

Migrant remittances, international capital flows, and economic growth: a short-run Keynesian model applied to the emerging economies

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Abstract

Purpose – Economic models highlight that migrant remittances contribute to the “Dutch disease” by appreciating the real exchange rate and reducing export competitiveness. However, empirical evidence demonstrates cases where remittance inflows are associated with exchange rate depreciation. In this study, we develop an economic model showing how remittances can lead to real exchange rate depreciation and promote economic growth when managed through monetary and fiscal policy.

Design/methodology/approach – We design a short-term Keynesian macroeconomic model incorporating the international bond market and remittances. We demonstrate that remittances may generate real exchange rate depreciation and boost exports through an enhanced international credit flow channel. We also examine the implications of government borrowing, monetary sterilization, and foreign direct investment (FDI) within this framework to understand their influence on remittance flow macroeconomic dynamics.

Findings – Our model presents four cases that shed light on how our hypothesized remittance-induced credit channel can impact economic growth in an emerging economy under a large value of (a) the international portfolio investment coefficient, f , (b) a small value of f , (c) a complete sterilization in the monetary sector, and (d) a partial sterilization in the monetary sector. We show that government borrowing and FDI are critical in moderating remittance effects on domestic interest and exchange rates. The findings highlight how central bank and government policy responses influence the extent to which remittances impact economic growth.

Originality/value – We present a new theoretical explanation for how remittances can lead to real exchange rate depreciation through the monetary and financial sectors. By incorporating government financing decisions and FDI, we clarify the macroeconomic effects of remittances for theory. The findings from the four cases have important policy implications, especially for open emerging economies that rely on remittances and seek to mitigate the risks of the Dutch disease while using remittances to promote economic growth.

Keywords Remittances, Dutch disease, FDI, Keynesian models, Monetary policy, Exchange rate, Foreign direct investment, Capital flows

Paper type Research paper

1. Introduction

In the past 2 decades, remittances to low- and middle-income countries (emerging economies) soared from an estimated \$66.8 billion in 1999 to \$651 billion in 2022, which represents an almost tenfold increase in total worldwide remittances (World Bank, 2021a, b, 2023, 2024). Remittances, the money sent back home by migrants, have numerous positive benefits for

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economic growth, poverty alleviation, and human capital formation (Azizi, 2020; Rapoport and Docquier, 2006). Yet, a rapid influx of foreign currency through remittances may appreciate the real exchange rate, resulting in less competitive exports in the global market and uneven economic development (Hassan and Holmes, 2013). The first systematic meta-analysis of 426 estimates from 67 studies found a small positive relationship between remittances and the real exchange rate, but the effect differs between countries (Anwar and Mang, 2022).

Yet, prior research has ignored the remittance-induced depreciation channel whereby rational investors substitute a lower domestic interest rate for a higher foreign interest rate (Amuedo-Dorantes and Pozo, 2004; Lopez *et al.*, 2007). In theory, these capital outflows can lead to a depreciation of the domestic currency, which in turn can boost net exports and potentially stimulate the economy of the recipient country (Rapoport and Docquier, 2006). Some recent empirical studies have found that while remittances appreciate the real exchange rate, the impact of the Dutch Disease *may* be small and effectively mitigated by policy (Adejumo and Ikhiede, 2019; Barrett, 2014). However, the specific macroeconomic mechanisms driving these outcomes are still not fully understood. Therefore, we aim to illustrate the circumstances under which a depreciation of the real exchange rate, induced by remittances, can promote economic growth. This understanding is essential for both economic theory and macro-policy.

Economic theory mentions the immediate benefits remittances provide the poor through domestic consumption, but many Keynesian models ignore the external financial sector and the possibility of a trade surplus through a depreciated real exchange rate (Conrad *et al.*, 2018). Remittances provide a critical lifeline of support for staple goods (food, shelter, etc.), and research shows a strong “multiplier effect of remittances” on domestic household consumption (Fullenkamp *et al.*, 2008; Karpestam, 2012). However, the previous studies show remittances may negatively impact investment and increase imports; thus, the elasticity of the previous effects on national income is shown to be less than one. Even recent Keynesian models have a generally pessimistic view of migrant remittances inducing export competitiveness. For example, Gonzalez and Sovilla’s (2014) static model notes a “remittance multiplier of (-1) ”, where national income paradoxically declines by the rate of remittances due to the real exchange rate overshooting. Likewise, dynamic models emphasize that remittances increase consumption, albeit with limited effects on investment or trade (Guha, 2013).

