ISSN 2392-1641
e-ISSN 2450-0097

Economics and Business Review

Volume 10 (4) 2024

CONTENTS

Poznań University of Economics and Business Press

Paper based publication

https://doi.org/10.18559/ebr.2024.4

ISSN 2392-1641
e-ISSN 2450-0097

POZNAŃ UNIVERSITY OF ECONOMICS AND BUSINESS PRESS
ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland
phone +48 61 854 31 54, +48 61 854 31 55
https://wydawnictwo.ue.poznan.pl, e-mail: wydawnictwo@ue.poznan.pl
postal address: al. Niepodległości 10, 61-875 Poznań, Poland

Printed and bound in Poland by:
Poznań University of Economics and Business Print Shop

Circulation: 80 copies

sciendo

Economics and Business Review

Volume 10 (4) 2024

CONTENTS

sciendo Economics and Business Review https://www.ebr.edu.pl Vol. 10 (4), 2024: 7–31 https://doi.org/10.18559/ebr.2024.4.1229

Spillover effects of remittances on local public spending in developing economies

Raúl Alberto Ponce Rodríguez[1] Benito Alán Ponce Rodríguez[2]
Juan Carlos Medina Guirado[3]

Abstract

We develop a political economy model to study spatial spillover effects of remittances on local public goods with inter-regional positive externalities. Our model postulates that spillovers of remittances are asymmetric with a complex pattern that depends on the degree of externalities of public spending, the inter-regional inequality of income, and whether local public goods are complementary or substitutes. We develop several tests to be verified empirically, for instance, our model states that if local public goods are substitutes and externalities are moderate, remittances received by households in one locality increase government spending in that locality but reduce spending in other districts. If externalities are significant, remittances affect local public spending in high-income localities but do not affect spending in low-income localities.

Keywords

- remittances
- local public goods
- spillovers
- inter-regional inequality
- state and local government

JEL codes: D63, F24, H7, H41

Article received 18 March 2024, accepted 8 November 2024.

Suggested citation: Ponce Rodríguez, R. A., Ponce Rodríguez, B. A., & Medina Guirado, J. C. (2024). Spillover effects of remittances on local public spending in developing economies. *Economics and Business Review*, *10*(4), 7–31. https://doi.org/10.18559/ebr.2024.4.1229

[1] Universidad Autónoma de Ciudad Juárez, Department of Social Science, Ciudad Juárez, Mexico, corresponding author: rponce@uacj.mx, https://orcid.org/0000-0003-0851-2687.

[2] Universidad Autónoma de Ciudad Juárez, Institute of Engineering and Technology, Ciudad Juárez, Mexico, alan.ponce@uacj.mx, https://orcid.org/0000-0003-4550-2103.

[3] Universidad Autónoma de Ciudad Juárez, Department of Social Science, Ciudad Juárez, Mexico, juan.medina@uacj.mx, https://orcid.org/0000-0002-3597-9031.

Introduction

According to the World Bank Report (2023), remittances to developing countries reached $669 billion in 2023. These private transfers from migrants to economic agents or relatives in their home country, are an important source of income for national households in countries such as India, China, Mexico, Egypt, and others. In the case of Mexico, data from the central bank of Mexico shows that remittances as a percentage of gross domestic product (GDP) have increased from 0.13% of GDP in 1979 to 4.3% in 2021, and at the subnational level, remittances could represent up to 10% of per capita income in several states of Mexico, such as Guerrero, Michoacan and Zacatecas. Other countries receiving considerable amounts of remittances, for example, China and India, also show that remittances have become increasingly important over time and heavily concentrated in some regions of the country. For instance, in the case of India, these international transfers are heavily concentrated in states such as Kerala, Maharashtra, and Uttar Pradesh, while in China, the provinces receiving most remittances are those with significant emigrants sending money back to their families.

The literature has recognised that remittances improve human capital (Salas, 2014), affect consumption and savings, and influence economic growth and development (Benhamou & Cassin, 2021), and change the inequality of distribution of income and poverty (Azizi, 2021). More recently, scholars have become interested in studying the effects of remittances on government spending (see Adida & Girod, 2011). However, most studies have focused on the effect of remittances on public spending by central government (see Kochi & Ponce-Rodríguez, 2010; Ponce-Rodríguez & Ponce-Rodríguez, 2022, among other works). Since local public spending can affect the well-being and economic development of communities, it is relevant to ask: What is the effect (if any) of remittances on local public goods in developing economies? In addition, to the best of our knowledge, we are the first to analyse the possibility of spillover effects of remittances on local public spending. Hence, we seek to contribute to the literature by considering a theoretical model that leads to empirically verifiable tests about the spatial effects of remittances on the provision of local public goods and its impact on the welfare of households.

To study this issue, we develop a model of electoral competition based on the work of Wittman (1983), in which politicians provide public goods with positive externalities, for instance, roads, highways, health services, and public safety (see Easton & Montinola, 2017). In a model with two localities, households receive remittances that affect tax revenue and spending. If local public goods show positive externalities, then remittances received in one locality might have spillover effects in other localities (see Hankla et al., 2019). In this context, our analysis suggests that remittances received in one

district might affect government spending and the welfare of households in other districts and that this spillover effect is asymmetric with a complex spatial pattern that depends on the degree of externalities of public spending, the inter-regional inequality of income, and whether local public goods are complementary or substitutes.

In cases where local public goods are complementary, remittances received in one locality do not affect government spending in other localities but increase the welfare of residents in other districts. However, if local public goods are substitutes and the size of externalities of public goods are moderate then remittances received by households living in one locality increase government spending in that district but reduce public spending in other localities. In this case, the reaction function of remittances in the government spending of other localities is negative because externalities of local public spending create an interdependence in the supply of local public goods across localities.

Our model also states that if the size of externalities is high, and the regional distribution of income is highly unequal, then remittances have a complex asymmetric spatial effect. For this case, the jurisdiction with high income and high demand for public spending provides a public good but the jurisdiction with low income and low demand for public spending behaves as a free rider and does not provide a public good. Hence, remittances received in a locality with high income increases government spending only in that locality but have a positive effect on welfare of residents of all localities. However, remittances received in a locality with low income do not increase government spending in any locality and do not affect a welfare of residents of any locality through a channel of government spending.[4]

In other words, remittances have an asymmetric spatial effect depending on the relative demand for public spending in each locality and only remittances received in the district with high demand for public spending would lead to positive spatial effects in the welfare of residents of other localities. Another interesting finding is that high inter-regional inequality in the distribution of income makes this last outcome more likely.

The paper is structured as follows: Section 1 describes the literature review; Section 2 discuss the type of public goods provided in modern economies that we consider in our model and some of the issues to be studied in this paper; Section 3 considers a model of spatial spillovers of remittances with complementary local public goods; Section 4 incorporates a model with homogeneous local public goods; Section 5 discuss our findings; last Section concludes.

[4] Remittances affect the welfare of households by changing their consumption set but do not affect government spending in low-income localities, and in this sense, remittances do not have an additional welfare effect through government spending.

1. Literature review

Given the importance of local public goods in the well-being of citizens and economic outcomes, it is relevant to understand its determinants. The normative literature on public economics has recognised that local public goods are determined by the socio-demographic characteristics of local residents, such as income, preferences, and taxes that explain the demand of households for local public goods (see Scotchmer, 2002).

In contrast to normative models, political economy models have emphasised how economic policies are likely to reflect the fact that policy makers are elected in democracies and local government spending is influenced by electoral competition and political institutions (see Hankla et al., 2019, among many other authors). For instance, Hankla et al. (2019) provides an analysis of the influence of elections, parties, and electoral systems in the provision of local public goods.

