Defying the Odds: Remittances during the COVID-19 Pandemic

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ABSTRACT This paper provides an early assessment of the dynamics and drivers of remittances during the COVID-19 pandemic, using a newly compiled monthly remittance dataset for a sample of 52 countries, of which 16 countries have bilateral remittance data. The paper documents a strong resilience in remittance flows, notwithstanding an unprecedented global recession triggered by the pandemic. Using the local projection approach to estimate the impulse response functions of remittance flows during January 2020–December 2020, the paper provides evidence that: (i) remittances responded positively to COVID-19 infection rates in migrant home countries, underscoring its role as an important automatic stabilizer; (ii) stricter containment measures have the unintended consequence of dampening remittances; and (iii) a shift from informal to formal remittance channels due to travel restrictions appears to have also played a role in the surge in formal remittances. Lastly, the size of the fiscal stimulus in the host country is positively associated with remittance flows to migrants’ home country as the fiscal response cushioned the economic impact of the pandemic.

KEYWORDS: Remittances; COVID-19; Shocks

JEL CLASSIFICATION CODES: F24; I10; O11

1. Introduction

The COVID-19 pandemic caused a large loss of human lives and led to the sharpest and most coordinated global output contraction in recent history. Countries were forced to put restrictions on people’s mobility to fight the pandemic and shut down non-essential businesses for extended periods. Unlike during the Global Financial Crisis where the advanced economies (AEs) were hit hard, while many low-income developing countries were relatively unscathed, the COVID-19 pandemic had a large adverse impact on economic activity in both advanced and developing countries. The developing countries, particularly low-income countries (LIC), provided much less fiscal and monetary support to their economies compared to AEs due to...
limited policy space. As a result, they suffered greater output loss compared to their richer counterparts (International Monetary Fund (IMF), 2021a).

Remittances are an important source for external financing for developing countries. For instance, remittance flows were greater than 5 percent of GDP in 57 countries in 2019 and are important lifeline for the poor. The World Bank estimates that about US$550 billion was sent back by migrant workers to low- and middle-income countries in 2020. According to data compiled by the World Bank and the Organisation for Economic Co-operation and Development (OECD), remittances to LICs were nearly four times higher than official development assistance (ODA) in 2018, and in 2019 they exceeded foreign direct investment (FDI).

While FDI quickly dried up during the pandemic, and ODA growth was constrained by fiscal pressures in advanced economies, much of the debate was focused on remittances with conflicting predictions on the implications of the pandemic. Indeed, at the onset of the pandemic, some studies drew attention on the potential large adverse impact of the pandemic on remittances (e.g. Chami & Sayeh, 2020; World Bank, 2020a, 2020b). Such predictions were in line with Barajas, Chami, Fullenkamp, and Garg (2010) who find that remittance flows increase business-cycle synchronization between remittance recipient countries and rest of the world and are particularly effective in channeling downturns from remittance sending countries to remittance receiving countries.

However, subsequent analyses pointed out that the picture was not unconditionally bleak as remittances were showing signs of resilience during the pandemic (Quayyum & Kpodar, 2020). Historical evidence points to remittances being great automatic stabilizers, smoothing output and consumption, especially among the poor (Chami, Hakura, & Montiel, 2009; Combes & Ebeke, 2011). But, sharp output contraction together with travel restrictions in major migrant hosting economies jeopardized migrants’ employment and income opportunities and brought into question remittances’ ability to smooth consumption in home countries at the start of the pandemic.

Against this backdrop, this paper provides an early assessment of how remittances flows to developing countries evolved during the pandemic and sheds light on the key driving factors. In doing so, it compiles a new and unique dataset of monthly remittance flows for a sample of 52 countries during January 2020 through December 2020, as well as monthly bilateral remittance flows (corridor data) for 16 recipient countries (with 410 corridors in total). The paper documents that many countries saw sustained increases in remittances during the pandemic especially after May 2020. In investigating the driving forces behind this resilience in remittances, the paper tested three main hypotheses: (i) the resilience in remittances was driven by a surge in COVID-19 cases in home countries as migrants rush to provide financial support to cushion the impact of the pandemic on their families; (ii) the resilience reflects a shift from informal remittance channels to formal channels triggered by widespread border closures and travel restrictions; (iii) the resilience was due to increase in remittances supported by the unprecedented fiscal stimulus implemented by richer countries, which are major migrant host countries. The greater use of digital payments is also thought to have supported remittances flows as cash transactions were constraints by lockdown measures and travel bans. The World Bank (2021) noted that many leading money transfer operators recorded double-digit growth in their digital services, in sharp contrast to a fall in their cash remittance services. Nevertheless, this channel was not tested in this paper due to the lack of data on the breakdown between digital and cash remittances.