We develop a short-term Keynesian model and show how remittances can lead to a depreciation of the foreign currency and enhanced competitiveness in the tradeable goods sector. Rashid and Sharma (2017) mention that remittances increase the money supply through credit expansion, and because of the increased money supply, the interest rate declines, prompting an increase in the interest-sensitive component of domestic consumption and investment. The two positive effects of remittances on national income increase the possibility of an overall positive impact of remittances on economic growth. We introduce a third channel in this paper. We claim that remittances can add to a central bank’s “high-powered money”, and through the money multiplier effect, the money supply in the recipient country rises manifold. Because of the increase in the money supply, the domestic interest rate declines, which, in turn, generates a positive effect on national income from remittances. This channel links the remittance-induced decline in domestic interest rates to international portfolio investments. Given the higher expected rates of return on foreign bonds relative to domestic interest rates, domestic portfolio investors switch from domestic bonds to equivalent foreign bonds. These capital flows result in the depreciation of the emerging economy’s currency. Thus, we show that net exports will rise, raising aggregate demand in the economy.

The Keynesian model presented in this paper explicitly considers how government financing (taxation and bonds) and FDI may affect our proposed remittance-induced credit channel. Excessive government borrowing can “crowd out” private sector investment by increasing domestic interest rates (Driffield and Jones, 2013). Also, in many emerging economies, FDI and remittances are crucial aspects of capital inflows, and both are sensitive to changes in exchange and interest rates (Kose and Ohnsorge, 2023). Therefore, we explicitly incorporate the effects of

both FDI and government borrowing into our model because both effects, unless accounted for, can dwarf our theorized exchange rate depreciation and trade surplus.

Also, our model posits that the size by which remittances affect domestic income through our proposed monetary channel crucially depends on the nature of the domestic financial markets, the government's restrictions on capital flows, and the monetary sterilization of the exchange rate. Empirical evidence shows significant differences exist between low-income (Sub-Saharan Africa) and middle-income (South Asian, Pacific, East Asia) emerging economies in their level of financial development (financial literacy, banking sector, financial regulation) (Azizi *et al.*, 2024). Hence, this may impact monetary policy and the speed at which rational investors can arbitrage between alternative portfolio investments. Also, many emerging economies practice capital market sterilization and use capital controls to limit the symptoms of the Dutch disease from an overvalued currency (Caroli and Rajan, 2015). Drastic fluctuations in interest and exchange rates can disrupt the corporate sector's valuation of domestic currency assets and liabilities, impacting corporate performance and planning. Central banks often sterilize the foreign exchange accumulated from remittances and FDI to regulate significant fluctuations in interest and exchange rates (Ghosh *et al.*, 2016). Thus, we explicitly incorporate the depth of the financial sector development and the speed by which the central bank absorbs foreign currency into our economic model.

The rest of the paper is organized as follows: In Section 2, we formally outline the assumptions of the Rashid and Sharma (2017) model, expanding on them to include a more detailed money supply process and to specify global portfolio investment flows based on the disparity between domestic and foreign rates of return. Section 3 analyses the model by illustrating four scenarios that influence the proposed remittance-induced depreciation of the real exchange rate, considering changes in the depth of an economy's financial development and the level of central bank intervention. Section 4 discusses the implications of our model for economic policy, and Section 5 concludes by presenting possible extensions to our model.

2. The model

2.1 Assumptions

Here are the formal assumptions of the Rashid and Sharma (2017) model:

(1) Remittance Allocation

- Let R denote total remittances received in foreign currency, and let E be the exchange rate (units of domestic currency per unit of foreign currency).
- The total remittance value in domestic currency is given by RE .
- A fraction c of RE is allocated to consumption, where $c \in (0, 1)$, and the remaining $(1 - c)RE$ is saved.
- A portion $\lambda(1 - c)RE$ of saved remittances is directly allocated to investment, where $\lambda \in (0, 1)$.

(2) Monetary Expansion through Remittances

- The remaining fraction $(1 - \lambda)(1 - c)RE$ of the remittances saved is deposited in financial institutions.
- These deposits serve as primary reserves, increasing the money supply through the money multiplier mechanism.
- Assuming a required reserve ratio $r \in (0, 1)$, the money multiplier is $1/r$, and the total money supply increase due to remittances is given by $\frac{1}{r}\delta RE$, where $\delta = (1 - \lambda)(1 - c)$.

