the investment-oriented remittances indicator, the endogeneity arises from for example, the fact that non-WTO member states that have low levels of investment-oriented remittances due possibly to weak regulatory environment and economic policies (of which trade policies) may be willing to become WTO Members given the advantages of the WTO in helping countries improving their economic and trade policies, as well as trade-related institutions (e.g., Basu et al., 2008; Basu, 2008; Buettner and Madzharova, 2018; Drabek and Bacchetta, 2004), with all these having the potential of promoting a business-friendly environment. Concerning the other regressors, the reverse causality can be explained as follows. Investment-oriented remittances flows may influence the real per capita income given that total remittances inflows affect economic development (e.g., Piteli et al., 2019) and economic growth (e.g., Cazachevici et al., 2020). Also, countries with a small private sector size, and that aim to promote the development of entrepreneurship and more generally the private sector, may receive higher development aid flows from donors. Similarly, in light of the potential effect of remittances flows on the real exchange rate (for example through the Dutch disease effects (e.g., Acosta et al., 2009; Hien et al., 2020), we may expect that investment-oriented remittances could affect the real exchange rate. As total remittances inflows exert a significant impact on financial development (e.g., Gupta et al., 2009), we may also expect that the portion of remittances flows devoted to business activities would also exert an impact on financial development.

The correctness of the baseline model (1) and its different specifications (estimated by the two-step system GMM estimator) is evaluated using the Arellano-Bond test of the presence of first-order serial correlation in the first-differenced error term (AR (1)); the Arellano-Bond test of the absence of second-order autocorrelation in the first-differenced error term (denoted AR (2)) and the Hansen/Sargan test of over-identifying restrictions (OID). For the AR(1) and AR(2) tests, we expect that at the 10% level, the p-values associated with the relevant statistics would be

respectively lower than 0.10, and higher than 0.10. As for the OID test, the p-value related to the statistic should be higher than 0.1 at the 10% level. Furthermore, we ensure that there is no proliferation of instruments in the regressions performed, as recommended by Roodman (2009).

An additional way to evaluate the correctness of the baseline model (1) (or any of its other specifications described below) is to check whether the coefficient of the one-period lag of the dependent variable obtained from the estimation of the model by the two-step system GMM estimator lies between the coefficient of the same dependent variable obtained from estimating the model using the FE estimator, and the coefficient of the same dependent variable obtained from estimating the model using the POLS estimator (see Bond et al., 2001).

The outcomes that allow testing hypothesis 1 arise from the estimation of the baseline model (1) by means of the two-step system GMM estimator. They are reported in columns [3] and [4] of Table 1.

The other specifications performed using the same estimator are as follows. First, we examine whether the effect of the duration of WTO membership on investment-oriented remittances depends on countries' real per capita income. To that end, we estimate a specification of model (1) that includes the interaction between the indicator of the duration of WTO membership and the real per capita income variable. The outcomes of this estimation are presented in columns [1] and [2] of Table 2. As the estimates would show how the effect of the duration of membership on investment-oriented remittances varies across countries in the full sample, they might not fully reflect the effect of membership duration over sub-samples, for example LDCs versus NonLDCs. To investigate how the duration of WTO membership influences investment-oriented remittances in LDCs and NonLDCs, we estimate another specification of model (1) that includes the dummy "LDC" and its interaction with the indicator of the duration of WTO membership. The dummy "LDC" takes the value 1 for countries in the full sample that pertain to the category of LDCs, and 0 for other countries. The outcomes of this estimation are reported in columns [3] and [4] of Table 2.

Second, outcomes reported in Table 3 allow testing hypotheses 2 to 4. In particular, the results presented in columns [1] and [2] of this Table permit to test hypothesis 2. These results are obtained by estimating a variant of the baseline model (1) that includes the indicator of the volatility of tariffs (denoted "TARIFFVOL" - see Appendix 1 for details on the definition and computation of this indicator) and its interaction with the variable capturing the duration of WTO membership. The outcomes displayed in columns [3] and [4] of Table 3 allow testing hypothesis 3. These estimates are obtained by estimating a specification of the baseline model (1) that consists of introducing in this baseline model, both the indicator of trade uncertainty and its interaction with

the variable measuring the duration of WTO membership. The trade uncertainty level is measured here by the world trade uncertainty index, denoted "WTU" (see Appendix 1 for details on the definition and computation of this indicator). Finally, the estimates presented in columns [5] and [6] of Table 3 are useful for testing hypothesis 4. They have been obtained by estimating another variant of the baseline model (1) that includes an indicator of economic uncertainty and its interaction with the indicator of the duration of WTO membership. The indicator of economic uncertainty is the world economic uncertainty indicator, denoted "WU" (see Appendix 1 for details on the definition and computation of this indicator).

3. Empirical results

The outcomes in columns [1] and [2] of Table 1 indicate that the duration of WTO membership exerts a negative and significant effect (at the 5% level) on the share of investment-oriented remittances in GDP for results based on the POLS estimator, but no significant effect (at the 10% level) of the duration of WTO membership on the ratio of investment-oriented remittances to GDP in column [2]. These outcomes are not consistent with hypothesis 1. However, as mentioned above, they are likely biased, as may also be the estimates of control variables. Concerning the latter, the outcomes in columns [1] and [2] indicate that outliers exhibit lower investment-oriented remittances inflows than non-outliers in the full sample. The real exchange rate depreciation and the improvement in the financial development level are positively and significantly associated with the share of investment-oriented remittances in GDP. At the 5% level, development aid exerts no significant effect on investment-oriented remittances (see both columns [1] and [2]), while the real per capita influences negatively and significantly the share of investment-oriented remittances in GDP in column [1], but exerts no significant effect on it in column [2]. Finally, the population size appears to affect negatively and significantly the same share for results based on the POLS estimator, but positively and significantly for outcomes based on the FE estimator.

[Insert Table 1, here]

We now turn to the estimates based on the two-step system GMM estimator, and which are more reliable than the ones obtained from the use of the POLS and FE estimators. At the outset, we note that in columns [3] and [4] of Table 1 and in Tables 2 and 3, the coefficients of the lagged dependent variable are all positive and significant at the 1% level. This confirms the state path dependence of the investment-oriented remittances variable. Interestingly, as expected, the coefficients of the lagged dependent variable (at least for the ones reported in column [3] of Table

1) is lower than the coefficient of the same variable in column [1] (results based on the POLS estimator) but higher than the one in column [2] of the same Table (i.e., result based on the FE estimator). Columns [3] and [4] of Table 1 and Tables 2 and 3 show the outcomes of the tests that allow checking the correctness of all model specifications whose estimates are presented in these Tables. It appears that all these variants of model (1) are correctly specified. For the empirical exercise, we can therefore rely on the outcomes based on the two-step system GMM estimator.

We note from column [3] of Table 1 that the duration of WTO membership influences positively and significantly (at the 1% level) the ratio of investment-oriented remittances to GDP. This finding confirms our hypothesis 1 that longstanding WTO members experience a higher positive effect of the duration of their membership on investment-oriented remittances than relatively new WTO Members. Specifically, an increase in the duration of WTO membership by 1 year (i.e., a change in the duration of the membership by 100 per cent) is associated with an increase in the ratio of investment-oriented remittances to GDP by 9.74 per cent. Regarding control variables, we note from column [3] of Table 1 that at the 1% level, the investment-oriented remittances to GDP ratio is positively driven by higher development aid inflows, a depreciation of the real exchange rate, and a higher share of domestic credit allocated by banks. At the 1% level, the real per capita income, and the population size influence negatively and significantly the share of investment-oriented remittances in GDP. These negative effects may hide the existence of some interplays between the duration of WTO membership and the real per capita income on the one hand, and between the duration of the membership and the population size on the other hand, on investment-oriented remittances inflows. We will check these assumptions in the analysis just below. The finding concerning the outliers dummy in column [3] of Table 1, is consistent with those in columns [1] and [2] of the same Table.