Using the new dataset and local projection models à la Jordà (2005), the paper finds that remittances responded positively to COVID-19 infection rates in home countries, after controlling for various factors including economic activity, underscoring its role as an important automatic stabilizer. Analysis of corridor-level data shows that higher COVID-19 infection rates in host countries, on the other hand, slowed down remittance flows. In addition, more stringent virus containment measures in home countries seem to have dampened remittance flows, after controlling for level of economic activity and infection rates, suggesting that containment measures may have made it more difficult to receive remittances, ceteris paribus. Travel restrictions (as measured by reductions

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1. Chami, R., & Sayeh, S. (2020). World Bank.  
2. World Bank. (2020a, 2020b).  
3. Combes, P., & Ebeke, E. (2011).  
4. Barajas, E., Chami, R., Fullenkamp, C., & Garg, S. (2010).  
5. Quayyum, M., & Kpodar, K. (2020).  
6. World Bank. (2021).  
7. World Bank. (2021a).  
8. World Bank. (2021b).  
9. Jordà, O. (2005).
in flight arrivals) boosted formal remittances, although the impact is short-lived. Finally, the size of the fiscal stimulus has positive spillover effects on remittances to migrant’s home countries, through the favorable impact on economic activities in the host country.

The paper fills an important void in the literature by analyzing some of the key drivers of remittance flows in the COVID-19 pandemic, using a novel dataset of high frequency data including a proxy for economic activity. The analysis helps to shed light on the various competing hypotheses on the drivers of remittance in this pandemic. The finding that remittances responded positively to COVID-19 infection rates in home country is novel and helps to cement remittances’ role as an automatic stabilizer.

This paper adds to the literature in several ways. While a strand of the literature has explored the response of remittances to various exogenous shocks (e.g. natural disasters, changes in rainfall), this paper is one of the first to explore the impact of a pandemic and policy responses to it on remittance flows. Also, unlike previous studies that have analyzed the impact on remittances from major shocks in the receiving country, this paper examines remittances in a context where both the sending and receiving countries are simultaneously experiencing supply and demand shocks induced by the COVID-19 pandemic. Moreover, to the best of our knowledge this paper is the first to exploit a high frequency panel dataset on remittances and test the impact of travel restrictions on formal remittance flows.

The paper is organized as follows. Section 2 presents a brief overview of the literature on the drivers of remittances, followed by Section 3 which discusses the newly compiled monthly remittance dataset and the stylized facts. Section 4 lays out the empirical model and Section 5 presents the results. We conclude in Section 6 with some policy implications.

2. Literature review

There is a vast literature on remittances covering its many facets such as its effects on economic development, its drivers, and the nature of decision-making at the household level. There are two major strands of the literature, one focusing on macroeconomics drivers of remittances while the other focuses on microeconomic considerations. Yang (2011) provides an excellent overview of the various strands and their key findings. Other comprehensive surveys include Chami et al. (2008); International Monetary Fund (IMF) (2005); and World Bank (2006).

Although studies converge on the drivers of remittances at both the macro- and microeconomic levels, there is disagreement on the relative importance of the drivers. Rapoport and Docquier (2006) provide a useful survey of the microeconomic literature. The seminal paper in the field is by Lucas and Stark (1985) who distinguish between the role of altruism and self-interest in sending remittances. Migrants may remit for altruistic reasons to boost consumption of family members at home. Households may also rely on remittances as an insurance mechanism, whereby the migrant workers abroad are expected to provide support to family members at home when they face an income shock. The insurance role of remittances is likely to be predominant during the COVID-19 pandemic as migrants face urgent need to support family members at home who are experiencing adverse health and economic challenges due to the pandemic.

Using data from Botswana especially during a drought, Lucas and Stark (1985) find a strong support for the insurance motive for remittances. Agarwal and Horowitz (2002) provide evidence that remittances are sent for altruistic reasons, similar to Shimada (2011) who underscores that altruistic migrants are likely to send more remittances home.

Another reason migrants send money home is for loan repayment. Migrants often borrow hefty amounts at high interest rates to finance their trips abroad. These are often from family and friends at home or from money lenders in the informal market. Using migrant data from Qatar, Antoniades, Ganesh, Weber, and Zubrickas (2018) show that loan repayment obligations had a stronger role to play in remittance decision than altruism. Pressures to repay loans may mount (especially from friends and family members) when the home economy is in distress.
Migrant workers may also remit home for investment purposes. Pre-COVID-19 empirical evidence points to remittances being more targeted towards consumption (see Barajas et al., 2009a, 2009b; Combes & Ebeke, 2011). If migrants have investments in businesses at home, the COVID-19 lockdown likely induced a liquidity crunch at these businesses, which may induce them to remit more money home.