(3) Exchange Rate and Foreign Sector

- The foreign exchange market is always in equilibrium, implying that the exchange rate E adjusts instantaneously to changes in remittance inflows.
- The trade balance follows the standard assumptions:

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$$X = X(E), \frac{dX}{dE} > 0 \dots \quad (1)$$

$$M = M(Y, E), \frac{M}{Y} > 0, \frac{M}{E} > 0 \dots \quad (2)$$

where X and M represent exports and imports, respectively.

(4) Consumption and Investment Behavior

- Consumption function:

$$C = C_0 + cY + c\mu RE - bi, b > 0 \dots \quad (3)$$

where C_0 is an exogenous component, μ represents the fraction of cRE allocated to domestically produced goods, and i is the interest rate.

- Investment function:

$$I = I_0 + \lambda RE - gi, g > 0 \dots \quad (4)$$

where I_0 is an exogenous component, and g represents the sensitivity of investment to the interest rate.

(5) Money Market Equilibrium

- The demand for money is given by:

$$M_d = d_1 Y - d_2 i, d_1 > 0, d_2 > 0 \dots \quad (5)$$

- The money supply function incorporates remittance inflows:

$$M_s = M_0 + \frac{1}{r} \delta RE, \delta > 0 \dots \quad (6)$$

- Equilibrium condition in the money market:

$$M_d = M_s \dots \quad (7)$$

(6) Interest Rate Determination

- Solving for the equilibrium interest rate:

$$i^* = \frac{d_1 Y - M_0 - (\delta RE/r)}{d_2} \dots \quad (8)$$

- The equilibrium interest rate i^* decreases as remittance inflows increase.

(7) Aggregate Demand and National Income

- The goods market equilibrium is given by:

$$y^* = C + I + X - ME \dots \quad (9)$$

Substituting the consumption, investment, and trade balance equations, the equilibrium level of national income y^* is:

$$Y = \frac{C_0 + I_0 + M_0}{1 - c} - \left(\frac{(1 - c) - \lambda - (\delta/r)(b + g)}{1 - c} \right) \dots \quad (10)$$

- (8) No other capital flows (e.g. FDI, or foreign aid) are considered apart from remittances, and the bond market is in closed form that means domestic and foreign bonds are not substitutes.
- (9) Prices are assumed to be fixed, indicating a short-run analysis. The model focuses on the demand-side effects of remittances on national income, excluding long-run supply-side effects such as productivity growth or human capital accumulation.

Therefore, remittance-induced credit expansion lowers interest rates and stimulates consumption and investment. The exchange rate adjustments may lead to depreciation or appreciation, depending on remittance inflows and their effect on the trade balance. Thus, remittances have a net positive effect on national income, provided the money multiplier and investment effects outweigh the initial negative impact on the trade balance.

2.2 Model extensions

In this paper, the goods and services sectors are modelled precisely as in the [Rashid and Sharma \(2017\)](#) paper, but in other sectors of the economy, some necessary extensions are introduced. Following prior studies ([Ghosh et al., 2016](#)), the government sector is added to show the effects of remittances on national income, interest rates, and exchange rates in the context of monetary sterilization of the additional money supply. We focus on the short-term effects of remittances on economic growth because it is justified by economic theory and policy. [Keynes's \(1936\)](#) general theory mentions the importance of immediate policy levers to stimulate consumption, and according to [Friedman's \(1957\)](#) "permanent income hypothesis," remittances are transitory income that can easily disappear; thus, a certain fraction must be saved. Therefore, we argue that while most remittances are directly spent on consumption (the "spending effect"), a portion is rationally saved back home. These savings make their way into the money supply and lower interest rates, indirectly stimulating business investment and consumption.

In the money market, the money supply process is elaborated at a more granular level of analysis. The financial markets are expanded to include the global bond market that permits the flow of international portfolio investments between the recipient country and the rest of the world. The introduction of international portfolio investment flows also expands the foreign exchange market. We account for FDI because, unlike financial aid, an exogenous grant, FDI, and remittances are all endogenous and sensitive to interest and exchange rate fluctuations ([Kose and Ohnsorge, 2023](#)). Another extension is incorporating the government sector, particularly the role of government borrowing (taxes and bonds), which may "crowd out" private sector domestic investment in the model ([Driffield and Jones, 2013](#)).