[Insert Table 2, here]

Results in the first column of Table 2 indicate that the coefficient of the variable "DUMWTO" is positive and significant at the 1% level, and the interaction term of the interaction variable ("DURWTO*[Log(GDPC))]" is negative and significant at the 1% level. We deduce that the effect of the membership duration on the share of investment-oriented remittances in GDP decreases as the real per capita income rises, and may even become negative for higher levels of the real per capita income. The level of the real per capita income above which this effect changes sign is US\$ 3463 [= exponential (0.978/0.120)]. Thus, countries whose real per capita income is lower than US\$ 3463 experience a positive effect of the duration of WTO membership on the share of investment-oriented remittances in GDP (or the real investment-oriented remittances). For the other countries, the real per capita income is negatively associated with the investment-

oriented remittances. These findings suggest that as they improve their real per capita income, countries tend to experience a lower investment of remittances in business activities. In other words, less developed countries among remittance-receiving countries (including low-income countries or LDCs) experience a positive effect of their duration of WTO membership on investment-oriented remittances flows, while in relatively advanced countries, households tend to use their remittances for other purposes (e.g., consumption) than for investment in domestic business activities. One may conclude from these findings that the WTO membership genuinely contributes to stimulating investment-oriented remittances in less advanced countries, in particular for longstanding Members compared to relatively new Members.

These findings are confirmed by results in column [2] of Table 2. The coefficient of the interaction variable ("DURWTO*LDC") is positive and significant at the 1% level, thereby indicating that LDCs experience a higher share of investment-oriented remittances in GDP than NonLDCs. The net effects of the duration of WTO membership on the share of investment-oriented remittances in GDP in LDCs and NonLDCs are respectively 0.274 ($= -0.0662 + 0.340$) and -0.066.

One explanation for the negative effect of the membership duration on investment-oriented remittances inflows in relatively advanced countries (including NonLDCs) may be that as the duration of their membership expands and their real per capita income increases, relatively advanced countries further enhance their domestic financial sector¹⁷. In turn, this allows households and firms to get easier access to credit, including at lower costs, for financing productive activities. Therefore, they become lesser dependent on their own resources to finance business activities, and could use these resources for other purposes, including consumption. Notwithstanding these outcomes, one may question whether these results do not hide the fact that the genuine effect of the duration of WTO membership on investment-oriented remittances ultimately depends on the stability and predictability of the business environment. The estimates reported in Table 3 would help provide answers to this question.

As also highlighted above, the negative effect of the population size on the share of investment-oriented remittances in GDP may reflect some interplay between the population size variable and the duration of WTO membership in affecting this share. This is simply because the

¹⁷ The literature has established that the economic development level (proxied for example by the real per capita income) is positively associated with the level of financial development. An increase in the real per capita income (as a proxy for the development level) is likely to be associated with greater economies of scale in financial services provision, which in turn, would spur financial development (Xu, 2000). Additionally, the expansion of an economy may lead to a rise in the demand for financial instruments by the private sector, and a better access to external finance (e.g., Ang and McKibbin, 2007).

population size may be an indicator of countries' dependence on remittances inflows (countries with larger populations are likely to have high numbers of emigrants and consequently experience higher amounts of remittances inflows), and therefore, influence the effect the duration of WTO membership on investment-oriented remittances. We expect that the positive effect of the duration of WTO membership on investment-oriented remittances could be higher in countries with larger populations than in countries with relatively smaller populations. The rationale for this assumption is that as the duration of the WTO membership increases (which theoretically means a continued improvement in domestic trade policies, economic policies and trade-related institutions), the business environment would improve, and countries with larger populations that receive higher amounts of total remittances are likely to allocate a higher share of these remittances for investment in business activities than countries with relatively smaller populations (that receive, all thing being equals, receive relatively lower amounts of remittances).

To test this assumption, we estimate (by means of the two-step system GMM estimator) a variant of model (1) in which we introduce the variable that captures the interaction between the indicator of WTO membership duration and the population size. The outcomes of this estimation are presented in column [3] of Table 2. This variant of model (1) is correctly specified as all requirements of the GMM estimator are met (see the results reported at the bottom of the Table) and the one-period lag of the dependent variable shows a positive and significant coefficient. The coefficients of control variables exhibit signs and statistical significances that are similar to those in the other columns of the Table (although coefficients could be of different magnitudes across the three columns of Table 2). Results show that the coefficient of "DURWTO" is negative and significant at the 1% level, and the interaction term associated with the interaction variable ("DURWTO*[Log(POP)]") is positive and also significant at the 1% level. We conclude, as expected, that longstanding WTO Members with larger populations enjoy a higher positive effect of their membership duration on the investment-oriented remittances-to-GDP ratio than relatively new WTO Members. In particular, this positive effect occurs only when the population size exceeds 723330 inhabitants [= exponential (0.483/0.0358)]. To recall, the values of the variable representing the population size range between 44102 habitants and millions 1,350 inhabitants (see Appendix 3). This means that the duration of WTO membership negatively affects the share of investment-oriented remittances in GDP in countries with a population size lower than 44102 inhabitants. For countries with populations larger than 44102 habitants, the higher the population size, the greater is the magnitude of the positive effect of the duration of WTO membership on the share of investment-oriented remittances in GDP. It appears from the panel dataset that over the last sub-period (i.e., 2017-2019), no country had a population size lower than 44102

inhabitants. Saint-Kitts and Nevis was the country with the lowest population size in the full sample and the last sub-period, with the total population amounting to 52436 inhabitants. We deduce that regardless of the real per capita income, countries always experience a positive effect of the duration of WTO membership on the share of investment-oriented remittances, with the magnitude of this effect increasing as the population size rises.

[Insert Table 3, here]

We now consider the outcomes presented in Table 3. Starting with those in column [1] of the Table, we note that the duration of WTO membership negatively and significantly affects the share of investment-oriented remittances in GDP as the level of tariff volatility moves upward. This is because the coefficient of the variable "DURWTO*TARIFFVOL" is negative and significant at the 1% level. At the same time, the coefficient of "DURWTO" is positive and significant at the 5% level. The combination of these two outcomes suggests that the duration of WTO membership positively influences the share of investment-oriented remittances in GDP in countries that experience lower degrees of tariff volatility. Another way to interpret these findings is that by reducing tariff volatility, the membership duration generates a rise in the share of investment-oriented remittances in GDP, and the lower the degree of tariff volatility, the higher the positive effect of the membership duration on the share of investment-oriented remittances in GDP. These findings, therefore, confirm hypothesis 2.

We obtain similarly from columns [2] and [3] of Table 3 that the duration of WTO membership affects positively and significantly the share of investment-oriented remittances in GDP in countries that experience lower degrees of trade uncertainty (see results in column [2]) or lower levels of economic uncertainty (see results in column [3]). This is because in columns [2] and [3], the interaction terms of the variables "DURWTO*WTU" and "DURWTO*WU" are negative and significant at the 1% level, while the variables "WTU" and "WU" hold coefficients that are positive and significant at the 1% level. These findings also confirm hypotheses 3 and 4, whereby the duration of the membership stimulates investment-oriented remittances (measured by the share of investment-oriented remittances in GDP) by contributing to lowering trade uncertainty and economic uncertainty.

Results concerning control variables are consistent across columns [1] to [3] of Table 3 as well as with those in column [3] of Table 1.

4. Robustness check analysis

In this section, we test the robustness of the findings in column [3] of Table 1 as well as in Tables 2 and 3. This robustness analysis is performed by using another measure of the investment-oriented remittances, which is the real investment-oriented remittances (constant 2010 US\$), denoted "RINVCST". It has been calculated by multiplying the share of investment-oriented remittances in GDP (i.e., the variable "RINVGDP") by the real GDP (constant 2010 US\$). This approach of computing the real investment-oriented remittances is similar to the one consisting of obtaining the remittances in real terms by dividing the variable measuring current remittances (current \$US) by the GDP deflator (constant prices) (see Ebeke, 2011; Le and Bodman, 2011; Saadi, 2020).

[Insert Figure 4, here]

Figure 4 presents the cross-plot between the duration of WTO membership and the real investment-oriented remittances flows. There appears to no clear-cut correlation pattern between these two indicators, but some outliers are present in the graph. More generally, we take into account these outliers in the empirical analysis by creating a dummy outliers "DUMOUT2" that takes the value of 1 for identified outliers, and 0, otherwise. Note that these outliers are slightly different from the ones observed in the left-hand side graph of Figure 3.

The robustness check empirical analysis consists of re-estimating here (taking into outliers present in the sample) all specifications of model (1) whose results are reported respectively in column [3] of Table 1, columns [1] and [3] of Table 2 and in all columns of Table 3. The resulting estimates are presented in Table 4. We first note that all requirements of the two-step system GMM estimator are met (see the outcomes at the bottom of Table 4). Second, there is once again a confirmation of the state dependence path of the variable capturing the investment-oriented remittances flows, as the coefficients associated with the one-period lag of the dependent variable are positive and significant at the 1% level across all columns of Table 4.

