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Working Paper

Measuring the contribution of international remittances to household expenditures and economic output: A micro-macro analysis for the Philippines

ADB Economics Working Paper Series, No. 714

Provided in Cooperation with:

Asian Development Bank (ADB), Manila

Suggested Citation: Kikkawa, Aiko; Gaspar, Raymond; Kim, Kijin; Mariasingham, Mahinthan J.; Zamora, Christian Marvin (2024) : Measuring the contribution of international remittances to household expenditures and economic output: A micro-macro analysis for the Philippines, ADB Economics Working Paper Series, No. 714, Asian Development Bank (ADB), Manila, <https://doi.org/10.22617/WPS240025-2>

This Version is available at:

<https://hdl.handle.net/10419/298160>

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MEASURING THE CONTRIBUTION OF INTERNATIONAL REMITTANCES TO HOUSEHOLD EXPENDITURES AND ECONOMIC OUTPUT

A MICRO–MACRO ANALYSIS FOR THE PHILIPPINES

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and Christian Marvin Zamora*

NO. 714

February 2024

**ADB ECONOMICS
WORKING PAPER SERIES**

ADB Economics Working Paper Series

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No. 714 | February 2024

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ISSN 2313-6537 (print), 2313-6545 (electronic)
Publication Stock No. WPS240025-2
DOI: <http://dx.doi.org/10.22617/WPS240025-2>

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ABSTRACT

The macroeconomic studies that assess the contribution of international remittances to the origin countries of migrants use a different definition of remittances than the microeconomic literature that examines the impact at the household and community levels. This study overcomes this difference in definition by integrating household expenditure data into the input-output analysis. Using the 2018 Family Income and Expenditure Surveys (FIES) of the Philippines, we find that remittance-financed household consumption and investment totaled ₱742.2 billion (\$14.1 billion) and contributed 3.5% of the country's total output, 3.4% of gross domestic product (GDP), and 3.7% of total employment in 2018. We note that the largest value added is accruing to the manufacturing sector as it accounts for more than a third of remittance recipients' spending basket followed by the trade and agriculture, forestry, and fisheries sectors, which are closely linked to the manufacturing industry. The international remittances income reported by households is less than half (43.8%) of the ₱1.7 trillion (\$32.2 billion) aggregate international remittances reported by the central bank in the same year based on the balance of payments definition.

Keywords: international remittance, household expenditure, micro–macro analysis, Philippines

JEL codes: F24, C67, D12

The authors would also like to acknowledge the contribution of the other members of the ADB Statistics and Data Innovation team: Elyssa Mariel Mores, Julian Thomas Alvarez, Arushi Gupta, and Mimika Mukherjee.

1. Introduction

In 2022, about \$350 billion worth of international remittances flowed to developing economies in Asia.¹ The economic contribution of remittances, commonly measured by their relative share of a country's gross domestic product (GDP), is substantial in the major migrant source countries, including Nepal (23%), the Philippines (9%), Pakistan (8%), and many Pacific countries such as Tonga (44%), and therefore plays an important role in advancing economic development.

Remittances largely go to migrants' families, supporting their consumption and sometimes their investment activities. Given the continued inflow of remittances to developing countries, there is a large body of empirical literature that examines its short- and long-term effects on recipient families' poverty status, savings and investment patterns, and human capital development. The impact of remittances is also well studied at the aggregate level, with links to national output and growth as well as economic cycles and other macroeconomic fundamentals.

Evidence from the microeconomic literature suggests that international remittances help smooth household consumption of basic foods and other essentials, improving the welfare and living conditions of migrant families (e.g., Awan et al. 2017; Acosta, Fajnzylber, and Lopez 2007; Mezger and Beauchemin 2010; and Woodruff and Zenteno 2007). Remittances also flow into children's education and family businesses, increasing long-term household productivity (e.g., Yang 2008; Cox Edwards and Ureta 2003; Gibson et al. 2019). There is an equally large body of macroeconomic literature that examines the impact of remittances on overall economic growth (e.g., Meyer and Shera 2017; Giuliano and Ruiz-Arranz 2009; and Cooray 2012), poverty (e.g., Ahmed, Sugiyarto, and Jha 2010; Yoshino, Taghizadeh-Hesary, and Otsuka 2017; and Adams and Page 2005), and other economic fundamentals (e.g., Ratha 2005).

In general, microeconomic and macroeconomic literature complement each other to provide a comprehensive assessment of the impact of remittances on migrants' households and communities, as well as on the overall economy of countries of origin. However, caution should be exercised when comparing the two sets of literature, as the definition and data source for international remittances differ significantly. In micro-level studies, remittances refer to the amount of income households report receiving from abroad, whether in cash or in kind. At the macro level, by contrast, remittances are the aggregated total of personal remittances reported by financial institutions and intermediaries, which necessarily include the amount that migrants send to their families and to elsewhere such as their own personal bank accounts.

A notable source of discrepancy can be attributed to the large sums of remittances that migrants and the diaspora transfer directly to their bank accounts back home or to other investments that remain independent of and undisclosed to household members. This type of remittance may be captured in macro remittances but is unlikely to be reported in household surveys. Another important source of difference is in the way informal remittances, or funds that flow through nonformal channels, are treated. At the household level, remittance income is reported regardless of the channels through which the funds flow, although there may be cases where informal

¹ This refers to developing member countries (DMCs) of the Asian Development Bank.

remittances are underreported. In contrast, aggregate remittance statistics reported by central banks often do not include informal remittances.²

Clemens and McKenzie (2018) documented a large discrepancy in the growth trend of remittances between micro and macro remittance data sources. They found that total remittance growth reported by all households typically ranges from about 8% (in the case of Pakistan) to 72% (El Salvador) of the growth in aggregate remittances reported by central banks over the same period. These differences in definition make it difficult to evaluate the contribution of remittances to economic output and growth in a way that is consistent across micro and macroeconomic settings.

In this paper, we propose to assess the simultaneous contribution of international remittances to household expenditures and the overall economic output of the migrants' country of origin by using the definition of remittances from the micro literature.³ We examine how the reported expenditures (referring here to both consumption and savings or investment activities) of remittance-recipient households effectively flow through the overall economy, taking into account the impact on individual sectors and their linkages. Using the case of the Philippines, one of the major source countries of international migrants, this study links household data and insights to the input-output table, which systematically presents all economic activities of a country, consisting of production, consumption, and investment, while showing the interdependencies among industries. Based on this micro-macro analysis approach, we estimate the combined first-degree impact of remittances generated by direct consumption or expenditure and the second-degree impact, capturing how remittance-induced purchases of goods and services spill over to other sectors through multiplier effects and the value chain.

We note that based on the 2018 Family Income and Expenditure Surveys (FIES), household expenditures financed by remittances were estimated at ₱742.2 billion (or \$14.1 billion).⁴ It is worth noting that this amount represents less than half (44%) of the total official international remittance inflows to the country reported by the Bangko Sentral ng Pilipinas (BSP) for the same year. We observe different household expenditure patterns between remittance-receiving households and non-remittance-receiving households depending on the extent of their dependence on remittance income. On average, recipient households spend more (as a percentage of their total expenditures) on education, real property and construction, and health.

Our micro-macro analysis shows that remittance-induced household expenditures contributed 3.5% of the country's total output, leading to 3.4% of the country's GDP through its value addition and to 3.7% of total employment in 2018.⁵ The industries that generate the most value added from the direct revenue of the consumption portion of remittances include manufacturing (25% of the total contribution to GDP), followed by wholesale and retail trade (17%), and agriculture, forestry, and fishing (14%). The savings or investment portion of household remittance income goes mostly to construction (9%). Should international remittances received by households arbitrarily increase by 10% (equivalent to ₱74.2 billion or \$1.4 billion), total domestic demand will

² Some countries, based on information of their nationals abroad, adjust their inward international remittance statistics to include remittances from informal channels; thus, the aggregate remittance statistics reported by the World Bank are also adjusted for informal remittances (Freund and Spatafora 2008).

³ This paper focuses on international remittances, which can be compared with data from BOP. Therefore, we do not include domestic remittances when referring to remittances unless specifically stated.

⁴ Based on the average exchange rate of the Philippine peso to the US dollar rate of ₱52.66 in 2018.

⁵ The BSP reported the headline figure of aggregate remittances at the equivalent of 9.3% of GDP in 2018 based on balance of payments definition.

be 0.29 percentage points higher than in the baseline scenario, resulting in an increase in output of 0.35 percentage points ($\approx \$2.4$ billion) and contributing to overall GDP growth of 0.34 percentage points ($\approx \$1.2$ billion) and employment growth of 0.36 percentage points (equivalent to nearly 150,000 jobs). The influence of an increase in remittance income on the expenditure reallocation toward investment activities boosts demand and thus the output for real estate and construction activities.

The next section provides a brief overview of the literature on remittances and economic development, focusing on empirical evidence of their influence on household expenditure and savings and the overall macroeconomy. Section 3 outlines the data and methods used in the micro-macro analysis and modeling exercises. Section 4 presents key insights and other findings from the micro-household data, while section 5 presents the results of the micro-macro analysis, quantifying the sectoral and overall impact of remittances on growth. The final section draws evidence-based policy implications and concludes.

2. Background and Literature Review

The extensive literature quantifying the impact of remittances can be divided into two groups of papers. One examines the effect on the welfare and productivity of recipient households based on micro datasets, while the other performs either panel data estimation or macro-modeling techniques using aggregate data on remittance inflows and estimates the impact on the overall economy and other macroeconomic indicators.