2.2.1 Consumption function. The consumption function accounts for interest rate sensitivity and remittance effects as follows:

$$C = C_0 + cY + c\mu RE - bi \dots \quad (11)$$

where C_0 is exogenous consumption, c is marginal propensity to consume, Y is national income, $c\mu RE$ is remittance-induced consumption, and bi is effect of interest rates on consumption which is negative.

2.2.2 *Investment function.* Investment function in [Rashid and Sharma \(2017\)](#), Equation (4) above can be extended including government borrowing and FDI as follows:

$$I = I_0 + \lambda RE + \eta FDI - gi - g_B B \dots \quad (12)$$

where I_0 is exogenous investment, λRE is direct remittance effect, ηFDI is investment from FDI, gi is interest rate sensitivity, and $g_B B$ is crowding-out effect from government borrowing.

2.2.3 *Foreign exchange market.* The initial foreign exchange market equilibrium condition in [Rashid and Sharma \(2017\)](#) is as follows:

$$X - ME + \dots = c(1 - \mu) - f(i - i_f) \dots \quad (13)$$

Now, considering the FDI appreciation effect, the Equation (13) can be extended as:

$$X - ME + \dots + FDI = c(1 - \mu) - f(i - i_f) - X_{FDI} \dots \quad (14)$$

where X_{FDI} is the exchange rate appreciation effect from FDI.

2.2.4 *Money market.* The money demand function can be expressed as:

$$M_d = d_1 Y - d_2 i \dots \quad (15)$$

where $d_1 Y$ is transaction motive for holding money, and $d_2 i$ is the interest rate effect on money demand.

Similarly, the money supply function is:

$$M_s = m + sRE, s = \delta/r \dots \quad (16)$$

Now embedding the effect of foreign bond purchase on money supply, the money supply function can be expressed as follows:

$$M_s = m + sRE + \gamma B \dots \quad (17)$$

where γB is foreign bond purchases expand the money supply.

The resulting money market equilibrium will be:

$$d_1 Y - d_2 i = m + sRE + \gamma B \dots \quad (18)$$

and the equilibrium interest rate will be:

$$i = \frac{d_1 Y - m - sRE - \gamma B}{d_2} \dots \quad (19)$$

2.2.5 *National income equilibrium.* The aggregate income or goods market equilibrium condition ($Y = C + I + X - ME$) can be modified by substituting the modified consumption and investment functions in equations (11) and (12) as:

$$Y = C_0 + cY + c\mu RE - bi + I_0 + \lambda RE + \eta FDI - gi - g_B B + X - ME \dots \quad (20)$$

Rearranging:

$$Y = \frac{C_0 + I_0 + X - ME + \eta FDI - (b + g)i - g_B B}{(1 - c)} + RE \frac{(c\mu + \lambda)}{(1 - c)} \dots \quad (21)$$

2.3 The IS and LM curves

The IS and LM curves represent equilibrium conditions in the goods and money markets. Using Equation (20) and solving for i provides:

$$i = \frac{(C_0 + I_0 + X - ME + \lambda RE + \eta FDI - g_B B) - (1 - c)Y}{b + g} \dots \quad (22)$$

which represents the IS curve:

$$i = \frac{(C_0 + I_0 + X - ME + \lambda RE + \eta FDI - g_B B)}{b + g} - \frac{(1 - c)}{b + g} Y \dots \quad (23)$$

where $\frac{(1 - c)}{b + g}$ is the slope and $\frac{(C_0 + I_0 + X - ME + \lambda RE + \eta FDI - g_B B)}{b + g}$ is the intercept.

Now, the money market equilibrium condition as show in Equation (18) and equilibrium interest rate i^* in Equation (19), the LM curve can be expressed as:

$$i = \frac{d_1}{d_2} Y - \frac{m + sRE + \gamma B}{d_2} \dots \quad (24)$$

where $\frac{d_1}{d_2}$ is the slope and $\frac{m + sRE + \gamma B}{d_2}$ is the intercept.

3. Case analysis of remittance-induced effects on the national income, domestic interest rate, and exchange rate

Table 1 provides a comparative summary of the four stylized cases derived from our extended Keynesian model.