[Insert Table 4, here]

Estimates presented in column [1] confirm hypothesis 1, as at the 5% level, the duration of WTO membership exerts a positive and significant effect on the real investment-oriented remittances flows. An increase in the membership duration by 1 year induces a rise in the real investment-oriented remittances flows by 5.24 per cent. As for control variables, the real investment-oriented remittances flows are positively driven by a higher real per capita income, an increase in total development aid inflows, a rise in the population size, a depreciation of the real exchange rate, and an improvement in the financial development level. It is worth noting here that

the effect of population size is positive, while it was negative when the dependent variable was the share of investment-oriented remittances in GDP. Additionally, the real per capita income variable holds a negative and significant coefficient when the dependent variable was the share of investment-oriented remittances in GDP. These difference in outcomes could be explained by the way the dependent variable is measured. In the previous analysis, it was measured as a share of GDP, which signifies that its changes (i.e., changes in the share of investment-oriented remittances) would depend on changes in both current values of investment-oriented remittances inflows, and current values of GDP. In contrast, in the present section, we use the real investment-oriented remittances inflows indicator, which does not depend on changes in the GDP.

Outcomes concerning control variables in the other five columns of Table 4 broadly align with those in column [1] of the same Table.

Taking-up estimates in column [2] of Table 4, we find the confirmation of the findings in column [1] of Table 2 that as their real per capita income improves, countries experience a negative effect of their membership duration on the real investment-oriented remittances inflows. The level of real per capita income above which the effect of the duration of WTO membership on the real investment-oriented remittances inflows becomes negative, amounts to US\$ 3272 [= exponential $(0.556/0.0687)$], which is not quite different from the one obtained (i.e., US\$ 3463) from column [1] of Table 2. Overall, the conclusions derived from the analysis of the estimates reported in column [1] of Table 2 are also valid here.

Results in column [2] of Table 4 confirm the finding in column [3] of Table 2 that the effect of the membership duration on the real investment-oriented remittances inflows increases as the population size rises, i.e., the membership duration exerts a higher positive effect on the real investment-oriented remittances inflows in countries with larger populations than in those with relatively smaller populations. This is because the coefficient of the variable ("DURWTO*[Log(POP)]") is positive and significant at the 1% level, whereas the variable "DURWTO" has a negative and significant coefficient at the 1% level.

Estimates provided in column [4] of Table 4 show that the coefficient of the variable ("DURWTO*TARIFFVOL") is negative and significant at the 1% level, while the coefficient of "DURWTO" is not significant at the conventional significance levels. We, therefore, infer that the duration of WTO membership consistently induces higher real investment-oriented remittances inflows in countries that experience lower degrees of tariff volatility, and the magnitude of this positive effect increases as the degree of tariff volatility declines.

We observe from column [5] of Table 4 that the coefficient of the interaction variable ("DURWTO*WTU") is negative and significant at the 1% level, and the coefficient of the variable

"DURWTO" is positive and significant at the 1% level. It, therefore, ensues that the membership duration promotes real investment-oriented remittances inflows in countries that experience lower levels of trade uncertainty, and the magnitude of this positive effect increases as the level of trade uncertainty falls. Along the same lines, we obtain from column [6] of Table 4 that the interaction term of the variable ("DURWTO*WTU") is negative and significant at the 1% level, while the coefficient of the variable "DURWTO" is positive and coefficient at the 1% level. We conclude that as the membership duration increases, real investment-oriented remittances inflows also rise in countries that experience lower levels of economic uncertainty, and the magnitude of this positive effect increases as the level of economic uncertainty falls.

The take-home message from Table 4 is that longstanding WTO Members enjoy higher real investment-oriented remittances inflows when they experience lower degrees of tariffs volatility, lower levels of trade uncertainty or lower levels of economic uncertainty. These findings fully align with those obtained in Table 3, and hence confirm once again hypotheses 3 and 4.

5. Further analysis

This section takes further the analysis carried out above in two ways. First, it examines the extent to which the effect of the duration of WTO membership on investment-oriented remittances depends on trade flows given that the ultimate goal of the WTO is to promote trade.

Second, in light of the discussion in section 2 that pointed out the critical role of development aid in fostering investment-oriented remittances in developing countries¹⁸, one could question whether the effect of the duration of WTO membership on investment-oriented remittances would not depend on the amounts of development aid received.

On the first issue, a large body of the literature has documented the positive effects of WTO membership (thanks to the various benefits of this membership) on trade flows, including both exports and imports and on economic growth, which is an important ingredient for spurring private investment. While the seminal work by Rose (2004) has found no empirical effect of the GATT/WTO membership on bilateral trade and on diverting away trade from non-members to members, the majority of subsequent studies have reported a positive effect of such a membership on trade flows. For example, Subramanian and Wei (2007) have found a positive impact of the GATT/WTO membership on trade flows, with the magnitude of this positive effect being higher for industrialized countries than for developing ones, and greater for some sectors than others.

¹⁸ As discussed in section 2, this could take place through the enhancement of productive capacities, the development of economic infrastructure, the accumulation of human capital, and the improvement of the regulatory environment.

Other subsequent works have documented empirically the existence of a positive effect of the GATT/WTO membership on bilateral trade flows¹⁹. In a recent study, Larch et al. (2019) take into the non-discriminatory nature of GATT/WTO commitments (which was ignored by previous studies) by considering the effects of GATT/WTO membership on international trade relative to domestic sales. Their findings indicate a larger trade effect of GATT/WTO membership than obtained by previous studies when the MFN effects of WTO membership are accounted for. Specifically, not only has the GATT/WTO membership increased trade among members by 171 per cent and trade between members and between members and non-members by about 88 per cent, but it has also promoted trade with non-members than the GATT.

Besides, there is a strong economic growth effect of WTO membership (e.g., Andersen et al., 2014; Brotto et al., 2021; Fan et al., 2021; Ganelli and Tervala, 2015; Koopman et al., 2020; Tang and Wei, 2009). The work by Tang and Wei (2009) has established that joining the GATT/WTO promotes domestic investments and economic growth, only for countries that underwent rigorous accession procedures. The improvement in economic growth performance is sustained over the first five years after accession, and the economy becomes permanently larger by 20% as a result. By extending the work of Tang and Wei (2009) to the sample of 32 newly acceded countries to the WTO, Bross et al. (2021) have obtained a larger effect than the ones reported by Tang and Wei (2009). In particular, the positive economic growth impact of the WTO accession lasts more than the first five years, and the economy is 30% larger five years after accession. Ganelli and Tervala (2015) have demonstrated, using a New Keynesian model, that unilateral trade liberalization reduces welfare due to terms-of-trade deterioration, and this creates an incentive for entering into a trade agreement. According to Fan et al. (2021), it is not only China that has benefited from its accession to the WTO, but the world has also benefitted from it because global welfare has significantly improved. These findings align with those of Andersen et al. (2014) who have obtained that the significant rise in the demand for industrial commodities brought about by China's WTO accession has led to an increase in the average annual growth in resource-rich countries by roughly one tenth in the post-China's accession period.

Against this background, we argue, on the one hand that the trade promotion effect of the WTO membership is likely to encourage investment in trade-related activities, including by remittance-receiving households in developing countries. We, therefore, postulate that the duration of WTO membership would promote investment-oriented remittances inflows in member-countries that enjoy higher trade flows, including both exports and import flows

¹⁹ See for example Chang and Lee (2011); Dutt (2020); Dutt et al. (2013); Eicher and Henn (2011); Goldstein et al. (2007); Helpman et al. (2008); Liu (2009); Roy (2011) and Tomz et al. (2007).

(*hypothesis 5*). It is worth noting that the positive effect of the duration of WTO membership on investment-oriented remittances through the import of goods and services channel could be explained by the fact that as WTO Members further improve their trade policy regime over time, trade barriers on imported goods and services will go down. In turn, this could encourage the import of intermediate inputs used in the process of producing goods that could be sold either in the domestic market or in foreign markets. For example, existing studies have reported a positive effect of trade policy liberalization on imports, exports and firms' profitability through the lowering of barriers to imported inputs. Santos-Paulino (2002) have obtained that the elimination of trade policy distortions has been a strong driver of import growth in developing countries. Bas (2012) has found that greater input tariff reductions have significantly increased the probability of entering the export market for firms producing in industries. Mukherjee and Chanda (2021) have shown that input tariff reductions have increased markups for Indian manufacturing firms. Fu et al. (2021) have uncovered that input tariff reduction significantly raises profitability for Chinese manufacturing firms.