Researchers find that the receipt of remittances has enabled households to fund daily consumption and productive investment. Yang (2008) showed that the exogenous increase in remittances due to the exchange rate shock triggered by the 1997 Asian financial crisis was primarily used by Filipino households for investment-related expenditures, especially education and microenterprises. In Guatemala, Adams and Cuecuecha (2010) found that households that received international remittances from the United States spent more on education (194%) and housing (81%) than they would have spent on these items in the absence of remittances. Amuedo-Dorantes and Pozo (2014) found that income from international remittances had a greater impact on Mexican households' health expenditures than other sources of income. Using visa lottery as a natural experiment, Gibson et al. (2019) show that large gains from Pacific migrants are not only short term but also long term. Mishra, Kondratjeva, and Shively (2022), who conducted an instrumental variable analysis using the 2010/11 Nepal Living Standards Survey, found that households receiving remittances spend more on food and education, suggesting a long-term increase in productivity. According to their estimate, a 10% increase in the annual value of remittances received increases average monthly food consumption by 0.9% and annual educational expenditure by 8%.

Remittances supplement domestic income and help households escape poverty and insure against income shocks. Yang and Martinez (2006) observed 2.8 percentage point reductions in the poverty rate among recipients of international remittances in the Philippines amid an increase in migrant households' remittance receipts equivalent to 10% of precrisis household income. Remittances have also been found to help households in rural Viet Nam exit poverty, particularly through asset growth, although the impact varies by the welfare status and ethnicity of the recipient (Amare and Hohfeld 2016). Meanwhile, also in the Philippines, using local rainfall changes as an identification strategy, Yang and Choi (2007) generally observed how remittances

respond to income shocks, smoothing household consumption. Other researchers also find a significant increase in establishing capital-intensive enterprises among recipient households.

However, not all empirical studies attribute positive outcomes to remittances. Several studies also suggest that remittances may fuel conspicuous consumption and/or disincentivize human capital investment if a typical job abroad does not require skills or if the children left behind, especially boys, are mobilized to work to meet labor needs (e.g., McKenzie and Rapoport 2011; Ang, Sugiyarto, and Jha 2009; and Gao, Kikkawa, and Kang 2021). In some countries, income from remittances is found to reduce the incentive to work in recipient households (e.g., Acosta, Lartey, and Mandelman 2009; Murakami, Yamada, and Sioson 2021).

Meanwhile, the macro-level empirical literature tackled the contribution of international remittances to the recipient country's macroeconomic fundamentals, including growth, inflation, exchange rate, and national poverty rate. Cooray (2012) used the growth model approach to examine a panel data of South Asian countries over the period 1970–2008 and found that a 1% increase in migrant remittances contributed to a 0.01% increase in economic growth. Giuliano and Ruiz-Arranz (2009) also reached a similar finding using a newly constructed dataset for remittances covering about 100 developing countries. However, the positive reinforcement of remittances on growth is more pronounced in countries with less developed financial systems, suggesting that these flows have helped overcome liquidity constraints. Similar findings can be found in Meyer and Shera (2017), who examine panel data of high remittance-receiving countries in Eastern Europe during the period 1999–2013.

Using computable general equilibrium model, Ahmed, Sugiyarto, and Jha (2010) found that a hypothetical 50% reduction in remittance flows would have a devastating impact on the poverty situation in Pakistan—with the poverty headcount ratio increasing by 6.4%. By constructing and analyzing a broader set of 71 developing countries, Adams and Page (2005) found that international remittances significantly reduce the level, depth, and severity of poverty in the developing world. Addressing endogeneity issues, they found that a 10% increase in official international remittances per capita leads to a 3.5% decline in the share of people living in poverty. Relatedly, Yoshino, Taghizadeh-Hesary, and Otsuka (2017) studied data from 10 developing Asian countries from 1980 to 2014 and found that a 1% increase in international remittances (as a percentage of GDP) can lead to a 22.6% decline in the poverty gap and a 16.0% decline in the poverty severity ratio. Using the Philippines as a case study, Goce-Dakila and Dakila, Jr. (2009) found that a 5% reduction in remittances received by households is accompanied by a decrease in overall gross output of less than half a percentage point, with the largest impact observed in the services sector. Further, Ratha (2005) has elaborated on the importance of workers' remittances as a stable source of external funding in developing recipient countries, which may even be countercyclical during a growth slowdown. This was evident during the coronavirus disease (COVID-19) pandemic (Kikkawa et al. 2021).

The empirical insights at the micro and macro levels complement each other and allow for a more comprehensive assessment of the impact of remittances on migrants' families and communities, as well as on the overall economies of countries of origin. However, care must be taken when comparing and synthesizing the two sets of findings, as the definitions of international remittances used in the micro and macro literature are not identical and the data sources are distinct. In micro-level studies, international remittances typically refer to the cash or in-kind income that households reported receiving from abroad in surveys. At the macro level, international

remittances refer to nationally aggregated external financing reported by financial institutions and intermediaries.

Varying definitions and data sources mean that some remittance flows are counted in one country but not in another country. One stream of remittances that is captured in macro statistics but not likely in micro data is the remittances that flow into migrants' own bank accounts or into direct investments such as real estate. Personal bank accounts that are not known or accessed by other family members are reportedly preferred by migrant workers because it gives them more control over the allocation (Ashraf et al. 2015).

Another source of inward remittances that is treated differently in micro and macro remittance statistics is informal remittances, which generally refer to transfers of funds that are not coursed through formal financial intermediaries. Household surveys potentially report all remittance income received by households in a given period, regardless of the channels through which these funds were transferred, although there may be cases where households underreport informal remittances. In contrast, macroeconomic remittance statistics, typically reported by central banks, do not include informal remittances except that some countries or datasets adjust aggregate remittance data based on migrant stock abroad to include informal remittances (World Bank 2023). There is also a form of income from abroad that does not appear in any of the statistics, such as unreported cash hand-carried by migrants that they save or consume themselves.

Apart from definitions, measurement errors can also lead to different sizes and trends in macro and micro remittance data. For macro data, there have been frequent changes in the official definition. Until 2005, using the Balance of Payments Manual (BPM) 5, remittances comprise workers' remittances and compensation of employees. Amid the difficulty of separating transfers made by migrant workers from their employment income from a number of other transfers, remittance statistics using the BPM6 now comprise personal transfers and compensation of employees (Clemens and McKenzie 2018).⁶ Even remittance data based on household surveys are not free of measurement error, particularly due to misreporting and recall errors. In addition, a typical national household income expenditure survey may not report (exclude) remittances receipts that are channeled to family businesses and cottage industries because the funds are then categorized to a separate household production module to derive household business income.

The discrepancy in remittance growth between macro data and household survey-based micro data is documented in Clemens and McKenzie (2018) for many major migrant-sending developing economies. They note that the growth in total remittances reported by households typically ranges from about 8% (Pakistan) to 72% (El Salvador) of the growth in aggregate remittances reported by the central bank for the same period. The discrepancy between the data could possibly explain the differences in the results of the analysis used to evaluate the impact of remittances in migrants' countries of origin in the micro and macro literature.

We propose to assess the short-run contribution of remittances to household expenditures and national-level output by using a consistent definition of remittances: the expenditure of recipient households. We feed micro-level remittance data to that of the macro-level analysis in accordance to how households spend, save, and invest their remittance income in specific sectors of the

⁶ Another item that may be included in macro remittances but not in micro household data is the inward transfer of a third-country national (as seen recently in the surge in remittances to Central Asian countries from migrating Russian nationals due to the Russian invasion of Ukraine).

economy and examine the magnitude of the macroeconomic impact of remittances using the so-called network of input-output linkages between different economic sectors. It can be hypothesized that household spending on goods and services in certain sectors that have strong sectoral economic linkages and value chains amplify the effect of remittances on the aggregate economy beyond direct consumption. The input-output (I-O) framework is one of the macroeconomic models that allows aggregate household-level expenditure and savings to be applied to industry sectors and the economy as a whole, and the impact to be assessed at a given point in time (Miller and Blair 2009). It clearly illustrates how different sectors contribute to the overall output by considering the interlinkages using a country-specific matrix that represents the structure of the economy.⁷

To date, there are a few studies that attempt to evaluate the macroeconomic contribution of remittance-induced expenditure using the I-O model, or that attempt to feed micro-level information and insights into the framework to evaluate its impact on overall growth. The work of Dridi et al. (2019) and Glytsos (1993) are most relevant to our proposed methodology for establishing micro-macro linkages to evaluate the contribution of remittances to household expenditure and the overall economy. Dridi et al. (2019) proposed a macroeconomic model to quantify how changes in aggregate demand due to additional income from household remittances propagate through the network of input-output linkages in sub-Saharan African countries. They find that countries with intricate and mutually dependent industrial linkages benefit more from remittance-led demand. In this paper, consumption preferences are determined using a macroeconomic model, but without micro data that provide more detailed preferences of heterogeneous households, including those with and without remittances. Given that many studies indicate distinct consumption patterns of migrant households, the assumption of homogeneous households is questionable.

Meanwhile, Glytsos (1993) incorporated information on the pattern of expenditure of remittance recipients from a Greek household survey into the country's input-output table. By converting the pattern of consumer expenditures into a structure of industry final demand, he estimated that the remittances received resulted in a gross output equivalent to 4.1% of the economy's total gross production in 1971 and created 74,000 new jobs in the non-agriculture sector. The model proposed by the study, however, is very data intensive, as it requires a longitudinal series of household micro data accompanied by corresponding I-O tables to establish causal impact.