3.1 Case 1: large capital mobility (large f) with FDI and government borrowing (example: India, Mexico)

(1) Money Market Equilibrium with FDI and Government Borrowing:

$$M_s = M_d + sRE + f(B + \eta FDI) \dots \quad (25)$$

Table 1. With FDI and government borrowing effects

Case	Interest rate (i)	Exchange rate (E)	Net exports ($X - M$)	Investment (I)	National income (Y)	Economic growth
Large f (Case 1)	Lower	Depreciates	Strong Increase	High (ηF & Remittances)	High	Strong
Small f (Case 2)	Higher	Minor Depreciation	Moderate Increase	Moderate	Moderate	Moderate
Full Sterilization (Case 3)	High	No Change	No Change	Weak	Low	Minimal
Partial Sterilization (Case 4)	Slightly Lower	Slight Depreciation	Modest Increase	Balanced	Moderate	Moderate

Source(s): Authors' own work

where f captures the additional money supply from foreign capital inflows, and η represents the proportion of FDI that directly influences investment.

(2) Interest Rate Determination with Government Borrowing:

$$i = \frac{M_s - L(Y, i)}{g_B B} \dots \quad (26)$$

where B represents government borrowing and g_B models crowding out effects.

(3) Foreign Exchange Market Equilibrium:

$$e = e_0 - fFDI \dots \quad (27)$$

where F models the impact of FDI on exchange rate appreciation.

(4) Aggregate Income with FDI and Government Borrowing:

$$Y = C + I + NX + s\eta F - g_B B \dots \quad (28)$$

where $s\eta F$ reflects that only a portion of FDI enhances investment, and $g_B B$ represents the extent to which government borrowing reduces private investment.

Effects:

- (1) Lower interest rates (i) stimulate investment.
- (2) Depreciating exchange rate (e) improves net exports.
- (3) FDI enhances growth but also competes with remittances in affecting exchange rates.
- (4) Minimal crowding out, as foreign investors buy government bonds, keeping i low.

3.2 Case 2: small capital mobility (small f) with FDI and government borrowing
(Example: Nigeria, Bangladesh)

(1) Money Market Equilibrium:

$$M_s = M_d + sRE + f(B + \eta F) \dots \quad (29)$$

Smaller f due to weak capital inflows.

(2) Interest Rate Determination with High Government Borrowing:

$$i = \frac{M_s - L(Y, i)}{g_B B} \dots \quad (30)$$

Higher B raises interest rates, crowding out private investment.

(3) Foreign Exchange Market:

$$e = e_0 - fF \dots \quad (31)$$

Minimal exchange rate depreciation (e constant).

(4) Aggregate Income with Reduced Private Investment:

$$Y = C + I + NX + s\eta F - g_B B \dots \quad (32)$$

Weaker FDI effects due to lower capital inflows and more substantial crowding-out effect ($g_B B$).
Effects:

- (1) Higher interest rates (i) reduce private investment.
- (2) Minimal exchange rate movement (e constant) due to weak remittance-induced capital outflows.
- (3) GDP growth is lower due to government borrowing limiting private sector expansion.

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3.3 Case 3: full sterilization of remittances with FDI and government borrowing (Example: Egypt)

- (1) Money Market Equilibrium (Sterilized):

$$M_s = M_d + sRE + f(B + \eta F), s = 0 \dots \quad (33)$$

No remittance-induced monetary expansion due to full sterilization.

- (2) Interest Rate Determination (No Effect from Remittances):

$$i = \frac{M_s - L(Y, i)}{g_B B} \dots \quad (34)$$

High $g_B B$ keeps interest rates elevated, suppressing investment.

- (3) Foreign Exchange Market:

$$e = e_0 - fF, e = e_0 \text{ (no depreciation)} \dots \quad (35)$$

No currency depreciation as remittance-driven capital outflows are absorbed by the central bank.

- (4) Aggregate Income with No Remittance Impact:

$$Y = C + I + NX + s\eta F - g_B B, s = 0 \dots \quad (36)$$

No direct remittance effect on investment or consumption.

Effects:

- (1) Interest rates remain high (i), limiting investment.
- (2) Exchange rate does not depreciate (e constant).
- (3) GDP growth is minimal, even with FDI inflows.

3.4 Case 4: partial sterilization of remittances with FDI and government borrowing (example: Philippines)

- (1) Money Market Equilibrium (Partially Sterilized):

$$M_s = M_d + sRE + f(B + \eta F), 0 < s < 1 \dots \quad (37)$$

Only a fraction s of remittances contribute to liquidity.