Likewise, we formulate the following hypothesis (**hypothesis 6**): in light of the strong positive effect of WTO membership on economic growth, we expect that the membership duration would induce greater investment-oriented remittances inflows in countries that experience a higher economic growth performance insofar as economic growth performance is a positive driver of private investment (e.g., Farla et al., 2016; Jongwanich and Kohpaiboon, 2008; Morrissey and Udomkerdmongkol, 2012).

To test empirically hypotheses 5 and 6, we estimate several specifications of the baseline model, including where the dependent variable is alternatively the share of investment-oriented remittances in GDP and the real investment-oriented remittances inflows. The first set of specifications of model (1) allows testing hypothesis 5 and involves including a trade variable in the baseline model (1) as well as the interaction of this variable with the variable capturing the duration of WTO membership. The trade variable could be the total exports of goods and services as a share of GDP, denoted "EXP", the total imports of goods and services as a share of GDP, denoted "IMP", or the total volume of trade (denoted "TRADE"), which is measured by the sum of the variables "EXP" and "IMP". The specification of model (1) that allows testing hypothesis 6, includes the economic growth rate variable (denoted "GROWTH") as well as its interaction with the variable measuring the duration of WTO membership.

For the sake of brevity, we have presented in Table 5 the summary of the outcomes of these estimations, as the full outcomes of regressions performed could be obtained upon request.

On the second issue, we argued in section 2 that development aid could affect investment-oriented remittances flows through a variety of channels, including the enhancement of productive capacities, the development of economic infrastructure, the accumulation of human capital, and the improvement of the regulatory environment. Results in Tables 1 to 4 have clearly indicated a positive and significant effect of total development aid on investment-oriented remittances flows (either expressed as a share of GDP or in real terms). In light of these findings, and given the various channels through which the effect of development aid on investment-oriented remittances inflows could operate, we submit that as higher development aid inflows induce the development of productive capacities – defined in a large sense - in recipient-countries (see Gnangnon, 2021), remittances receiving households may be incentivized to draw on the amounts of remittances received to invest in business-related projects (through for example, entrepreneurship) insofar as the increase in the membership duration also helps to improve the business environment. Building on these arguments, we postulate the following ***hypothesis 7***: the duration of WTO membership would exert a positive effect on investment-oriented remittances inflows as the amounts of development aid increase, and the magnitude of this positive effect would increase as these aid amounts rise.

To test hypothesis 7, we estimate another variant of model (1) (with each of the two indicators of remittances), i.e., model (1) in which we introduce the interaction variable between the variable capturing development aid, and the indicator of the duration of WTO membership. The resulting estimates are displayed in Table 6.

The different variants of model (1) that allow testing hypotheses 5 to 7 are correctly specified, as all requirements for the validity of the GMM estimator are met. Additionally, in these model specifications, the coefficients of the one-period lag of the dependent variable ("RINVGDP" and "RINVCST") are positive and significant at the 1% level.

[Insert Table 5, here]

We observe from both the upper and lower parts of Table 5 that the coefficients of "DURWTO" are not significant at the conventional significance levels in columns [1] and [2], but they are significant at the 1% level in column [3]. In the meantime, the coefficients of the variable ("DURWTO*VAR") are positive and significant at the 1% level in columns [1] to [3], where the variable "VAR" represent respectively total trade volume, export volume, and import volume. These outcomes lead us to conclude that the effect of the duration of WTO membership on investment-oriented remittances (either expressed as a share of GDP or in real terms) does depend on trade flows, including both exports of goods and services, imports of goods and services and the overall trade volume. In particular, this effect is positive and consistently increases as the

volume of trade (export volume, import volume, and the overall trade volume) rises. These outcomes confirm the hypothesis 5 set out above.

Estimates presented in column [4] of the upper part of Table 5 indicate that the coefficient of the variable "DURWTO" is negative and significant at the 5% level, while the interaction term of the variable between capturing the interaction between the duration of WTO membership and the variable representing the economic growth rate, is positive and significant at the 1% level. We conclude that the effect of the membership duration on the share of investment-oriented remittances in GDP does depend on the economic growth rate prevailing in the country. It is positive only when economic growth rate exceeds 1.6% ($= 0.0336/0.0207$), as otherwise, the effect is negative. We note from Appendix 3 that the values of the indicator of economic growth rate range between -6.6% and 29.3%. Thus, countries whose economic growth rates oscillate between -6.6% and 1.6% experience a negative effect of the duration of WTO membership on the share of investment-oriented remittances in GDP. On the other side, countries whose economic growth rates are higher than 1.6% experience a positive effect of the duration of WTO membership on the share of investment-oriented remittances in GDP, with the magnitude of this positive effect increasing as the economic growth performance further improves.

Turning to column [4] of the bottom part of Table 5, the coefficient of "DURWTO" is not significant at the conventional significance levels, while the coefficient of the variable "DURWTO*GROWTH" is positive and significant at the 1% level. These outcomes lead to the conclusion that the duration of WTO membership consistently exerts a positive effect on the real investment-oriented remittances flows, and the magnitude of this impact rises as the economic growth rate further increases. All in all, the outcomes in both the upper and lower parts of column [4] in Table 5 confirm the hypothesis 6 set out above.

[Insert Table 6, here]

Regarding the estimates presented in the two columns of Table 6, we obtain, in line with hypothesis 7, that the coefficient of the variable "DURWTO*Log(ODA)" is positive and significant at the 1% level. Meanwhile, the coefficient of "DURWTO" is negative and significant at the 1% level. Taken these outcomes jointly (i.e., for each column of the Table), we can deduce that the effect of the WTO membership duration on each of the indicators of investment-oriented remittances depends on the amounts of development aid that accrue to countries. The effect of the WTO membership duration on the ratio of investment-oriented remittances to GDP is positive for amounts of development aid higher than US\$ 84,958,097 [= exponential ($1.488/0.0815$)]. As values of total development aid range between US\$ 240,000 and million US\$ 6,740 (see Appendix 3), we conclude that countries that receive aid amounts comprising between

US\$ 240,000 and US\$ 84,958,097 experience a negative effect of the duration of WTO membership on the share of investment-oriented remittances in GDP. Conversely, countries that benefit from development aid flows exceeding US\$ 84,958,097 enjoy a positive effect of their membership duration on the share of investment-oriented remittances in GDP, and the magnitude of this positive effect rises as the development aid flows increase. The same conclusions apply to the real investment-oriented remittances inflows considered as the dependent variable. Here, the amount of development aid above which (below which) the effect of the membership duration on the real investment-oriented remittances inflows is positive (negative) is: million US\$ 160 [= exponential (1.294/0.0685)].

The take-home message conveyed by the analysis of results in Table 6 is that the effect of the duration of WTO membership on investment-oriented remittances inflows (either expressed as a share of GDP or in real terms) is positive for high amounts of development aid, and the magnitude of this effect increases as the amounts of development aid received rise.

On another note, estimates associated with control variables are consistent with those reported in Table 4.

6. Conclusion

This article has examined the effect of the duration of WTO membership on investment-oriented remittances inflows, using a sample of 120 countries over the period 1996-2019. The paper claims that by improving the stability and predictability of the business environment over time, the duration of WTO membership for a given member-state (i.e., the time spent by that country as WTO Member) would provide strong incentives to remittance-receiving households to invest a fraction of their remittances in business activities. The stability and predictability of the business environment are measured by several indicators, including, through lower levels of tariff volatility, trade uncertainty and economic uncertainty.

The analysis has established several findings.

First, it has revealed that over the full sample, while the duration of WTO membership exerts, on average, a positive effect on investment-oriented remittances inflows, the magnitude of this positive effect increases as the population size rises (regardless of countries' level of development, proxied by their real per capita income). This is because the population size reflects the number of emigrants and potentially the amounts of total remittances received by a country. Thus, compared to relatively new Members, longstanding WTO Members enjoy a higher positive

effect of their membership duration on investment-oriented remittances inflows when they have large populations.