At the individual amount, the amount and frequency of sending remittances is also determined by factors such as income, education, environment in the host country, the existence of country-to-country remittance corridors, etc. Determinants at the receiving end include level of income, relationship with sender, potential senders’ assets in area of origin, etc. (Carling, 2008).

The main macroeconomic determinants of remittances (without being exhaustive) include the stock of migrants, income of the home and host country, cyclicality of growth between the host and home country, disasters, exchange restrictions and transaction costs (see, for example, Freund & Spatafora, 2008). Countries with greater migrant stocks abroad receive more remittances in general. Adams (2009) stresses that skill levels of the migrants abroad also matter, with countries exporting greater proportion of low-skilled workers receiving more in remittances per capita than those that export high-skilled workers.

The literature finds that growth in the host country is positively associated with remittance flows, while growth in home country is negatively associated with remittance flows (Abdih, Barajas, Chami, & Ebeke, 2012; Barajas et al., 2010; De, Quayyum, Schuettler, & Yousefi, 2019; Frankel, 2011; World Bank, 2020a). For instance, during the global financial crisis, when advanced economies suffered collapses in growth, remittance flows to low- and middle-income countries fell by 5 percent. At the same time, studies also find remittances to be less volatile than other foreign currency flows and relatively stable even during episodes of sharp business cycle volatility, such as during sudden stops and financial crises (Ahmed & Martinez-Zarzoso, 2016; De, Islamaj, Kose, & Reza Yousefi, 2019). Moreover, remittances helped to cushion adverse shocks to home country economic activity from natural disasters (Yang & Choi, 2007) and drop in rainfall in countries with low-level of financial development (Arezki & Bruckner, 2012). Further, Combes and Ebeke (2011) also show that remittances help to smooth consumption and provide insurance against various shocks including natural disasters. What would happen to remittances during the pandemic when both the host and the home countries were faced with sharp growth contractions was, therefore, an open question at the outset.

Transaction costs constitute a major friction in the transfer of remittances and, as a result, affect their volume. When costs are high, migrants either refrain from sending money home, reducing the volumes, or use informal channels (Ahmed, Mughal, & Martinez-Zarzoso, 2021; Ferriani & Oddo, 2019; Freund & Spatafora, 2008; Kosse & Vermeulen, 2014). Estimates for the amount of remittances sent through informal channels can vary significantly from 50 to 250 percent of officially recorded remittance flows (Amjad, Irfan, & Arif, 2013; Freund & Spatafora, 2008; Ratha, 2011). While the overall cost of remittances has been trending down over the past decade, mostly due to competition from more technologically adept companies, it remains still high. As a result, informal channels are still active, but flows through informal channels may have been adversely affected by travel restrictions in the COVID-19 pandemic.

More recently, Shimizutani and Yamada (2021) use monthly household panel data covering the period before and during the epidemic to examine the impacts of COVID-19 on a set of household welfare indicators in Tajikistan. The main results show adverse but temporary effects of the pandemic in April and May 2020. The results also suggest that remittances quickly returned to the levels of previous years after this decline in April and May 2020. Remittances have helped mitigate the negative effects of the pandemic-induced recession by playing an insurance role. Similar results are found for Mexico. Dinarte, Jaume, Medina-Cortina, and Winker (2021) observe a significant increase in formal remittances during the pandemic despite record unemployment in remittance sending economies. The authors argue that such an increase likely reflects a shift from informal (unrecorded) to formal remittance channels rather than an increase in total remittances.
In sum, the literature highlights several factors that may influence in opposite directions the response of remittances in times of adverse shocks. While the decline in activity in the sending country could create downward pressure on remittances, the negative shock in the receiving country could increase remittances. The specific context of the pandemic would suggest that the net effect is a priori uncertain and will also depend on the substitution between formal and informal remittances. Finally, the effect of the pandemic on remittances may depend on the response of countries to contain the health crisis (containment and border closures) and sustain economic activity (fiscal stimulus).

3. Data definitions and sources

The analysis of remittance flows is subject to challenges related to their definition, accuracy and data availability. It is therefore important to use an internationally accepted definition to ensure comparability in a cross-country setting. In this context, we follow the definition of remittances by the World Bank, which is widely used in the literature and consistent with the reporting standards adopted by many countries. Remittances (inward or outward) are defined as the sum of personal transfers and compensation of employees as compiled in national balance of payments data collected by the International Monetary Fund (IMF), supplemented by additional data from official country sources, including central banks and national statistical institutes. Personal transfers include all current transfers in cash or in kind between resident and nonresident individuals, regardless of the source of income of the sender and the relationship between households (World Development Indicators [WDI], 2021). Thus, personal transfers may go beyond workers’ remittances. Compensation of employees refers to the income of cross-border, seasonal, and other short-term workers who are employed in an economy where they are nonresident, or residents employed by nonresident entities.5