3. Methodology and Data Sources

The paper conducts a micro-macro analysis using data from a single-year household survey—the 2018 FIES—and I-O tables to estimate the effect of remittances on household expenditures and on the sectoral and overall economy. It uses a simple and straightforward methodology that illustrates and quantifies the short-term contribution of remittances to household expenditures and overall economic output, taking into account the impact on individual sectors and their interlinkages. The micro-macro analytical approach requires a minimum set of data that are commonly available in many developing economies: (i) household income and expenditure

⁷ The I-O framework has been used in the existing literature to assess the environmental impact of household consumption (e.g., Serió and Klasen 2015; Schepelmann et al. 2020) or evaluating the impact of tourism on output and growth (e.g., Pratt 2015 for seven small-island developing states). Unlike the CGE model, the I-O model's impact assessment can also be done with simple data and solution software.

surveys, and (ii) I-O tables. We follow a two-step process: (i) tracing remittance income received by households and identifying how it is spent, invested, or saved; and (ii) quantifying the contribution of this expenditure to sectoral and overall economic output. We use the Philippines, which is one of the largest sources of migrant workers and remittance recipients in Asia, as a case study.

STEP 1: Micro-level analysis of household spending and saving pattern

The first step is to examine the expenditure patterns and the allocation by commodity items of remittance-receiving households.⁸ We generate descriptive statistics and estimate consumption equations to derive the marginal propensity to consume, which we allow to vary by household characteristics such as income quintile and remittance dependency. We use the Philippine Statistics Authority's microdata of the 2018 FIES. The survey interviewed a sample of about 180,000 households, and the dataset generates the weighted sample of about 25 million households deemed present in 2018.⁹ The dataset provides reliable estimates of income and expenditure at different spatial levels, including national, regional, provincial, and highly urbanized cities (PSA 2020).

The per item consumption equations are estimated, taking into consideration the households' remittance-receiving status. This information allows us to allocate changes in aggregate consumption when we conduct simulations for remittance shock scenarios using the I-O model. We estimate the consumption equations closely following the empirical specification of Wang, Hagedorn, and Chi (2021), with some additional assumptions about how income from remittances is allocated and utilized in a remittance-receiving household:

$$C_{ij} = \alpha_i + \beta_i TInc_j + \sum_{n=1}^4 \gamma_{in} remidependency_j + \sum_{n=1}^4 \rho_{in} (TInc_j \times remidependency_j) + \delta \mathbf{X}_j + \varepsilon_{ij} \quad (\text{Equation 1})$$

The dependent variable, C_{ij} , refers to the share of each expenditure item i in the total expenditure of household j . Here, we categorize total household living expenses into 16 broad commodity items: food, tobacco and alcohol, housing and utilities, durables (including vehicles), clothing, furnishings, health, transport, communications, education, recreation, finance, real property and construction, miscellaneous expenses, real property and new construction, and bank savings and investments. Note that the limited details in the FIES do not allow the identification of relevant expenditures related to family enterprises that may have been financed by the receipt of remittances.

The coefficient, β_i , refers to the percentage point change in the share of expenditure item i in total expenditure given a percentage change in total household income. Unlike Wang, Hagedorn, and Chi (2021), who distinguish between remittance and non-remittance income by obtaining a unique parameter of marginal propensity to consume for each income, we use household's $TInc_j$ or total income (in log) regardless of sources. In other words, we assume that remittance income is as fungible as all other sources of income, such as wages and salaries. This is consistent with

⁸Throughout the paper, remittance-receiving households are defined as households receiving cash income from abroad, which is our measure of remittance income. Note that this variable from the FIES questionnaire also includes other sources of income from abroad, such as (i) pensions, retirement, workmen's compensation, and other benefits; (ii) cash gifts, support, relief, etc. from abroad; and (iii) dividends from investments abroad.

⁹ This translates to about 25 million Filipino households in 2018 as defined by the Philippine Statistics Authority, which is highly consistent with the more than 26 million Filipino households recorded in the 2020 Census of Population and Housing. The survey response rate was 92.5% (PSA 2020).

several studies that corroborate Friedman's (1957) permanent income hypothesis. For example, Castaldo and Reilly (2007) found only modest effect of receipt of international remittances on the marginal spending behavior of households in Albania. Further, such a modest effect was found only for food consumption. Meanwhile, a study based on the 2005 Ghana Living Standards Survey found almost negligible changes in household spending behavior (Adams and Cuecuecha 2013).

Our assumption of fungibility of remittance income also seems consistent with the pattern of remittances and other sources of income among Filipino households. Descriptive statistics show that Filipino households typically rely on more than two sources of income and that the share of overseas remittances to the total household income does not exceed 50% for the majority (83.9%) of remittance-receiving households (see more details on descriptive statistics in the next section). In addition, we found that as much as 64% of recipient households of international remittances also report income from domestic remittances, which poses a methodological challenge to identify the particularities of the expenditure allocation of international remittances income.

In equation 1, we also introduced a control variable indicating the extent of household dependence on remittance income by adding the interaction between total household income, $TInc_j$, and the categorical variable, $remidependency_j$, which is based on the share of remittance income to the total income of household j at a 25% interval (hence, resulting in five independent household groups including nonrecipients). The coefficient ρ_i provides a measure of how β_i differs across household groups. This approach is intended to capture the possibility that the share of income from remittances may have different effects on consumption patterns.

Household-level characteristics X_j , include household size, share of members below the age of 5, share of members aged 5 to 17 years, and household head characteristics such as age, gender, marital status, educational attainment, and job status. Place of residence (urban or rural) and region are also controlled for in the model. The idiosyncratic error term ε_{ij} is assumed to be uncorrelated with the explanatory variables. The set of equations in (1) is estimated using the seemingly unrelated regression technique of Shonkwiler and Yen (1999), allowing the error to be correlated across equations (Moon and Perron 2005).

The consumption equations do not provide insights to evaluate the potential impact or causal inference of migration and remittances on the consumption behavior of recipient households. Instead, our primary objective is to understand how households allocate their income, including income from international remittances and expenditures based on their revealed expenditure patterns.

STEP 2: Macrosimulation using the input-output framework

The second step in constructing the micro-macro analysis model is to aggregate households' total income from international remittances and their expenditures (consumption and investment) reported in the FIES and map them to the macro-level input-output table. As mentioned, it is expected that the total income from remittances reported by households will differ from the international remittance data reported by the central bank due to the differences in definitions and data sources. We feed remittance income allocated toward expenditure and savings and investment to the 2018 Benchmark Input-Output (I-O) Accounts of the Philippines in the form of final demand from households and evaluate its impact on sectoral and overall output. As an additional exercise, we simulate how a 10% increase in remittance income changes expenditure

patterns using the consumption equation and how the changes translate to sectoral and overall output.

a. Mapping commodity items to I-O sectors

Commodity items from the 2018 FIES are mapped to the 80-sector disaggregation of the 2018 I-O table.¹⁰ The FIES-IO concordance matrix¹¹ allows a one-to-one matching that largely considers the sectors that produced (or delivered) the commodity (or service). However, the matrix leaves out retail and wholesale trade sectors (I-O sectors 54 and 55) from which a majority of the goods were purchased. To overcome this limitation, we collect retail and wholesale trade margins by sector from the 2016 Annual Survey of Philippine Business and Industry and use them to allocate a portion of the value of commodity items that should go to retail and wholesale trade sectors.¹² We also differentiate the purchase of domestic products out of remittances from that of foreign products (whereby the latter does not constitute domestic output except in retail sectors). We derive a matrix containing import demand levels of intermediate and final demand components by sector and deduct it from the published 2018 input-output table.

b. Deriving I-O household final demand driven by remittance income

The final demand from households refers to their final expenditure, which consists of their consumption (the sum of household spending on various consumption items) and their savings or investment (items such as bank savings, real estate purchases, and construction and/or major renovations). To determine the aggregate expenditure of households, we first calculate the portion of remittance income used for consumption and savings or investment per household. We assume that households spend their remittance income on consumption in the proportion equivalent to the share of remittance income in total income. Household savings are the residual of income and their total consumption plus deposits in banks/investments, purchase/amortization of real property, and money used either to build a new house or for major repair or renovation of an existing house, according to the System of National Accounts 2008 guide (European Commission et al. 2009).

We calculate the sum of remittance-financed consumption and savings of all households to determine the aggregate amount of expenditure and the savings component of remittances. The sum of expenditures forms part of household final consumption expenditures, while the savings

¹⁰ The 2018 Benchmark I-O Accounts of the Philippines include the I-O transaction table, the technical coefficient matrix, and the Leontief inverse matrix in three dimensions (i.e., 16x16, 80x80, and 240x240) corresponding to the sectoral disaggregation.

¹¹ The detailed expenditure items in the FIES follow the classification system, Philippine Classification of Individual Consumption According to Purpose (PCOICOP). To maintain their equivalence with the I-O sector, we follow the four-step conversion process in consultation with the Philippine Statistics Authority:

- 1) PCOICOP to 2002 Philippine Central Product Classification (PCPC)
- 2) 2002 PCPC to 1994 Philippine Standard Industrial Classification (PSIC)
- 3) 1994 PSIC to 2009 PSIC (Updates to 1994 PSIC)
- 4) 2009 PSIC to 2018 I-O Sectors

Using the concordance above, the commodity items with PCOICOP codes 011121 (corn on the cob), 011121 (whole corn/grain), 011121 (corn grits), and 011121 (other corn, corn starch, etc.) are all classified under I-O sector 02 (Growing of corn).