Second, by reducing tariffs volatility, trade uncertainty and economic uncertainty, the membership duration influences positively investment-oriented remittances inflows. Furthermore, the positive effect of the duration of WTO membership on investment-oriented remittances inflows is higher in countries that enjoy high trade volumes, and higher economic growth performance. These findings suggest that longstanding WTO members experience higher investment-oriented remittances inflows in the context of lower levels of tariff volatility, lower degrees of trade and economic uncertainties, and consequently when they enjoy an improvement in trade performance (in terms of trade volumes) and economic growth performance.

Interestingly and not least, the analysis has found that the higher the amounts of development aid inflows, the greater is the magnitude of the positive effect of its membership duration on investment-oriented remittances inflows. Lower aid inflows result in an adverse effect of the membership duration on investment-oriented remittances inflows.

In terms of policy implications, these findings have revealed that the duration of WTO membership (and not merely the membership in the WTO) is an important positive driver the private investment, including investment-oriented remittances inflows. The effect of the membership duration on investment-oriented remittances varies across countries and depends on the extent to which the compliance with WTO rules and the commitments by every WTO Member influences the domestic business environment.

All in all, the present study, which to the best of our knowledge, is the first to address this issue, complements other previous studies that highlighted the relevance of the WTO in promoting the development of the private sector in its member states (including developing members and the poorest among them).

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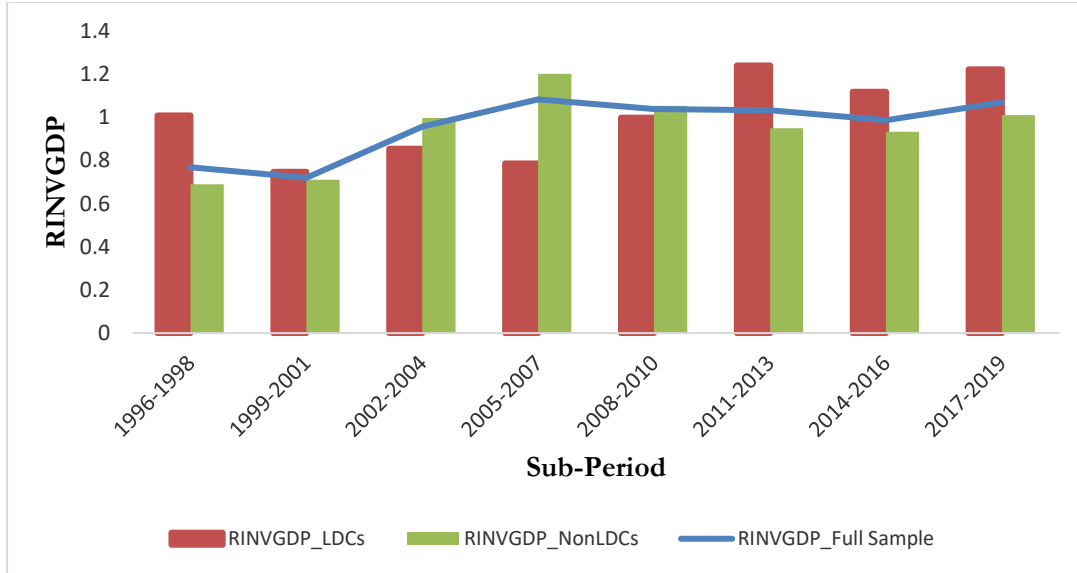
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FIGURES

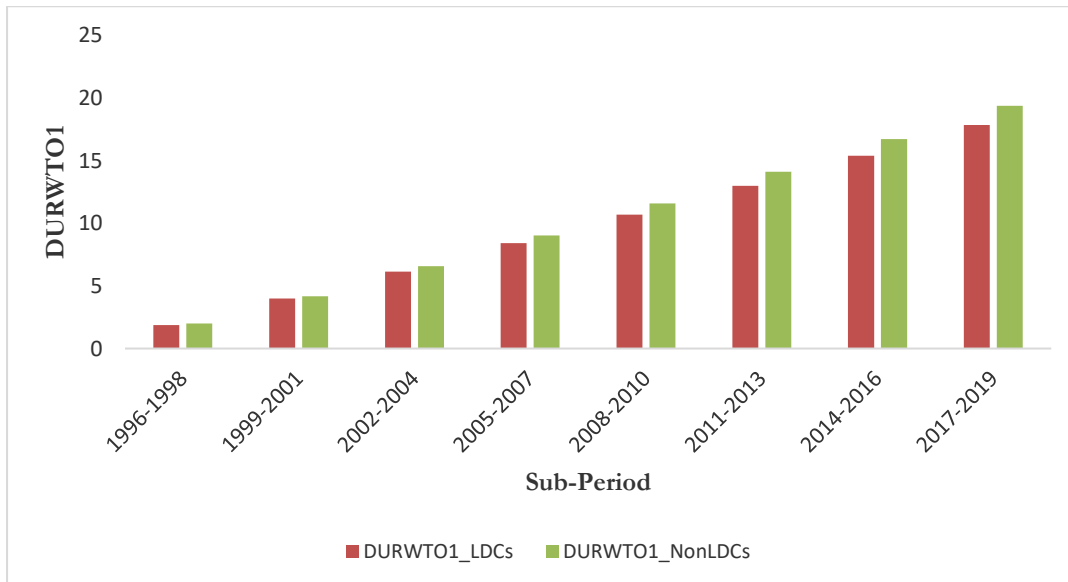
Figure 1: Development of the share of investment-oriented remittances in GDP_Over the full sample and the sub-samples of LDCs and NonLDCs



Source: Author

Note: The variables "RINV GDP" is the share of investment-oriented remittances in percentage of GDP.

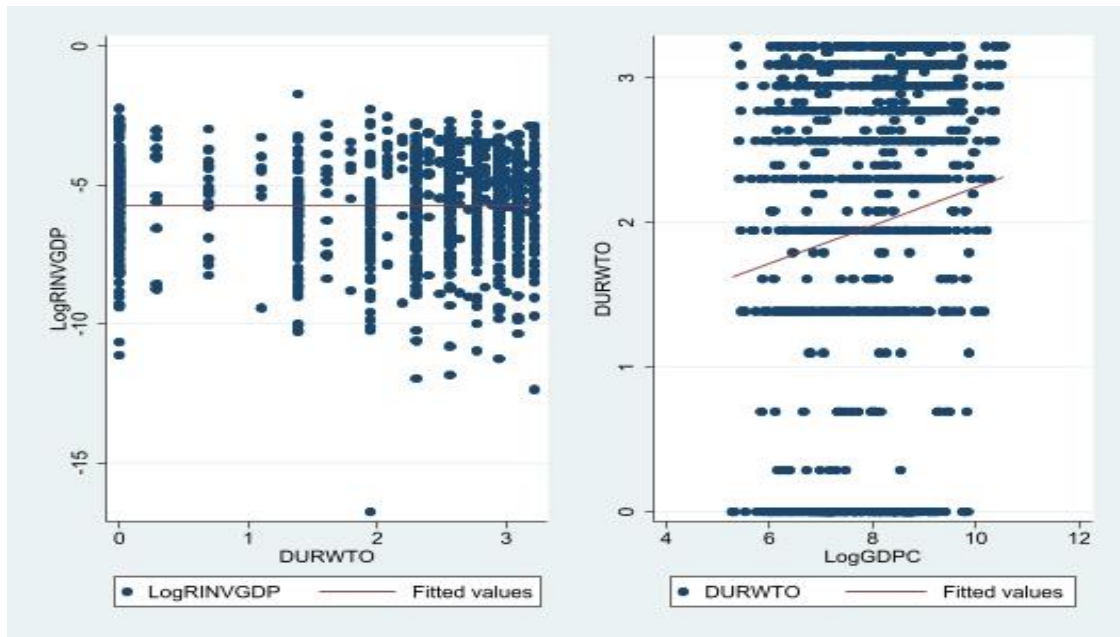
Figure 2: Duration of WTO membership in LDCs and NonLDCs



Source: Author

Note: The variable "DUR WTO1" is the non-transformed indicator of the duration of WTO membership.