While the World Bank’s remittance dataset covers a worldwide sample of countries over a relatively long period, the annual frequency limits analyses in a fast-changing environment, such as during the COVID-19 pandemic, where high-frequency data are needed to capture the dynamics of remittances in a more granular way, investigate counterintuitive trends and inform policy making in a timely manner. In addition, the World Bank dataset does not include high frequency bilateral remittance data. Given that remittance behaviors are heavily influenced by receiver and sender-country characteristics, total remittance flows at the receiving country level can reflect divergent or heterogenous driving forces from source countries.

To overcome these challenges, we compiled a new and unique dataset of monthly remittance flows for a sample of 52 countries, of which 6 are high-income countries, 35 are middle-income countries and 11 are low-income countries (see Annex 1 for the sample composition and data sources). The time dimension of the data collected spans from January 2020 to December 2020. In addition, we gather monthly bilateral remittance flows (corridor data) for 16 countries in the sample, totaling 410 corridors, for the same period. Data were also collected for the period January 2018–December 2019 to enable the calculation of the change in remittances relative to the pre-COVID period, and to accommodate the lags required in the empirical model.

The data are extracted from detailed balance of payments and statistical notes published by national central banks and statistical institutes. Where necessary, the data are converted into US dollars using the monthly average USD/local currency exchange rate from the IMF’s International Financial Statistics (IFS) database or the relevant central banks. The compilation of the remittances data required some flexibility in the definition of the variables while preserving comparability across countries. Indeed, some countries in the sample have reported workers’ remittances instead of personal transfers in their balance of payments, and for those, workers’ remittances are used as a proxy for personal transfers. Others do not report compensation of employees, but given that these flows are significantly smaller in magnitude relative to personal transfers, the overall trend in remittances is little affected (see Annex 2 on data Remittances during the COVID-19 pandemic 677
availability by country). Overall, the 52 countries in the sample accounted for 45 percent of worldwide remittances in 2019.

To illustrate the usefulness of the dataset, Figure 1 shows the year-on-year growth rate of cumulative remittances in 2020 (the sample median) and compares it to the trend in 2019. The V-shaped recovery in remittances is clear. Remittance growth started off the year well above the level in early 2019, before falling sharply as the COVID-19 pandemic spreads out to the World and drastic containment measures to stop the pandemic were put in place by countries. After bottoming out in May 2020, remittance growth quickly recovered to finish the year in a positive territory, well above the December 2019 level. Additional stylized facts are provided in the Annex 3.

4. Empirical strategy

This paper focuses on the pandemic period (January 2020 through December 2020), and adopts the following model to explain developments in remittances:

\[
\Delta \ln(\text{Rem})_{c,t+h} = \sum_{i=1}^{n} x_i \Delta \ln(\text{Rem})_{c,t-i} + \sum_{i=1}^{n} \beta_i \ln(\text{Covid})_{c,t-i} + \sum_{j=0}^{h} \delta_j \ln(\text{Covid})_{c,t+j} \\
+ \sum_{i=1}^{n} \theta_i X_{c,t-i} + v_t + u_c + \epsilon_{c,t+h}
\]

for \( h = 0 , \ldots, H \) where:

- \( \Delta \ln(\text{Rem}) \) is the year-on-year cumulative change in remittances for a given month since Jan 2020. For instance, taking the month of June 2020, \( \Delta \ln(\text{Rem}) \) is the change in the remittances in the first six months of the year relative the same period in 2019 (in percent).
- Covid stands for the number of total COVID-19 cases per million population in the remittance-receiving country.
- $X$ is a set of control variables which include the number of total COVID-19 cases per million population in the remittance-sending country; economic activity in the remittance sending and receiving countries proxied by Nitrogen Dioxide (NO$_2$) emissions per head; and the US dollar/local currency exchange rate.
- $v$ is the time dummy, $u$ is the country specific effect, and $\varepsilon$ is the error term clustered at the country level and robust to heteroscedasticity.
- the number of lags, $n$, is limited at 3 to reduce the loss of observations at the beginning of the sample period, and the forecast horizon, $h$, is constrained to 4–5 months by the time dimension of the data.
- All variables are in logarithmic form, unless otherwise indicated.