¹² For example, retail and wholesale trade margins for I-O sector 02 of commodities are both 9%; thus, if the total expenditure on such commodities is ₱100.00, we allocate ₱9.00 each to retail and wholesale trade.

form part of gross fixed capital formation. The combined aggregate of the two is synonymous to the level of final demand induced by remittances, which we shall collate as the vector y^{remit} .

c. Estimating impact of remittance-sourced household final demand on output and employment

The contemporaneous impact of remittance-financed demand on the gross output of the economy is estimated using the 80-sector I-O table. For ease of presentation, the estimates are later aggregated into 16 I-O sectors. To estimate the baseline outputs per production sector i induced by remittances (x_i^{remit}), the final demand vector derived from the earlier steps, y^{remit} , is multiplied by the 80-sector Leontief inverse matrix (B) published by the Philippine Statistics Authority (PSA), i.e.,

$$x^{remit} = B \cdot y^{remit}$$

where x^{remit} denotes the vector of sectoral gross outputs realized through remittances, which entail both direct and indirect impacts. Once x^{remit} is obtained, it is multiplied elementwise by the vector of sectoral employment-to-output ratios, e , to derive the level of employment per sector associated with remittances. Sectoral employment-to-output ratios are estimated using the employment per I-O sector based on the 2018 Labor Force Survey and gross output per sector based on the 2018 I-O table.

d. Extension–Simulation with exogenous change in remittance income

As an extension of the model, we also simulate the impact of a 10% increase in remittance income on gross output and employment. We estimate the share of each sector in every household's total expenditure with and without the hypothetical increase in remittance income. The hypothetical change in the aggregate expenditure (both consumption and savings) is derived from a micro simulation based on the results of the consumption equations.

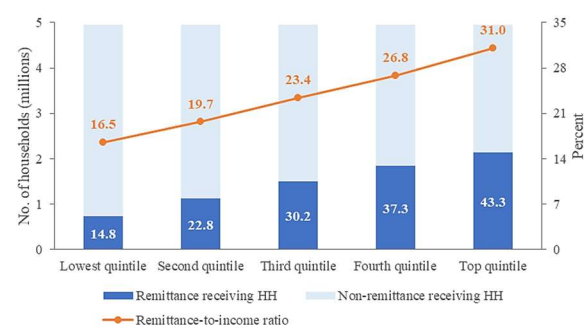
4. Remittance Income and Reported Household Expenditures in the Philippines

The Philippines is a major country of origin for international migrants, sending an average of more than 2 million workers each year since 2016.¹³ The United Nations Department of Economic and Social Affairs Population Division (2021) estimates that about 6.1 million Filipinos currently live abroad, representing 5.4% of the country's total population. In 2018, up to 29.7% of all households in the Philippines received cash from abroad. Remittance-receiving households are distributed across all income groups, with a higher representation in the higher quintiles (Figure 1a). This is consistent with the general observation that international migration is not as common among the poor, who cannot afford the initial costs of migration (de Haas 2010). The share of remittance income in total household income increases with income level, from an average of only 16% in the lowest quintile to 31% in the highest income group. International remittances have the highest share (31%) in the top income quintile, which is even higher than income from wages and salaries.

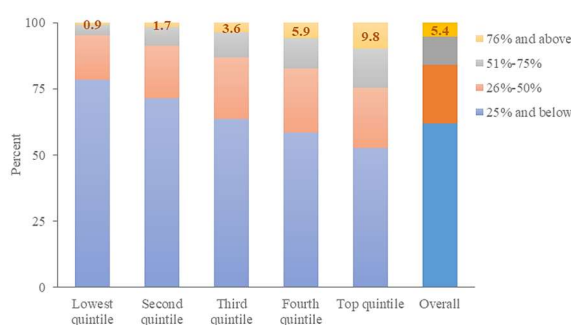
¹³ However, this number declined during the COVID-19 pandemic due to travel restrictions and suppressed global economic activity.

Figure 1: Philippine Households by Receipt of and Dependence on International Remittances and Income Quintile, 2018

a. By Receipt of International Remittances



b. Remittance-Receiving Households' Dependence on Remittances



Notes: In (a), the numbers inside the blue bar represent the share of remittance-receiving households to total number of households per income quintile.

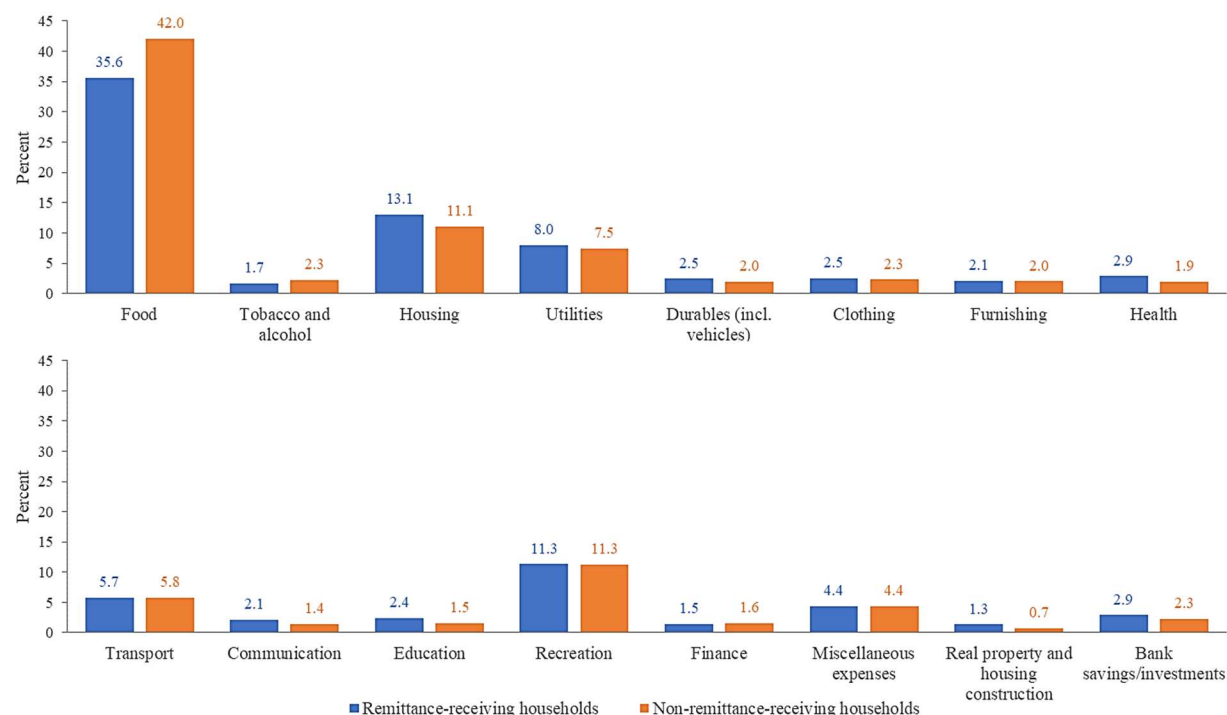
Source: Authors' calculations.

Remittance income accounts for only a quarter or less of their total income for more than the majority (61.8%) of the overall remittance-receiving households (Figure 1b). Another 22.1% report that remittances account for 26%–50% of their total income, while the remaining households (16.1%) use remittances as their primary source of income, with about one-third of households reporting that they rely heavily on remittances (over 75%). The dependency on remittances as a source of income is greater among households in higher income brackets.

Household Consumption and Savings by Remittance Receiving Status

The average annual spending of a Filipino household reached ₱239,000 (≈ \$4,538.4). Figure 2 shows the share of each broad commodity including savings and investments, in total household expenditures, comparing the remittance-receiving and non-recipient households. The overall spending allocation patterns of the two groups of households on the various commodities are similar. However, there are significant differences in the share of some commodity items, such as food, housing, health, and education. The allocation of remittance-receiving households in food expenditures (35.6%) is relatively lower than the share of non-remittance-receiving households (42%). In contrast, spending on housing and on productivity-enhancing items such as health and education is relatively higher among remittance recipients. Remittance-receiving households also spend more on investments, in terms of share to their total expenditure, such as real property, major repairs or renovations, and construction of new houses, as well as on bank savings and investments.

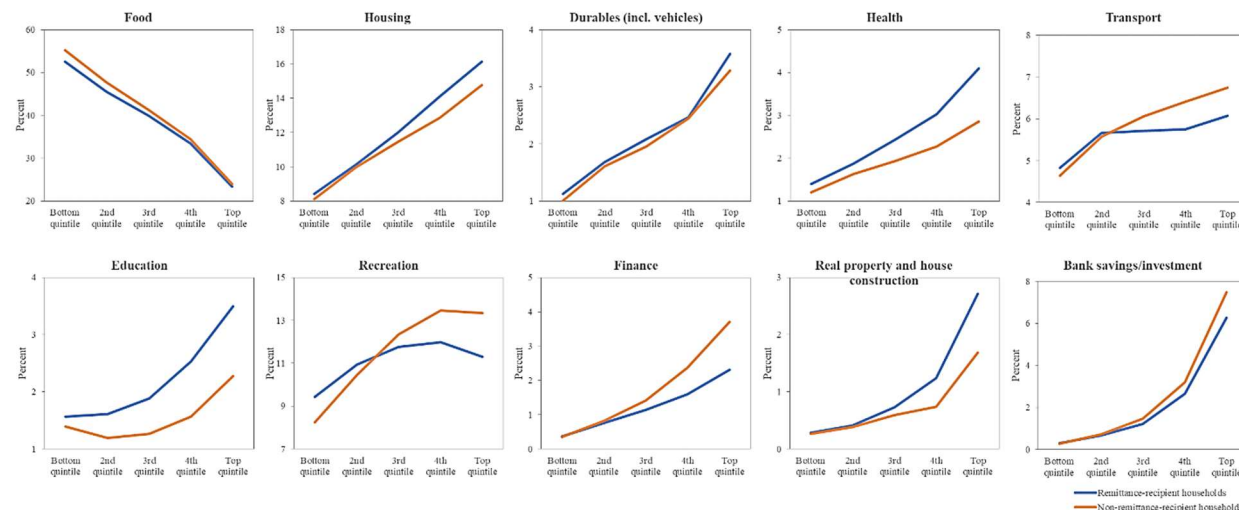
Figure 2: Share of Broad Expenditure Items to Total Expenditure, by Receipt of Remittances, 2018



Source: Authors' calculations.