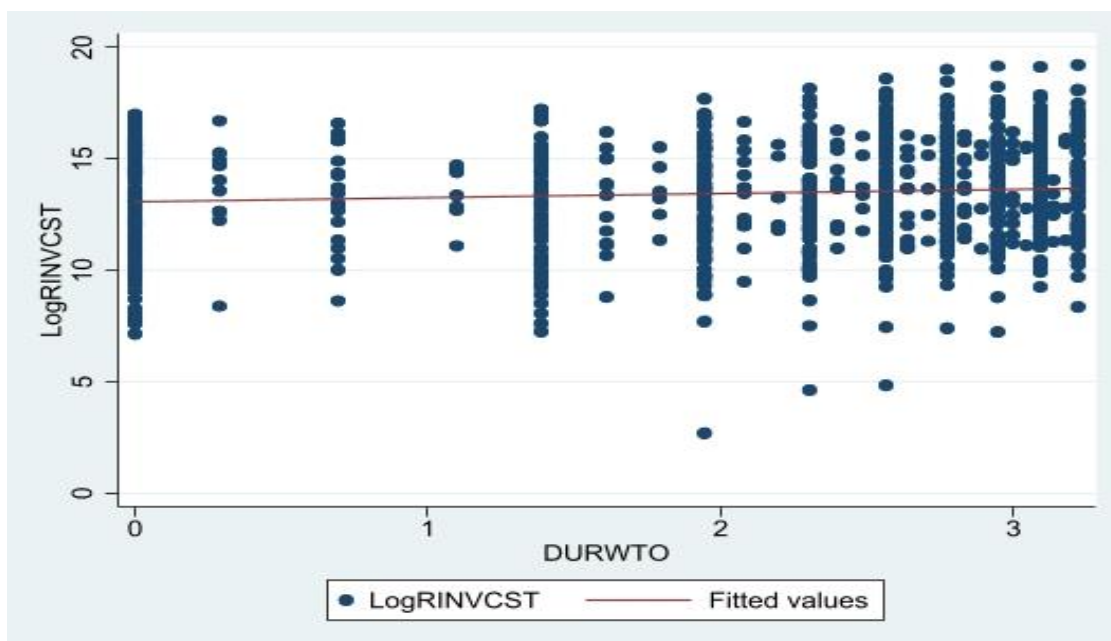
Figure 3: Correlation pattern between the WTO membership duration and the share of investment-oriented remittances in GDP, and between the WTO membership duration and the real per capita income_Over the full sample



Source: Author

Note: The variables "RINV GDP" is the share of investment-oriented remittances in GDP (not expressed in percentage). The variable "DURWTO" is the transformed indicator of the duration of WTO membership, and "GDPC" is the real per capita income (constant 2010 US\$).

Figure 4: Correlation pattern between the WTO membership duration and the real investment-oriented remittance _Over the full sample



Source: Author

Note: The variables "RINVCST" is the real investment-oriented remittances flows ((constant 2010 US\$)). The variable "DURWTO" is the transformed indicator of the duration of WTO membership.

Table 1: Effect of the duration of WTO membership on investment-oriented remittances flows
Estimators: POLS, FE and Two-Step System GMM

Variables	POLS	FE	Two-Step System GMM
	Dependent variable: Log(RINVGDPI)		
	(1)	(2)	(3)
One-period lag of the dependent variable	0.766*** (0.0349)	0.336*** (0.0527)	0.523*** (0.0183)
DURWTO	-0.0497** (0.0214)	0.0999 (0.102)	0.0974*** (0.0220)
Log(GDPI)	-0.221*** (0.0613)	-0.225 (0.142)	-0.240*** (0.0383)
Log(ODA)	0.0259 (0.0162)	0.0321* (0.0171)	0.213*** (0.0337)
Log(POP)	-0.0717*** (0.00626)	0.809*** (0.231)	-0.229*** (0.0254)
Log(REER)	-0.636*** (0.205)	-0.707*** (0.0689)	-0.398*** (0.0929)
Log(FINDEV)	0.173*** (0.0407)	0.0841** (0.0374)	0.359*** (0.0380)
DUMOUT1	-2.003*** (0.366)	-2.738*** (0.334)	-3.376*** (0.0552)
Constant	4.519*** (0.935)	-12.06*** (3.861)	1.077 (0.805)
Observations - Countries	724 - 120	724 - 120	724 - 120
R-squared/ Within R-squared	0.843	0.4407	
AR1 (P-Value)			0.0002
AR2 (P-Value)			0.4207
OID (P-Value)			0.2903

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. In the regressions based on the two-step system GMM approach, the variables "DURWTO", "DUMOUT1", "REER", "GDPI", "ODA" and "FINDEV" have been treated as endogenous. The variable "POP" has been treated as exogenous. Time dummies have been included in the regressions.*

Table 2: Effect of the duration of WTO membership on investment-oriented remittances flows
Estimator. Two-Step System GMM

Variables	Dependent variable: Log(RINVGDPI)		
	(1)	(2)	(3)
Log(RINVGDPI) _{t-1}	0.519*** (0.0125)	0.473*** (0.0142)	0.506*** (0.0161)
DURWTO	0.978*** (0.103)	-0.0662*** (0.0182)	-0.483*** (0.169)
DURWTO*[Log(GDPI)]	-0.120*** (0.0127)		
DURWTO*LDC		0.340*** (0.0361)	
DURWTO*[Log(POP)]			0.0358*** (0.0105)
LDC		-1.579*** (0.160)	
Log(GDPI)	-0.0527 (0.0360)	-0.461*** (0.0509)	-0.249*** (0.0321)
Log(ODA)	0.179*** (0.0227)	0.250*** (0.0282)	0.147*** (0.0229)
Log(POP)	-0.218*** (0.0187)	-0.315*** (0.0236)	-0.280*** (0.0304)
Log(REER)	-0.522*** (0.0575)	-0.159** (0.0621)	-0.844*** (0.0850)
Log(FINDEV)	0.373*** (0.0218)	0.228*** (0.0323)	0.361*** (0.0335)
DUMOUT1	-3.395*** (0.0294)	-3.487*** (0.0393)	-3.416*** (0.0456)
Constant	0.721 (0.594)	2.248*** (0.729)	5.169*** (0.679)
Observations - Countries	724 - 120	724 - 120	724 - 120
AR1 (P-Value)	0.0001	0.0002	0.0002
AR2 (P-Value)	0.3495	0.3490	0.3588
OID (P-Value)	0.4068	0.4833	0.2073

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. The variables "DURWTO", "DUMOUT1", "REER", "GDPI", "ODA", "FINDEV" and the interaction variables have been treated as endogenous. The variable "POP" has been treated as exogenous. Time dummies have been included in the regressions.

Table 3: Effect of the duration of WTO membership on investment-oriented remittances flows for varying levels of trade policy volatility, trade uncertainty and economic uncertainty
Estimator. Two-Step System GMM

Variables	Dependent variable: Log(RINVGDP)		
	(1)	(2)	(3)
Log(RINVGDP) _{t-1}	0.682*** (0.0139)	0.515*** (0.0179)	0.579*** (0.0152)
DURWTO	0.0543** (0.0242)	0.0646*** (0.0200)	0.233*** (0.0289)
DURWTO*TARIFFVOL	-0.126*** (0.0329)		
TARIFFVOL	0.285*** (0.0577)		
DURWTO*WTU		-0.595*** (0.0768)	
WTU		1.563*** (0.215)	
DURWTO*WU			-1.451*** (0.100)
WU			3.279*** (0.268)
Log(GDPC)	-0.215*** (0.0220)	-0.304*** (0.0249)	-0.336*** (0.0328)
Log(ODA)	0.0674*** (0.0140)	0.169*** (0.0227)	0.0886*** (0.0316)
Log(POP)	-0.0246 (0.0161)	-0.0932*** (0.0275)	-0.0792** (0.0364)
Log(REER)	-0.727*** (0.0433)	-0.664*** (0.107)	-0.833*** (0.0915)
Log(FINDEV)	0.279*** (0.0353)	0.349*** (0.0335)	0.419*** (0.0342)
DUMOUT1	-2.614*** (0.0914)	-3.130*** (0.0612)	-3.233*** (0.0737)
Constant	2.811*** (0.392)	1.249 (0.792)	3.856*** (0.785)
Observations - Countries	471 - 113	592 - 97	592 - 97
AR1 (P-Value)	0.0119	0.0004	0.0004
AR2 (P-Value)	0.6338	0.5238	0.9652
OID (P-Value)	0.7950	0.6711	0.2362

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. The variables "DURWTO", "TARIFFVOL", "WTU", "WU", "DUMOUT1", "REER", "GDPC", "ODA", "FINDEV" and the interaction variables have been treated as endogenous. The variable "POP" has been treated as exogenous. Time dummies have been included in the regressions.