The model is estimated by the local projection approach (LP) developed by Jordà (2005), which allows to gauge the impact of a shock at time $t$ on the dependent variable at different forecast horizons. The LP is robust to misspecification of the lag structure as the impulse responses can be defined without any reference to the unknown data-generating process (Jordà, 2005), whereas conventional vector autoregressive models (VARs) require imposing sufficient identifying restrictions to derive the impulse responses functions (IRFs). Should the VAR specification be non-representative of the data generating process, this can lead to a bias in the estimation of and inference from the IRFs. Reflecting its flexibility and appealing features, the LP has been increasingly used in the literature, including by Alesina, Furceri, Ostry, Papageorgiou, and Quinn (2019); Auerbach and Gorodnichenko (2013); Caselli and Roitman (2016); Jordà, Schularick, and Taylor (2013); Furceri, Prakash, and Zdzienicka (2018); Kpodar and Abdallah (2017); and Ramey and Zubairy (2018).

The LP, however, recognizes that subsequent shocks are possible. Therefore, the derived impulse response function captures the treatment effect given the usual path of subsequent shocks and the usual behavior of other variables. Teulings and Zubanov (2014) note that this might bias the results, and as a result the LP specification can be expanded to control for shocks occurring between $t + 1$ and $t + h$ (captured by the third term of Equation (1)). This, in effect, sterilizes the effect of potential subsequent shocks, thereby isolating the treatment effect of the shock at time $t$ on the dependent variable.

Several factors, including data availability constraints, guided the choice and measurements of the variables. Using the year-on-year change in remittances allows us to capture the dynamics of remittances relative to a situation without the pandemic, while the cumulative remittances up to a given month helps smooth out potential data noise.

As discussed in the literature review, while studies have identified a variety of drivers of remittances, they concur that the key determining factors are the income per capita of the remittance-sending and receiving countries. However, monthly GDP data or high frequency data on economic activity (such as industrial production) are not available for developing countries. An exception is the data on NO$_2$ emissions, primarily from burning fossil fuels for transportation and electricity generation, which although an imperfect proxy of economic activity, has the advantage of being readily available for a worldwide sample of countries at a monthly frequency. Deb, Furceri, Ostry, and Tawk (2020) show that NO$_2$ emissions are strongly correlated with variables which are commonly used in macro-economic analysis to measure economic activity such as industrial production.

The variable of interest in this model is the COVID-19 infection rate (aggregated from daily data) of the remittance-receiving country. But, given that the pandemic has also affected the remittance-sending countries, this needs to be controlled for. The challenge is how to define the remittance-sending countries in the absence of corridor (or bilateral) remittance data for most
countries in the sample. To overcome this, we rely on the 2017 migrant stock matrix compiled by the World Bank to calculate for each migrant-hosting country its share in the total migrants originating from a given country. The COVID-19 infection rate in the remittance-sending country is proxied by the weighted average of the corresponding variables in the host countries, with the weight being the migrant share (this assumption will be relaxed later when considering the remittance corridor data). The same approach has been used to calculate the level of NO2 emissions per head in the remittance-sending country.

To properly isolate the impact of the COVID-19 pandemic on remittances, the exchange rate effect needs to be controlled for. Due to limited data availability on the nominal effective exchange rate, the average US dollar/local currency exchange rate of the remittance-receiving country has been used. The rationale for controlling for the exchange rate is that many developing countries have experienced exchange rate pressures amid the pandemic, and the resulting depreciation may have affected remittances. The direction of the effect is, however, subject to debate in the literature. In the case of Mexico, Mandelman and Vilán (2020) argue that inter-temporal substitution might have played a role since a stronger dollar provide immigrants with additional incentives to send more resources back home. On the other hand, if migrants target a given level of income for their families, a depreciation of the local currency means that they can send less in foreign currencies for the same outcome.

A positive association between remittance inflows and COVID-19 infection rate in the home country would lend support to the hypothesis that the insurance motive has played a role in the strong resilience in remittance inflows observed so far. This would be consistent with the counter-cyclical nature of remittances, as it has been evidenced during periods of recessions, financial crises, food price shocks and natural disasters (Bettin, Presbitero, & Spatafora, 2015; Combes, Ebek, Etoundi, Ntsama, & Yogo, 2014; De, Islamaj, et al., 2019; Frankel, 2011; Yang & Choi, 2007).

5. The results

5.1. The response of remittances to the COVID-19 pandemic

We estimate the IRF of the changes in remittances with respect to the number of total COVID-19 cases per million population in the home country (Figure 2). The results show that within two to five months after the shock, remittances are positively associated with COVID-19 cases. For instance, a 10 percent rise in COVID-19 cases per million population would lead to 0.3 percentage point increase in remittances on a cumulative basis after 5 months. This result sheds light on the shock absorption role of remittances for vulnerable households in poor countries.