In addition, there are few studies that seek to analyse systematically the impact of remittances on government spending but most of these studies focus on the central government. For instance, Johansson (1997) explores how inter-family private transfers affect Pigouvian taxes, Kochi and Ponce-Rodríguez (2010) analyse the impact of remittances on universal and focalised welfare programs, and Page and Plaza (2006) study the government's response to remittances such as the 3 × 1 matching grants program in Mexico to attract funding for specific community projects. In an interesting paper, Abdih et al. (2012) studies how remittance can deteriorate the institutional quality of governments by increasing the share of funds diverted by the government for its own purposes.

In this paper, we consider a political economy model to show how subnational governments respond to changes in the perceived demand of public goods of residents. To the best of our knowledge, we are the first to analyse the possibility of spillover effects of remittances on local public spending. Hence, we seek to contribute to the literature by considering a theoretical model that leads to empirically verifiable tests about the spatial effects of remittances on the provision of local public goods and its impact on the welfare of households.

2. Local public goods and some stylised facts to model

Modern economies provide many local public goods with inter-regional externalities. For instance, spending in public safety (police) in one jurisdiction could have positive externalities on other jurisdictions, as criminal or-

ganizations might have members and activities that cross the geographical boundaries of local governments.[5] If one district increases spending in public safety and reduces criminal activity in that jurisdiction, this could increase local safety in neighboring districts (by weakening criminal organisations that operate in different jurisdictions). In this case, spending on local public safety has positive externalities on residents of other districts. Other local public goods with positive inter-regional externalities recognised in the literature include public spending on education, health services, infrastructure (roads connecting cities from different regions), local environmental policies, etc.

The mobility of households and firms across jurisdictions also leads to positive inter-regional externalities of local public goods. A household travelling to another jurisdiction might enjoy parks, museums, and local safety without necessarily paying for those goods. In this case, these public goods are complementary in the utility function of residents (in other words, a resident of district 1 can benefit from local public goods provided by jurisdictions 1 and 2). We analyse this case and its welfare effects on propositions 1 to 3 of section 4, although, for the simplicity of the model, we do not study the mobility decisions of households and firms.[6]

Instead of the property of complementary, other local public goods might show some degree of homogeneity and might be considered substitute goods. In this case, the supply of local public goods in locality 1 reduces the marginal utility of providing a local public good in locality 2 due to marginal decreasing returns of the consumption of public goods in both localities. An empirical example of this type of public good could be public safety and education. For instance, if district 1 increases spending in public safety and reduces criminal activity in jurisdictions 1 and 2, this would increase local safety in district 2 and the net marginal benefit of spending an additional $1 in public safety in that district falls. In other words, there could be a crowding-out effect in the supply of a public good from one district to others, and we analyse whether this crowding-out effect could create incentives in some local governments to free ride in their supply of these types of public goods in section 5.

Another issue of interest is the large body of literature showing that public goods are explained by the income and sociodemographic characteristics of residents (such as age and gender), which are related to the demand of pub-

[5] Local public goods are goods provided in some jurisdiction that are non-exclusive, non-rival and their benefits extend to other jurisdictions.

[6] We do not model mobility because it significantly complicates the model. In a political economy model, mobility of households could affect local elections, having the effect that politicians could consider how local public goods and taxation could attract and deter certain types of constituencies in the locality. Mobility also might lead to tax and expenditure competition. Hence, the complexities arising from these issues are beyond the scope of this paper. The interested reader on the effect of mobility of local public goods can consult Myers (1990) and Wellisch (1994).

lic spending. The literature also shows that elections, electoral competition, political institutions, and other incentives of policy makers are correlated with the supply side of public goods in modern democracies (for a comprehensive empirical study of demand and supply side issues taking in many countries over several decades, see Hankla et al., 2019). In the context of local public goods with inter-regional externalities, it is plausible that the income and sociodemographic characteristics of residents of that district and residents of other districts could explain the equilibrium levels of local education, public safety, public infrastructure, etc. But if this is the case, how could changes in income and preferences for public goods of residents of neighboring districts affect the supply of local public goods? In this paper we address this issue in propositions 4–7 in section 4.

3. Effects of remittances when local public goods are complementary

Consider an economy with two localities indexed by $q = i, j$. Each locality has a local government that provides a public good paid by local income taxes. The government in each locality is selected by a public election and there are two parties indexed by $p = L, R$. Each locality is constituted by $h = 1, 2, ..., H_q$ voters-households, who decide their private consumption, pay taxes, and vote in their local election. In this economy, the local election is determined as follows: in the first stage, parties select a policy platform constituted by a local public good determined by g_{pq} and the corresponding tax τ_{pq}. In the second stage, voters observe the parties' policies and vote for the policy that is closest to the voters' own interests on policy. In the third stage, votes are counted and the party with the most votes wins the election and implements policy.

In this economy, parties have preferences over policies. Wittman (1983) is the first to identify that parties might have preferences over policies because parties represent the preferences of a coalition of voters in the electorate over public policies. In our economy, the preferences of those voters controlling party p of locality i are given by a representative utility function given by $\mu_{pi} = \alpha_{pi} \ln(x_{pi}) + \beta_{pi} \ln(g_{pi}) + k_j \psi_{pi} \ln(g_{pj})$, where x_{pi} is a private good, g_{pi} is a public good provided by some party p in locality i, and g_{pj} is the public good provided by some party p in locality j.

Parameters $\alpha_{pi}, \beta_{pi}, \psi_{pi}$: $\alpha_{pi} + \beta_{pi} + \psi_{pi} = 1$ reflect the intensity of preferences of the party for the private good and local public goods provided by localities i and j, while $k_j \in [0,1]$ reflects whether the public good of locality j has positive externalities on residents of locality i. If $k_j = 0$, there is no positive externality of the local spending of the locality j on households living in lo-

cality i (in other words, public spending of locality j does not affect the welfare of residents of locality i), and on the other extreme, if $k_j = 1$, the public good of locality j is a nationwide pure public good. If $k_j > 0$, then any positive size of public spending of locality j affects positively the welfare of residents of locality i.

The budget constraint of the representative group of voters controlling party p in locality i is $x_{pi} = (e_{pi} + \omega_{pi})(1 - \tau_{pi})$, where e_{pi} is the representative endowment of the group of voters, $\omega_{pi} \geq 0$ is the amount of remittances that these voters receive, and τ_{pi} is a local income tax that finances public spending by the government of locality i.[7] In addition, the indirect utility function for each party is given by $v_{pi}(e_{pi}, \omega_{pi}, g_{pi}, g_{pj}, \tau_{pi})$, where $v_{pi}(e_{pi}, \omega_{pi}, g_{pi}, g_{pj}, \tau_{pi}) = \alpha_{pi} \ln((e_{pi} + \omega_{pi})(1 - \tau_{pi})) + \beta_{pi} \ln(g_{pi}) + k_j \psi_{pi} \ln(g_{pj})$ for $p = L, R$ in locality i. A similar indirect utility function is defined for parties in locality j, which is given by $v_{pi}(e_{pj}, \omega_{pj}, g_{pj}, g_{pj}, \tau_{pj})$.