Table 4: Robustness check_Effect of the duration of WTO membership on investment-oriented remittances flows

Estimator. Two-Step System GMM

Variables	Dependent variable: Log(RINVCST)					
	(1)	(2)	(3)	(4)	(5)	(6)
Log(RINVCST) _{t-1}	0.595*** (0.0174)	0.603*** (0.0111)	0.608*** (0.0155)	0.741*** (0.0114)	0.517*** (0.0165)	0.564*** (0.0193)
DURWTO	0.0524** (0.0252)	0.556*** (0.110)	-0.395*** (0.143)	0.0461 (0.0293)	0.0899*** (0.0338)	0.235*** (0.0451)
DURWTO*[Log(GDPC)]		-0.0687*** (0.0140)				
DURWTO*[Log(POP)]			0.0280*** (0.00908)			
DURWTO*TARIFFVOL				-0.147*** (0.0519)		
TARIFFVOL				0.147 (0.0945)		
DURWTO*WTU					-0.725*** (0.0802)	
WTU					1.924*** (0.231)	
DURWTO*WU						-1.421*** (0.129)
WU						3.109*** (0.343)
Log(GDPC)	0.120*** (0.0368)	0.255*** (0.0480)	0.163*** (0.0392)	0.00485 (0.0236)	0.212*** (0.0322)	0.157*** (0.0483)
Log(ODA)	0.149*** (0.0287)	0.136*** (0.0219)	0.0903*** (0.0259)	0.0467** (0.0213)	0.182*** (0.0220)	0.179*** (0.0382)
Log(POP)	0.234*** (0.0296)	0.263*** (0.0190)	0.201*** (0.0259)	0.265*** (0.0198)	0.458*** (0.0402)	0.351*** (0.0531)
Log(REER)	-0.566*** (0.0871)	-0.659*** (0.0496)	-0.869*** (0.0750)	-0.832*** (0.0406)	-0.675*** (0.124)	-0.993*** (0.105)
Log(FINDEV)	0.235*** (0.0370)	0.249*** (0.0214)	0.215*** (0.0341)	0.193*** (0.0343)	0.290*** (0.0315)	0.417*** (0.0426)
DUMOUT2	-4.982*** (0.341)	-4.818*** (0.253)	-4.857*** (0.486)	-3.349*** (0.203)	-4.762*** (0.321)	-5.088*** (0.343)
Constant	0.944 (0.683)	0.0393 (0.640)	3.482*** (0.729)	2.565*** (0.512)	-2.712*** (0.919)	0.402 (0.938)
Observations - Countries	723 - 119	723 - 119	723 - 119	471 - 113	592 - 97	592 - 97
AR1 (P-Value)	0.0060	0.0056	0.0002	0.0287	0.0004	0.0005
AR2 (P-Value)	0.4050	0.3657	0.3588	0.8804	0.5367	0.9039
OID (P-Value)	0.2528	0.1652	0.2073	0.5603	0.6183	0.3505

Note: * p -value<0.1; ** p -value<0.05; *** p -value<0.01. Robust standard errors are in parenthesis. The variables "DURWTO", "TARIFFVOL", "WTU", "WU", "DUMOUT2", "REER", "GDPC", "ODA", "FINDEV" and the interaction variables have been treated as endogenous. The variable "POP" has been treated as exogenous. Time dummies have been included in the regressions.

Table 5: Effect of the duration of WTO membership on investment-oriented remittances flows for varying volumes of international trade/economic growth rates

Estimator. Two-Step System GMM

Effect of the duration of WTO membership on the share of investment-oriented remittances flows in GDP ("RINVGD")				
VAR =				
Variables	Log(TRADE) (1)	Log(EXP) (2)	Log(IMP) (3)	GROWTH (4)
DURWTO	0.0202 (0.0170)	0.0362 (0.0293)	0.138*** (0.0242)	-0.0336** (0.0161)
DURWTO*VAR	0.167*** (0.0222)	0.0628*** (0.0230)	0.161*** (0.0207)	0.0207*** (0.00369)
VAR	-0.0653 (0.0593)	-0.168*** (0.0615)	0.295*** (0.0452)	-0.0308*** (0.00777)

Effect of the duration of WTO membership on the real investment-oriented remittances flows ("RINVCST")				
VAR =				
	Log(TRADE) (1)	Log(EXP) (2)	Log(IMP) (3)	GROWTH (4)
DURWTO	-0.00709 (0.0279)	0.0241 (0.0363)	0.199*** (0.0387)	-0.0227 (0.0239)
DURWTO*VAR	0.169*** (0.0305)	0.0790*** (0.0274)	0.216*** (0.0299)	0.0190*** (0.00343)
VAR	0.0982 (0.0778)	-0.116** (0.0582)	0.399*** (0.0633)	-0.000995 (0.00742)

Note: *p-value < 0,1; **p-value < 0,05; ***p-value < 0,01. Robust standard errors are in parenthesis. The variable "VAR" is the variable that is interacted with each of the indicator of the duration of WTO membership (i.e., "DURWTO"). In the regressions performed and whose full outcomes could be obtained upon request, the variables "DURWTO", "EXP", "IMP", "TRADE", "GROWTH", "DUMOUT1", "DUMOUT2", "REER", "GDPC", "ODA", "FINDEV" and the interaction variables have been treated as endogenous. The variable "POP" has been treated as exogenous. Time dummies have been included in the regressions. All model specifications whose results are reported here are correctly specified, as all requirements for the validity of GMM estimator are met. Additionally, in these model specifications, the coefficients of the one-period lag of the dependent variable ("RINVGD" and "RINVCST") are positive and significant at the 1% level.

Table 6: Effect of the duration of WTO membership on investment-oriented remittances flows for amounts of development aid

Estimator. Two-Step System GMM

Variables	Log(RINVGDP)	Log(RINVCST)
	(1)	(2)
One-period lag of the dependent variable	0.539*** (0.0193)	0.620*** (0.0222)
DURWTO	-1.488*** (0.371)	-1.294*** (0.378)
DURWTO*[Log(ODA)]	0.0815*** (0.0188)	0.0685*** (0.0190)
Log(GDPC)	-0.243*** (0.0372)	0.109*** (0.0374)
Log(ODA)	-0.0682 (0.0441)	-0.0924 (0.0583)
Log(POP)	-0.115*** (0.0221)	0.317*** (0.0373)
Log(REER)	-0.825*** (0.0834)	-0.911*** (0.0853)
Log(FINDEV)	0.347*** (0.0390)	0.255*** (0.0384)
DUMOUT1	-3.330*** (0.0677)	
DUMOUT2		-5.013*** (0.513)
Constant	6.772*** (1.031)	5.697*** (1.245)
Observations - Countries	724 - 120	723 - 119
AR1 (P-Value)	0.0002	0.0053
AR2 (P-Value)	0.3377	0.3470
AR3 (P-Value)	0.9630	0.6378
OID (P-Value)	0.2369	0.4597

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. The variables "DURWTO", "DUMOUT2", "REER", "GDPC", "ODA", "FINDEV" and the interaction variable have been treated as endogenous. The variable "POP" has been treated as exogenous. Time dummies have been included in the regressions.*

