Accounting for global migrant remittances flows

Accounting for Global Migrant Remittances Flows

Joao-Pedro Ferreira; Michael Lahr; Pedro Ramos and Eduardo Castro

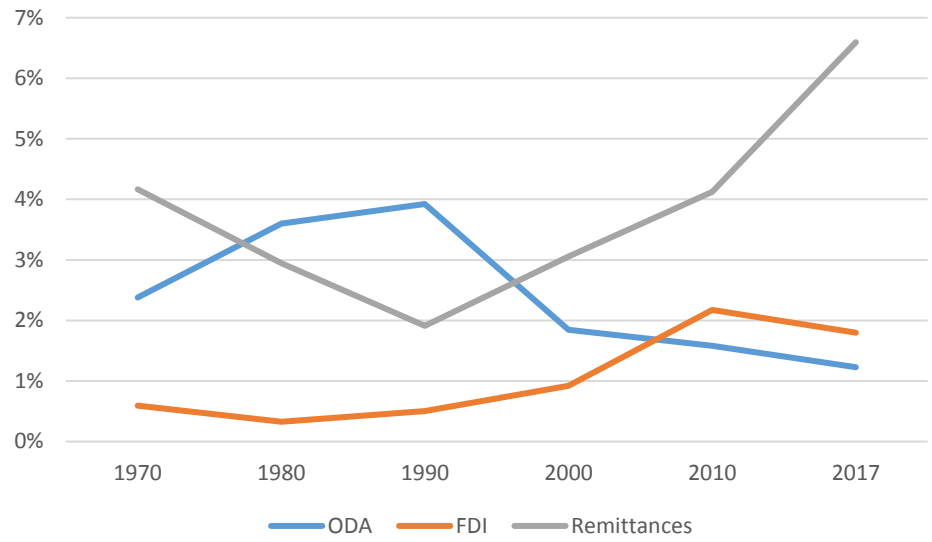
ABSTRACT. Migrant remittances are important to some countries. According to the World Bank, they comprise more than 30% of the GDP of Kyrgyzstan, Tonga, Tajikistan, Haiti and Nepal. Compared to official development aid or foreign direct investment, remittances have lately become a prime income stream for less-developed nations. In this paper, we analyze the net spillover and feedback effects from the consumer demand generated in migrants' home countries. We use World Bank estimates of remittances and the World Input-Output Database (WIOD) for the investigation with so-called "hypothetical insertion" as the tool of choice. We find that even some developed nations, like the U.S., likely benefit from remittances (the largest global path for remittances is that from the U.S. to Mexico), but that not all do (e.g., Canada does not). We stop short of making strong policy recommendations. Instead, we suggest that more attention is paid to the veracity of remittance estimates.

1. Introduction

Migrant remittances matter, especially to many lower and lower-middle income countries. Indeed, they can comprise more than 10% of their GDP. Indeed, their share of GDP can be far more than that for most industries or economic activities of a nation. In the economies of Kyrgyzstan, Tonga, Tajikistan, Haiti or Nepal, remittances constitute around 30% of GDP (World Bank, 2018). For more than a billion people who live in countries with GDPs less 4,000 US$ *per capita*, money received from relatives and friends who live abroad can be vital for purchasing basic necessities. The political and media attention given to migration issues, and consequently remittances, is in many cases biased and, to say the least, insufficiently based on scientific arguments. Indeed, workers or pensioners in richer countries sacrifice a share of their potential savings to improve the lives of those in their home country. The Global Forums on Remittances, Investment and Development (IFAD, 2018) estimates that 75% of remittances are used for immediate needs such as food, shelter and healthcare; the remaining 25% are used to invest in education or savings. Also, when compared with other transboundary flows, such as Official Development Aid (ODA) or Foreign Direct Investment (FDI), remittances have become a prime income stream for less developed countries. Figure 1 compares the weight of ODA, FDI and migrant remittances in the lower and lower-middle income countries GDP since 1970. Taylor (1999) concludes that the decision to migrate definitely influences international movements of people and the monetary flows, both in the migrant host country and in the regions from which migrants come. Remittances shape local, regional or national production as they change household consumption and, consequently, national production (Jahjah et al., 2005; Castaldo and Reilly, 2015).

While remittances can be quite important to some developing nations, they tend to be a minor direct loss to high-income countries (according to World Bank (2019), approximately 0.6% of their GDP). So, migrant remittances appear to play a significant role in reducing international inequalities; they help to accomplish Sustainable Development Goals (Adams and Page, 2003). The Global Forum on Remittances, Investment and Development, structured several recommendations around pillars that include the need to "acknowledge the full spectrum of migrant contributions" or "improve remittance-related data to foster effective policies" (IFAD, 2018).

Figure 1: Remittances have surpassed ODA and FDI in the share of GDP supplied to low and lower-middle countries



Source: World Bank (2018)

The World Bank, U.N. and other international institutions have been improving the availability of remittances data. But research to date still focuses almost exclusively on the direct effects of remittances, neglecting the role of international dependencies among industries and countries. As value chain and international trade studies have shown, despite any final consumption that occurs in a specific economy, the Gross Value Added (GVA) or Employment effects are geographically distributed among different regions and countries with the production inputs needed to satisfy that consumption also has a multiplicity of origins (Timmer et al., 2012). So, the international distribution of migrant remittances also should have distinct impacts according to the way people in the home country spend their money or, even, the economic structure of a given region. Taylor (1999) highlights that the inflow of remittances also has different impacts when they are spent on basic products or, otherwise, invested in physical capital that benefits local production and firms (Taylor, 1999). Nevertheless, this suggests that following flows of transactions beyond the direct effects is critical to a proper understanding of the full nature of the allocation of the total economic effects. Indeed, the set of all flows should be integrated into a framework that assesses them in the context of the general equilibrium effects generated, namely the spillovers and feedback effects among national economies (Dietzenbacher et al., 2013). The advent of intercountry input-output (I-O) models enables such work.

Interestingly, transboundary income flows, such as remittances, remain inadequately handled as noted as early as Rose and Stevens (1991). These authors consider that, in multiregional I-O models (and hence, also in intercountry frameworks), the assumption that household consumption only directly depends on the labor income distributed by industries located in the same country is quite restrictive[1]. So, no other explicit tax, savings or other monetary flows across countries adjustment are made. This idea seems less acceptable as some countries depend more on other macroeconomic flows that are not directly

[1] An exception to this usual procedure is mostly commonly found in I-O models devoted to the study of regional and urban areas and which commuting flows are included (Ferreira et al., 2018).

associated with trade or production (FDI, aid assistance, migrant remittances and other financial transactions).

Having in mind this gap, herein we examine remittances in a new light and assess their economic impacts at the international level. In section two, we detail some numbers of World Bank and UN data. Our research has two major goals, one that is methodological and involves extending the World Input-Output Database (WIOD) to include migrant remittances. More specifically, we permit transboundary income flows, so that households from one country "transfer" income to another country in which some of those funds are spent. This approach is further developed in Section 3. A second goal addresses how remittances shape national economies through value chains by departing from the World Bank current estimates of migrant remittance flows. To do this, we assess how remittances affect the interdependencies among countries by measuring changes in the national GVA as embodied in production required to satisfy each country's final demand[2]. This analysis is presented in Section 4. In Section 5, we identify new opportunities and avenues for research in remittance and international migration studies.

2. Migrant Remittances: Definition and Data

Trade is acknowledged as a major source of national income. But to some less-developed economies, migrant remittances are more important. The IMF (2007) and the OECD (2006) define migrant remittances as the sum of three different sections of the balance of payments:

- Gross earnings of workers residing abroad for less than twelve months, including the value of in-kind benefits (part of the compensation of employees);
- Monetary transfers sent home from workers residing abroad for more than a year;
- Net wealth transfers of migrants who move (permanently) from one country of employment to another.

While this definition may seem clear, it is less so in practice. Perhaps not surprisingly those that reconcile data observe several accounting difficulties that affect the quality of the remittance data and, therefore, its comparability across countries (World Bank, 2009). Some national banks record remittances as "compensation of employees", but others do not distinguish migrant transfers from "other current transfers from other sectors".[3]

A plethora of studies and reports acknowledge that remittances have increased in volume and relative importance worldwide. Yang (2011, p. 129) reports that, since the late 1990s and according to the available statistics,

> the growth rate of remittances in real terms has been impressive: in the decade preceding the 2008 financial crisis (1999–2008), the average annual real growth rate of remittances was 12.9 percent. This compares to the 11.0 percent annual real growth rate of foreign direct investment and exceeds the 5.8 percent annual real growth rate of official development assistance.

Thus, it is clear that remittances deserve more attention from the international community.

The Statistics Division of the World Bank produces a unique contribution—an annual bilateral remittances matrix. Departing from the balance of payments data, where some of the countries detail their

[2] The gross value added (GVA) is the measure of the value of goods and services produced in an area, industry or sector of an economy. GVA plus taxes less subsidies equals the gross domestic product.

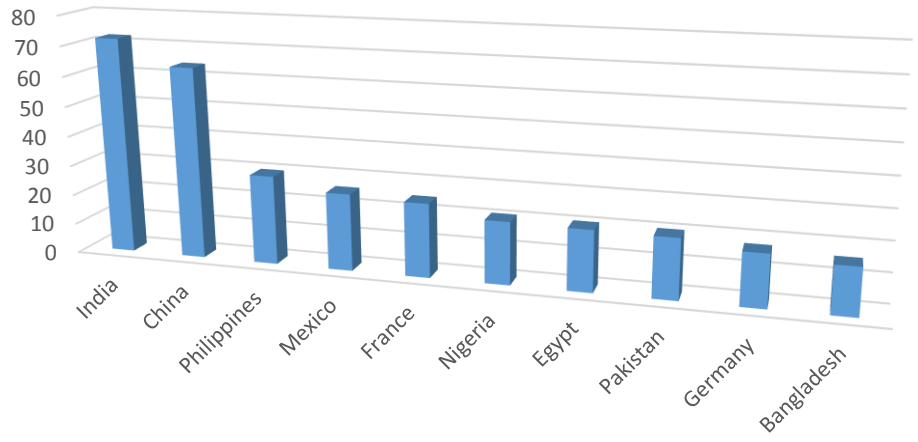
[3]Despite methods established as a common approach to estimate migrant remittances the OECD and IMF warns that remittances data *per country* have serious limitations, so that remittance estimates should be interpreted with some degree of caution. For more, please see Taylor (1999), Daianu (2002) and Ratha (2003).

inflows and outflows of remittances, the World Bank estimates tables for each year, between 2010 and 2017, that report migrant remittances flows by country of origin and destination. To be consistent with the WIOD data, in this work, we focus particularly on the World Bank's 2014 matrix. Each matrix relates remittances flows in millions of US$ for 188 World Bank member countries as well as for 26 other economies that report separate social and economic statistics (World Bank, 2016). Cells in each column of these remittance matrices represents inflows into a particular country while the cells along a row show what countries receive income outflows from a country. For example, it is possible to observe that the U.S. economy receives $6.6 billion in income inflows via remittances while immigrants living in the U.S. send more than $149 billion to their respective countries of origin. Naturally, the diagonal of this table is composed by null values. The World Bank estimates rely upon international migration data for the period 1960–2013 provided by the U.N. Population Division (2013) and complemented by more recent national censuses. But the World Bank has to deal with several data difficulties, as credible national data on bilateral remittances are generally unavailable (Ratha and Shaw, 2007). This is not only because some countries do not report sources of remittances inflows but also either because other countries underestimate outflows due to internal restrictions on international transfers or because of the irregular status of migrants. Manic (2017) underlines that the data on remittances excludes some money transferred through firms such as Western Union or MoneyGram as well as any cash or in-kind remittances (which can be important among countries that share a border). Nevertheless, the World Bank estimates the inflow and outflows of international transfers by allocating remittances received by using the distributions of their national migrants' destination countries.[4] In this vein, the integration of remittances into broader economic frameworks is a research gap that this article begins to address.

The World Bank estimates more than 247 million people (3.4 percent of the world population) live outside their countries of birth. The Mexico–United States path is the most heavily trodden migration corridor in the world. The Russia–Ukraine path is the second largest, followed by Bangladesh–India, and Ukraine–Russia path. In economic terms, year 2015 estimates of worldwide remittance exceed $601 billion (about 1% of world GDP). Of that, the World Bank estimates that developing countries receive about $441 billion (nearly three quarters), nearly three times the volume they receive via official development assistance. Figure 1 shows the Top 10 remittance recipients in $US billions for the year of 2015.

[4] According to Ratha and Shaw (2007), this proxy poses some difficulties because some migrants move to countries with lower per capita income than the origin country. It is unlikely that migrants residing in lower-income countries transfer funds to family members in high-income countries on the scales suggested by World Bank estimates.