In what follows, we describe the preferences and constraints for each voter in locality i. As we mentioned before, there are $h = 1, 2, \ldots, H_q$ voters in each locality $q = i, j$. Each voter has preferences given by $\mu_{hi} = \alpha_{hi} \ln(x_{hi}) + \beta_{hi} \ln(g_{pi}) + k_j \psi_{hi} \ln(g_{pj})$ and the voter's budget constraint is $x_{hi} = (e_{hi} + \omega_{hi})(1 - \tau_{pi})$ for all $h = 1, 2, \ldots, H_q$, where e_{hi} is the voter's endowment, $\omega_{hi} \geq 0$ is the amount of remittances that the voter type h receives, and τ_{pi} is the income tax rate that the voter pays to the local government of the jurisdiction. In this economy, there is heterogeneity of preferences, endowments, and remittances that explain the distribution of ideal policies for the local spending of each household. In other words, some voters would prefer high local spending and taxes, while others prefer low spending and taxation.

The welfare of each voter depends on the tax and spending policies adopted by parties L or R, depending on which party wins the local election. Hence, the welfare of a voter living in locality i with endowment e_{hi} under the policies of party L, g_{Li}, τ_{Li} is given by the indirect utility function $v_{hi}(e_{hi}, \omega_{hi}, g_{Li}, g_{pj}, \tau_{Li})$ and under the policies of party R, g_{Ri}, τ_{Ri} is given by $v_{hi}(e_{hi}, \omega_{hi}, g_{Ri}, g_{pj}, \tau_{Ri})$. In the second stage of the electoral game, the choice of the vote for a voter type e_{hi} is given by $\Psi_{hi} = v_{hi}(e_{hi}, \omega_{hi}, g_{Li}, g_{pj}, \tau_{Li}) - v_{hi}(e_{hi}, \omega_{hi}, g_{Ri}, g_{pj}, \tau_{Ri})$. If $\Psi_{hi} \geq 0$, the voter votes for party L, otherwise he or she votes for party R.

In the third stage, the party with the majority of the votes wins the local election: if party L wins, then policies g_{Li}, τ_{Li} are implemented, otherwise the ideal policies of party R, g_{Ri}, τ_{Ri} are implemented. The median voter in locali-

[7] For mathematical simplicity we have chosen an income tax on the full income of households, which is the household's endowment and transfers from remittances. It is well known that a universal income tax is equivalent to a consumption tax. Although remittances do not pay income taxes in many economies, households use their full income to consume, and therefore, households pay consumption taxes. Given the equivalence between income and consumption taxes in our model, the results of this analysis are equivalent to those we would obtain if we had assumed an economy with consumption taxes.

ty i determines the majority of the votes in the local election. Following the same logic as before, $\upsilon_{mi}(e_{mi}, \omega_{mi}\, g_{Li}, g_{pj}, \tau_{Li})$ and $\upsilon_{mi}(e_{mi}, \omega_{mi}, g_{Ri}, g_{pj}, \tau_{Ri})$ represent the indirect utility functions of the median voter in locality i under policies of parties L and R and the choice of the vote of the median voter is given by $\Omega_{mi} = \upsilon_{mi}(e_{mi}, \omega_{mi}\, g_{Li}, g_{pj}, \tau_{Li}) - \upsilon_{mi}(e_{mi}, \omega_{mi}, g_{Ri}, g_{pj}, \tau_{Ri})$. If $\Omega_{mi} \geq 0$ then party L in locality i wins the election and implements g_{Li}, τ_{Li}, otherwise party R wins the election and implements policies g_{Ri}, τ_{Ri}. A similar local election in locality j takes place simultaneously and determines taxes and local public spending in that locality.

The budget constraint of the local government in each locality is given by $g_{pq} = \tau_{pq} \sum_{h=1}^{H_q} (e_{hq} + \omega_{hq})$, where $\tau_{pq} \sum_{h=1}^{H_q} (e_{hq} + \omega_{hq})$ is tax revenue of localities $q = i, j$. Note that the locality's aggregate income I_q is constituted by the sum of endowments and remittances of all residents of locality q, which is given by $I_q = \sum_{h=1}^{H_q} (e_{hq} + \omega_{hq})$.

For this economy, the politico-economic equilibrium is shaped by the parties' policy platforms, $g^{\star}_{pq}, \tau^{\star}_{pq}$ for parties $p = L, R$ in localities $q = i, j$, the choices of the vote of households-voters, and the implementation of local spending and taxation in each locality (see the formal definition in proposition 1).

Proposition 1. *For this economy, the politico-economic equilibrium is constituted as follows:*

1) In the first scenario, parties $p = L, R$ propose policies $g^{\star}_{pq}, \tau^{\star}_{pq}$ in localities $q = i, j$ such that:

$$g^{\star}_{pq}, \tau^{\star}_{pq} \in \arg\max \upsilon_{pq}(e_{pq}, \omega_{pq}, g_{pq}, \tau_{pq}) \;\; st: \;\; g_{pq} = \tau_{pq} \sum_{h=1}^{H_q} (e_{hq} + \omega_{hq}) \qquad (1)$$

2) In the second stage, voters in locality $q = i, j$ vote for party L if:

$$\Psi_{hq} = \upsilon_{hq}(e_{hq}, \omega_{hq}, g^{\star}_{Lq}, \tau^{\star}_{Lq}) - \upsilon_{hq}(e_{hq}, \omega_{hq}, g^{\star}_{Rq}, \tau^{\star}_{Rq}) \geq 0 \qquad (2)$$

Otherwise, they vote for party R.

3) The choice of the vote of the median voter is given by Ω_{mq} in each locality $q = i, j$ as follows:

$$\text{if} \qquad \Omega_{mq} = \upsilon_{mq}(e_{mq}, \omega_{mq}, g^{\star}_{Lq}, \tau^{\star}_{Lq}) - \upsilon_{mq}(e_{mq}, \omega_{mq}, g^{\star}_{Rq}, \tau^{\star}_{Rq}) \geq 0 \qquad (3)$$

Then party L in locality $q = i, j$ wins the election and implements $g^{\star}_{Lq}, \tau^{\star}_{Lq}$. Otherwise, party R wins the election and implements $g^{\star}_{Rq}, \tau^{\star}_{Rq}$.

In what follows, proposition 2 characterises the size of local spending and taxation in each locality of this economy.

Proposition 2. Local elections lead to an equilibrium size of government spending in localities $q = i, j$ given by:

$$g_{pq}^{\star} = \left(\frac{\beta_{pq}}{\alpha_{pq} + \beta_{pq}} \right) \sum_{h=1}^{H_q} (e_{hq} + \omega_{hq}) \tag{4}$$

Proof
See the Appendix.

Proposition 2 says that government spending in each locality is determined by the relative ratio of intensity of preferences for public goods vis-à-vis private goods of the representative voter controlling the party that wins the election in each locality $q = i, j$. This ratio is given by $\frac{\beta_{pq}}{\alpha_{pq} + \beta_{pq}}$. Government spending in each locality is also determined by the locality's aggregate income I_q, which is the sum of endowments and remittances of all residents of the locality and given by $I_q = \sum_{h=1}^{H_q} (e_{hq} + \omega_{hq})$. To simplify notation, we define the equilibrium size of local spending in each locality in (4) by the function $g_{pq}^{\star} = g_{pq}^{\star}(I_q, \beta_{pq}, \alpha_{pq})$. Note that increases in the locality's aggregate income and the relative ratio of intensity of preferences for public goods of the representative voter controlling party p in each locality $q = i, j$ lead to increases in the size of government spending $g_{pq}^{\star}$.

For the analysis that follows, we consider the effects of the government's spending on the welfare of the society. In our economy, the welfare of the society is represented by the egalitarian social welfare function defined by $SW_q = \sum_{h=1}^{H_q} \upsilon_{hq}$, which is the linear sum of the well-being of all residents of the locality. As stated in proposition 2, local public spending is determined by the aggregate income of residents and the preferences for private and public goods of the representative coalition of voters controlling the party that is elected in each locality. This implies that remittances received in each locality affect the size of local public spending and the welfare of residents in each locality.