Appendix 1: Definition and Source of variables

Variables	Definition	Source
RINVGDP	This is the share of investment-oriented remittances in GDP. For the sake of empirical analysis, this variable is not expressed in percentage. It has been computed as the share of total remittances received by a given country (in a given year) in GDP multiplied by the annual investment rate (investment as a share of GDP, not expressed in percentage).	Author's calculation based on data on the share of total remittances received in GDP collected from the World Development Indicators (WDI), and data on annual investment rate (investment as a share of GDP) is drawn from the Penn World Table (version 10.0).
RINVCST	This is the indicator of the real investment-oriented remittances flows (constant 2010 US\$). It has been calculated by multiplying the share of investment-oriented remittances in GDP (i.e., the variable "RINVGDP") by the real GDP (constant 2010 US\$) (see for example, Herzer, 2011 who applied the same approach to compute the indicator of the real foreign direct investment inflows). This approach of computing the real investment-oriented remittances is similar to the one consisting of obtaining the remittances in real terms by dividing the variable measuring current remittances (current \$US) by the GDP deflator (constant prices) (see Ebeke, 2011; Le and Bodman, 2011; Saadi, 2020).	Author's calculation based on the real GDP data extracted from the WDI.
DURWTO	This is the transformed indicator of a country's duration of WTO membership (see Section 3.1 for further details on the computation of this indicator).	Author's computation based on data on WTO Membership extracted from the WTO's website (https://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm)
TARIFFVOL	This is the indicator of the volatility of tariffs. It is computed as the standard deviation (over non-overlapping sub-periods of 3-year) of the applied tariff rate (weighted mean) for all products. Let us denote "TARIFFVOL1" the computed indicator of tariff volatility. Given that this variable contains many zero values and displays a skewed distribution, it has been transformed as follows: $TARIFFVOL = \text{sign}(TARIFFVOL1) * \log(1 + TARIFFVOL1)$, where $ TARIFFVOL1 $ refers to the absolute value of the variable "TARIFFVOL1".	Author's calculation based on data on tariffs extracted from the WDI.
WTU	This is transformed measure of the aggregate world trade uncertainty index that measures trade uncertainty. The original data is available on a quarterly basis from 1996 onwards. For	See the database developed by Ahir et al. (2018) and accessible online

	<p>the sake of the analysis, we have computed the annual data of the world trade uncertainty index (denoted "WTU1") using for every year, the average of data over the four quarters. The trade uncertainty indicator is computed per country by counting the number of times "uncertainty" is mentioned within a proximity to a word related to trade in the Economist Intelligence Unit (EIU) country reports (Ahir et al., 2018). Ahir et al. (2018) have search EIU reports for the words "uncertain," "uncertainty," and "uncertainties" appearing near the following words: protectionism, North American Free Trade Agreement, tariff, trade, United Nations Conference on Trade and Development, and World Trade Organization. The index is equally weighted average and so called by total number of words in the Economist Intelligence Unit country reports, and multiplied by 100,000. An increase in the index shows that trade uncertainty is rising, and vice versa.</p> <p>Given that this variable contains many zeros, and has a skewed distribution, it has been transformed as follows: $WTU = \text{sign}(WTU1) * \log(1 + WTU1)$, where $WTU1$ refers to the absolute value of the variable "WTU1".</p>	<p>at: https://worlduncertaintyindex.com/data/</p>
WU	<p>This is transformed measure of the aggregate world trade uncertainty index that measures trade uncertainty. The original data is available on a quarterly basis from 1952 onwards. For the sake of the analysis, we have computed the annual data of the world uncertainty index (denoted "WU1") using for every year, the average of data over the four quarters. The world uncertainty indicator is computed per country by counting the frequency of the world "uncertainty" (or its variant) in EIU country reports. The index has been normalized by the total number of words and rescaled by multiplying by 1,000. A higher number means higher uncertainty and vice versa.</p> <p>As the variable "WU1" contains many zeros, and has a skewed distribution, it has been transformed as follows: $WU = \text{sign}(WU1) * \log(1 + WU1)$, where $WU1$ refers to the absolute value of the variable "WU1".</p>	
EXP	This is the ratio of a country's exports of goods and services to its GDP (not expressed in percentage).	Author's calculation based on data extracted from the WDI.
IMP	This is the ratio of a country's imports of goods and services to its GDP (not expressed in percentage).	Author's calculation based on data extracted from the WDI.
TRADE	This is the ratio of the sum of a country's exports and imports of goods and services to its GDP (not expressed in percentage).	Author's calculation based on data extracted from the WDI.

GROWTH	This is the economic growth rate (in percentage), that is, the growth rate of the Gross Domestic Product (constant 2010 US\$).	WDI
GDPC	Real Per Capita Gross Domestic Product (constant 2010 US\$).	WDI
REER	This is the measure of the real effective exchange rate (CPI-based) (REER), computed using a nominal effective exchange rate based on 66 trading partners. An increase in the 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 2012). The dataset could be found online at: http://bruegel.org/publications/datasets/real-effective-exchange-rates-for-178-countries-a-new-database/
FINDEV	This is the proxy for financial development, and is measured by the share of domestic credit to private sector by banks in GDP (not expressed in percentage).	WDI
ODA	This is the real net disbursements of total Official Development Assistance (ODA) expressed in constant prices 2019, US Dollar.	OECD (Organization for Economic Cooperation and Development) database on development indicators.
POP	This is the measure of the total Population	WDI

Appendix 2: List of countries used in the analysis along with the duration of their WTO membership as at 2019 (end-year of the period under analysis)

Country	Duration of Membership in 2019	Country	Duration of Membership in 2019	Country	Duration of Membership in 2019	Country	Duration of Membership in 2019
Albania	20	Croatia	20	Kazakhstan	5	Rwanda**	23
Algeria	0	Cyprus	25	Kenya	25	Sao Tome and Principe**	0
Angola**	25	Djibouti**	25	Kyrgyz Republic	22	Saudi Arabia	15
Antigua and Barbuda	25	Dominica	25	Lao PDR**	1	Senegal**	25
Argentina	25	Dominican Republic	25	Lebanon	0	Serbia	0
Armenia	17	Ecuador	24	Lesotho**	25	Seychelles	5
Azerbaijan	0	Egypt, Arab Rep.	25	Liberia**	4	Sierra Leone**	25
Bangladesh**	25	El Salvador	25	Madagascar**	25	Slovenia	25
Barbados	25	Eswatini	25	Malawi**	25	South Africa	25
Belarus	0	Ethiopia**	0	Malaysia	25	Sri Lanka	25
Belize	25	Fiji	25	Maldives	25	St. Kitts and Nevis	23
Benin**	24	Gabon	25	Mali**	25	St. Lucia	25
Bhutan**	0	Gambia**	23	Mauritius	25	St. Vincent and the Grenadines	25
Bolivia	25	Georgia	20	Mexico	25	Sudan**	0
Bosnia and Herzegovina	0	Ghana	25	Moldova	19	Suriname	25
Botswana	25	Grenada	24	Mongolia	23	Tajikistan	7
Brazil	25	Guatemala	25	Morocco	25	Tanzania**	25
Burkina Faso**	25	Guinea**	25	Mozambique**	25	Thailand	25
Burundi**	25	Guinea-Bissau**	25	Namibia	25	Togo**	25
Cabo Verde	12	Guyana	25	Nepal**	16	Trinidad and Tobago	25
Cambodia**	16	Haiti**	24	Nicaragua	25	Tunisia	25
Cameroon	25	Honduras	25	Niger**	23	Turkey	25
Chile	25	Hong Kong SAR, China	25	Nigeria	25	Uganda**	25
China	19	India	25	North Macedonia	17	Ukraine	1
Colombia	25	Indonesia	25	Oman	20	Uruguay	25
Comoros**	0	Iran, Islamic Rep.	0	Pakistan	25	Uzbekistan	0
Congo, Dem. Rep**	25	Iraq	0	Panama	22	Venezuela, RB	25
Congo, Rep.	25	Israel	25	Paraguay	25	Vietnam	13
Costa Rica	25	Jamaica	25	Peru	25	Yemen, Rep**	6
Cote d'Ivoire	25	Jordan	20	Philippines	25	Zambia**	25

*Note: Countries for which the duration of WTO membership is '0' in 2019 are de-facto non-WTO Members. The 34 LDCs in the full sample are marked with "**".*

Appendix 3: Descriptive statistics on variables used in the analysis

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
RINVGD	724	0.011	0.014	0.000	0.103
RINVCST	724	5682528.000	18,000,000	125.534	223,000,000
DURWTO1	724	11.524	7.728	0.000	24.000
TARIFFVOL1	471	0.358	1.986	0.000	38.623
WTU1	592	0.359	1.110	0.000	16.450
WU1	592	0.189	0.142	0.000	0.995
TRADE	671	0.789	0.382	0.184	2.918
EXP	671	0.352	0.193	0.060	1.502
IMP	671	0.437	0.217	0.112	2.141
GROWTH	723	4.155	2.915	-6.606	29.297
ODA	724	604,000,000	752,000,000	240,000	6,740,000,000
FINDEV	724	0.350	0.283	0.002	1.518
REER	724	106.465	28.325	56.340	645.307
GDPC	724	4402.449	4416.825	198.919	28746.430
POP	724	43,400,000	155,000,000	44102.330	1,350,000,000

Notes: The ratios "RINVGD", "TRADE", "EXP", "IMP" and "FINDEV" are not expressed in percentage.