The observed heterogeneity in expenditure patterns could be due to the skewed distribution by income of remittance-receiving households. Figure 3 shows the share of total expenditure on broad commodity items, by income quintile and receipt of remittances. Expenditure patterns are largely the same between the remittance-recipient and non-recipient groups, but notable differences are still observed in education, health, financial services, real property and construction, recreation, and transportation. These differences are more pronounced in the higher income quintiles. The use of financial services is found to be higher among non-remittance receiving households. While this is somewhat counterintuitive, given that many households receive funds through financial intermediaries, it may suggest that financial inclusion and use of financial services remains limited among remittance recipients.

Figure 3: Share of Broad Commodity Items to Total Expenditure, by Income Quintile and Receipt of Remittances, 2018



Source: Authors' calculations.

Descriptive data show that savings behavior does not show significant differences between remittance- and non-remittance-receiving households. In 2018, the average share of savings in household income is 17.3% (Figure 4). Remittance-receiving households have a slightly lower savings ratio (17.1%) than non-remittance-receiving households (17.8%). As expected, households with bank accounts have a higher savings rate (25.5% versus 17.2%), although their numbers account for no more than 1% of total households. Comparing the two groups of households, the savings rate of remittance recipients is slightly higher (26.3%) than the non-remittance-receiving households (24.4%).

Figure 4: Savings Rate, by Bank Use and Receipt of Remittances, 2018



Source: Authors' calculations.

Findings from Household Consumption Equations

We further investigate the expenditure pattern of remittance recipients and non-recipients by estimating the consumption equation presented in section 3. Table 1 presents our empirical results. Following the relevant literature, such as Zhu et al. (2014) and Wang, Hagedorn, and Chi (2021), the coefficients, β_i , of total household income can be interpreted as the marginal propensity to consume, which varies by receipt of remittances as well as the extent of dependency to such income source with the interaction term, ρ_i . In terms of magnitude, bank savings or investments are observed to have the largest increase in any expenditure item amid a similar increase in total household income. For a 10% increase in total household income, the share that average households allocate to bank savings and investments increases by 0.43 percentage points. This is followed by durables (including vehicles), finance, and recreation. Allocation toward real property and housing construction also rises by 0.12 percentage points with a 10% increase in household income.

	(1) Food	(2) Tobacco and Alcohol	(3) Housing	(4) Utilities	(5) Durables (including vehicles)	(6) Clothing	(7) Furnishing	(8) Health
Variables								
Region dummies	YES	YES	YES	YES	YES	YES	YES	YES
Weighted no. of observations	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315
R-squared	0.598	0.085	0.258	0.092	0.035	0.071	0.039	0.075

Table 1. continued.

	(9) Transport	(10) Communication	(11) Education	(12) Recreation	(13) Finance	(14) Miscellaneous Expenses	(15) Real Property and Housing Construction	(16) Bank Savings/Investments
Variables								
Total household income (log)	1.065*** (0.002)	0.604*** (0.001)	0.542*** (0.002)	1.383*** (0.003)	1.454*** (0.001)	-0.505*** (0.001)	1.178*** (0.002)	4.289*** (0.003)
Remittance dependency group (Benchmark = Non-remittance receiving households)								
Group 1 = 0% < Remittance-to-income ratio ≤ 25%	0.623*** (0.041)	-0.990*** (0.014)	-2.827*** (0.034)	8.030*** (0.073)	1.899*** (0.023)	1.626*** (0.024)	-3.544*** (0.046)	1.089*** (0.070)
Group 2 = 25% < Remittance-to-income ratio ≤ 50%	4.450*** (0.069)	-1.003*** (0.023)	-9.412*** (0.057)	8.562*** (0.122)	6.019*** (0.038)	1.183*** (0.040)	-9.425*** (0.077)	2.441*** (0.117)
Group 3 = 50% < Remittance-to-income ratio ≤ 75%	3.983*** (0.100)	0.973*** (0.033)	-16.519*** (0.083)	16.741*** (0.178)	8.064*** (0.055)	3.161*** (0.059)	-19.323*** (0.113)	8.453*** (0.171)
Group 4 = Remittance-to-income ratio > 75%	7.255*** (0.131)	7.711*** (0.044)	-19.772*** (0.109)	24.813*** (0.233)	10.551*** (0.072)	5.062*** (0.077)	-39.047*** (0.148)	-18.929*** (0.223)
Interaction term (Total household income x remittance dependency group)								
Group 1 = 0% < Remittance-to-income ratio ≤ 25%	-0.061*** (0.003)	0.094*** (0.001)	0.249*** (0.003)	-0.698*** (0.006)	-0.181*** (0.002)	-0.119*** (0.002)	0.290*** (0.004)	-0.145*** (0.006)
Group 2 = 25% < Remittance-to-income ratio ≤ 50%	-0.408*** (0.005)	0.110*** (0.002)	0.815*** (0.005)	-0.782*** (0.010)	-0.550*** (0.003)	-0.089*** (0.003)	0.772*** (0.006)	-0.281*** (0.009)
Group 3 = 50% < Remittance-to-income ratio ≤ 75%	-0.386***	-0.031***	1.436***	-1.446***	-0.738***	-0.248***	1.632***	-0.733***

	(9) Transport	(10) Communication	(11) Education	(12) Recreation	(13) Finance	(14) Miscellaneous Expenses	(15) Real Property and Housing Construction	(16) Bank Savings/Investments
Variables								
Group 4 = Remittance-to- income ratio > 75%	(0.008) -0.663*** (0.010)	(0.003) -0.545*** (0.003)	(0.007) 1.764*** (0.008)	(0.014) -2.077*** (0.018)	(0.004) -0.940*** (0.006)	(0.005) -0.401*** (0.006)	(0.009) 3.209*** (0.012)	(0.013) 1.507*** (0.017)
Constant	-7.719*** (0.023)	-5.818*** (0.008)	-6.272*** (0.019)	-0.484*** (0.041)	-15.310*** (0.013)	11.689*** (0.014)	-12.535*** (0.026)	-49.011*** (0.039)
Household characteristics	YES	YES	YES	YES	YES	YES	YES	YES
Household head characteristics	YES	YES	YES	YES	YES	YES	YES	YES
Region dummies	YES	YES	YES	YES	YES	YES	YES	YES
Weighted no. of observations	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315	23,179,315
R-squared	0.076	0.270	0.112	0.150	0.206	0.048	0.044	0.148

Notes: Household level characteristics include household size, share of members aged less than 5 years, share of member aged between 5 and 17 years. Household head characteristics are age, gender, marital status, educational attainment, and job status. Due to missing information in some explanatory variables, the effective weighted number of observations is lower than the total number of households in 2018.

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations.

This also applies to disbursements toward transport, health, communication, and education. Meanwhile, the share to total expenditure on food shows the largest decline when households can earn a higher income, i.e., their allocation on food drops by 1.2 percentage points on average when they have a 10% increase in income. The shares for other expenditure items, such as tobacco and alcohol, and for utilities decrease on average with higher household income. The table also shows that expenditure allocation differs significantly between remittance-receiving households and those that do not, as indicated by the statistically significant coefficient in γ_{in} . This finding is consistent with the observations from descriptive data.

The extent of remittance-receiving households' dependency on remittance income, indicated by the group dummies in the equation, is correlating to consumption choices. Non-remittance-receiving households slash a relatively higher share of food expenditures when their income increases than remittance-recipient households. On average, a 10% increase in household income among non-remittance recipients is associated with a decrease in the share of food consumption by 1.2 percentage points but such response is attenuated for remittance recipients. It is interesting to note that remittances appear to have a significant influence on the allocation of recipient households to long-term productivity-enhancing and investment-related spending and activities. While the increase in the share of education-related expenses to total household expenditures in response to a rise in household income is seen across all households, the coefficient is larger for remittance-receiving households, even when the model controls for the share of children in different age groups in the household.

Similarly, the average share of expenditure on real property investment is 0.12 percentage points higher for every 10% increase in household income, with additional rates ranging from 0.03 to 0.3 percentage points among remittance recipients, highest among those with a high reliance on remittances. Regarding health expenditures, remittance-receiving households except those with the highest reliance on remittances, allocate more than non-recipient households when income increases. One explanation for this could be that, unlike other investment items, health care costs generally do not exceed a certain threshold or that this group of remittance recipients has better health conditions given their better income situation. Further, the allocation toward disbursements relating to bank savings and investment is higher for all remittance-receiving households than non-recipient households except for the households most dependent on remittances. However, it is worth noting that only the households with the highest dependence on remittance income have a higher proxy marginal propensity to consume than the non-remittance-receiving households, suggesting that remittance income encourages bank savings and investment. Meanwhile, the coefficients on recreation and, to some extent, on food show a lower marginal propensity to consume for remittance-receiving households compared to non-recipient households.