Since the regression controls for economic activities in the host country (to the extent that NO2 emissions can reliably capture the state of the economy), the identified impact of COVID-19 on remittances represents the efforts of migrants to assist their families beyond the economic hardship they were facing. On the other hand, by controlling for economic activities in the home country, the significance of the result shows that migrant sought to support their families more than what the economic impact would entail. This can be related to the health impact of the crisis, as poor families who rely on remittances, cannot afford social distancing measures, and hence are more exposed than others. Running the IRF without controlling for NO2 emissions for the home and host economies shows a smaller reaction of remittances to COVID-19 infection rates. Predictably, the downward pressure on remittances from reduced economic activity in the host economy partially offsets the effect observed in Figure 2.

The fiscal response to the COVID-19 pandemic, in particular the direct support to households, has been unquestionably much smaller in developing countries than in advanced economies. While cash transfer programs remain the most widely used safety net intervention by governments in developing economies (Gentilini, Almenfi, Orton, & Pamela, 2020), the reach and appropriate targeting of these transfers in countries with weak social protection systems
are uncertain. Additionally, these emergency cash transfer programs fell short of the disproportionate loss of income sustained by vulnerable households. In this context, our finding suggests that remittances have played a critical role of a complementary social safety net.

The initial drop in remittances observed in the IRF is surprising. This could be attributed to a delay in the response of remittances and possibly the containment measures implemented in many countries. Lockdown measures were triggered by a rise in COVID-19 infections, and while these are justified on public health safety grounds, there were unintended consequences. Anecdotal evidence suggests that lockdown measures led to a closure of money transfer outlets, many of which were operating as small businesses. Since remittance transactions are mostly cash-based and require a physical access to the service providers, it is likely that a rise in COVID-19 infections may coincide with a decline in remittances.

We then introduce an interaction between the total number of COVID-19 cases per million population and an index of stringency of government restrictions in the model. This composite index compiled by the University of Oxford takes values between 0 and 100, with larger values indicating stricter containment measures. Figure 3 shows the IRF of remittances with respect to a COVID-19 shock for a country with a stringency index equal to the 10th percentile of the sample (a stringency index of 28) and that of a country with a stringency index equal to the 90th percentile of the sample (a stringency index of 87). The results indicate a more pronounced drop in remittances a month after the shock in the country with stricter containment measures, but the difference is not statistically significant (Figure 3). Nevertheless, as shown in Figure 4, the unconditional response of remittances to stricter containment measures in the home country is clearly negative and statistically significant, after controlling for the COVID-19 infection rate.

A range of robustness tests are conducted. First, we rerun the IRF for the change in remittance-to-GDP ratio (Annex Figure 1, Supplemental Material). The results are similar, confirming the insurance hypothesis as a plausible explanation of the resilience in remittance flows during the pandemic. We also use the number of new COVID-19 cases per million population (Annex Figure 2, Supplemental Material) and the number of total COVID-19 deaths per million population (Annex Figure 3, Supplemental Material), without qualitatively altering the main findings. Since countries experienced multiple waves of COVID-19 infections, we tested if
there is a symmetry in the response of remittances to a negative or a positive change in COVID-19 infections. The result indicates that a positive change in the COVID-19 infection rate leads to an increase in remittance flows, while a decline in the COVID-19 infection rate also reduces remittances (Annex Figure 4, Supplemental Material). Nevertheless, the difference between the two coefficients at different time horizons is not statistically significant. The lack of conclusive evidence on a potential asymmetry suggests that the response of remittance to the spread of COVID-19 is of a short-term nature, and consequently does not translate into a structural increase in remittances.

5.2. Testing for the informal channel hypothesis

Remittances through informal channels are by definition difficult to measure but are believed to be sizeable. They often take the form of cash carried by airplane passengers, goods sent by migrants to their relatives, or hawala-type transactions whereby the money is remitted without...
cash movements across borders. The approach typically used in the literature is to rely on errors and omissions in the balance of payments (BOP) to gauge a shift of informal remittances to formal channels (e.g. Freund & Spatafora, 2008), but this suffers from drawbacks. El-Qorchi, Maimbo, and Wilson (2003) underline that BOP accounts probably contain little numerical—and certainly no identifiable—traces of hawala (informal remittances), and, thus, no empirical handle can be grasped to quantify or explore the dimensions and forms of these kinds of transactions. The rationale is that if the underlying transaction is outside the formal financial sector from both ends, it is unlikely to contribute to errors and omissions. Further, errors and omissions capture unrecorded trade flows, capital flights, and reflect to a great extent the quality of BOP statistics. Informal remittances are likely to be relatively small compared to these large flows and statistical errors, and hence may have a limited impact on errors and omissions.