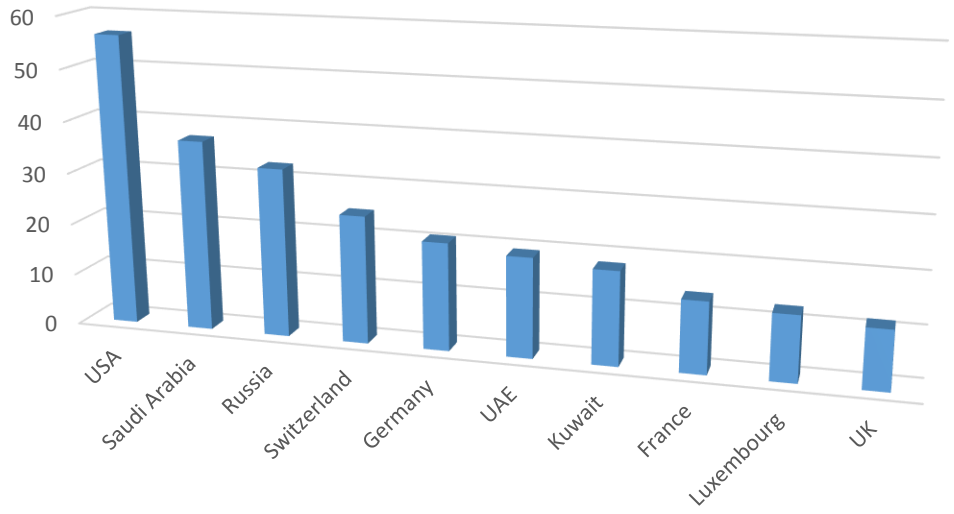
Figure 1: Top ten countries in migrant remittances inflows in 2015 ($US billions)



Source: *Migrants and Remittances Factbook* (2016)

Interestingly, the top 10 recipient countries account for more than 50% of all remittances; many are large developing economies. According to World Bank estimates, India and China alone receive more than 20% of worldwide remittances. Although not among the top 10 receiving countries, remittances comprise more than 25 percent of the national GDP in small economies like Tajikistan, the Kyrgyzstan, Nepal, Tonga, Moldova and Liberia.

Figure 2: Top ten countries in migrant remittances outflows in 2015 ($US billions)



Source: *Migrants and Remittances Factbook* (2016)

Figure 2 shows that the United States is the top remittance-sender. It alone accounts for about 10% of all remittance outflows. Interestingly, three Middle East economies are among the top-10 sending countries. Combined, immigrants into Saudi Arabia, United Arab Emirates and Kuwait create more remittances outflows than the U.S., according to World Bank estimates, and account for 12% of all remittance flows. Russia is another relevant remittance-sender, mainly because of flows to former Soviet states. Perhaps unsurprisingly, small wealthy economies have relatively higher remittance outflows as a

share of their GDPs. In 2015, remittances outflows were more than 10% of the GDP for Luxembourg, Marshall Islands, Oman, Lebanon, Kuwait, Maldives and Malta.

In absolute terms, there are seven paths that represent flows of more than US$10 billion per year. The most important is that between the U.S. and Mexico ($25 billion US). By degree of importance, the other most relevant paths are U.S.-China, Hong Kong-China, UAE-India, U.S.-India and Saudi Arabia-India.

A prime decision for emigrants is the decision to emigrate. This "choice" masks different reasons. Taylor (1999) suggests that migration decisions are part of a household strategy to raise their income, obtain sufficient funds to invest in future activities and/or mitigate some income risks. We thus expect migrants to move from where their earnings are low (or in which living is politically risky) to countries where they expect to earn more (or the politics of day-to-day life are less risky). After moving to their new homes abroad, immigrants recount numerous possible motives for sending remittances. Docquier and Rapoport (2005), OECD (2006) and Jena (2018) discuss several of them. The reasons run from "pure altruism" (to help others in their former country) to "pure self-interest" (they will eventually benefit from their "investment" in their home country) to complying with an explicit family agreement (as insurance or a loan made between the migrant and his/her relatives). Variations in the natures of households that migrate limit the ability to generalize about remittance behavior (Carling, 2008). Despite the migrant's motivation to send money back, it is consensual that migrant remittances can have important effects on the national income distributions and, consequently, on households' consumption, which will have other indirect effects in the economy (Taylor and Wyatt, 1996; Ratha and Shaw, 2007; Bang et al., 2016). While well known to interindustry analysts, Manic (2017) recognizes that the resulting shock in demand, promoted by increasing remittances, can resonate within an economy differently and alter regional or national economic dynamics, including the spatial distribution of capital. Similar phenomena also happen internationally. Taylor (1999) underlines that remittances can positively influence production in emigrants' home countries since they enhance households' abilities to consume as well as pump up some firms with scarce capital and, hence, some national economies with scarce savings and foreign exchange. In macroeconomic terms, remittances are a form of trade that generates multiplier effects on incomes, employment, and production. They are worthy of study.

For certain, what all these works agree is that the international economic consequences of remittances are likely to be far more complex than their simple direct effects. So, we propose to assess its indirect and induced effects, by integrating such flows in a framework of comprehensive set of international and inter-sectoral linkages, and shed some light on the impacts of such economic phenomena.

3. Incorporating Remittances in a WIOD 'closed' framework

Input-output tables link production and consumption among the different industries, intuitions, households, and regions within one framework. To assess the economic implications of adding migrant remittances, we extend the WIOD framework so that migrant remittances data is included. WIOD essentially is a symmetric multiregional international input-output table (Dietzenbacher et al., 2013; Timmer et al, 2015). WIOD contains data for each year from 2000 to 2014. We use WIOD for the most recent year—2014. The traditional form of an input-output table is described by Miller and Blair (2009) and presented in Figure 1. In WIOD intermediate demand is described by 56 industries and for 44 economies (43 countries plus the "Rest of the World"). Values are presented in US$ millions. WIOD also includes some socio-economic accounts, which contains industry-level data on jobs, capital stock, the compensation of employees and prices. But WIOD accounts do not include transboundary income flows; so, gross and net inflows and outflows of income are identical.

Rose and Stevens (1991) note that transboundary transactions beyond those for commodities and services have almost never been adequately addressed. This definitely remains the case for WIOD and other recent intercountry I-O databases. But some suggestions have been made vis-à-vis I-O and literature in the field of regional science. As an example, the following note that such flows have relevant economic effects: the income flows as interregional commuting flows (Hewings et al. 2001; Ferreira et al., 2018), inheritances and intergenerational flows in favor of elderly or youth (Laitner, 1997; Kohli and Künemund, 2003; Gamburd, 2015), foreign direct investment, international aid and migrant remittances (Manic, 2017). Herein, we suggest a method that introduces remittances into intercountry I-O accounts and, hence, modelling. This approach might be applied to other transboundary flows and also shed some light on interdependencies beyond those embodied in international trade.

As in any symmetric I-O table, those of WIOD can be transformed to estimate the direct plus indirect impacts of changes in the final demand while accounting for spillover and feedback effects. Indirect effects are estimated through the estimation of what is commonly called an 'open' economy matrix (Miller and Blair, 2009). In this particular type of Leontief matrix, intermediate consumption is endogenous while all final consumption is exogenous. Miller and Blair (2009: 34) suggest that "in the case of households, especially, this 'exogenous' categorization is something of a strain on basic economic theory". Indeed, when production changes, aggregate household income also changes, and this naturally affects consumption. As a consequence, many analysts 'close' the model with regard to household consumption, so that it endogenously generates income. Figure 3 shows the traditional structure of the 'closed' I-O, extended for the multicountry case, as in WIOD.

Figure 3: 'Closed' I-O model

	Industries	Household Final Consumption	Other Final Consumption	Total
Industries	**Z**	**C**	$\bar{\mathrm{F}}$	x
Labor and Other Domestic Income	**Λ**	**0**	**0**	$\boldsymbol{\lambda^q}$
Other GVA Components	**T**	**0**	**0**	**t**
Savings and Other Transboundary Income Flows	**0**	**S**	**0**	**s**
TOTAL	**x**	$\boldsymbol{\lambda^r}$	$\bar{\mathbf{f}}^{\boldsymbol{r}}$	

The upper-left quadrant is the **Z** (2,464 × 2,464) submatrix represents global intermediate demand, which represents the international and intranational trade. A given element z_{ij}^{qr} represents the use of input by industry *j* located in the country *r* of products produced by the industry *i* located in country *q*. When *q* and *r* are equal, intracountry trade is identified; when *i* and *j* are equal it is intra-industry trade. The labor income element ($\lambda_j^{qr} \in \mathbf{\Lambda}$) represents the income paid by industry *j* in country *r* to households residing in country *q*.[5] The absence of transboundary flows means that $\boldsymbol{\lambda}_i^{qr}$ is, indeed, a vector since there are no income flows from country *r* to country *q*. Thus, all income received by households of each country fully

[5] WIOD socio-economic accounts do not contain information concerning the "Rest of the World" economy. As the "Rest of the World" is central to this analysis, our model displays "GVA" (the sum of labor income and other GVA components) where **Λ** and $\boldsymbol{\lambda^q}$ appear in Figure 3. So, it is assumed, due to the absence of more information, that all the GVA is distributed intranationally.

originates from industries within its borders. In this way, the vectors $\mathbf{x}^r$ and $\boldsymbol{\lambda}^r$ are readily transposed as $\mathbf{x}^q$ and $\boldsymbol{\lambda}^q$.

Also inside the bold border in Figure 3, the **C** (2.464 × 44) submatrix, which is composed of elements c_i^{qr} corresponds to the household final consumption in country *r*. As in matrix **Z**, **C** includes international dependencies. So, households living in *r* consume products produced in the industry *i* in country *q*. In economic terms, the inclusion of **C** and **Λ** elements ensures that the household consumption now depends of the income generated by each industry in each country as any typical 'closed' I-O model. In other words, they are endogenous. Additionally, the submatrix $\bar{\mathbf{F}}$ corresponds to the total final consumption less household consumption. So, $\bar{\mathbf{F}}$ plus **C** correspond to total final demand. Finally, the share of household income ($\boldsymbol{\lambda}^r$) that is not included in the model is represented by the (44 × 44) matrix **S**, which when summed across rows is denoted by the vector **s**.

The 'core matrix' defined by the bold border is the one that will give origin, after the adequate algebraic procedures, to the Leontief matrix (**L**). The direct requirements matrix **A** is estimated by dividing the intermediate consumption (z_{ij}^{qr}) with an associated appended element of distributed labor income $\boldsymbol{\lambda}_j^{qr}$ by the total output per industry (x_j^r), and appending to that resulting matrix the elements of the household consumption matrix (**C**) multiplied by the inverse of the total income earned by the "household sector" ($\boldsymbol{\lambda}^r$). This matrix can be partitioned in different submatrices as follows:

$$\mathbf{A} = \begin{bmatrix} \mathbf{A_{11}} & \mathbf{A_{12}} \\ \mathbf{A_{21}} & \mathbf{0} \end{bmatrix} \qquad (1)$$

As described in Lahr and Miller (2001), the standard representation of an *n*-sector and *m*-country I-O direct requirements matrix are shown in the upper-left of this partitioned matrix, which is identified as $\mathbf{A_{11}}$. The partition $\mathbf{A_{12}}$ represents household consumption coefficients. Finally, the $\mathbf{A_{21}}$ represents the labor income coefficients by industry and country. Thus, given the Leontief matrix is estimated as

$$\mathbf{L} = (\mathbf{I} - \mathbf{A})^{-1} \qquad (2)$$

where **I** is the identity matrix with the same dimension as matrix **A**. The matrix **L** can also be presented in partitioned form as

$$\mathbf{L} = \begin{bmatrix} \mathbf{\Phi} & \mathbf{\Phi A_{12}} \\ \mathbf{A_{21}\Phi} & (\mathbf{I} + \mathbf{A_{21}\Phi A_{12}}) \end{bmatrix} \qquad (3)$$

where $\mathbf{\Phi} = (\mathbf{I} - \mathbf{A_{11}} - \mathbf{A_{12}A_{21}})^{-1}$. Final demands and gross outputs can be partitioned similarly, so that now

$$\bar{\mathbf{f}} = \begin{bmatrix} \bar{\mathbf{f}}_1 \\ \bar{\mathbf{f}}_2 \end{bmatrix} \text{ and } \mathbf{x} = \begin{bmatrix} \mathbf{x_1} \\ \mathbf{x}_2 \end{bmatrix}$$

In this case, x_1 represents the industries output, the $\bar{\mathbf{f}}_1$ the final exogenous demand direct towards industries, the x_2 represents the total household income and the $\bar{\mathbf{f}}_2$ is equal to zero, once there is any final demand directed towards income.

As we want to close the model to include transboundary flows, the assumption that income and consumption depend only directly on flows that originate within country's borders represents a critical constraint. So, inspired by Rose and Stevens (1991) and Li et al. (1999), we propose including other kinds of income flows, say those related to household savings. The values introduced are those obtained after

adapting the World Bank bilateral migrant remittances matrix to the 43 economies of the WIOD database[6]. The new structure of the model is presented in Figure 5[7].