In summary, remittance-receiving households tend to have higher productive spending in education and health and investment-related activities, especially in real estate and bank savings, compared to their non-recipient counterparts. We also find no evidence that remittance income exacerbates conspicuous consumption among recipient households. However, it is worth further investigating the factors behind the limited use of financial services among remittance-receiving households.

5. Micro-Macro Analysis on the Impact of Remittance-Driven Household Demand (Consumption and Investment)

In 2018, remittance income reported by households in the FIES totaled ₱742.2 billion (\$14.1 billion), equivalent to 4.1% of the GDP. This is slightly less than half (43.8%) of the official aggregate international remittances into the country reported by the Bangko Sentral ng Pilipinas (BSP), which amounted to ₱1.7 trillion or \$32.2 billion, or approximately 9.3% of GDP. The BSP compiles statistics on personal remittances according to the latest Balance of Payments guidelines.¹⁴ It is worth noting that unlike many other central banks, the BSP estimates remittances sent through informal channels using surveys, including the FIES (World Bank 2023), and adds them to the official remittance statistics, which helps reduce the gap in micro and macro remittance statistics.

Household final demand (consumption and savings/investment) by sector

Total household final demand, consisting of consumption and savings/investment financed by remittance income, accounts for 5.6% of total household final demand reported in the I-O transactions table in the same year. We note that household final consumption in the manufacturing sector is the highest at almost ₱2.1 trillion (\$38.9 billion), or 37.9% of the aggregate consumption (Table 2). Philippine households' final consumption for manufacturing consists mainly of food, which accounts for 65.6% of total household demand from manufacturing, beverages, petroleum, and chemical products. The manufacturing sector is followed by accommodation and food services (11.9%) and agriculture, forestry, and fishing (11.8%). The trade sector, which distributes final goods to households mainly through retail activities, also claims a relatively high share (11.4%).

The pattern of final household demands of remittance-receiving and non-recipient households at aggregate level across 16 input-output sectors is shown in Table 2. It mimics the consumption pattern of the FIES-based grouping of expenditures in section 4. Non-remittance-receiving households have more than 2 percentage points higher share of consumption in the manufacturing and agriculture sectors. They also have a slightly higher share of consumption on wholesale and retail trade, of about 1.3 percentage points. In comparison, remittance-receiving households have higher consumption allocation for real estate and ownership of dwellings (about 2 percentage points). Other sectors with a higher share than non-recipient households include utilities (1.2 percentage points), education (1.0 percentage points), and information and communication (0.8 percentage points). Remittance recipients also have a slightly higher share in the health sector than non-recipients.

Based on our calculations, the share of remittance income used for household consumption is about 72.9%, while the rest is either saved or allocated to capital formation activities such as real property and construction. Our analysis decomposing the imported content of intermediate and final demand shows that about 84.3% of remittance income represents final demand for domestic goods, while the rest (15.7%) are imports, which do not constitute domestic output except for the

¹⁴ The BSP records remittance transactions as part of the country's Balance of Payments, so data on personal remittances include (1) net compensation received (i.e., gross earnings less taxes, social security contributions, and transportation and travel expenses) of overseas Filipino workers abroad who are temporary residents or also referred to as "resident OFWs"; (2) personal transfers in cash or in kind of overseas Filipino workers, who have acquired long-term residence in their host country or "nonresident OFWs"; and (3) capital transfers between resident and nonresident households for capital-generating activities such as residential housing construction (Tuaño-Amador et al. 2022).

retail sector. In the following section, we report only the contribution of remittances to domestic outputs and value added.

Table 2: Allocation of Household Consumption by Remittance-Receiving and Non-Remittance-Recipient Households by Sector in 2018 (%)

Sector	Overall	Remittance-Receiving Households	Non-Remittance-Receiving Households
Agriculture, forestry, and fishing	11.8	10.3	12.4
Mining and quarrying	–	–	–
Manufacturing	37.9	36.4	38.6
Electricity, steam, water and waste management	4.9	5.8	4.6
Construction	0.1	0.2	0.1
Wholesale and retail trade; repair of motor vehicles and motorcycles	11.4	10.5	11.7
Transportation and storage	3.9	3.7	4.0
Accommodation and food service activities	11.9	11.8	11.9
Information and communication	1.8	2.3	1.6
Financial and insurance activities	1.6	1.6	1.7
Real estate and ownership of dwellings	10.6	12.0	10.0
Professional and business services	0.2	0.2	0.2
Public administration and defense; Compulsory social security	0.0	0.0	0.0
Education	1.9	2.6	1.6
Human health and social work activities	0.7	1.0	0.6
Other services	1.1	1.4	1.0

– = denotes no allocation, FIES = Family Income and Expenditure Survey.

Source: Authors' calculations from FIES 2018 microdata.

Table 3 shows the distribution of baseline remittance-induced final household demand (both in terms of amount and share) across sectors that contributed to the production of domestic goods and services in the Philippines in 2018. It shows that remittances contribute significantly to demand through final consumption. Consumption financed by remittances predominantly goes to the manufacturing (₱162 billion), wholesale and retail trade (₱61.2 billion), and agriculture (₱59.2 billion) sectors. Meanwhile, the savings/investment portion of remittances flows mostly to the construction sector at ₱118 billion, accounting for a large share of more than 70%. This is followed by manufacturing (₱24.7 billion) and agriculture (₱15.9 billion).

Table 3. Share of Consumption and Savings/Investments in Remittance Income, 2018

Sector	Consumption		Savings/Investment	
	(₱ billion)	(%)	(₱ billion)	(%)
Agriculture, forestry, and fishing	59.2	12.8	15.9	9.8
Mining and quarrying	–	–	0.6	0.3
Manufacturing	162.0	35.0	24.7	15.2
Electricity, steam, water and waste management	26.6	5.7	0.1	0.0
Construction	0.6	0.1	118.0	72.7
Wholesale and retail trade; repair of motor vehicles and motorcycles	61.2	13.2	0.1	0.1
Transportation and storage	19.8	4.3	0.0	0.0
Accommodation and food service activities	39.4	8.5	0.0	0.0
Information and communication	9.1	2.0	0.8	0.5
Financial and insurance activities	8.4	1.8	0.1	0.1
Real estate and ownership of dwellings	56.1	12.1	0.3	0.2
Professional and business services	0.9	0.2	1.2	0.7
Public administration and defense; Compulsory social security	0.2	0.0	0.0	0.0
Education	10.0	2.2	0.2	0.1
Human health and social work activities	4.0	0.9	0.1	0.1
Other services	5.9	1.3	0.2	0.1
Overall	463.3		162.3	

– = denotes no allocation, FIES = Family Income and Expenditure Survey.

Source: Authors' calculations from FIES 2018 microdata.

Overall contribution of remittance income

Our micro-macro model shows that the share of remittance income used by households for consumption and investment-related activities (in Table 3) translates to about 3.5% of the overall economic output (amounting to ₱1.3 trillion or \$24.4 billion) and 3.4% of domestic gross value added (amounting to ₱626 billion or \$11.9 billion) that goes through various sectors of the Philippine economy in 2018.¹⁵ Such remittance-induced final demand also implies that about 1.5 million people are employed, equivalent to 3.7% of the country's total employment.

Table 4 decomposes the overall economic contribution of remittance-driven household final demand (both consumption and savings/investment) to the broad 16 I-O sectors. Given the huge allocation in the manufacturing sector, the effect of remittance income is largest in the sector in both gross output (₱455 billion or 35.5% of gross output contribution) and value added (₱143 billion or 23% of gross value added).¹⁶ This is not only due to the large inflow of remittances into the sector but also due to the high sectoral interdependence and output multipliers. As shown in Figure 5, manufacturing has the highest intersectoral linkage for both forward (2.97) and

¹⁵ Note that this contribution only accounts for the purchase of domestic products, while excluding import contents, which do not constitute domestic output except in retail sectors. The foreign content (imports) of household final demand by remittance recipients amount to 0.7% of GDP.

¹⁶ The contribution of manufacturing to GDP is lower than the contribution to output due to the relatively large import contents in the outputs.

backward (1.33) measures.¹⁷ Sectors with higher backward and forward linkage indices tend to have larger output multipliers, as they generate significant demand for inputs from other sectors while triggering increased production in the industries that supply their inputs. This is intuitive because production requires inputs from relevant upstream sectors such as agriculture and extractive activities, while the outputs produced are often used as intermediate input by other industries. On closer examination, this is particularly true for the manufacture of electrical equipment; rubber and plastic products; wood, bamboo, cane, rattan articles and related products; paper and paper products; transport equipment; and machinery and equipment other than electrical.