In what follows, proposition 3 says that in the event of local public spending showing positive externalities, then an increase in the size of remittances received by residents of locality j have a positive effect on the welfare of residents of locality i, because remittances received in locality j, affect positively the size of local spending in that locality and have spillover effects that not only determine the well-being of residents of locality j but also the welfare of residents of neighbor jurisdictions. Proposition 3 shows this outcome directly by substituting the equilibrium size of local public goods in localities i and j and the private goods consumed by residents of locality i.

Proposition 3. The welfare of all residents in each locality is given by $SW_q = \sum_{h=1}^{H_q} \upsilon_{hq}$.

In locality i

$$SW_i = \sum_{h=1}^{H_i} \alpha_{hi} \ln(x_{hi}^{\star}) + \sum_{h=1}^{H_i} \beta_{hi} \ln(g_{pi}^{\star}) + k_j \sum_{h=1}^{H_i} \psi_{hi} \ln(g_{pj}^{\star}) \tag{5}$$

where

$$x_{hi}^{\star} = \left(\frac{\alpha_{pi}}{\alpha_{pi} + \beta_{pi}} \right) (e_{hi} + \omega_{hi}) \qquad \forall h = 1, 2, \ldots, H_i \tag{6}$$

and

$$g_{pq}^{\star} = \left(\frac{\beta_{pq}}{\alpha_{pq} + \beta_{pq}} \right) \sum_{h=1}^{H_q} (e_{hq} + \omega_{hq}) \quad \text{for} \quad q = i, j \tag{7}$$

Proposition 3 shows that remittances received in locality i only affect the production of public goods of locality i positively. Similarly, remittances received in locality j positively only affect the production of public goods of locality j positively. However, proposition 3 also shows that remittances received by residents of locality j have spillover effects in the welfare of residents of locality i if $k_j > 0$ (and remittances received by residents of locality i have spillover effects in the welfare of residents of locality j if $k_i > 0$). To see this, note that an increase in remittances received by households living in locality j increases the revenue and spending of that locality, and therefore the welfare of residents of locality i. The marginal effect of an increase in the aggregate amount of remittances received by households living in locality j in the welfare of all residents of locality i is given by $\frac{\partial \Psi_i}{\partial \sum_{h=1}^{H_j} \omega_{hj}} = \frac{k_j \sum_{h=1}^{H_i} (\psi_{hi})}{\sum_{h=1}^{H_j} (e_{hj} + \omega_{hj})} > 0$.

The spillover effect that remittances received in locality j have on locality i depends positively on the extent of externalities of the local public good supplied in locality j, k_j, and the aggregate intensity of preferences of residents of locality i for the public good provided by locality j, given by the parameter $\sum_{h=1}^{H_i} (\psi_{hi})$.

To summarise our findings from this section, Table 1 shows the case for complementary local public goods and assumes an increase in remittances received in localities i and j. It also presents the reaction function of government spending in all localities, the net consumption of local public goods (for the case of locality i the net consumption is given by $g_i + k_j g_j$ and for locality j

Table 1. Spatial effects of remittances with complementary local public goods

Moderate and large spillovers: $k_i > 0$ and $k_j > 0$	**Production of g_i or reaction function of government spending of locality *i***	**Production of g_j or reaction function of government spending of locality *j***	**Net consumption of local public goods by residents of locality *i*, given by $g_i + k_j g_j$**	**Net consumption of local public goods by residents of locality *j*, given by $g_j + k_i g_i$**	**Effect on welfare of residents of locality *i***	**Effect on welfare of residents of locality *j***
An increase in remittances in locality *i*	leads to an increase in g_i	no effect on g_i	increase	increase	positive	positive
An increase in remittances in locality *j*	no effect on g_i	leads to an increase of g_i	increase	increase	positive	positive

Source: own work.

is given by $g_j + k_i g_i$), and welfare effects of remittances. Table 1 shows that regardless of whether the externalities of local public goods are moderate or large, an increase in remittances received by households living in locality *i* increases the size of government spending in that locality but does not affect the level of public spending in district *j*. However, because of the complementarity of local public goods and its inter-regional positive externalities, an increase in remittances received by residents of locality *i* increase he welfare of residents in localities *i* and *j*. Similar findings hold for an increase in remittances received by households living in locality *j*.

4. Spatial effects of remittances with homogeneous public goods

In the last section, local public goods are complementary in the utility function. Here we assume local public goods have some degree of homogeneity. The main distinction between the two sections is that the supply of local public goods in locality *j* reduces the marginal utility of a local public good in locality *i* due to marginal decreasing returns of consumption of public goods in both localities. In this case, the structure of preferences of the representative coalition of voters controlling party *p* is given by $\mu_{pi} = \alpha_{pi} \ln(x_{pi}) + \beta_{pi} \ln(g_{pi} + + k_j g_{pj})$, where x_{pi} is the private good, g_{pi} is the public good provided by some party *p* in locality *i*, g_{pj} is the public good provided by some party *p* in locality *j*, and $g_{pi} + k_j g_{pj}$ is the aggregate consumption of local public goods of a res-

ident in locality i. Similarly, the aggregate consumption of local public goods of a resident in locality j is $g_{pj} + k_i g_{pi}$.

As before, parameters α_{pi}, β_{pi} reflect the intensity of preferences of the private good, the local public good in locality i, and the public good of locality j. We assume $\alpha_{pi} + \beta_{pi} = 1$, while $k_j \in [0, 1]$ is a parameter that reflects whether the public good of locality j has positive externalities on residents of locality i. Similarly, the preferences of voters in locality i are $\mu_{hi} = \alpha_{hi} \ln(x_{hi}) + \beta_{hi} \ln(g_{pi} + k_j g_{pj}) \; \forall \; h = 1, 2, ..., H_i$ and for voters of locality j are $\mu_{hj} = \alpha_{hj} \ln(x_{hj}) + \beta_{hj} \ln(g_{pj} + k_i g_{pi}) \; \forall \; h = 1,2, ..., H_j$.

As in the previous section, the political process forming local governments is the same as before: in the first scenario, parties select a policy platform constituted by the public good g_{pq} and the corresponding tax τ_{pq}. In the second stage, voters observe the parties' policies and vote. In the third stage, votes are counted, and the party with the majority of votes takes all and implements their policy.

In what follows, proposition 4 describes the size of local spending and the spatial effects of remittances. To distinguish the results of this section with our analysis in the previous section, we define the equilibrium local public goods by $\tilde{g}_{pq}$ for $p = L, R$ and $q = i, j$.

Proposition 4. Local elections lead to an equilibrium size of government spending $\tilde{g}_{pq}$ for $p = L, R$ as follows.

For locality i:

$$\tilde{g}_{pi} = \frac{\beta_{pi}\left(\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi}\right) - k_j \alpha_{pi} \beta_{pj}\left(\sum_{h=1}^{H_j} e_{hj} + \sum_{h=1}^{H_j} \omega_{hj}\right)}{1 - k_i k_j \alpha_{pi} \alpha_{pj}}$$

and for locality j:

$$\tilde{g}_{pj} = \frac{\beta_{pj}\left(\sum_{h=1}^{H_j} e_{hj} + \sum_{h=1}^{H_j} \omega_{hj}\right) - k_i \alpha_{pj} \beta_{pi}\left(\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi}\right)}{1 - k_j k_i \alpha_{pj} \alpha_{pi}}$$

Proof

See the Appendix.