Figure 5: 'Closed' I-O model with migrant remittances

	Industries	Household Final Consumption	Other Final Consumption	Total
Industries	**Z**	**C**	$\bar{\mathrm{F}}$	**x**
Labor and Other Domestic Income	**Λ**	**M**	**0**	$\mathbf{h}^q$
Other GVA Components	**T**	**0**	**0**	**t**
Savings and Other Transboundary Income Flows	**0**	**Σ**	**0**	$\boldsymbol{\sigma}$
TOTAL	**x**	$\mathbf{h}^r$	$\bar{\mathbf{f}}^r$	

The above means that a new nonzero partition **M** must be added. In economic terms, this algebraic change implies that household consumption no longer depends exclusively on the income distributed within a country by its industries but also from the remittances flows from households located in other countries. This partition is a 44 × 44 matrix composed of elements that consist of remittances benefitting country *q* and with origin in country *r*. In **M**, the diagonal elements (where $q = r$) are strictly null values, except in the case of the "Rest of the World". The inclusion of this partition does not change industries' outputs in each country. But, $\boldsymbol{h}^r$ are the total household income flows that now also include pertinent gross inflow of remittances (**i**'**M**, where **i** is a summation vector of ones with appropriate length) among countries. And, similarly, **S** in Figure 3 adjusts and gives way to matrix **Σ**, as it does not include remittances since they are now incorporated inside the bolded border. Moreover, the inclusion of M within the bolded area implies that remittances are endogenous to our model. This means that a given shock in consumption should generate income elsewhere with the economy. That is, remittances from a country generates consumption elsewhere in the world. In our model, the remittances that are transmitted across countries is exogenously identified by the World Bank. They could potentially be made endogenous to the model, however, using the series of WIOD tables and World Bank data.

Remittances represent an income of country *q* with origin in the country *r*, they are also a 'kind' of expenditure made by households in *r* country. As a result, household consumption coefficients in the new coefficient matrix ($\overline{\mathbf{A}}$) are now smaller to national and international consumption dependencies (directed towards industries) as more income in each country is being distributed internationally (but directly to the households). Those remittances effects in each country depend on the balance between the reduction in coefficients and the rise due to remittances. This causes the multiplier effects to change, as well as the new Leontief inverse, $\overline{\mathbf{L}}$. Otherwise, the exogenous final consumption ($\bar{\mathbf{f}}$) is constant, as well as the industries' output per country. So, accordingly

[6] The exception is Taiwan that has no migrant remittances official records in the World Bank database. So, specifically for this work the Taiwan economy was merged with the Rest of the World economy.

[7] The **M** matrix is available as supplementary online data in a spreadsheet file.

$$\bar{\mathbf{x}} = \bar{\mathbf{L}}\bar{\mathbf{f}} \qquad (5)$$

or, instead

$$\begin{bmatrix} \mathbf{x}_1 \\ \bar{\mathbf{x}}_2 \end{bmatrix} = \bar{\mathbf{L}} \begin{bmatrix} \bar{f}_1 \\ \bar{f}_2 \end{bmatrix} \qquad (6)$$

With different total income distribution, the same previous shock will have a different economic distribution among the world economies, differently affecting each industry in each country. As represented by Lahr and Miller (2001), the insertion of a new submatrix where instead it was a null quadrant will now change the partitioned Leontief matrix, that now becomes

$$\mathbf{L}' = \begin{bmatrix} \boldsymbol{\gamma} & \boldsymbol{\gamma}\,\mathbf{A_{12}}\,(\mathbf{I}-\mathbf{A_{22}})^{-1} \\ \boldsymbol{A_{21}\gamma}(\mathbf{I}-\mathbf{A_{22}})^{-1} & (\mathbf{I}+\mathbf{A_{21}}\boldsymbol{\gamma}\,\mathbf{A_{12}}(\mathbf{I}-\mathbf{A_{22}})^{-1}) \end{bmatrix} \qquad (7)$$

where $\boldsymbol{\gamma} = (\mathbf{I}-\mathbf{A_{11}}-\mathbf{A_{12}}(\mathbf{I}-\mathbf{A_{22}})^{-1}\mathbf{A_{21}})^{-1}$. The $\mathbf{A}_{22}$, presented in equation (7) now represents the submatrix **M** region in the input coefficients matrix in Figure 4. And will have effects in the multipliers presented in all the matrix.

Summing up, the effects enhanced through remittances depend on the equilibrium between the following structural changes: (1) the reduction in the household consumption coefficients; (2) income earned via the production activity engaged in the other economies; and, (3) the income that flows out to expand the consumption of households in other economies. In practical terms, two examples are presented. First, a given shock in the U.S. economy now will, in this scheme of things, favor more Mexico's economy through the entrance of monetary flows (besides those already considered via trade) that are directly sent to Mexican households. Or second, a shock in the economy of Luxembourg will have an expansionist effect in Portugal, due to its large migrant community living in the country, and a contractionary effect in US, as the imports of Luxembourg from the U.S. (measured as a share of the income) reduce and the residual remittances flows from Luxembourg to the U.S. do not compensate that decrease. Finally, as all of these factors are integrated in the WIOD table, the results are really determined by the intricate interconnections established between nations and sectors of the world economy.

Finally, I-O has the potential to integrate a much larger comprehensive set of transboundary flows. This work is still a modest contribution, as many other flows are not hereby integrated. Nevertheless, the innovative integration of remittances extension shall open new avenues to the future integration of some other relevant variables and dimensions.

4. Results

To assess the impacts of migrant remittances, we compare the change in the GVA after the inclusion of this new flow in our model. The impacts generated by the production of any given industry or any country affect the world economy differently. Indeed, as Rose and Stevens (1991) highlight, the inclusion of an additional flow in an I-O framework affects the multiplier estimates. To simplify the interpretation of the results and analyze the specific impacts of bilateral relations between two economies, we estimate the effects in an economy of a 1% change in exogenous final demand ($\bar{\boldsymbol{f}}^{\boldsymbol{p}}$) directed towards country *p*, for each one of the economies considered in the WIOD. So, given that

$$x_i^p = \mathbf{L}\,\overline{f}^p \text{ and } \overline{x}_i^{qp} = \overline{\mathbf{L}}\;\overline{f}^p \qquad (8)$$

Thus, when in both cases the economy *p* is affected by the same shock ($\overline{f}^p$) and in one case, the result for output in country *q* will be x_i^{qp}, when no remittances are included in the model and otherwise $\overline{x}_i^{qp}$ with remittances)**.** This represents the output of the industry *i* located in country *q* following a shock in *p.* So, the contribution of remittances to change the economic linkages are given by the differences between the initial output obtained without remittances and the new output obtained in the second estimation. So,

$$\omega^{qp} = \sum x_i^{qp} - \sum \overline{x}_i^{qp} \qquad (9)$$

ω^{qp} is the impact of remittances in the total output of country *q* incorporated in 1% of country *p*'s exogenous final demand. But, as the value added is a better measure of a sector's contribution to an economy, the output values (at the industry level) are multiplied by the value-added coefficients in order to obtain the migrant remittances contributions in terms of GVA.

We underline that this I-O application departs from the WIOD for the year 2014 and extends the analysis of direct remittances presented in the World Bank statistical reports for that same year. So, the effect on national economies not only considers the balance between inflows and outflows, as in World Bank Statistics, but also all the interdependencies established between countries at the intermediate and household consumption level and, ultimately, as collected in the GVA coefficients.

We analyze the data for the 44 economies available in the 2014 WIOD database. We do so by taking a general equilibrium view of remittances flows by economy. This procedure is combined in four new tables presenting: (1) cross-country GVAs in the case of no transboundary flows; (2) cross-country GVAs in the case of transboundary flows from remittances; (3) absolute differences in cross-country GVAs; and, (4) the relative difference in the interdependencies established between countries[8]. Not surprisingly, we derive findings that are quite different from those described by the World Bank. Sometimes the net effects take on unexpected directions and magnitudes, at least compared to the naive effects related by the World Bank. In absolute terms, the influence of the larger and most developed countries on less-developed economies, such as the Rest of the World, India or China, is remarkably stark. So, (even) stronger interdependencies are now observed between the U.S. and these less-developed nations. In fact, the whole image somehow changes, with new critical flows arising from smaller countries emerging, while other countries like Portugal, India or Greece appear to be far more connected to countries like Switzerland and Canada. Recall that our results refer strictly to 2014 remittances data as reported by the World Bank.

Figure 5 and Figure 6 summarize the most relevant results in both absolute and relative terms. To better understand the numbers presented in Figure 5 and 6, we give two examples. Observing Figure 5, a 1% change in final demand on the US embodies $7.65 billion US in GVA on the Rest of the World in the base scenario without remittances. Once remittances are included, the independencies change; now the value of the Rest of the World embodied in the same amount of final demand is $7.98 billion U.S. The absolute difference is $331 million U.S. or 4.3% as shown in Figure 5. Alternatively, a 1% of Canada final

[8] The four tables compiling our results are available upon request and have been submitted as supplementary data.

demand shock creates $81.7 million US of GVA in India. After including remittances this value rises to $110.8 million U.S., a difference of about 36% ($29.1 million U.S.). Figure 5 shows the top 15 bilateral remittances differences due to a 1% change in the total final demand of each economy. It shows that the worldwide effects of migrant remittances are most sensitive, in absolute terms, to final demand changes in the U.S. economy. Indeed, a change by 1% in the US final demand affects the GDP of economies in Mexico (by 160 US$ million), India (by 140 US$ million) and China (by 120 US$ million) most and, more marginally, the economies of Germany, Japan and France. The Rest of the World economy is the one that depends most on migrant remittances since 1% change in the final demand of countries such as, Russia (69 US$ million), Great Britain (51 US$ million), Canada (48 US$ million), France (39 US$ million), Germany (33 US$ million) and Italy (31 US$ million) can generate significate remittances flows that benefit this 'region' economy.

Figure 5: Top 15 remittances GVA impacts of a 1% change in final demand in absolute (and relative) terms (US$ millions)

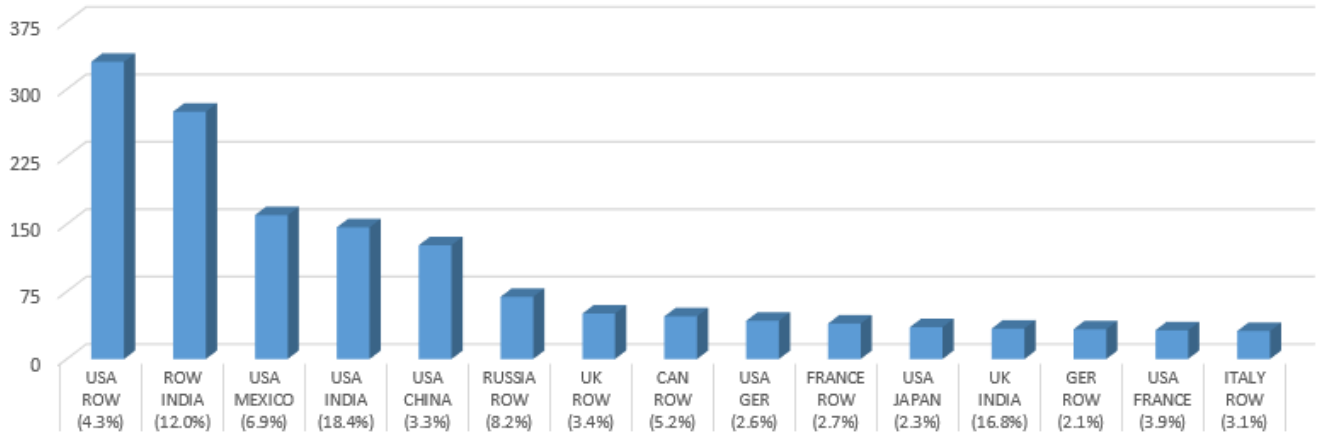
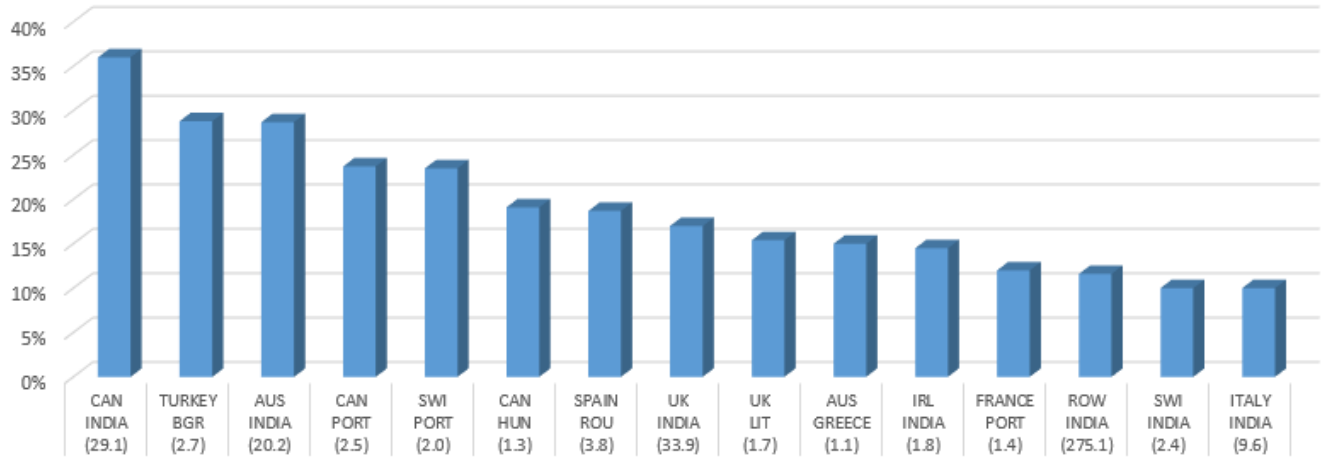


Figure 6: Top 15 relative remittances impacts in GVA due to 1% change in final demand (and in absolute terms – US$ millions) [9]



Legend: AUS – Australia; BGR – Bulgaria; CAN – Canada; GER – Germany; HUN – Hungary; IRL – Ireland; LIT – Lithuania; PORT – Portugal; ROU – Romania; ROW – Rest of the World; SWI – Switzerland; UK – United Kingdom; USA – United States of America

Numbers in Figures 5 and 6 suggest that, despite the flows established between some of the world largest economies, migrant remittances can be of great importance to smaller economies that have expatriates spread around the world. Indeed, Figure 6 shows the most critical top 15 changes in GVA dependencies, in relative terms, when migrant remittances are included in the model.