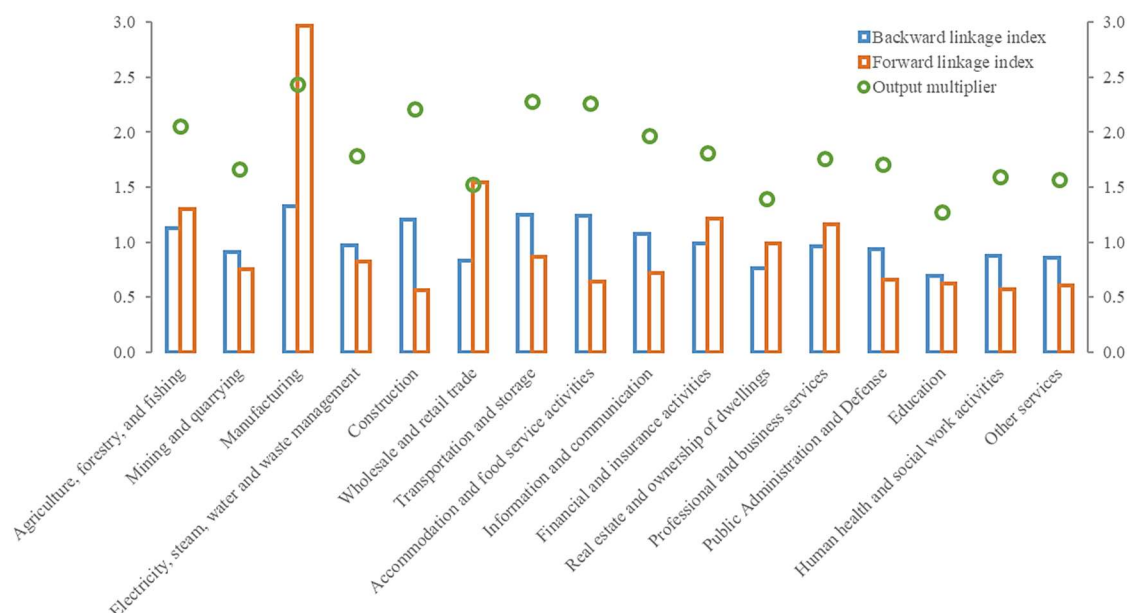
After manufacturing, agriculture (₱178 billion) and wholesale and retail trade (₱150 billion) also generate a large share of remittance-led outputs. Retail trading activities, with a relatively large share of expenditure among recipient households, have a high forward linkage index. The savings and investment portion of their remittance income also boosts economic output, largely due to their expenditure on real property and construction activities. In terms of employment impact, remittance-induced final demand benefits the 644,000 people employed in the agriculture sector (43% of total employment). The impact of employment is also high in the wholesale and retail trade sector (209,000) and in construction (154,000).

¹⁷ The forward linkage index, also known as the index of sensitivity of dispersion, captures the extent to which the sector's output is used by other sectors as input. In other words, it measures the increase in an industry's production that is driven by an increase in final demand across all sectors of the economy. The backward linkage index, or index of power of dispersion, determines the extent to which a sector's production depends on inputs from other sectors. Therefore, an increase in the production of sectors that have relatively high backward linkages generates greater demand for the output of other sectors. The output multiplier refers to the total amount of economy-wide production induced by final demand in different economic sectors (Miller and Blair 2009).

Table 4: Economic Contribution of Remittance Income by Sector, 2018

Sector	Gross Output		Gross Value Added		Employment	
	(₱ billion)	(%)	(₱ billion)	(%)	('000s)	(%)
Agriculture, forestry, and fishing	178	14	89	14	644	43
Mining and quarrying	33	3	25	4	12	1
Manufacturing	455	35	143	23	135	9
Electricity, steam, water and waste management	50	4	31	5	7	0
Construction	120	9	55	9	154	10
Wholesale and retail trade; repair of motor vehicles and motorcycles	150	12	106	17	209	14
Transportation and storage	44	3	20	3	117	8
Accommodation and food service activities	46	4	16	3	81	5
Information and communication	20	2	10	2	8	1
Financial and insurance activities	48	4	26	4	9	1
Real estate and ownership of dwellings	81	6	67	11	7	0
Professional and business services	29	2	17	3	27	2
Public administration and defense; Compulsory social security	1	0	0	0	1	0
Education	15	1	13	2	20	1
Human health and social work activities	5	0	3	0	5	0
Other services	8	1	5	1	70	5
Total	1,283	100	626	100	1,506	100

Source: Authors' calculations.

Figure 5: Sectoral Interdependency and Output Multipliers, 2018

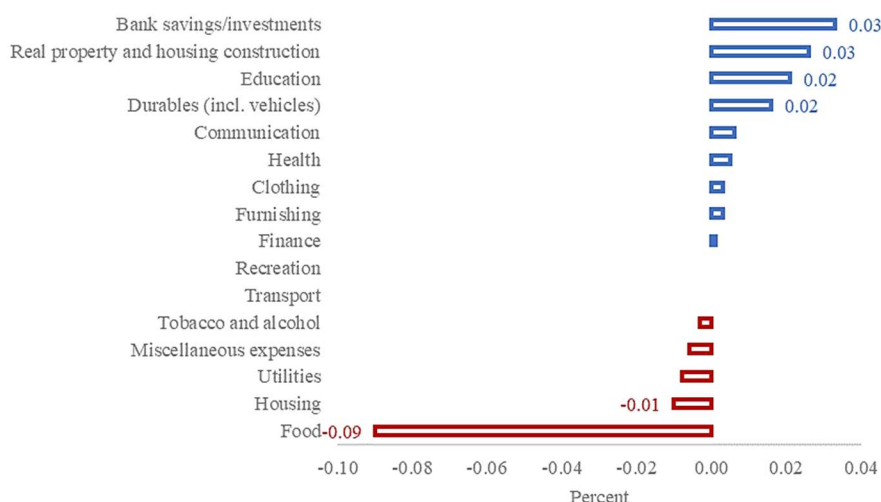
Source: Authors' calculations.

Extension: Simulating a 10% increase in remittance income using the micro-macro model

Extending our micro-macro analysis of remittances, we examine the macroeconomic impact of a hypothetical and exogenous 10% across-the-board increase in remittance income of remittance-receiving households in the Philippines, equivalent to ₱74.2 billion (\$14.1 billion). The model integrates a micro-simulated reallocation of household expenditures resulting from higher income based on the consumption equation (Equation 1). This will complement our understanding of the contribution of remittance-led household expenditures, savings, and investments by providing more insights into sector-specific contributions to economic output and value added. This assumes that non-recipient households are not affected by this exogenous change via potential spillover effects.

Figure 6 illustrates the results of the microsimulation results of a 10% increase in remittances received. It shows that such additional income reduces the average share of food in total expenditure by 0.09 percentage points among remittance-receiving households. This decline is offset by an increase in the share spent on bank savings and investments (0.03 percentage points) and spending on real property and housing construction (0.03 percentage points), education (0.02 percentage points), durable goods (0.02 percentage points), and health (0.01 percentage points). In comparison, the estimated reduction in the share of food is much higher than the 0.0001 percentage points estimated in Wang, Hagedorn, and Chi (2021) in the context of remittance-receiving households in the Kyrgyz Republic as well as the associated increase in the share of spending on medical and related expenses (i.e., 0.0001 percentage points). The remittance receiving families in the Kyrgyz Republic are mostly in the poor income groups that are highly dependent on remittances (Gao, Kikkawa, and Kang 2021). This could explain the inelasticity of food items in the shock scenario.

Figure 6: Simulated Reallocation Impact in the Share of Broad Expenditure Items to Total Household Spending



Note: Data labels refer to the percent change in the share of expenditure on each commodity item to total expenditure.

Source: Authors' calculations.

The reallocation effect varies by household income level. The decline in the share of food to total expenditures is greatest for the higher income quintiles (Figure Annex 1). Accordingly, the spending allocation to productive and investment activities is also higher among the wealthier households. Aside from food consumption, the share of spending on housing and utilities, as well as recreational items such as restaurants and accommodations, has also fallen in the top income quintiles. We also note the same pattern of spending reallocation when we look at households with different levels of dependence on remittance income, and that the share of food expenditure declines when remittance-receiving households have higher dependence on remittance income (Figure Annex 2). In addition, the increase in remittances would also boost the share of spending on investment and productivity-inducing items such as bank savings and investments, real property and housing, and education.

Incorporating the above insights into the I-O analysis, Table 5 presents the simulated macroeconomic impact of a 10% increase in remittance income received by households. Overall gross output is estimated to be 0.35 percentage points higher (₱128.4 billion or \$2.4 billion) than the baseline level (₱36.5 trillion or \$693.9 billion) if households spend, save, or invest this additional receipt in various sectors of the economy. Downstream sectors such as mining and quarrying, as well as electricity, steam, water and waste management, and agriculture, benefit from the higher remittance flows and the corresponding increase in final demand from recipient families. They benefit from the high output multiplier of the manufacturing sector, which despite some reduction in allocations, continues to account for a large chunk of total spending by remittance-receiving households.

Table 5: Estimated Impact of a 10% Increase in Remittance Income by Sector, 2018

Sector	Gross Output		Gross Value Added		Employment	
	(₱ billion)	% Change to Baseline	(₱ billion)	% Change to Baseline	('000s)	% Change to Baseline
Agriculture, forestry, and fishing	17.8	0.52	8.9	0.51	64.5	0.64
Mining and quarrying	3.3	1.35	2.5	1.55	1.2	0.57
Manufacturing	45.5	0.42	14.3	0.41	13.5	0.37
Electricity, steam, water and waste management	5.0	0.56	3.1	0.56	0.7	0.50
Construction	11.8	0.39	5.4	0.39	15.2	0.39
Wholesale and retail trade; repair of motor vehicles and motorcycles	15.0	0.32	10.6	0.33	21.0	0.26
Transportation and storage	4.4	0.26	2.0	0.28	11.7	0.36
Accommodation and food service activities	4.6	0.43	1.6	0.39	8.1	0.47
Information and communication	2.0	0.19	1.0	0.19	0.8	0.19
Financial and insurance activities	4.8	0.18	2.6	0.17	0.9	0.16
Real estate and ownership of dwellings	8.1	0.53	6.7	0.57	0.7	0.36
Professional and business services	2.9	0.15	1.7	0.15	2.7	0.15
Public administration and defense; Compulsory social security	0.1	0.01	0.0	0.01	0.1	0.01
Education	1.5	0.17	1.3	0.17	2.0	0.17
Human health and social work activities	0.5	0.11	0.3	0.11	0.6	0.11
Other services	0.8	0.14	0.5	0.13	7.1	0.23
Overall	128.4	0.35	62.6	0.34	150.7	0.37

Source: Authors' calculations.