Proposition 4 shows that the equilibrium level of $\tilde{g}_{pi}$ depends positively on the structure of preferences for public goods of the coalition controlling the party in office in locality i, α_{pi}, β_{pi}, and locality j, α_{pj}, β_{pj}, the aggregate income of locality i, $\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi}$ and locality j $\sum_{h=1}^{H_j} e_{hj} + \sum_{h=1}^{H_j} \omega_{hj}$, and the distribution of

spillovers k_i and k_j. Spillovers of public spending create an interdependence in the supply of local public goods across localities, that is, an increase in $\tilde{g}_{pj}$ reduces the marginal benefits of producing $\tilde{g}_{pi}$ and vice versa. This outcome follows from the fact that the marginal utility of consuming local public goods decreases with increases in $\tilde{g}_{pi}$ and $\tilde{g}_{pj}$, since the overall consumption of local public goods for a resident of locality *i* is equal to $\tilde{g}_{pi} + k_j \tilde{g}_{pj}$.

Proposition 4 also shows that the greater the extent of spillovers of $\tilde{g}_{pi}$ on locality *j*, that is the higher k_i, the higher the $\tilde{g}_{pi}$ at the political equilibrium. This is not for altruism, or because the party in locality *i* considers the preferences of residents of locality *j*, but because of a crowding-out effect of $\tilde{g}_{pi}$ on the supply of $\tilde{g}_{pj}$. To see this, note that an increase in $\tilde{g}_{pi}$ reduces the supply of $\tilde{g}_{pj}$ and the nationwide consumption of public goods for the party in locality *i*, which is given by $\tilde{g}_{pi} + k_j \tilde{g}_{pj}$. To compensate for this crowding-out effect, $\tilde{g}_{pi}$ goes up with increases in k_i.

In proposition 5, we provide some comparative analysis of the response of $\tilde{g}_{pi}$ to changes in the elasticity of the utility function of the party and the public good of locality *j*, that is β_{pj}, with respect to changes in the elasticity of the utility of the party and private goods of locality *j*, that is α_{pj}, and with respect to changes in the extent of spillovers from the public good of locality *j*, that is k_j.

Proposition 5. The comparative analysis of $\tilde{g}_{pi}$ implies that:

$$1)\ \frac{\partial \tilde{g}_{pi}}{\partial \beta_{pj}} < 0,\ 2)\ \frac{\partial \tilde{g}_{pi}}{\partial \alpha_{pj}} > 0, \text{ and } 3)\ \frac{\partial \tilde{g}_{pi}}{\partial k_j} \gtrless 0$$

Proof
See the Appendix.

Proposition 5 states that an increase in β_{pj} indicates that the marginal utility of the party and the local public good in locality *j* is higher, which increases its demand in locality *j*. The government of that locality increases $\tilde{g}_{pj}$, which also increases the size of positive externalities of $\tilde{g}_{pj}$ on locality *i* and leads to a reduction in the marginal utility of public goods in locality *i* and reduces the supply of $\tilde{g}_{pi}$. In addition, an increase in α_{pj} means that private consumption is more attractive relative to public goods for the party in locality *j*. The government in that locality reduces $\tilde{g}_{pj}$, which in turn reduces the positive externalities of $\tilde{g}_{pj}$ on locality *i* and, as a response, the local government in locality *i* increases $\tilde{g}_{pi}$. Finally, an increase in k_j leads to an ambiguous effect on $\tilde{g}_{pj}$ because higher externalities from $\tilde{g}_{pj}$ increase consumption of local public goods in locality *i*, and reduce the marginal electoral benefit of producing $\tilde{g}_{pi}$. Hence, an increase of k_j tends to lead to a reduction in $\tilde{g}_{pi}$. However, an increase in k_j reduces the slope of the reaction function of $\tilde{g}_{pi}$ to changes in $\tilde{g}_{pj}$, making $\tilde{g}_{pi}$ less sensitive to changes in k_j, which explains the ambiguous effect of k_j on $\tilde{g}_{pi}$.

In what follows, propositions 6, 7, and 8 characterise the spatial distribution of public goods and the effect of remittances for an economy with homogeneous public goods for different levels of interjurisdictional spillovers, that is, for different values of k_i and k_j.

Proposition 6. The case of no externalities of public goods and no spillover effects of remittances. If local spending does not show spillovers, that is, if $k_i = k_j = 0$, the spatial distribution of government spending for localities $q = i, j$, $\tilde{g}_{pq}$ is given by:

$$\tilde{g}_{pq} = \beta_{pq}\left(\sum_{h=1}^{H_q} e_{hq} + \sum_{h=1}^{H_q} \omega_{hq}\right) \tag{10}$$

In this case, remittances received by households in locality j do not have spillover effects on public spending of locality i, and vice versa.

Proof

It follows trivially from proposition 4.

Proposition 6 shows the spillover effects of remittances through its impact on the size of local public spending of localities i and j. In the absence of externalities of public goods across localities, that is, for the case in which $k_i = k_j = 0$, remittances do not have spatial effects, since local spending only depends on the aggregate income of the locality constituted by the endowments plus remittances that households in that locality receive. Local spending also depends on the preferences of the coalition of voters controlling the party. Hence, remittances received in locality j do not affect the size of government spending enjoyed by residents of locality i and vice versa.

Proposition 7. Moderate externalities of local public spending: If local public spending shows "moderate" spillovers, that is, if:

$$k_i > 0, k_j > 0 : 0 < k_i < \left(\frac{1}{\alpha_{pj}}\right)\left(\frac{\beta_{pj}}{\beta_{pi}}\right)\left(\frac{\sum_{h=1}^{H_j}(e_{hj} + \omega_{hj})}{\sum_{h=1}^{H_i}(e_{hi} + \omega_{hi})}\right)$$

and

$$0 < k_j < \left(\frac{1}{\alpha_{pi}}\right)\left(\frac{\beta_{pi}}{\beta_{pj}}\right)\left(\frac{\sum_{h=1}^{H_i}(e_{hi} + \omega_{hi})}{\sum_{h=1}^{H_j}(e_{hj} + \omega_{hj})}\right)$$

then the spatial distribution of government spending for localities, $\tilde{g}_{pi}$ and $\tilde{g}_{pj}$, is given as follows:

In locality i:[8]

$$\tilde{g}_{pi} = \frac{\beta_{pi}\left(\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi}\right) - k_j\,\alpha_{pi}\,\beta_{pj}\left(\sum_{h=1}^{H_j} e_{hj} + \sum_{h=1}^{H_j} \omega_{hj}\right)}{1 - k_i\,k_j\,\alpha_{pi}\,\alpha_{pj}} \tag{11}$$

and for locality j:

$$\tilde{g}_{pj} = \frac{\beta_{pj}\left(\sum_{h=1}^{H_j} e_{hj} + \sum_{h=1}^{H_j} \omega_{hj}\right) - k_i\,\alpha_{pj}\,\beta_{pi}\left(\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi}\right)}{1 - k_j\,k_i\,\alpha_{pj}\,\alpha_{pi}} \tag{12}$$

In this case, remittances in locality j have "negative" spillover effects on public spending in locality i and vice versa.

Proof

It follows trivially from proposition 4.