Accordingly, after including migrant remittances, a 1% change in final demand in Canada has an 36% additional impact on India's economy when compared with the scenario without remittances. This is not a unique case. India now also benefits more from changes in the final demand from the economies of Australia, the Rest of the World, Great Britain and, even, the Ireland. Another example is Portugal. Compared with former effects of 1% final demand in Canada, Switzerland or France, the specific effects in the Portuguese economy are now higher in 24%, 23% and 12%, respectively. Countries of eastern Europe also benefit somewhat from remittances. Bulgaria's embodied GVA in 1% of Turkish final demand is 29% high while a change in 1% of Spanish final demand enhances Romania's GVA by 19% more than without remittances. These results, highlight how remittances have the potential to grossly alter the extension of international interdependencies.

Summing up, the impacts generated by all related changes also help us to better understand the international effects of migrants on national economies. Assuming, the total impact of remittances in countries GVA, Table 1 shows the countries that induce a higher increase in other countries GVA as a share of their own national GVA and in contrast, those that benefit relatively more from remittances, as a share of its own national GVA.

Table 1: Top economies inducing and benefitting (in relative terms) due to remittances

Countries that induce a higher increase in remittances (measured as a share of their own GVA)		**Countries that benefit more from remittances** (measured as a share of their own GVA)

[9] In order to exclude more residual flows, the flows presented in Figure 6 represent a minimum of 1 million US$.

Canada	1.12%		India	2.94%
Australia	0.84%		Mexico	1.39%
Russia	0.79%		Portugal	1.03%
France	0.70%		Malta	0.95%
Switzerland	0.66%		Bulgaria	0.91%

So, as it is possible to understand, in economies that stimulate large remittances outflows, the leakage to other national economies due to remittances is more important, like in the case of Canada. But, the increasing international outflow of these richer countries is offset by important gains in smaller more-fragile economies as India, Mexico, Portugal, Malta and Bulgaria. Besides the results presented in Table 1, it is important to highlight that the Rest of the World benefits approximately 0.5% of its GVA due to remittances. This aggregate result hides some important effects of migrants' remittance for African, Asian or South American countries.

Finally, to better understand the consequences of incorporating remittances in a more comprehensive framework, U.S. results highlight one major finding of this application. As we noticed before, migrant remittances correspond to household income that is "transferred" abroad. This initial shock then generates a set of spillover and feedback effects resulting from increasing need of inputs in the economy. In the case of the U.S., the amount of effects that return to the national economy more than compensates the contractionary effect of resulting from national household coefficient consumption. This is mostly because U.S. benefits of its trading position with other national economies worldwide and their need to import American products to satisfy an increasing demand. This somehow unexpected result shows, at least, that remittances and international interdependencies are, at least, far more complex than some political discourse wants us to believe.

5. Conclusions

This paper shows that international transboundary income flows are quite important nowadays. In particular, we show that migrant remittances can strongly influence dependencies among countries. Indeed, it seems in some cases, the net result of the remittance interdependencies can influence positively or negatively the economy, as in the case of India or Canada. We also find that the size of remittance pathways more than offset the trade spillovers and feedbacks arising from the magnitude of consumer demand generated in migrants' home countries—the case of remittance sent by migrants now based in the United States. This paper shows that it is unquestionable that after adding remittances to a 'traditional' WIOD model you will find that the specific relationship between countries and the interdependencies estimated will be different from the ones previously analyzed. This had already been acknowledged by others, most particularly at the regional or local level. Now, we clearly demonstrate the phenomenon for remittances at the international level.

Despite the veracity of the approach presented herein, we warn about believing too strongly in the country-to-country details of our findings. This is because the World Bank's data matrix on remittances knowingly contain discrepancies with biases that are not perfectly understood. Most of the discrepancies are due to differences in the reporting of migration data across countries, which are similar in nature to those incurred by WIOD developers for the cases of trade and investment flows.[10] A prime of example of

[10] "Such discrepancies arise because of differences in definition and reporting time" (World Bank, 2016, p. xv). For example, "some countries compile data based on citizenship of the migrant worker rather than their residency status. Further, data are shown entirely as either

such discrepancies is that incurred when, say, second-generation French citizens of Algerian descent return to their ancestral homeland. Part of the labor compensation of such French immigrants to Algeria are assigned by the World Bank as remittances to France, a sizeable flow for which is unlikely to arise. Bahna (2013) points out that remittances tend to be produced only if the migrating household members are in the position of parents, militating that this has heavy consequences for frameworks that estimate remittances based simply upon migration data.

It is clear that from migration and remittances point of view that our work fills a research gap and point toward several potential avenues for future work. As an example, departing from our approach, researchers can apply WIOD and World Bank data across a time-series to perform a dynamic analysis. Also, instead of applying the World Bank data, some future work should address alternative and, perhaps, more-realistic distributions of international remittances, either using better information or by more deeply assessing specific "remittance corridors". Another goal consists of assessing the net impacts on the origin nations of migrants who gain sufficient assets and knowledge while abroad to invest in their home countries (Hass et al., 2015). Indeed, the research framework presented here is entirely compatible with other analyses that relate how remittances might influence economies in the future, departing from assumptions and hypothesis about distances, borders, "walls" and the relative proximity between/among countries. Finally, our work may also be complemented by new information re-estimates remittances by assessing the, perhaps different, way such funds are spent in the receiving-country, particularly by differentiating between the nature of spending on basic, luxury or capital goods[11].

Unfortunately, biased political discourse likely demotivates some public bodies from undertaking more-detailed studies of international remittances. Yet such discourse brings international migration issues to the foreground. Moreover, the continued free movement of capital will encourage ever-more international migration. This means remittance volumes are likely to continue to climb and become an ever more critical issue in international trade and macroeconomics studies. So regardless of the direction and flavor of any political discourse, a better understanding of the full impacts of remittances can certainly help policymakers design more effective laws and plans for their countries. Perhaps a more lucid view of the full ramifications of the financial transfers to and from a migrant's home country can dampen or even eliminate some of the political judgments now escalating in some developed countries.

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compensation of employees or personal transfers, although they should be split between the two categories if the [IMF] guidelines were correctly followed" (World Bank, 2016, p. xvii).

[11] We would like to acknowledge the important contribution of the anonymous referees to the inclusion of new suggestions and ideas for future work.

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	AUS	AUT	BEL	BGR	BRA	CAN	CHE	CHN
AUS	9474.1	7.4	13.7	2.1	59.2	50.9	15.7	1154.9
AUT	15.1	2352.5	19.8	4.9	21.3	24.2	46.5	107.1
BEL	28.4	22.3	2536.3	3.4	32.8	30.8	41.3	152.7
BGR	2.1	5.3	6.1	243.0	2.7	2.7	2.4	19.2
BRA	45.4	13.4	37.0	3.0	18231.3	76.2	16.9	770.9
CAN	48.1	11.0	27.0	2.1	68.6	10961.2	18.0	384.8
CHE	42.7	45.8	54.2	3.2	51.5	71.5	3289.3	252.5
CHN	486.1	75.3	135.8	13.8	490.8	568.5	93.3	81305.7
CYP	0.9	1.3	1.5	0.3	1.0	1.1	0.8	6.4
CZE	7.9	31.5	20.7	3.5	9.4	9.8	13.5	55.6
DEU	148.5	381.0	226.1	26.8	225.0	230.1	311.6	1251.3
DNK	14.1	8.3	13.1	1.4	17.8	19.4	10.8	101.1
ESP	40.9	31.3	61.0	14.9	79.8	55.8	45.2	246.1
EST	1.3	0.9	1.5	0.2	1.2	1.3	1.5	6.5
FIN	9.0	6.6	10.6	0.7	10.3	12.6	8.5	63.2
FRA	72.5	55.5	189.8	10.4	126.9	118.1	113.9	530.6
GBR	134.5	58.0	156.5	9.4	131.9	235.3	153.1	684.0
GRC	7.5	4.3	6.2	7.1	9.1	7.7	5.3	55.8
HRV	2.1	7.1	3.6	0.8	2.3	2.5	2.6	13.5
HUN	4.8	22.6	9.0	3.5	6.3	6.9	8.1	34.3
IDN	83.0	6.9	14.4	1.6	60.3	41.7	8.5	442.8
IND	70.3	17.5	37.1	3.6	120.5	81.7	23.5	531.2
IRL	15.6	8.3	26.5	1.3	21.4	28.3	21.9	99.6
ITA	75.3	92.4	85.7	15.6	109.3	110.6	150.4	400.0
JPN	170.9	24.1	46.6	3.8	140.8	198.5	35.6	1615.9
KOR	86.0	14.5	20.0	2.5	130.6	99.5	15.6	1177.2
LTU	2.4	2.6	3.5	0.3	2.8	3.0	2.2	16.8
LUX	3.2	6.2	14.0	0.7	4.1	3.8	10.2	24.6
LVA	1.0	1.3	1.6	0.2	1.2	1.4	2.7	7.6
MEX	31.0	6.2	14.8	1.1	76.2	213.1	12.9	195.3
MLT	0.3	1.2	0.7	0.2	0.4	1.1	0.7	2.3
NLD	41.7	47.1	125.2	5.2	65.4	52.1	55.7	273.4
NOR	16.5	11.4	20.7	1.5	46.5	31.2	12.2	133.9
POL	18.3	42.7	48.7	7.2	23.0	29.7	31.0	124.0
PRT	7.5	5.6	14.6	0.9	28.2	10.6	8.3	50.1
ROU	5.9	22.7	15.7	8.5	8.6	9.2	9.9	46.0
RUS	68.0	58.9	53.9	9.2	96.1	93.9	63.6	823.4
SVK	5.4	18.2	7.0	1.2	4.3	4.8	6.0	27.5
SVN	1.9	11.2	3.5	1.0	2.3	2.6	3.9	11.5
SWE	21.6	16.3	28.6	1.9	30.5	26.1	20.3	132.5
TUR	30.6	24.2	30.8	15.7	45.8	43.7	21.9	206.8
USA	558.2	142.0	381.2	20.1	885.2	3503.4	239.5	3273.8
ROW	1027.2	205.0	380.2	47.3	1428.4	910.4	285.2	8991.2