The border closures and ensued suspension of international flights amid the COVID-19 pandemic has led to the belief that a major channel of informal remittances has been severely disrupted. Consequently, some analysts partly attributed the resilience of remittances during the pandemic to a shift from informal remittances to the formal sector. We tested this hypothesis by introducing in the model the year-on-year monthly change in arrival flights, with the appropriate lags and lead values. Figure 5 shows the IRF which depict an inverse relationship between air traffic flows and remittances. This lends support to the hypothesis the air travel restrictions (a decline in air traffic flows) have a positive and significant impact on formal remittance flows. To illustrate, a complete shutdown of passenger air traffic (a 100 percent drop) would lead to an increase in formal remittances inflows by about 10 percentage points within the first two months, after which the impact phases out gradually. Nevertheless, it should be noted that from the perspective of the receivers, remittance flows do not necessarily increase; rather the flows are better captured in official statistics.

5.3. Evidence from remittance corridor data

As indicated above, remittance corridor data have been successfully compiled for 16 receiving countries in the sample. For each of these countries, the data provide the breakdown of remittance inflows according to the country of origin of the transfers, making up a total of 410
corridors with data at a monthly frequency. Estimating the model with corridor data enables us to carry out an additional robustness tests and a more granular analysis by looking at how the incidence of the COVID-19 pandemic in the remittance-sending countries affect remittance inflows to the receiving countries.15

Figure 6 depicts the IRF derived from estimating by the LP the response of remittance growth to new COVID-19 cases per million population in the home economy. We confirm the previous results whereby remittances react positively to COVID-19 shocks in the home country. However, the dynamic and the magnitude of the response are somewhat different, most likely reflecting country heterogeneity. Remittances rise within the first month to reach a peak of about 0.4 percentage point increase following a 10 percent surge in total COVID-19 cases per million, then decline somewhat before rebounding, although the changes following the initial reaction are not statistically significant.16

With the corridor data, it is also interesting to investigate the impact of the COVID-19 pandemic and the stringency of containment measures in the host country. We discussed the disproportionate adverse impact of the pandemic on migrants, who often are employed in the sectors hardest hit by the pandemic. As anticipated, the IRF indicates that remittances in the home country declines with the COVID-19 shock in the host country (Figure 7), the opposite of what occurs with a COVID-19 shock in the home country. The stringency of the containment measures in the host economy also appears to be negatively associated with remittances to the home economy (Figure 8).

5.4. Fiscal stimulus in migrant host countries and remittances patterns

The pandemic prompted many countries to undertake massive fiscal stimulus measures at a scale never seen before in the recent history. These includes additional social spending and tax cuts, as well as loans or equity injections and public guarantees. Measures benefiting households directly consisted of cash handouts, wage subsidies, enhanced unemployment benefits and other social transfers. Since some analysts argue that the fiscal stimulus in advanced economies could be a contributing factor to the resilience of remittances, it is useful to test if this is supported by the corridor remittance data.
We used a dummy variable taking 1 if the size of the COVID-19-related fiscal measures is above the median of the sample of remittance-sending countries, and 0 otherwise. This dummy is interacted with the COVID-19 infection rate of the home economy to assess whether the reaction of remittances inflows to COVID-19 incidence in the home economy is conditional to the size of the fiscal stimulus in the host economy. As countries that have been hard hit by the pandemic would tend to provide more fiscal stimulus, the regression excludes the incidence of COVID-19 and the NO\textsubscript{2} emissions of the host economy in a first step.
Figure 9 depicts the difference between the response of remittances to COVID-19 in the corridors where the remittance sending countries had a large fiscal response compared to those where the fiscal response in the remittance sending countries is weaker (below the sample median). The finding suggests that fiscal stimulus measures, indeed, have a positive effect on remittance flows, although this tends to decline over time. This difference becomes statistically non-significant after controlling for the incidence of COVID-19 and NO2 emissions of the host economy, which suggests that the main channel through which fiscal stimulus affected remittances was by cushioning the adverse economic and health impact of the pandemic in the host economy.18

One could argue that an issue of measurement may arise with the size of the announced measures if they were not fully implemented in 2020. To address this issue, we use the change in the government spending ratio to GDP in 2020 relative to pre-COVID level. The results, again, lends support to the hypothesis that in countries with larger fiscal responses to avert the health and economic fallout of the pandemic, migrants were able to send more money to their families back home.19

6. Conclusion

This paper set out to investigate whether the deep global recession brought about by the COVID-19 pandemic led to a sharp decline in remittances as previously feared. A number of analysts feared that the patterns in remittance flows observed during the global financial crisis would prevail, perhaps with greater intensity given the depth of the economic dislocation worldwide. The paper therefore explored competing hypotheses in the literature on drivers of remittances to identify plausible explanations in the context of the pandemic. We investigate how the relative economic and pandemic developments between recipient and sending countries affected remittance flows. A novel feature of our investigation was to build a unique intra-year dataset which allowed us to capture monthly dynamics of remittance flows.