Proposition 7 shows that the equilibrium level of $\tilde{g}_{pi}$ depends positively on the structure of preferences for public goods of the coalition controlling the party in office in locality i, α_{pi}, β_{pi}, and the aggregate income of that locality. In addition, $\tilde{g}_{pi}$ depends negatively on those factors that increase the supply of the local public good in locality j, such as the extent of spillovers of $\tilde{g}_{pj}$ on locality i, the intensity of preferences of the coalition of voters controlling the party in locality j, β_{pj}, and the size of endowments and remittances of locality j, $\sum_{h=1}^{H_j} e_{hj} + \sum_{h=1}^{H_j} \omega_{hj}$, because these factors increase local public goods in locality j and reduce the marginal benefits of providing public goods in locality i. As a result, parties in locality i recognise that their electoral benefits increase if they reduce the size of $\tilde{g}_{pi}$.

In this case, spillovers of local public spending create an interdependence in the supply of local public goods across localities, that is, an increase in remittances received by residents of locality j increase the supply of $\tilde{g}_{pj}$, which in turn reduces the marginal benefits of producing $\tilde{g}_{pi}$ in locality i and vice versa. In other words, remittances received in locality j have a crowding-out effect on the provision of public goods in locality i. This outcome follows from the fact that the marginal utility of consuming local public goods decreases with increases in $\tilde{g}_{pi}$ and $\tilde{g}_{pj}$, since the overall consumption of local public goods is equal to $\tilde{g}_{pi} + k_j\,\tilde{g}_{pi}$. If this crowding-out effect is strong enough, then the marginal utility of consuming a local public good in locality i could be driven to

[8] A similar condition is characterised for locality j.

zero, and it could create incentives for locality i to free ride and not provide a local public good in its locality.

In this case, the expected sign of increases in remittances in locality j on welfare of residents of locality i could be negative. This contrasts with our prediction of the spatial effect of remittances for the case in which local public goods are complementary. In the latter case, the expected impact on welfare of residents of locality due to increases in remittances received by households in locality j is positive.

Proposition 8. Case of Large Externalities of Local Public Spending: If local spending shows "high" spillovers in the locality with high demand for public spending, that is, if $\tilde{g}_{pi} > \tilde{g}_{pj}$ and:

$$k_i > 0, k_j \geq 0 : k_i \geq \left(\frac{1}{\alpha_{pj}}\right)\left(\frac{\beta_{pj}}{\beta_{pi}}\right)\left(\frac{\sum_{h=1}^{H_j}(e_{hj}+\omega_{hj})}{\sum_{h=1}^{H_i}(e_{hi}+\omega_{hi})}\right)$$

then the spatial distribution of government spending for localities i and j is given as follows:

$$\tilde{g}_{pi} = \beta_{pi}\left(\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi}\right) \quad \text{and} \quad \tilde{g}_{pj} = 0 \tag{13}$$

In this case, spillovers from remittances are spatially asymmetric. That is, remittances in locality i have a positive spillover effect on public spending of locality j but remittances in locality j do not have spillovers on public spending of locality i.

Proof

It follows from proposition 4.

Proposition 8 shows that if externalities from the locality with high demand for public spending are significant, and or the distribution of regional income is highly unequal, then remittances have an asymmetric spatial effect depending on the relative size of the demand for public spending in each locality. Remittances received in locality i have a spillover effect on residents of locality j, but remittances received in locality j do not have a spillover effect on residents of locality i.

To see this, note that for this case, local public goods might be positive in the locality with high demand for public spending, which in our case, by assumption, is locality i, while the supply of local public goods in locality j would be zero, that is, $\tilde{g}_{pi} > 0$ and $\tilde{g}_{pj} = 0$. The reason for this outcome is that the size of government spending in locality i is high enough to drive to zero the mar-

ginal utility of consuming this local public good in locality j. Therefore, the party winning the local election in locality j has political incentives to free ride and does not provide a local public good in its locality.

Hence the consumption of public goods in locality j is given by $\tilde{g}_{pj} + k_i \tilde{g}_{pi} = k_i \tilde{g}_{pi} = k_i \beta_{pi} \left(\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi} \right)$, therefore an increase of \$1 in remittances received in locality i increases the overall consumption of public goods of residents of locality j by an amount equal to $k_i \beta_{pi} > 0$. However, increases in remittances received in locality j do not affect the consumption of public goods of residents of locality i because the consumption of public goods by their residents is expressed by $\tilde{g}_{pi} + k_j \tilde{g}_{pj} = \tilde{g}_{pi} = \beta_{pi} \left(\sum_{h=1}^{H_i} e_{hi} + \sum_{h=1}^{H_i} \omega_{hi} \right)$, and therefore an increase in remittances in locality j does not affect the overall consumption of public goods of residents of locality i.

In this case, remittances received by locality i affect government spending in locality i and would have a positive effect on the welfare of residents in locality j, but remittances received in locality j would not affect government spending in any locality, nor would they influence the welfare of residents of any locality. In other words, remittances have an asymmetric spatial effect depending on the relative demand for public spending in each locality and only remittances received in a locality with high demand for public spending would lead to positive spatial effects in the other locality.

It is relevant to point out that the outcome in proposition 7 is more likely when the inequality of income across localities is significant. Note that for proposition 7 to hold, the extent of spillovers in the high-income locality, given by k_i, must satisfy the following condition:

$$k_i \geq \left(\frac{1}{\alpha_{pj}} \right) \left(\frac{\beta_{pj}}{\beta_{pi}} \right) \left(\frac{\sum_{h=1}^{H_j} (e_{hj} + \omega_{hj})}{\sum_{h=1}^{H_i} (e_{hi} + \omega_{hi})} \right)$$

and this is more likely if the ratio between aggregate income in the low- and high-income localities, expressed by the term:

$$\frac{\sum_{h=1}^{H_j} (e_{hj} + \omega_{hj})}{\sum_{h=1}^{H_i} (e_{hi} + \omega_{hi})}$$

is sufficiently low. In this case, the inter-regional inequality of income leads to a significant disparity between the demand for public goods of high- and low-income localities, and the high-demand locality might drive to zero the

marginal utility of providing public goods in the low-demand locality, which might explain why in the equilibrium the corresponding supply of localities i and j would be $\tilde{g}_{pi} > 0$ and $\tilde{g}_{pj} = 0$.

5. Discussion of findings

In this section, we discuss the findings of our model. As mentioned before, Table 1 shows the case for complementary local public goods and Table 2 the case for local public goods with substitutability. We consider the effect of an increase in remittances received in localities i and j, the reaction function of government spending in all localities, the net consumption of local public goods (for the case of locality i the net consumption is $g_i + k_j g_j$ and for locality j is $g_j + k_i g_i$), and welfare effects of remittances.

Table 1 demonstrates that regardless of whether the externalities of local public goods are moderate or large, an increase in remittances received by households living in locality i increases the size of government spending only in that locality but does not affect public spending in locality j. Because of the complementarity of local public goods and their inter-regional positive externalities, an increase in remittances received by residents of locality i boosts the welfare of residents in localities i and j. Similar findings hold for an increase in remittances received by households living in locality j.

Table 2 shows a more complex pattern of the spatial effects of remittances on government spending. In the case of moderate spillovers, an increase in remittances received by households living in locality i not only increases the size of government spending in that locality but also exerts a crowding-out effect in government spending in locality j (that is, the size of public spending in locality j falls). However, an increase in remittances received by residents of locality i has a net positive effect on the welfare of residents of localities i and j, because the net consumption of public goods in both localities rises. Our analysis shows that we can expect similar implications for remittances received by residents of locality j.

In the case of large externalities of local public spending, an increase in remittances in locality i, only increases the level of government spending in that locality and it does not affect government spending of district j. In addition, an increase in remittances received by residents of locality i increases the welfare of residents of localities i and j because the net consumption of public goods in both localities rises.