CYP	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR
0.5	4.9	65.7	6.8	26.1	0.6	5.4	56.2	80.9
1.1	24.6	300.6	10.0	30.6	1.1	9.5	86.6	67.8
1.5	15.7	246.7	17.8	59.7	1.4	15.3	257.3	172.2
0.5	2.5	21.5	1.6	5.7	0.2	1.3	13.2	10.7
1.0	7.0	138.4	12.6	60.2	1.1	11.4	121.3	112.9
0.7	5.9	99.9	10.8	35.1	0.8	9.5	123.2	141.2
1.4	14.5	327.8	19.5	70.4	1.6	15.4	205.9	163.3
5.9	63.9	848.3	74.3	272.2	8.5	80.4	622.6	671.5
105.8	1.0	4.5	1.7	1.1	0.6	0.5	3.1	7.1
0.6	975.9	178.0	10.0	23.0	0.9	7.4	60.3	52.7
7.9	183.6	22031.4	148.7	389.9	11.7	122.6	1072.7	925.3
0.5	5.8	102.2	1883.2	21.6	1.5	23.0	49.8	84.2
3.3	21.0	312.8	24.3	8770.2	2.0	19.4	461.5	233.9
0.1	0.4	6.9	2.2	1.9	117.9	11.1	3.8	5.1
0.4	3.3	58.9	9.7	13.5	6.6	1686.6	31.3	37.3
4.1	39.5	622.1	46.4	366.7	3.5	34.0	19225.9	556.4
9.5	35.2	585.8	79.4	170.6	5.1	50.4	612.5	18465.5
5.6	2.4	33.2	3.1	11.0	0.3	2.4	21.2	30.3
0.1	1.6	17.6	1.4	3.7	0.1	0.7	8.3	8.9
0.4	11.5	97.4	4.7	14.3	0.7	4.1	35.7	33.2
0.5	4.3	75.5	6.3	34.6	0.9	5.2	54.9	59.3
2.0	10.1	166.1	19.4	65.1	1.4	20.0	145.9	201.9
0.5	4.7	75.6	10.0	28.7	0.6	6.9	64.9	171.2
5.5	41.0	617.9	42.0	221.8	4.1	32.4	614.1	404.7
1.9	18.7	260.3	17.3	73.5	1.9	16.9	177.8	201.8
0.8	14.2	131.6	10.4	40.7	1.2	10.5	93.8	109.7
0.1	1.4	20.3	4.6	4.0	2.8	3.3	11.1	11.0
0.6	2.3	39.1	3.6	6.8	0.3	2.1	26.8	18.9
0.3	0.6	8.7	2.8	2.2	3.6	2.7	5.3	7.6
0.4	4.2	68.1	5.2	62.2	0.4	4.6	60.3	57.2
0.2	0.4	2.9	0.5	0.6	0.1	0.2	2.5	10.2
2.4	27.3	655.4	35.0	94.7	3.4	29.5	326.3	311.3
0.7	6.2	154.8	31.7	42.9	1.9	21.1	122.8	203.0
1.8	58.5	402.5	33.9	59.9	6.5	23.1	158.5	151.5
0.4	3.0	49.4	3.9	80.7	0.3	3.4	64.9	44.5
0.7	6.5	92.7	5.3	20.3	0.7	3.3	57.7	34.4
5.4	45.5	388.5	26.0	92.6	7.8	49.2	204.9	211.3
0.3	20.8	66.1	3.3	9.9	0.3	2.4	27.5	35.7
0.2	2.6	28.7	1.7	4.0	0.2	1.0	13.0	8.3
0.8	8.8	134.8	70.8	32.6	5.7	76.0	87.4	104.4
0.9	13.3	243.8	16.4	78.8	2.1	11.3	147.4	156.0
7.8	79.0	1474.0	136.8	378.2	8.7	128.7	1313.6	1321.7
16.9	118.6	1557.0	177.0	800.7	16.5	122.1	1457.8	1486.3

GVA interdependencies without remittances

GRC	HRV	HUN	IDN	IND	IRL	ITA	JPN	KOR
4.3	1.1	3.4	95.8	130.0	6.1	36.7	594.4	161.0
7.3	10.9	25.0	8.2	17.8	4.7	95.5	41.2	19.7
11.4	2.9	10.2	12.1	29.5	11.2	94.2	56.4	24.6
9.2	0.6	2.1	1.7	3.0	0.8	15.6	6.1	3.1
7.7	2.1	5.7	66.6	135.9	8.4	80.8	224.3	87.2
6.5	1.5	4.9	31.4	64.1	17.7	58.2	235.0	73.1
10.8	3.1	10.2	21.9	54.1	15.4	143.8	134.4	49.0
47.2	10.9	43.9	374.4	524.4	53.0	388.7	1650.3	795.2
3.1	0.2	0.8	0.6	1.3	0.4	3.9	2.7	1.1
3.2	2.6	15.8	4.3	8.7	3.2	43.3	18.5	10.0
66.0	24.2	125.9	78.6	177.9	56.9	673.5	396.5	217.6
4.5	1.2	8.8	7.9	16.8	4.3	30.1	44.7	17.0
25.8	4.1	13.6	23.8	47.8	15.5	226.6	116.8	51.3
0.3	0.1	0.3	0.6	1.4	0.4	2.3	3.2	1.5
2.2	0.6	2.4	7.4	9.8	4.9	20.4	27.2	15.1
33.5	6.4	28.9	48.5	89.2	33.1	393.7	224.9	98.7
37.2	7.9	25.2	55.2	153.4	155.2	312.3	299.2	150.2
1369.4	0.9	1.8	6.3	14.2	1.8	27.8	23.3	10.8
1.6	268.9	3.2	1.5	2.7	0.6	18.0	6.0	2.4
2.8	4.2	617.7	2.4	5.2	2.7	35.7	13.4	7.4
5.1	1.1	3.3	5727.1	123.6	5.0	46.0	333.6	113.3
11.1	2.8	7.2	74.4	15631.4	12.3	93.0	197.5	97.2
5.2	0.8	3.5	7.3	16.1	828.7	47.4	41.2	19.8
52.7	19.5	32.5	35.8	77.3	27.1	13461.6	199.0	95.0
10.9	2.8	14.7	205.5	169.7	27.0	101.0	35287.9	447.2
6.8	2.3	11.1	96.9	122.6	9.8	61.0	358.0	8219.3
0.7	0.2	1.0	1.6	3.4	0.8	7.6	7.1	2.9
2.5	0.3	1.8	2.3	4.7	4.7	18.7	11.1	4.2
0.5	0.1	0.4	0.7	1.5	0.5	3.0	3.4	1.6
3.5	0.7	3.0	14.6	54.7	8.6	36.2	104.9	46.9
0.6	0.2	0.2	0.2	0.4	0.2	3.4	1.4	0.5
18.1	4.6	18.2	23.1	46.3	40.8	196.6	95.8	46.5
5.1	1.1	4.1	13.3	26.4	9.2	39.6	59.3	30.2
10.2	4.8	28.9	9.8	21.2	9.1	112.2	46.6	25.9
2.7	0.5	2.2	5.0	9.5	3.3	28.5	20.4	8.9
6.6	1.7	12.6	3.9	9.1	2.7	69.4	18.9	9.1
22.7	8.5	21.4	75.4	138.8	20.2	192.3	423.4	146.9
1.6	1.5	11.1	1.9	4.0	2.0	25.3	8.8	5.3
0.9	7.0	3.3	1.0	2.3	0.6	18.5	4.5	2.3
5.3	1.5	6.4	12.6	25.7	8.8	48.5	51.7	24.5
23.4	3.9	10.0	27.3	46.3	8.8	122.6	80.6	35.3
73.9	16.2	68.1	267.8	582.9	408.1	619.8	1714.7	775.1
149.2	37.0	104.0	928.6	1983.3	215.3	1024.1	3932.4	1561.7

LTU	LUX	LVA	MEX	MLT	NLD	NOR	POL	PRT
0.7	1.1	0.6	28.7	0.3	19.7	6.8	11.1	4.0
1.1	2.0	1.5	13.1	1.0	22.5	9.6	28.7	5.2
1.8	12.5	1.7	17.8	0.9	95.9	17.7	29.1	12.0
0.3	0.3	0.2	1.6	0.2	3.4	1.1	3.5	1.2
1.3	1.8	1.1	64.7	0.6	63.7	22.7	17.1	16.0
0.9	2.5	0.9	140.9	1.4	30.9	18.1	11.9	5.7
1.4	8.3	1.9	29.9	1.0	76.8	17.8	26.9	11.6
8.2	10.1	7.3	359.7	4.1	261.6	70.7	127.1	40.3
0.2	0.2	0.2	0.7	1.8	1.4	0.7	1.9	0.2
1.3	1.2	1.1	7.3	0.3	16.8	6.8	35.6	3.8
12.1	31.5	11.3	153.4	4.1	328.3	117.3	308.5	75.4
1.4	1.3	1.9	9.2	0.4	17.7	50.0	17.1	3.9
3.4	4.4	2.6	54.3	1.4	56.9	24.3	46.0	152.1
1.6	0.2	3.7	0.6	0.1	1.7	5.3	1.6	0.3
1.4	0.7	2.5	6.8	0.2	17.1	16.5	11.5	2.0
4.3	23.8	4.1	65.8	2.9	136.2	53.5	79.3	55.8
4.7	42.1	5.9	87.7	10.4	168.7	111.5	77.2	38.4
0.4	0.6	0.3	5.2	0.4	6.1	2.3	5.1	2.0
0.1	0.3	0.1	1.4	0.1	2.5	1.6	2.5	0.7
0.7	1.1	0.8	5.1	0.2	11.0	3.7	15.3	2.4
0.8	0.9	0.7	30.7	0.3	28.1	5.7	10.3	5.0
1.6	2.3	1.4	61.7	0.8	43.9	15.9	23.4	11.6
0.5	5.4	0.8	16.6	0.5	28.5	8.7	10.5	5.6
5.5	10.2	5.0	72.6	6.5	85.2	37.6	93.1	36.8
1.9	4.1	1.6	174.4	1.0	75.8	24.4	32.1	11.9
1.2	1.9	1.1	104.2	0.8	33.0	13.2	30.9	6.7
167.0	0.2	6.4	1.4	0.0	3.8	6.7	7.1	0.7
0.2	172.4	0.3	2.2	1.0	10.0	2.6	3.3	2.0
3.3	0.1	147.0	0.7	0.1	2.1	3.5	2.4	0.3
0.7	1.3	0.6	8217.0	0.3	18.0	5.9	7.4	5.6
0.1	0.1	0.1	0.3	43.4	0.9	1.2	0.6	0.1
3.5	7.2	3.4	31.1	2.8	3912.2	34.9	51.5	18.2
2.4	2.5	1.9	12.3	0.5	24.7	2823.3	23.3	6.0
9.9	3.4	8.7	15.9	1.1	51.3	30.2	2656.9	9.7
0.3	0.9	0.3	7.0	0.2	10.1	5.0	6.0	1261.3
0.5	2.8	0.4	5.2	0.3	12.5	4.1	11.1	2.9
12.1	5.4	11.7	45.9	1.3	55.0	28.1	150.5	15.3
0.6	0.6	0.6	2.7	0.1	7.6	2.8	17.8	1.6
0.3	0.3	0.3	1.5	0.1	2.8	1.2	4.4	0.7
2.5	2.1	3.0	14.1	1.4	38.2	122.2	25.4	7.4
2.4	2.0	2.5	24.9	1.9	36.8	14.3	34.2	10.5
10.0	48.2	9.5	2120.8	7.7	507.2	154.8	144.2	64.9
25.9	36.1	18.1	618.5	9.2	480.6	162.0	226.1	145.2

ROU	RUS	SVK	SVN	SWE	TUR	USA	ROW
3.8	31.9	2.8	1.2	9.7	19.5	361.6	1282.7
15.5	36.6	12.8	9.9	20.7	16.0	148.6	355.1
8.8	40.5	5.8	2.4	37.4	21.6	264.6	562.4
8.0	6.5	1.1	0.8	2.3	9.4	20.0	83.6
8.6	73.5	3.9	4.1	17.4	31.6	588.4	1442.0
6.2	36.2	3.4	1.2	19.1	21.1	2985.4	1253.9
9.3	64.0	6.2	3.1	22.4	21.5	493.1	1118.3
40.3	625.6	28.7	12.5	120.7	178.7	3852.1	8534.4
1.0	5.0	0.3	0.1	1.6	0.7	7.8	42.3
9.0	35.3	32.1	2.6	13.4	10.7	71.1	164.8
93.5	403.8	74.0	25.4	207.1	171.1	1629.5	3045.4
4.3	21.3	2.4	0.9	69.7	9.1	122.8	339.7
17.5	74.7	8.8	5.0	34.9	54.0	356.2	1197.3
0.3	9.1	0.3	0.1	8.9	0.8	8.6	31.0
2.1	34.5	1.5	0.5	42.7	8.6	90.3	185.5
32.7	130.6	19.4	7.2	73.6	72.6	821.8	1834.8
25.8	177.2	14.0	6.1	111.3	70.1	1441.8	2899.0
6.8	10.0	1.3	0.8	4.3	37.1	59.2	355.7
1.5	3.4	1.3	5.9	2.6	1.8	18.3	85.9
19.6	13.9	10.1	2.9	8.4	7.2	53.0	121.8
4.0	32.2	2.4	1.4	7.9	25.1	386.2	1000.6
8.6	67.2	5.4	2.5	28.5	66.0	793.9	2286.2
3.4	14.7	1.7	0.8	15.0	6.9	238.8	450.7
56.4	188.3	21.1	18.4	64.5	94.9	748.8	1411.5
11.3	176.1	9.5	3.1	28.7	46.7	1578.4	3438.0
8.4	119.0	15.9	4.5	16.5	52.1	820.3	1589.5
0.8	19.2	0.6	0.5	6.8	1.9	21.2	99.4
1.4	6.6	0.9	0.4	5.9	2.2	26.8	155.3
0.3	8.3	0.3	0.2	5.0	1.0	9.1	42.5
3.2	17.5	1.8	0.8	7.7	15.2	2307.4	566.9
1.0	0.6	0.1	0.1	1.6	0.5	3.4	12.4
16.6	69.2	10.4	4.3	53.2	35.4	437.4	962.7
4.3	39.1	2.6	1.0	61.2	16.0	181.4	514.5
25.6	90.7	28.4	4.9	52.1	28.7	171.5	441.6
2.7	10.5	1.4	0.6	6.9	7.0	73.5	304.1
1007.1	16.0	4.5	1.7	8.2	16.6	63.5	229.2
40.9	10089.3	21.0	5.2	55.7	105.5	627.9	2625.2
5.0	16.9	469.5	1.4	5.3	4.8	30.9	104.2
2.2	5.0	1.6	216.7	2.4	2.3	15.7	57.0
5.1	41.6	3.7	1.4	3373.6	15.7	185.7	505.2
27.4	157.3	7.5	4.2	24.9	4339.6	278.0	1089.4
55.6	322.8	34.4	13.9	244.2	203.2	140421.4	3245.0
130.3	847.2	79.1	32.2	201.6	470.0	7650.7	72122.6