The analysis shows that, after an initial fall, remittances appear to have played the role of an automatic stabilizer during the pandemic. Remittances seem to have defied the odds by surprisingly rising in most countries in the sample, many of which are developing economies. It
appears that the recession and pandemic containment measures in migrant host economies—that would impose a downward pressure on remittances—have been dwarfed by the urgent need for migrants to provide assistance to their families (driven by the insurance motive). A shift from informal remittance channels to formal channels appears to have also played a role, although this result should be interpreted with caution as it may not necessarily imply an increase in remittance flows, but improved recording in official statistics. Finally, there is evidence that fiscal stimulus in advanced economies have supported remittances, mainly through the impact on growth in these economies.

Understanding how remittance flows were affected in the pandemic has important policy implications. It can help assess options to address the large external financing needs stemming from the global crisis, and provide insights to policy makers on appropriate fiscal, monetary and financial sector policies in response to these flows. In countries where a large segment of low-income households relies on remittances, understanding remittance flows can help assess the impact on poverty, and inform policies to support the poor. The magnitude of remittance flows and their convenient countercyclical nature also call for bold steps to address the issue of high cost of remittances, which continues to hinder remittance flows to many countries.

While the evidence so far shows that there was an increase in remittances in most countries, it remains to be seen whether this is a durable trend. Indeed, the paper finds that some of the increase is largely due to temporary factors. Going forward, how the pandemic is brought under control in various countries and the subsequent positive impetus to economic activity will have important ramifications on the ensuing dynamics of remittance flows.

There are promising avenues for future research. For instance, microeconomic studies would be needed to investigate how the pandemic has affected migrants’ employment status and the consequences for remittances at the individual level. It could be that migrants who were employed during the pandemic were able to continue supporting their families back home; those who became partially employed may have been forced to devote a higher share of their income to remittances, while those who lost their jobs may have dissaved. Moreover, additional work would be needed to further investigate the magnitude of the shift from informal to formal remittance flows using household survey data.

Notes
1. See Ahmed and Martínez-Zarzoso (2016) who provide evidence for a stronger stabilization role of remittances relative to FDI and ODA in Pakistan.
2. In this paper, the home country is defined as the country of origin of the migrant and the host country is the country where the migrant is residing.
3. Considering data the empirical model requires lagged data on remittances, monthly data from January 2018 to December 2019 were also collected.
4. This is consistent with Cox, Eser, and Jimenez (1998) who provide evidence that private transfers were typically directed towards those who are ill or unemployed.
5. The definition of remittances used in this study covers formal transfers and therefore does not consider informal transfers and in-kind remittances, which are difficult to estimate. Remittances made through informal banking arrangements that allow the transfer of funds outside formal financial institutions (hawala-type transactions) are also excluded.
6. To deal with zero values, we use ln(1 + x), with x being the variable.
7. Another possible proxy is the night light measure, but data are available with a delay.
8. It should be, however, noted that the business cycle effect also hinges on whether the home country depends on a few or multiple sources of remittances sources. Similarly, the diversity of migrant’s source countries mitigates possible downside effects of the host-country business cycles and reduces the home country’s dependence on one particular source.
9. The IMF estimates that total COVID-19-related fiscal measures in advanced economies in 2020 amounted to 9.14 percent of GDP compared to 5 percent of GDP for developing economies (IMF, 2021b).
10. The time between when the shock materializes and when the remittances are sent to the beneficiaries.
11. For identification purpose, the model also includes the index of stringency in additive term, and the appropriate lag values.
12. The total COVID-19 infection rate is interacted with a dummy variable taking 1 when new COVID-19 cases surge and 0 when they decline.

13. Daily data on international flight arrivals are provided by Flightradar24 and then aggregated at a monthly frequency for each country.

14. Given that air travel restrictions are taken to slow down the spread of COVID-19, the model controls for COVID-19 infection rate (as in the baseline specification) to properly isolate the impact of air traffic restrictions on remittances.

15. The only differences with the main model include the size of the sample and the use of corridor specific effects instead of country-specific effects. The error term is clustered at the corridor level.

16. The IRF obtained using the number of new COVID-19 cases per million population yield broadly similar conclusions.

17. Data are provided by the International Monetary Fund (see International Monetary Fund, 2021b).

18. Results not shown in the paper to save space, but are available upon request. This result could also suggest that direct support to households (which was part of the fiscal stimulus) did not benefit the migrants, otherwise there should be a residual effect of the fiscal stimulus on remittances. It is possible that many migrant workers, in particular the undocumented migrants, lacked access to basic social safety nets and hence did not qualify for these government support measures, but only benefited indirectly from broad economic support measures that helped save jobs.

19. These results are also available upon request.

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