(2) Interest Rate Determination (Moderate Effect):

$$i = \frac{M_s - L(Y, i)}{g_B B} \dots \tag{38}$$

Moderate decline in interest rates.

(3) Foreign Exchange Market:

$$e = e_0 - fF \dots \tag{39}$$

Mild exchange rate depreciation supports exports.

(4) Aggregate Income with Balanced Growth:

$$Y = C + I + NX + s\eta F - g_B B, 0 < s < 1 \dots \tag{40}$$

Balanced contributions from remittances, FDI, and net exports.
Effects:

- (1) Interest rates decrease slightly (*i*), supporting investment.
- (2) Mild exchange rate depreciation (*e*) improves competitiveness.
- (3) GDP growth is moderate, benefiting from both remittances and FDI.

4. Discussion

4.1 Theoretical contribution

Our study theoretically contributes to the formal Keynesian models used to study the impact of remittances on economic growth (Chowdhury, 2016; Cazachevici *et al.*, 2020). In a static short-run Keynesian model consisting only of the goods and services sector and the foreign exchange sector Gonzalez and Sovilla (2014) show three effects of remittances on national income: (1) an increase in consumption of domestically produced goods and services “spending effect”, (2) increased consumption of imported goods and services, and (3) a decline in net exports due to an appreciation of the local currency (Dutch disease). The first effect is expansionary, and the other two are contractionary. The offsetting nature of the latter two effects creates an overall negative impact of remittances on national income (−1).

Rashid and Sharma (2017) identify three additional effects of remittances on the economy. These include: (1) a direct increase in investment, (2) an indirect rise in consumption from a decrease in the domestic interest rate, and (3) an indirect increase in investment from a decrease in the domestic interest rate. All three effects are expansionary and raise the possibility of a positive impact of remittances on national income. In contrast, this study sheds light on another mechanism by which remittances impact national income. Specifically, a lower domestic interest rate than the foreign interest rate triggers arbitrageurs to substitute domestic bonds for foreign bonds. The capital outflow causes local currency depreciation, raising net exports and the national income. After accounting for FDI and government borrowing, four cases are offered that illustrate how the remittance-induced credit channel can impact economic growth, domestic interest rates, and exchange rates for a remittance-dependent emerging economy under a large value of (a) the international portfolio investment coefficient, *f*, (b) a small value of *f*, (c) a complete sterilization in the monetary sector, and (d) a partial sterilization in the monetary sector.

4.2 Policy recommendations

Different open emerging economies with varying levels of financial development and government-imposed restrictions on capital flows can be used to elucidate the four cases. Research finds that large remittance-receiving countries benefit the most when capital mobility allows for enhanced financial development and institutional strength matters (Azizi, 2020). Countries with rigid financial markets face remittance misallocation toward consumption rather than future investment (Dutch Disease) (Anwar and Mang, 2022; Azizi *et al.*, 2024). Hence, as (case-1) demonstrates, an open emerging economy with a large global portfolio investment coefficient (f), a developed financial market with rational investors, and limited restrictions on capital flows will generally experience higher economic growth. The exchange rate may increase or decrease when FDI and government borrowing are incorporated into the model. However, a large remittance-dependent open emerging economy (India, Mexico), with an educated middle class and strong banking sector, may be able to hedge against the risks of the Dutch Disease by better leveraging its financial development (large f).

Prior research points to the difficulty of conducting monetary policy and exchange rate volatility in countries with a high fraction of remittances to GDP (Barajas *et al.*, 2018). Our model, in contrast, suggests that a relatively efficient credit channel, combined with more financial literacy and a strong investment environment for arbitrage, can help mitigate exchange rate and interest rate volatility. We suggest that countries with decent financial institutions leverage remittances and FDI for industrialization and financial stability (Afridi *et al.*, 2024). For example, countries with a robust financial sector (large f) can implement remittance-backed investment programs (e.g. diaspora bonds) to channel capital into productive sectors such as healthcare and education. If capital inflows are large (f), foreign investors purchase these bonds, limiting the rise in domestic interest rates. This reduces the crowding-out effect, allowing private sector borrowing to continue. Also, we recommend maintaining a flexible exchange rate to prevent an excessive currency appreciation from FDI and remittances. Thus, central banks and regulators may not have to persistently worry about excessive macroprudential regulations when a robust financial sector and credit flow channel can substitute for arduous capital controls imposed by monetary officials.