	AUS	AUT	BEL	BGR	BRA	CAN	CHE	CHN
AUS	9461.5	7.6	13.8	2.1	59.1	53.0	16.0	1151.3
AUT	16.0	2342.8	19.8	4.7	21.4	25.4	47.5	106.8
BEL	29.2	22.4	2515.3	3.3	32.9	33.0	42.0	152.0
BGR	2.2	5.3	6.0	238.2	2.7	2.9	2.4	19.0
BRA	46.7	13.7	36.8	3.0	18206.7	78.4	17.6	768.8
CAN	49.0	11.2	26.9	2.1	68.4	10958.2	18.3	383.1
CHE	43.8	46.0	53.7	3.1	51.4	73.4	3282.1	250.8
CHN	500.1	76.7	136.0	13.5	490.9	590.8	95.9	81093.4
CYP	1.1	1.3	1.5	0.3	1.0	1.2	0.8	6.4
CZE	8.3	31.8	20.5	3.4	9.4	10.5	13.8	55.3
DEU	153.9	381.8	225.2	26.0	225.2	238.9	316.4	1246.1
DNK	14.6	8.3	13.1	1.4	17.8	20.2	11.0	100.5
ESP	43.1	31.7	62.3	14.5	81.9	59.0	48.5	246.6
EST	1.4	0.9	1.5	0.2	1.2	1.3	1.5	6.5
FIN	9.3	6.6	10.6	0.7	10.3	13.0	8.6	62.9
FRA	76.4	56.4	194.2	10.1	127.8	126.9	120.5	531.1
GBR	139.3	58.3	154.9	9.1	131.7	240.3	153.8	680.4
GRC	8.6	4.3	6.4	6.9	9.1	8.6	5.5	55.5
HRV	2.6	7.3	3.6	0.8	2.4	3.0	2.7	13.6
HUN	5.4	23.1	9.0	3.3	6.4	8.2	8.4	34.3
IDN	84.5	7.1	14.5	1.6	60.5	43.3	8.9	443.3
IND	90.4	19.0	38.6	3.6	124.1	110.8	25.9	558.5
IRL	16.1	8.3	26.2	1.2	21.3	28.9	22.0	99.0
ITA	80.3	92.6	86.4	15.1	110.0	118.0	153.3	399.2
JPN	174.1	24.6	46.7	3.7	141.9	203.1	36.4	1611.6
KOR	87.9	14.7	20.0	2.5	130.2	102.7	16.0	1173.8
LTU	2.5	2.6	3.4	0.3	2.8	3.3	2.2	16.7
LUX	3.3	6.2	13.9	0.7	4.1	4.0	10.3	24.4
LVA	1.1	1.3	1.6	0.2	1.2	1.5	2.7	7.6
MEX	31.7	6.4	15.0	1.0	75.9	215.3	13.3	195.4
MLT	1.0	1.2	0.7	0.2	0.4	1.2	0.7	2.4
NLD	43.0	47.1	124.0	5.0	65.4	54.2	56.3	272.1
NOR	16.9	11.4	20.6	1.4	46.4	31.9	12.4	133.3
POL	19.4	42.9	48.6	6.9	23.1	32.2	31.5	123.9
PRT	8.0	5.7	14.8	0.9	29.9	13.1	10.3	50.0
ROU	6.3	22.8	15.7	8.1	8.7	10.1	10.1	45.8
RUS	69.7	59.0	53.7	9.0	96.2	96.8	64.1	821.4
SVK	5.6	18.4	7.0	1.2	4.4	5.3	6.2	27.4
SVN	2.1	11.3	3.5	0.9	2.3	2.8	3.9	11.5
SWE	22.4	16.4	28.6	1.8	30.5	27.1	20.7	132.1
TUR	31.6	24.6	30.9	15.2	45.8	45.1	22.4	205.6
USA	567.9	143.5	378.8	19.6	883.9	3521.1	243.0	3259.8
ROW	1053.3	210.4	380.0	46.1	1421.3	958.0	293.5	8928.1

CYP	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR
0.6	5.0	67.0	7.0	26.9	0.6	5.4	57.4	85.2
1.1	24.6	303.3	10.1	31.1	1.1	9.5	86.9	68.9
1.5	15.7	247.5	17.8	62.2	1.4	15.3	263.4	174.3
0.5	2.5	21.8	1.6	6.5	0.2	1.3	13.3	11.1
1.0	7.1	140.2	12.8	62.3	1.1	11.4	123.3	115.5
0.7	6.0	100.9	10.9	35.8	0.8	9.6	123.8	143.0
1.4	14.5	328.6	19.6	72.0	1.6	15.4	207.4	165.0
6.0	64.3	856.2	75.5	279.9	8.5	80.7	630.8	685.7
104.7	1.0	4.5	1.7	1.2	0.6	0.5	3.1	7.7
0.6	972.5	178.9	10.0	23.2	0.9	7.3	60.2	53.5
7.9	183.2	21978.6	148.5	394.2	11.6	122.4	1073.5	935.0
0.5	5.8	102.6	1879.7	22.0	1.5	22.9	50.1	85.1
3.3	21.0	318.9	24.4	8708.9	2.0	19.6	475.9	240.2
0.1	0.4	7.0	2.2	1.9	116.9	11.2	3.8	5.3
0.4	3.3	59.2	9.8	13.7	6.5	1682.6	31.4	37.8
4.1	39.7	631.1	46.7	376.7	3.5	34.2	19118.0	566.2
9.5	35.3	587.5	79.6	172.7	5.0	50.4	612.3	18460.2
5.6	2.4	34.7	3.2	11.2	0.3	2.4	21.6	31.0
0.1	1.6	19.0	1.4	3.8	0.1	0.8	8.5	9.1
0.4	11.5	98.7	4.7	14.6	0.7	4.1	35.7	34.4
0.6	4.4	76.8	6.5	35.3	0.9	5.3	56.1	61.2
2.2	10.7	174.8	20.2	70.5	1.4	20.3	154.8	235.8
0.5	4.7	75.8	10.0	28.9	0.6	6.9	65.0	172.3
5.4	41.1	623.2	42.1	223.2	4.0	32.4	617.2	409.0
1.9	18.9	263.1	17.8	75.5	1.9	17.0	180.9	206.7
0.8	14.3	133.0	10.6	41.5	1.2	10.5	95.0	111.7
0.1	1.4	20.7	4.5	4.3	2.7	3.3	11.1	12.7
0.6	2.3	39.6	3.6	6.9	0.3	2.1	27.2	19.0
0.3	0.6	8.9	2.8	2.3	3.5	2.7	5.4	8.2
0.4	4.2	69.4	5.8	61.9	0.4	4.7	61.6	59.0
0.2	0.4	2.8	0.5	0.6	0.1	0.2	2.5	10.4
2.4	27.3	654.6	34.9	95.4	3.4	29.4	325.5	313.1
0.7	6.2	154.9	31.6	43.2	1.9	21.1	122.4	203.7
1.8	58.1	407.6	33.7	60.6	6.4	23.0	158.7	157.1
0.4	3.0	51.3	3.9	80.8	0.3	3.4	72.9	45.9
0.7	6.5	94.3	5.3	24.1	0.7	3.3	57.9	35.3
5.4	45.5	392.3	26.2	94.0	8.0	49.3	206.2	214.6
0.3	22.7	66.8	3.3	10.0	0.3	2.4	27.5	36.5
0.2	2.6	29.1	1.7	4.0	0.2	1.0	13.0	8.4
0.9	8.8	135.7	70.4	33.6	5.6	76.7	87.9	106.2
0.9	13.4	247.5	16.5	79.2	2.1	11.4	148.4	157.7
8.0	79.5	1483.8	138.3	385.7	8.7	129.0	1320.8	1341.2
17.4	120.6	1590.3	183.4	826.2	16.5	123.2	1497.2	1537.0

GVA interdependencies with remittances

GRC	HRV	HUN	IDN	IND	IRL	ITA	JPN	KOR
4.4	1.1	3.4	95.1	126.6	6.3	38.1	594.1	160.6
7.3	10.7	24.6	8.2	17.4	4.8	95.8	41.3	19.7
11.4	2.9	10.1	12.0	28.7	11.3	97.0	56.5	24.5
9.3	0.6	2.0	1.7	2.9	0.8	15.8	6.1	3.1
7.8	2.2	5.6	65.9	132.0	8.5	83.1	229.2	87.1
6.5	1.5	4.9	31.1	62.5	17.7	59.1	234.9	72.9
10.9	3.1	10.1	21.6	53.0	15.5	147.8	134.1	48.9
47.9	11.2	43.7	372.2	511.2	53.9	398.2	1664.4	803.9
3.1	0.2	0.7	0.6	1.3	0.4	3.9	2.7	1.1
3.2	2.5	15.6	4.2	8.5	3.2	43.4	18.5	10.0
66.0	24.0	124.5	77.9	173.9	57.4	678.2	397.1	217.1
4.6	1.2	8.6	7.8	16.3	4.4	30.4	44.7	17.0
25.7	4.1	13.4	23.7	47.2	15.9	228.1	117.6	51.4
0.3	0.1	0.3	0.6	1.4	0.4	2.3	3.2	1.5
2.2	0.6	2.4	7.3	9.6	4.9	20.6	27.2	15.1
33.6	6.5	28.7	48.2	87.9	33.6	401.9	226.5	99.0
37.3	7.9	24.9	54.6	150.4	155.4	314.1	299.1	149.8
1363.6	0.9	1.8	6.2	13.9	1.8	28.1	23.3	10.8
1.6	264.4	3.1	1.5	2.7	0.7	18.0	6.0	2.4
2.8	4.1	609.5	2.4	5.1	2.8	35.8	13.5	7.4
5.2	1.2	3.3	5680.5	119.1	5.2	47.0	333.5	113.3
12.1	3.1	7.5	76.3	15011.5	14.1	102.6	214.1	102.6
5.2	0.8	3.5	7.2	15.8	828.0	47.6	41.2	19.8
52.5	19.2	32.1	35.6	75.7	27.3	13421.0	199.4	94.8
11.2	2.9	14.7	204.4	166.3	27.2	103.6	35260.0	446.7
6.9	2.4	11.0	96.2	119.4	9.9	62.1	365.0	8196.8
0.7	0.2	1.0	1.6	3.3	1.0	7.7	7.1	2.9
2.5	0.4	1.8	2.2	4.6	4.7	18.9	11.0	4.1
0.5	0.1	0.4	0.7	1.5	0.6	3.1	3.4	1.6
3.6	0.8	3.1	14.6	53.0	9.1	36.9	105.3	46.9
0.6	0.2	0.2	0.2	0.4	0.2	3.3	1.4	0.5
18.1	4.6	18.0	22.9	45.2	40.8	197.1	95.9	46.4
5.1	1.1	4.1	13.2	25.8	9.3	39.9	59.3	30.2
10.3	4.7	28.2	9.7	20.8	9.7	113.0	46.8	25.9
2.7	0.5	2.2	4.9	9.3	3.4	28.8	20.6	8.9
6.7	1.7	13.0	3.9	8.9	2.7	73.6	19.0	9.0
22.8	8.5	21.1	74.9	135.7	20.5	193.6	423.4	146.7
1.6	1.4	11.0	1.9	3.9	2.1	25.3	8.8	5.3
1.0	7.2	3.3	1.0	2.3	0.6	18.4	4.5	2.3
5.4	1.5	6.3	12.4	25.2	8.9	49.0	51.8	24.5
23.4	3.9	9.9	27.0	45.3	8.9	123.2	80.5	35.2
74.6	16.7	67.4	265.0	568.9	408.8	629.4	1715.5	774.5
152.6	39.5	103.1	916.4	1940.2	217.1	1055.3	3921.3	1554.8