However, remittances received by households of locality j does not increase government spending in any locality because the local government of locality j free rides and does not provide a local public good. For this rea-

Table 2. Spatial effects of remittances with homogeneous local public goods

Moderate and large spillovers: $k_i > 0$ and $k_j > 0$	**Production of g_i or reaction function of government spending of locality *i***	**Production of g_j or reaction function of government spending of locality *j***	**Consumption of local public goods by residents in locality *i* $\tilde{g}_i + k_j \tilde{g}_j$**	**Consumption of local public goods by residents in locality *j* $\tilde{g}_j + k_j \tilde{g}_i$**	**Effect on welfare of residents in locality *i***	**Effect on welfare of residents in locality *j***
An increase in remittances in locality *i*	leads to an increase in $\tilde{g}_i$	leads to a reduction in $\tilde{g}_j$	increase	increase	positive	positive
An increase in remittances in locality *j*	leads to a reduction in $\tilde{g}_i$	leads to an increase in $\tilde{g}_j$	increase	increase	positive	positive
Large externalities of local public spending						
An increase in remittances in locality *i*	leads to an increase in $\tilde{g}_i$	no effect on $\tilde{g}_j$	increase	increase	positive	positive
An increase in remittances in locality *j*	no effect on $\tilde{g}_i$	no effect on $\tilde{g}_j$	no change	no change	no effect on welfare	no effect on welfare

Source: own work.

son, the reaction function of government spending and welfare of residents of both localities remains unchanged even if households of locality *j* receive more remittances.

Normative versus political economy considerations

In this section, we discuss several key differences that emerge between the outcomes of our political economy and a normative model with a central social planner. This comparison helps to put into perspective our analysis and seeks to provide insights into the role of fiscal decentralisation and political institutions in shaping local spending policy. The first key difference is that the aggregation of preferences in policy design differs significantly between our political economy model and the normative model. A central planner considers the marginal social benefits and costs of spending and taxation across all localities. In contrast, our model posits that the preferences of the ruling party dictate local spending decisions. This can lead to suboptimal levels of public goods, either exceeding or falling short of the socially optimal level, depending on the party's preferences. It also means that the marginal effect of remittances in these models is different; while increases in remittances might lead to social benefits under a social planner, it might not improve welfare of the society in our political economy model.

Secondly, the efficiency of local spending varies between the two models. A normative model ensures Pareto efficiency, while our political model does not. The degree of externalities amplifies the welfare costs of inefficient public good allocation. This inefficiency stems from decentralised decision-making and the limited consideration of externalities by parties, who prioritise the preferences of their electoral base. Fiscal decentralisation exacerbates this issue, as policymakers are incentivised to ignore the positive externalities of the effect of remittances on spending in other localities. Moreover, political incentives drive politicians to neglect the positive externalities of spending on residents outside their core voter base, which means that an income effect from remittances might only be incorporated to the extent that it affects the party in power. In our model, single-peaked preferences for local spending imply that the political inefficiency grows with the divergence between the ideal policy of the average voter and the ideal policy of the ruling party.

Finally, strategic behaviour by parties in our political economy model can lead to coordination failures and welfare losses. Parties' Cournot-Nash reaction functions result in negative externalities between localities, hindering the maximisation of gains from cooperative behaviour. In contrast, a benevolent central planner, free from such strategic considerations, can achieve optimal allocative efficiency and maximise welfare.

Conclusions

In this paper, we develop a political economy model to study the spatial spillover effects of remittances. In our economy, local governments are formed through elections, in which parties select a policy platform constituted by a local public good and a proportional income tax, voters observe the parties' policies and vote. After votes are counted, the party with the majority takes all and implements local policy. In a two-district economy, households have their own income but also receive remittances, and local governments are formed by parties with preferences over public goods. Since local public goods are normal and show positive externalities, remittances received in one jurisdiction might affect government spending in that locality, but also change the consumption of public goods of residents of other jurisdictions. Hence, remittances received on one locality might have spillover effects on the welfare of residents of other localities.

Our model shows that the spillover effects of remittances are asymmetric with a complex pattern that depends on the degree of externalities of public spending, the inter-regional inequality of income, and whether local public goods are complementary or substitutes. In the case where local public

goods are complementary, remittances received in one locality do not affect government spending in other localities but increase the welfare of residents of other localities.

However, if local public goods are substitutes (there is some degree of homogeneity) and the size of externalities of public goods are moderate, then remittances received by households living in one locality increase government spending in that locality but reduce spending in other districts. In this case, the reaction function of remittances in the government spending of other localities is negative because externalities create an interdependence in the supply of local public goods across localities, that is, an increase in remittances received by residents of one locality boosts the supply of the public good in that locality but reduces the marginal benefits of producing a public good in other districts. This outcome follows from the fact that the marginal utility of consuming local public goods decreases with increases in the provision of public goods in all localities.

Our model also shows that if the degree of externalities is high, and the distribution of regional income is highly unequal, then remittances have a complex asymmetric spatial effect. In this case, a jurisdiction with a high income and high demand for public spending provides a public good but a jurisdiction with a low income and low demand behaves as a free rider and does not provide a public good. Hence, remittances received in localities with high income would have a positive effect on the welfare of residents of all localities, but remittances received in low-income localities would not influence the welfare of residents of any locality.

In other words, remittances have an asymmetric spatial effect depending on the relative demand for public spending of each district and only remittances received in the locality with a high demand for public spending would lead to positive spatial effect in other localities. Our analysis shows that high inter-regional inequality in the distribution of total income (endowments and remittances) makes this outcome more likely.

Appendix

Proposition 2
Proof

In the first scenario, parties $p = L, R$ in localities $q = i, j$ propose policies $g^{\star}_{pq}$, $\tau^{\star}_{pq}$ such that $g^{\star}_{pq}, \tau^{\star}_{pq} \in \text{argmax}\, \upsilon_{pq}\,(e_{pq}, \omega_{pq}, g_{pi}, g_{pj}, \tau_{pq})$ *st:* $g_{pq} = \tau_{pi} \sum_{h=1}^{q}(e_{hq} + \omega_{hq})$. Assume the case of locality i, then solve the next optimisation problem:

$$\max \upsilon_{pi} = \alpha_{pi} \ln\left((e_{pi} + \omega_{pi})\left(1 - \frac{g_{pi}}{\sum_{h=1}^{H_i}(e_{hi} + \omega_{hi})}\right)\right) + \beta_{pi} \ln(g_{pi}) + k_j \psi_{pi} \ln(g_{pj}) \quad \text{(A1)}$$

Hence:

$$\frac{\partial \upsilon_{pi}}{\partial g_{pi}} = \frac{-\alpha_{pi}}{\sum_{h=1}^{H_i}(e_{hi} + \omega_{hi})\left(1 - \frac{g_{pq}}{\sum_{h=1}^{H_i}(e_{hi} + \omega_{hi})}\right)} + \frac{\beta_{pi}}{g_{pi}} = 0 \quad \text{(A2)}$$

which leads to:

$$g^{\star}_{pq} = \left(\frac{\beta_{pq}}{\alpha_{pq} + \beta_{pq}}\right) \sum_{h=1}^{H_q}(e_{hq} + \omega_{hq}) \qquad \text{for} \qquad q = i, j \quad \text{(A3)}$$

Proposition 4
Proof

In this case, the parties' problem in locality i is:

$$\max \upsilon_{pi} = \alpha_{pi} \ln\left((e_{pi} + \omega_{pi})\left(1 - \frac{\tilde{g}_{pi}}{\sum_{h=1}^{H_i}(e_{hi} + \omega_{hi})}\right)\right) + \beta_{pi} \ln(\tilde{g}_{pi} + k_j\, \tilde{g}_{pj}) \quad \text{(A4)}$$