The results also suggest that the additional remittance income, with its influence to be allocated more toward real estate activities, will induce higher output for the real estate and ownership of dwellings and construction activities. Given the high baseline expenditure share of accommodation and food services, the macroeconomic impact of additional remittances in this sector remains high. Further, with reallocation toward education and health, the economic output induced by higher receipt of remittances also benefits the health care and education sectors. The same pattern also applies to the impact on value added per sector, which is 0.34 percentage points higher than the baseline, equivalent to \$1.19 billion in 2018. Our results are generally consistent with those of Goce-Dakila and Dakila, Jr. (2009) based on a general equilibrium approach. They found that a 5% reduction in remittances received by households is accompanied by a decrease in the overall gross output of less than half a percentage point, with the largest impact observed in the services sector. Apart from the fact that their analysis uses macro statistics for remittances, which can be at least double the actual remittance income of households, their results are comparable.

6. Conclusion and Policy Implications

This study evaluated the contribution of international remittances to overall economic output of the migrants' country of origin using a consistent definition of remittances which is drawn from the reported international remittance income of the recipient households. Using the input-output framework, we illustrated how household income from remittances flows into each industry and ultimately into the overall economy. We find that remittance income reported by Philippine households amounted to ₱1.7 trillion in 2018, equivalent to 44% of the aggregate international remittance inflows officially reported by the central bank in the same year. Remittance-financed household consumption and investment contributed to 3.5% of the country's total gross output (\$24.4 billion), 3.4% (\$11.9 billion) of gross domestic product (GDP), and 3.7% (1.5 million individuals) of total employment in 2018. In our simulation, a general increase in international remittance income of 10% (equivalent to \$1.4 billion) leads to an increase in the country's GDP of 0.34 percentage points over the baseline, i.e., about \$1.2 billion in 2018. The sectors that benefit the most from the additional remittance-led consumption and savings/investment include manufacturing, construction, and agriculture. Demand from remittance recipients for these sectors can provide an additional boost to domestic output and value added, as these sectors have high multiplier effect. Sectors such as mining and quarrying and electricity, steam, water and waste management, which have relatively low direct allocation on upstream sectors, experienced large increases in gross output and gross value added (relative to their baseline levels) because of their strong linkages with manufacturing. The exogenous increase in remittances induces households to reallocate more to investment-related spending, which boosts demand and output in the real estate and construction sectors.

Our analysis and findings can guide policymakers in migrants' countries of origin in many ways. First, the study confirms the existence of large differences in the size of international remittances reported by households and the central bank, which is an important factor to consider for remittance data analysis at the micro, macro, or both levels. The findings also indicate that an attempt to promote the productive use of remittances should not only include remittance-recipient households as the target audiences, but also reach out to migrants/immigrants and diaspora investors, who likely remit a sizable share of international remittances.

Second, the proposed input-output analysis can be used as a tool to examine how income from remittances flows from households to different sectors and to the overall economy, whether they are channeled into productive sectors with high sectoral dependence, and what impact it has on job creation. In other words, it is possible to assess whether remittances are creating virtuous cascading effects on the output of the whole economy. The benefit of this analysis becomes clearer when applied to multiple countries, allowing for comparison. An additional benefit of the proposed micro-macro analysis, which examines the share of import contents that remittance income purchases, is also an alternative assessment of its direct contribution to the economy of the migrants' home country. In addition, our analytical tool can help governments anticipate the household- and industry-specific effects of possible fluctuations in remittance flows with relatively little data requirement.

Future research is needed to close the gap between micro and macro remittance studies and overcome definitional differences. One is to study the flow of remittance-sourced expenditures related to family businesses or family business investments that can be financed from remittances. Many household surveys are silent on the source of such investment funds, reporting only the net profits earned from the family business as income. It is also important to conduct

more research on how migrants, immigrants, and the diaspora themselves consume and invest remittances in countries of origin (apart from remitting funds to families) so that we can fill the gap in the data and literature. In addition, because of its simple data requirements, our approach can be applied to other migrant countries of origin for comparison to broaden our understanding of the impact and mechanisms through which remittances influence the economies of these countries.

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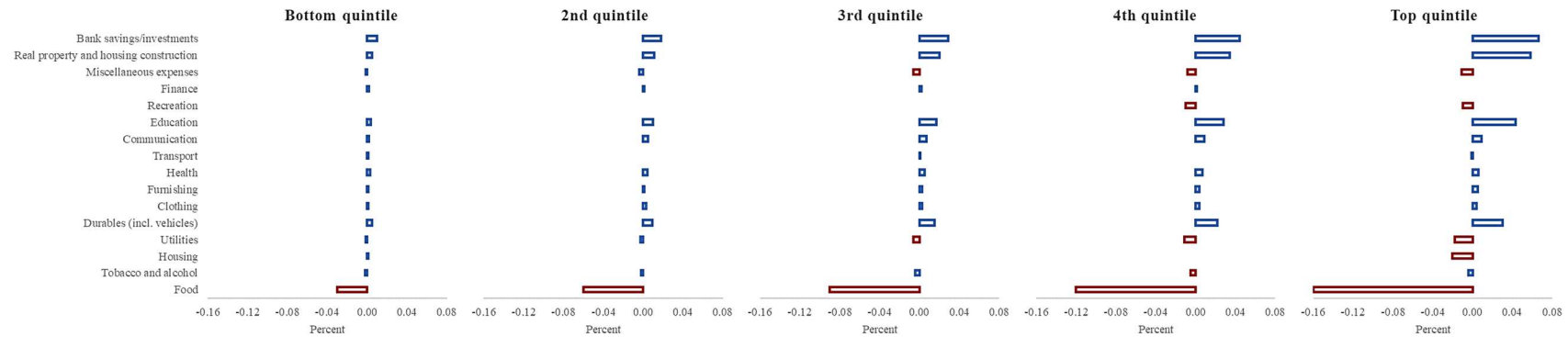
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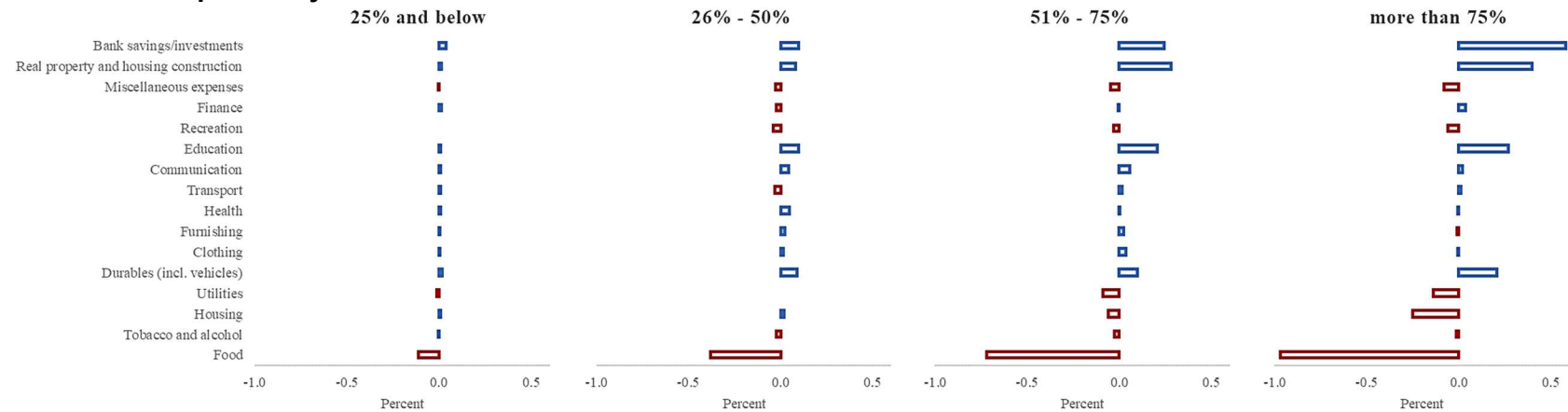
APPENDIX

Figure A1: Simulated Reallocation Impact in the Share of Broad Expenditure Items to Total Household Spending, by Income Quintile



Source: Authors' calculations.

Figure A2: Simulated Reallocation Impact in the Share of Broad Expenditure Items to Total Household Spending, by Remittance Dependency



Source: Authors' calculations.

Measuring the Contribution of International Remittances to Household Expenditures and Economic Output

A Micro–Macro Analysis for the Philippines

This study assesses the simultaneous contribution of international remittance income reported by recipient households to the overall economy of the Philippines by integrating micro data and macro simulation based on an input–output framework. It finds that remittance-driven household expenditures and investments contributed 3.5% of the country’s total output, 3.4% of the gross domestic product, and 3.7% of the total employment in 2018. Industries that received the bulk of remittances in the form of final consumption are manufacturing, agriculture, and wholesale and retail trade.

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