LTU	LUX	LVA	MEX	MLT	NLD	NOR	POL	PRT
0.7	1.1	0.6	28.4	0.4	20.1	7.0	11.1	4.0
1.1	2.0	1.5	12.9	0.9	22.7	9.7	28.4	5.1
1.7	12.6	1.6	17.6	0.9	97.3	17.8	29.0	12.0
0.2	0.3	0.2	1.6	0.2	3.5	1.2	3.4	1.2
1.2	1.9	1.1	63.6	0.6	64.0	22.9	17.1	17.1
0.9	2.5	0.9	138.2	1.3	31.1	18.2	11.9	5.7
1.4	8.2	1.8	29.4	1.0	76.9	17.9	26.7	11.7
7.9	10.3	7.3	354.2	4.0	263.8	71.9	126.1	40.2
0.1	0.2	0.2	0.7	1.7	1.4	0.7	1.9	0.2
1.2	1.2	1.1	7.2	0.3	16.9	6.8	35.1	3.7
11.5	31.4	11.1	151.1	4.0	329.9	118.1	305.5	74.4
1.3	1.3	1.8	9.1	0.4	17.8	50.3	16.9	3.8
3.2	4.6	2.5	54.3	1.4	58.1	24.7	45.7	147.8
1.5	0.2	3.6	0.6	0.1	1.7	5.3	1.6	0.3
1.4	0.7	2.4	6.7	0.2	17.1	16.7	11.4	2.0
4.1	24.3	4.0	65.5	2.8	137.8	54.1	79.7	58.8
4.5	41.9	5.8	86.2	10.1	169.2	111.7	76.5	37.9
0.4	0.6	0.3	5.2	0.4	6.3	2.3	5.1	2.0
0.1	0.3	0.1	1.4	0.1	2.5	1.6	2.5	0.7
0.7	1.1	0.8	5.1	0.1	11.2	3.8	15.0	2.3
0.8	1.0	0.7	30.2	0.3	29.4	5.8	10.3	5.0
1.6	2.5	1.5	63.5	0.8	46.5	17.2	23.9	12.2
0.5	5.4	0.8	16.2	0.5	28.6	8.8	10.4	5.5
5.2	10.3	4.9	71.5	6.2	85.9	37.9	92.1	36.1
1.8	4.1	1.6	171.9	0.9	76.4	24.7	32.0	11.8
1.2	1.9	1.1	102.5	0.8	33.3	13.5	30.6	6.7
163.2	0.2	6.2	1.4	0.0	3.9	7.0	7.4	0.7
0.2	171.6	0.3	2.2	1.0	10.0	2.7	3.3	2.1
3.1	0.1	144.9	0.7	0.1	2.1	3.5	2.4	0.3
0.6	1.3	0.6	8046.2	0.3	18.5	6.1	7.5	5.5
0.1	0.1	0.1	0.3	42.4	0.8	1.2	0.6	0.1
3.3	7.2	3.3	30.6	2.7	3910.2	35.1	50.9	17.9
2.3	2.5	1.8	12.2	0.5	24.8	2821.9	23.0	6.0
9.3	3.4	8.4	15.8	1.0	51.7	30.7	2634.1	9.5
0.3	1.3	0.3	6.9	0.2	10.4	5.0	6.0	1239.1
0.5	2.8	0.4	5.2	0.3	12.6	4.1	10.9	3.0
11.7	5.4	11.8	45.4	1.2	55.5	28.4	148.7	15.2
0.5	0.6	0.5	2.7	0.1	7.7	2.9	17.5	1.5
0.3	0.3	0.3	1.4	0.1	2.8	1.2	4.4	0.7
2.4	2.1	2.9	14.0	1.4	38.4	123.3	25.1	7.3
2.3	2.0	2.4	24.5	1.8	37.4	14.5	33.8	10.3
9.6	48.1	9.4	2092.7	7.5	509.3	156.3	143.6	64.4
25.0	36.3	18.2	609.7	8.9	486.1	165.9	226.2	143.5

ROU	RUS	SVK	SVN	SWE	TUR	USA	ROW
3.8	33.3	2.7	1.2	10.0	19.7	373.1	1277.3
15.3	37.0	12.7	9.9	20.8	16.5	153.5	352.9
8.7	41.1	5.7	2.4	37.3	22.4	271.1	558.2
7.8	6.6	1.1	0.8	2.4	12.2	21.1	82.6
8.5	75.2	3.9	4.1	17.6	31.8	605.9	1432.9
6.1	37.8	3.4	1.3	19.3	21.2	2997.8	1242.8
9.2	65.4	6.1	3.2	22.5	22.0	502.3	1106.1
40.0	635.2	28.3	12.7	122.3	179.8	3978.6	8513.1
1.0	5.0	0.3	0.1	1.6	0.9	8.4	41.7
8.8	35.4	31.7	2.6	13.4	10.9	74.0	163.6
92.0	408.1	72.9	25.4	207.4	177.5	1671.9	3026.4
4.2	21.7	2.4	1.0	69.9	9.3	126.5	336.6
17.8	76.3	8.7	5.0	35.4	54.4	375.9	1197.7
0.3	9.4	0.2	0.1	8.8	0.8	9.0	30.8
2.1	34.6	1.5	0.5	44.5	8.7	92.3	184.3
32.4	133.4	19.3	7.3	74.2	74.4	853.7	1836.3
25.4	180.5	13.8	6.1	111.3	70.7	1466.3	2872.9
6.8	10.4	1.3	0.8	4.4	37.5	63.0	351.9
1.4	3.5	1.2	6.0	2.6	1.9	19.5	85.9
19.1	14.2	10.0	2.8	8.6	7.3	56.4	121.4
4.0	33.7	2.4	1.4	8.1	25.3	397.2	1026.5
9.0	73.9	5.6	2.6	30.0	66.6	940.4	2561.3
3.4	15.3	1.7	0.8	14.9	6.9	242.5	446.1
55.7	189.3	20.8	18.3	64.6	95.4	770.9	1404.4
11.2	180.1	9.3	3.1	29.3	47.1	1613.8	3409.9
8.2	120.5	15.7	4.4	16.8	52.1	845.3	1575.4
0.8	19.7	0.6	0.5	6.8	1.9	22.8	98.2
1.3	6.8	0.9	0.4	5.9	2.2	28.1	153.3
0.3	8.8	0.3	0.2	5.0	1.0	9.8	42.3
3.2	18.4	1.8	0.8	8.0	15.3	2467.4	567.8
1.0	0.6	0.1	0.1	1.5	0.5	3.8	12.2
16.3	70.3	10.2	4.3	53.1	35.9	446.3	955.1
4.2	39.5	2.5	1.0	61.4	16.1	185.3	511.2
24.9	90.8	27.8	4.8	52.3	29.0	181.7	440.3
2.7	10.9	1.4	0.6	7.0	7.0	79.1	301.1
993.7	16.2	4.4	1.7	8.3	16.8	66.7	226.8
40.2	10062.3	20.6	5.3	55.9	105.7	646.1	2625.8
4.9	16.9	465.0	1.4	5.3	4.9	32.4	103.2
2.2	5.1	1.6	215.3	2.4	2.3	16.4	56.6
5.0	42.2	3.7	1.4	3362.5	16.1	191.9	501.9
26.9	158.0	7.4	4.1	25.1	4333.2	286.9	1079.3
54.9	339.0	34.0	14.1	245.6	205.2	140472.1	3238.1
128.8	916.4	77.8	33.1	207.9	473.0	7981.2	71578.2

	AUS	AUT	BEL	BGR	BRA	CAN	CHE	CHN
AUS	-12.6	0.2	0.1	0.0	0.0	2.1	0.4	-3.5
AUT	0.9	-9.7	0.0	-0.2	0.1	1.2	1.0	-0.3
BEL	0.9	0.1	-21.0	-0.1	0.1	2.2	0.7	-0.7
BGR	0.1	0.0	0.0	-4.8	0.0	0.2	0.1	-0.2
BRA	1.3	0.3	-0.3	-0.1	-24.5	2.2	0.7	-2.1
CAN	1.0	0.1	-0.1	-0.1	-0.2	-3.1	0.3	-1.8
CHE	1.1	0.2	-0.5	-0.1	-0.1	1.8	-7.2	-1.7
CHN	14.0	1.4	0.2	-0.3	0.1	22.4	2.6	-212.3
CYP	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0
CZE	0.4	0.2	-0.2	-0.1	0.0	0.7	0.3	-0.2
DEU	5.4	0.8	-0.9	-0.8	0.2	8.8	4.8	-5.2
DNK	0.5	0.1	0.0	0.0	0.0	0.8	0.2	-0.5
ESP	2.2	0.4	1.3	-0.4	2.2	3.2	3.2	0.6
EST	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
FIN	0.3	0.0	0.0	0.0	0.0	0.4	0.1	-0.2
FRA	3.9	0.8	4.4	-0.3	1.0	8.8	6.5	0.6
GBR	4.8	0.2	-1.6	-0.3	-0.2	5.1	0.7	-3.5
GRC	1.1	0.1	0.1	-0.2	0.0	0.9	0.1	-0.3
HRV	0.6	0.2	0.0	0.0	0.0	0.4	0.1	0.1
HUN	0.7	0.5	0.0	-0.2	0.1	1.3	0.3	0.0
IDN	1.5	0.2	0.1	0.0	0.3	1.6	0.4	0.5
IND	20.2	1.5	1.6	0.1	3.7	29.1	2.4	27.3
IRL	0.5	0.0	-0.3	0.0	-0.1	0.6	0.1	-0.7
ITA	5.1	0.2	0.7	-0.5	0.6	7.4	3.0	-0.9
JPN	3.2	0.5	0.1	-0.1	1.1	4.6	0.8	-4.3
KOR	1.9	0.2	0.0	-0.1	-0.4	3.2	0.4	-3.5
LTU	0.1	0.0	0.0	0.0	0.0	0.2	0.0	-0.1
LUX	0.1	0.0	-0.1	0.0	0.0	0.2	0.1	-0.2
LVA	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
MEX	0.6	0.2	0.2	0.0	-0.4	2.2	0.3	0.0
MLT	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.0
NLD	1.3	0.0	-1.2	-0.2	0.0	2.1	0.6	-1.3
NOR	0.4	0.0	-0.1	0.0	-0.1	0.7	0.2	-0.6
POL	1.1	0.2	-0.1	-0.3	0.1	2.5	0.5	-0.2
PRT	0.5	0.1	0.2	0.0	1.7	2.5	2.0	-0.1
ROU	0.3	0.1	0.0	-0.3	0.0	0.9	0.2	-0.2
RUS	1.7	0.1	-0.2	-0.2	0.1	2.9	0.5	-2.0
SVK	0.2	0.2	0.0	0.0	0.0	0.4	0.2	-0.1
SVN	0.2	0.1	0.0	0.0	0.0	0.2	0.1	0.0
SWE	0.8	0.1	0.1	0.0	0.0	1.0	0.4	-0.4
TUR	1.0	0.5	0.0	-0.5	-0.1	1.5	0.6	-1.2
USA	9.6	1.5	-2.4	-0.5	-1.3	17.7	3.4	-13.9
ROW	26.1	5.3	-0.1	-1.2	-7.1	47.5	8.3	-63.1