Hence:

$$\frac{\partial v_{pi}}{\partial \tilde{g}_{pi}} = \frac{-\alpha_{pi}}{\sum_{h=1}^{H_i}(e_{hi}+\omega_{hi})\left(1-\frac{\tilde{g}_{pi}}{\sum_{h=1}^{H_i}(e_{hi}+\omega_{hi})}\right)} + \frac{\beta_{pi}}{\tilde{g}_{pi}+k_j\,\tilde{g}_{pj}} = 0 \qquad \text{(A5)}$$

In the case of parties $p = L, R$ in locality j:

$$\frac{\partial v_{pj}}{\partial \tilde{g}_{pj}} = \frac{-\alpha_{pj}}{\sum_{h=1}^{H_j}(e_{hj}+\omega_{hj})\left(1-\frac{\tilde{g}_{pj}}{\sum_{h=1}^{H_j}(e_{hj}+\omega_{hj})}\right)} + \frac{\beta_{pj}}{\tilde{g}_{pj}+k_i\,\tilde{g}_{pi}} = 0 \qquad \text{(A6)}$$

Solve the system of equations (A5) and (A6) to find that the equilibrium size of government spending $\tilde{g}_{pq}$ for $p = L, R$ is given*:*

For locality i:

$$\tilde{g}_{pi} = \frac{\beta_{pi}\left(\sum_{h=1}^{H_i}e_{hi}+\sum_{h=1}^{H_i}\omega_{hi}\right)-k_j\,\alpha_{pi}\,\beta_{pj}\left(\sum_{h=1}^{H_j}e_{hj}+\sum_{h=1}^{H_j}\omega_{hj}\right)}{1-k_i\,k_j\,\alpha_{pi}\,\alpha_{pj}} \qquad \text{(A7)}$$

and for locality j:

$$\tilde{g}_{pj} = \frac{\beta_{pj}\left(\sum_{h=1}^{H_j}e_{hj}+\sum_{h=1}^{H_j}\omega_{hj}\right)-k_i\,\alpha_{pj}\,\beta_{pi}\left(\sum_{h=1}^{H_i}e_{hi}+\sum_{h=1}^{H_i}\omega_{hi}\right)}{1-k_j\,k_i\,\alpha_{pj}\,\alpha_{pi}} \qquad \text{(A8)}$$

Proposition 5
Proof

Use condition (A8) from proposition. Note that $k_j > 0, \alpha_{pi} > 0, 1 - k_i\,k_j\,\alpha_{pi}\,\alpha_{pj} > 0$, $\sum_{h=1}^{H_j}e_{hj}+\sum_{h=1}^{H_j}\omega_{hj} > 0$. Hence:

$$\frac{\partial \tilde{g}_{pi}}{\partial \beta_{pj}} = -\frac{k_j\,\alpha_{pi}\left(\sum_{h=1}^{H_j}e_{hj}+\sum_{h=1}^{H_j}\omega_{hj}\right)}{1-k_i\,k_j\,\alpha_{pi}\,\alpha_{pj}} < 0 \qquad \text{(A9)}$$

and for the case $\frac{\partial \tilde{g}_{pi}}{\partial \alpha_{pj}}$, it is satisfied that:

$$\frac{\partial \tilde{g}_{pi}}{\partial \alpha_{pj}} = -\frac{\tilde{g}_{pj}(k_i\, k_j\, \alpha_{pi})}{1 - k_j\, k_i\, \alpha_{pj}\, \alpha_{pi}} < 0 \tag{A10}$$

$$\frac{\partial \tilde{g}_{pi}}{\partial \alpha_{pj}} = \frac{\tilde{g}_{pj}(k_i\, k_j\, \alpha_{pi})}{1 - k_j\, k_i\, \alpha_{pj}\, \alpha_{pi}} > 0 \tag{A11}$$

and finally for the case of $\frac{\partial \tilde{g}_{pi}}{\partial k_j}$

$$\frac{\partial \tilde{g}_{pi}}{\partial k_j} = \frac{\tilde{g}_{pj}(k_i\, \alpha_{pj}\, \alpha_{pi}) - \alpha_{pi}\, \beta_{pj} \left(\sum_{h=1}^{H_j} e_{hj} + \sum_{h=1}^{H_j} \omega_{hj} \right)}{1 - k_i\, k_j\, \alpha_{pi}\, \alpha_{pj}} \gtrless 0 \tag{A12}$$

References

Abdih, Y., Chami, R., Dagher, J., & Montiel, P. (2012). Remittances and institutions: Are remittances a curse? *World Development*, *40*(4), 657–666. https://doi.org/10.1016/j.worlddev.2011.09.014

Adida, C. L., & Girod, D. M. (2011). Do migrants improve their hometowns? Remittances and access to public services in Mexico, 1995–2000. *Comparative Political Studies*, *44*(1), 3–27. https://doi.org/10.1177/0010414010381073

Azizi, S. (2021). The impacts of workers' remittances on poverty and inequality in developing countries. *Empirical Economics*, *60*(2), 969–991. https://doi.org/10.1007/s00181-019-01764-8

Benhamou, Z. A., & Cassin, L. (2021). The impact of remittances on savings, capital and economic growth in small emerging countries. *Economic Modelling*, *94*, 789–803. https://doi.org/10.1016/j.econmod.2020.02.019

Easton, M. R., & Montinola, G. R. (2017). Remittances, regime type, and government spending priorities. *Studies in Comparative International Development*, *52*, 349–371. https://doi.org/10.1007/s12116-016-9233-7

Hankla, C. R., Martinez-Vazquez, J., & Rodríguez, R. A. (2019). *Local accountability and national coordination in fiscal federalism: A fine balance*. Edward Elgar Publishing.

Johansson, O. (1997). Optimal Pigouvian taxes under altruism. *Land Economics*, *73*(3), 297–308. https://doi.org/10.2307/3147169

Kochi, I., & Ponce Rodríguez, R. A. (2010). Do remittances crowd out the government's redistributive policy? *Journal of Economic Development*, *35*(4), 45–72. https://doi.org/10.35866/caujed.2010.35.4.003

Myers, G., (1990). Optimality, free mobility, and the regional authority in a federation. *Journal of Public Economics*, *43*, 107–121.

Page, J., & Plaza, S. (2006). Migration remittances and development: A review of global evidence. *Journal of African Economies*, 15(2), 245–336.

Ponce Rodríguez, R. A., & Ponce Rodríguez, B. A. (2022). Remittances and the size and composition of government spending. *Revista de Economía y Finanzas Nueva Época*, *18*(4), 1–36. https://doi.org/10.21919/remef.v18i4.745

Salas, V. B. (2014). International remittances and human capital formation. *World Development*, *59*, 224–237. https://doi.org/10.1016/j.worlddev.2014.01.035

Scotchmer, S. (2002). Local public goods and clubs. In: A. Auerbach, M. Feldstein (Eds.), *Handbook of public economics* (vol. 4, 1997–2042). Elsevier.

Wellisch, D. (1994). Interregional spillovers in the presence of perfect and imperfect household mobility. *Journal of Public Economics*, *55*(2), 167–184.

Wittman, D. A. (1983). Candidate motivation: A synthesis of alternative theories. *The American Political Science Review*, *77*(1), 142–157. https://doi.org/10.2307/1956016

World Bank Report. (2023). *Remittances*. World Bank Group. https://www.knomad.org/publication/migration-and-development-brief-39