Yet, in (case-2) where investors respond gradually due to a small f : an underdeveloped financial sector, a less efficient bond market, and restrictions on capital flows, economic growth is somewhat lower. We suggest that for a large open economy that lacks a robust financial sector (Nigeria, Bangladesh) (small f), a far more effective approach may be using a certain fraction of remittances to promote financial development, which is necessary to create an advantageous investment environment. For example, increasing capital mobility can strengthen domestic bond markets to allow foreign participation in public debt issuance and temper the crowding out effects of government borrowing. Also, countries with a weaker credit-flow channel can encourage remittance-linked investment incentives (e.g. remittance-matching funds) to promote financial development. Meanwhile, a temporarily devalued exchange rate through remittances can facilitate trade and build up a country's foreign exchange reserves to promote business investments.

With complete monetary sterilization (case-3), when the central bank completely absorbs any excess foreign currency caused by remittances into the emerging economy, we demonstrate that the initial impact of remittances on national income is weak. The central bank absorbs most remittances into reserves, preventing money supply growth, reducing investment potential, and leading to weak GDP growth (Egypt) (Aizenman and Glick, 2008; World Bank, 2023). Therefore, any change in the money supply from migrant remittances is almost completely neutralized. Because the exchange rate is unaffected, the economy ultimately settles at the original equilibrium points in the short run with no change in national income. FDI positively affects investment, but government borrowing pressures weaken them. In turn, we recommend that monetary policy officials implement partial sterilization policies to avoid over-restricting liquidity and promote credit expansion. Also, government officials

can use remittance-backed sovereign bonds to finance government spending without raising interest rates and crowding out the benefits of private-sector investment.

When we examine the case of partial sterilization (case-4), our findings are more realistic. In simple terms, this case represents an example of a central bank managing the opposing forces of interest and exchange rate policy to promote a trade surplus and future investment. While FDI can have a larger growth impact than remittances, remittances are generally more stable when combined with effective institutional policies (Driffield and Jones, 2013). Notably, in the Philippines, the central bank's approach to partial sterilization has balanced remittance-driven liquidity expansion with inflation control. This has enabled private credit growth while preventing excessive currency appreciation, thus fostering a resilient economic environment (Bayangos, 2012; Yap, 2008). In effect, we recommend that emerging economies with less financial depth balance remittance-driven liquidity growth, FDI attraction, and exchange rate management as an optimal strategy. This permits the central bank to maintain moderate remittance sterilization to control inflation while enabling investments from remittances and FDI to be directed into high-value industries to diversify economic growth.

5. Extension and conclusion

We theoretically explore how migrant remittances influence economic growth in open emerging economies. By extending Rashid and Sharma (2017), our analysis explicitly considers government financing through bonds and endogenizes FDI. We introduce an enhanced international credit flow channel, illustrating how remittances can result in real exchange rate depreciation, business investments, increased export competitiveness, and future economic growth under effective monetary and fiscal policies. We provide four illustrative scenarios detailing how different monetary policy responses—from complete to partial sterilization—and varying levels of financial market development affect the macroeconomic impact of remittances. For example, countries employing complete sterilization, such as Egypt, may limit the growth benefits of remittances by preventing monetary expansion and restricting potential investment. Conversely, financially developed countries, such as India and Mexico, with high capital mobility and partial sterilization, can effectively leverage remittances and FDI, thereby experiencing minimal crowding-out effects and more substantial economic growth.

Future empirical research could expand upon our framework by examining variations across emerging economies to validate our theoretical predictions. While we carried out basic tests in the online appendix, investigating how these economies respond differently to remittance inflows via the credit expansion channel would deepen understanding and guide optimal policy configurations. Also, because we focused on the short-term demand-side effects of remittances, future studies could explore the longer-term supply-side impacts of our model on human development (Mohammed, 2022). To sum up, our Keynesian framework provides a tractable theoretical model with empirically validated policy recommendations for the positive macroeconomic potential of remittances for economic growth. In turn, we lay the groundwork for future empirical research to establish the causal mechanisms that underpin our framework.

Additionally, we have conducted preliminary empirical tests in the *online supplementary appendix* with publicly available data that essentially validate and strengthen the discussion of the four cases derived from our Rashid and Sharma (2017) model extension.

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Supplementary material

The supplementary material for this article can be found online.

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