CYP	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR
0.1	0.1	1.3	0.2	0.8	0.0	0.1	1.2	4.4
0.0	0.0	2.7	0.0	0.5	0.0	0.0	0.3	1.1
0.0	0.0	0.8	0.0	2.6	0.0	0.0	6.1	2.1
0.0	0.0	0.4	0.0	0.8	0.0	0.0	0.1	0.4
0.0	0.1	1.8	0.2	2.1	0.0	0.1	2.0	2.6
0.0	0.1	1.0	0.1	0.7	0.0	0.0	0.7	1.8
0.0	0.0	0.7	0.1	1.6	0.0	0.0	1.6	1.8
0.1	0.4	7.9	1.2	7.7	0.0	0.3	8.2	14.3
-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
0.0	-3.4	0.9	0.0	0.2	0.0	0.0	0.0	0.8
0.0	-0.4	-52.8	-0.2	4.4	-0.1	-0.2	0.8	9.7
0.0	0.0	0.4	-3.6	0.4	0.0	0.0	0.3	0.8
0.0	0.1	6.1	0.1	-61.3	0.0	0.1	14.5	6.3
0.0	0.0	0.1	0.0	0.0	-1.0	0.1	0.0	0.2
0.0	0.0	0.3	0.0	0.2	-0.1	-4.0	0.1	0.5
0.0	0.3	9.0	0.2	10.0	0.0	0.2	-107.9	9.8
0.0	0.0	1.7	0.1	2.1	-0.1	0.0	-0.3	-5.3
0.0	0.0	1.6	0.1	0.3	0.0	0.0	0.4	0.7
0.0	0.0	1.4	0.0	0.1	0.0	0.0	0.2	0.2
0.0	0.0	1.3	0.0	0.3	0.0	0.0	0.0	1.1
0.0	0.1	1.3	0.2	0.6	0.0	0.1	1.3	1.9
0.1	0.6	8.7	0.8	5.4	0.1	0.3	8.9	33.9
0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.1	1.0
-0.1	0.0	5.3	0.1	1.4	0.0	0.0	3.1	4.3
0.0	0.2	2.8	0.5	2.0	0.0	0.1	3.1	4.9
0.0	0.1	1.3	0.2	0.8	0.0	0.0	1.2	2.1
0.0	0.0	0.3	-0.1	0.3	-0.1	0.0	0.0	1.7
0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.4	0.2
0.0	0.0	0.1	0.0	0.1	-0.1	0.0	0.0	0.6
0.0	0.1	1.3	0.6	-0.3	0.0	0.1	1.3	1.8
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
0.0	0.0	-0.8	0.0	0.7	0.0	0.0	-0.7	1.8
0.0	0.0	0.1	0.0	0.3	0.0	0.0	-0.4	0.7
0.0	-0.3	5.1	-0.2	0.7	-0.1	-0.1	0.1	5.6
0.0	0.0	1.8	0.0	0.1	0.0	0.0	8.0	1.4
0.0	0.0	1.6	0.0	3.8	0.0	0.0	0.2	0.9
0.0	0.0	3.9	0.2	1.3	0.2	0.1	1.3	3.3
0.0	1.9	0.7	0.0	0.2	0.0	0.0	0.0	0.8
0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.1
0.0	0.0	0.9	-0.3	1.0	-0.1	0.8	0.5	1.8
0.0	0.1	3.7	0.1	0.3	0.0	0.0	1.0	1.7
0.2	0.5	9.8	1.5	7.5	0.0	0.3	7.2	19.5
0.6	2.0	33.2	6.3	25.5	0.0	1.1	39.4	50.7

Impacts of remittances in international interdependencies

GRC	HRV	HUN	IDN	IND	IRL	ITA	JPN	KOR
0.1	0.1	0.0	-0.7	-3.4	0.2	1.4	-0.3	-0.4
0.0	-0.2	-0.4	-0.1	-0.4	0.1	0.3	0.1	0.0
0.0	0.0	-0.1	-0.1	-0.8	0.1	2.8	0.1	0.0
0.1	0.0	0.0	0.0	-0.1	0.0	0.2	0.0	0.0
0.1	0.1	0.0	-0.7	-3.9	0.2	2.3	4.9	-0.1
0.1	0.1	0.0	-0.3	-1.6	0.1	0.9	-0.1	-0.1
0.1	0.0	-0.1	-0.3	-1.1	0.1	3.9	-0.3	-0.2
0.7	0.4	-0.1	-2.3	-13.3	0.9	9.6	14.2	8.7
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	-0.1	-0.3	0.0	-0.2	0.1	0.1	0.0	0.0
0.1	-0.3	-1.4	-0.7	-4.0	0.5	4.7	0.6	-0.4
0.0	0.0	-0.2	-0.1	-0.4	0.0	0.3	0.0	0.0
-0.1	0.0	-0.2	-0.1	-0.6	0.4	1.5	0.8	0.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	-0.1	-0.2	0.0	0.2	0.0	0.0
0.1	0.1	-0.2	-0.3	-1.3	0.6	8.1	1.6	0.3
0.1	0.0	-0.3	-0.6	-3.1	0.2	1.9	-0.1	-0.4
-5.8	0.0	0.0	-0.1	-0.3	0.0	0.3	0.0	0.0
0.0	-4.6	-0.1	0.0	0.0	0.0	0.0	0.1	0.0
0.0	-0.1	-8.2	0.0	-0.1	0.1	0.1	0.1	0.0
0.1	0.1	0.0	-46.6	-4.4	0.2	0.9	-0.1	0.0
1.0	0.3	0.4	1.9	-619.9	1.8	9.6	16.6	5.4
0.0	0.0	0.0	-0.1	-0.3	-0.7	0.2	-0.1	-0.1
-0.2	-0.4	-0.4	-0.3	-1.6	0.2	-40.6	0.4	-0.1
0.3	0.2	-0.1	-1.1	-3.3	0.2	2.6	-27.9	-0.5
0.1	0.1	-0.1	-0.7	-3.2	0.1	1.0	7.0	-22.5
0.0	0.0	0.0	0.0	-0.1	0.2	0.1	0.0	0.0
0.0	0.0	0.0	0.0	-0.1	0.0	0.2	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
0.1	0.0	0.0	-0.1	-1.7	0.5	0.7	0.4	0.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	-0.3	-0.2	-1.1	0.1	0.5	0.0	-0.1
0.0	0.0	0.0	-0.1	-0.6	0.0	0.3	0.0	-0.1
0.1	-0.1	-0.7	-0.1	-0.4	0.6	0.8	0.2	0.0
0.0	0.0	0.0	0.0	-0.1	0.1	0.3	0.1	0.0
0.1	0.0	0.4	0.0	-0.2	0.1	4.1	0.0	0.0
0.1	-0.1	-0.3	-0.5	-3.0	0.2	1.3	0.0	-0.3
0.0	0.0	-0.1	0.0	-0.1	0.1	0.1	0.0	0.0
0.0	0.2	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	-0.1	-0.1	-0.6	0.1	0.6	0.1	0.0
0.0	0.0	-0.1	-0.3	-1.0	0.1	0.6	-0.1	-0.1
0.7	0.5	-0.6	-2.8	-14.1	0.7	9.5	0.8	-0.6
3.4	2.5	-0.9	-12.2	-43.1	1.8	31.2	-11.1	-6.9

LTU	LUX	LVA	MEX	MLT	NLD	NOR	POL	PRT	
	0.0	0.0	0.0	-0.3	0.1	0.4	0.2	0.0	0.0
	-0.1	0.0	0.0	-0.2	0.0	0.2	0.1	-0.3	-0.1
	-0.1	0.1	0.0	-0.2	0.0	1.4	0.1	-0.2	0.0
	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-0.1	0.0
	-0.1	0.0	0.0	-1.0	0.0	0.4	0.2	-0.1	1.0
	0.0	0.0	0.0	-2.8	0.0	0.2	0.1	0.0	0.0
	-0.1	-0.1	0.0	-0.4	0.0	0.1	0.1	-0.2	0.1
	-0.3	0.1	0.0	-5.6	-0.2	2.2	1.2	-1.0	-0.1
	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0
	-0.1	0.0	0.0	-0.1	0.0	0.1	0.1	-0.5	-0.1
	-0.6	-0.2	-0.2	-2.3	-0.2	1.6	0.8	-3.1	-1.0
	-0.1	0.0	0.0	-0.1	0.0	0.1	0.3	-0.2	-0.1
	-0.2	0.2	-0.1	0.0	-0.1	1.2	0.5	-0.3	-4.2
	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
	-0.1	0.0	-0.1	-0.1	0.0	0.1	0.2	-0.1	0.0
	-0.2	0.5	-0.1	-0.3	-0.1	1.6	0.6	0.4	3.0
	-0.2	-0.2	-0.1	-1.5	-0.3	0.5	0.3	-0.7	-0.6
	0.0	0.0	0.0	-0.1	0.0	0.1	0.1	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	-0.1	0.0	0.1	0.1	-0.3	0.0
	0.0	0.0	0.0	-0.4	0.0	1.4	0.2	0.0	0.0
	0.0	0.3	0.1	1.8	0.0	2.6	1.3	0.5	0.6
	0.0	0.0	0.0	-0.3	0.0	0.1	0.1	-0.1	-0.1
	-0.3	0.1	-0.1	-1.1	-0.3	0.7	0.3	-0.9	-0.6
	-0.1	0.0	0.0	-2.5	0.0	0.6	0.3	-0.2	-0.1
	0.0	0.0	0.0	-1.7	0.0	0.3	0.2	-0.3	-0.1
	-3.8	0.0	-0.1	0.0	0.0	0.0	0.3	0.3	0.0
	0.0	-0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	-0.2	0.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	-170.8	0.0	0.5	0.2	0.0	-0.1
	0.0	0.0	0.0	0.0	-0.9	0.0	0.0	0.0	0.0
	-0.2	0.0	-0.1	-0.5	-0.1	-2.0	0.2	-0.5	-0.3
	-0.1	0.0	0.0	-0.2	0.0	0.1	-1.4	-0.2	-0.1
	-0.6	0.0	-0.3	-0.2	0.0	0.4	0.5	-22.8	-0.2
	0.0	0.5	0.0	0.0	0.0	0.2	0.1	0.0	-22.2
	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-0.1	0.1
	-0.4	0.0	0.2	-0.5	0.0	0.5	0.3	-1.8	-0.2
	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-0.3	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0
	-0.1	0.0	-0.1	-0.2	0.0	0.2	1.1	-0.3	-0.1
	-0.1	0.0	-0.1	-0.4	-0.1	0.6	0.2	-0.4	-0.2
	-0.4	-0.1	-0.1	-28.1	-0.2	2.1	1.6	-0.6	-0.5
	-1.0	0.2	0.1	-8.8	-0.3	5.5	3.9	0.0	-1.6

ROU	RUS	SVK	SVN	SWE	TUR	USA	ROW
0.0	1.4	0.0	0.1	0.3	0.2	11.5	-5.4
-0.3	0.4	-0.2	0.0	0.1	0.6	5.0	-2.3
-0.1	0.6	-0.1	0.0	-0.1	0.8	6.5	-4.3
-0.2	0.1	0.0	0.0	0.0	2.7	1.1	-1.0
-0.1	1.7	0.0	0.0	0.3	0.2	17.5	-9.1
-0.1	1.6	-0.1	0.0	0.1	0.1	12.4	-11.0
-0.1	1.4	-0.1	0.1	0.2	0.5	9.3	-12.2
-0.4	9.6	-0.4	0.1	1.6	1.2	126.5	-21.3
0.0	0.0	0.0	0.0	0.0	0.1	0.5	-0.6
-0.2	0.1	-0.3	0.0	0.0	0.1	2.9	-1.2
-1.5	4.3	-1.1	0.0	0.3	6.3	42.5	-19.0
-0.1	0.5	0.0	0.0	0.2	0.2	3.7	-3.1
0.3	1.6	-0.1	0.0	0.5	0.5	19.7	0.4
0.0	0.3	0.0	0.0	0.0	0.0	0.4	-0.2
0.0	0.1	0.0	0.0	1.7	0.1	1.9	-1.2
-0.3	2.8	-0.2	0.2	0.6	1.8	32.0	1.5
-0.4	3.3	-0.2	0.0	0.0	0.6	24.5	-26.2
-0.1	0.5	0.0	0.0	0.1	0.4	3.8	-3.8
0.0	0.1	0.0	0.1	0.0	0.0	1.2	0.0
-0.5	0.3	-0.1	0.0	0.2	0.1	3.5	-0.5
0.0	1.5	0.0	0.0	0.2	0.2	11.0	25.9
0.4	6.7	0.2	0.2	1.6	0.5	146.5	275.1
-0.1	0.6	0.0	0.0	0.0	0.1	3.7	-4.6
-0.7	1.0	-0.3	-0.1	0.1	0.5	22.1	-7.1
-0.1	4.0	-0.1	0.1	0.5	0.4	35.5	-28.1
-0.1	1.5	-0.2	0.0	0.3	0.0	25.0	-14.1
0.0	0.4	0.0	0.0	0.0	0.0	1.5	-1.2
0.0	0.2	0.0	0.0	0.0	0.0	1.2	-2.0
0.0	0.5	0.0	0.0	0.0	0.0	0.7	-0.2
0.0	0.9	0.0	0.0	0.3	0.1	160.0	0.9
0.0	0.0	0.0	0.0	0.0	0.0	0.3	-0.2
-0.3	1.1	-0.2	0.0	0.0	0.5	8.9	-7.6
-0.1	0.5	0.0	0.0	0.1	0.1	3.9	-3.4
-0.6	0.1	-0.7	-0.1	0.2	0.3	10.1	-1.3
0.0	0.4	0.0	0.0	0.1	0.0	5.6	-3.0
-13.3	0.3	-0.1	0.0	0.1	0.2	3.2	-2.3
-0.7	-27.1	-0.4	0.0	0.2	0.3	18.2	0.7
-0.1	0.1	-4.5	0.0	0.0	0.1	1.5	-1.1
-0.1	0.1	0.0	-1.4	0.0	0.0	0.7	-0.4
-0.1	0.5	-0.1	0.0	-11.1	0.3	6.3	-3.3
-0.5	0.7	-0.1	0.0	0.2	-6.4	8.9	-10.2
-0.6	16.1	-0.4	0.2	1.4	1.9	50.7	-97.8
-1.6	69.2	-1.3	0.9	6.3	3.0	330.5	-544.4