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Estimating effects of domestic transfers using alternative micro-foundations: how do they affect policies assessments?

The case of trade liberalization in Senegal

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This paper aims at assessing how domestic urban-rural remittances can mitigate macroeconomic shocks in a developing country, especially in terms of income inequities. In particular, when trade liberalization occurs, it may affect the national income structure and increase regional poverty, following shifts in sectoral trade patterns. As underlined by Cox (1990, 2002), Cox and Jimenez (1998) and Morduch (1995), private transfers can significantly help households to deal with exogenous risk and similar studies also find evidence of an efficient risk sharing between the poorest households thanks to private cash exchange (Deaton, 1997; Townsend, 1995; Jalan and Ravallion, 1997). Then, this paper consists in assessing the mitigating impact of remittances on economic shocks by using a micro-macro CGE framework, in which transfer behavior is micro-founded. This model is applied to the case of Senegal[1]. Indeed, Senegal is a developing country which is characterized by regional disparities in terms of employment rates, qualifications and poverty. These inequalities are particularly marked between urban and rural areas. Furthermore, the choice of Senegal is justified for working on remiting behavior, since the country is the ground of massive internal migration towards urban areas, especially in Dakar. This is heighten by geography and climate: Senegal is located between desert areas (to the North) and tropical zones (to the South) that implies a long dry season, when agricultural activities are diminished. Consequently, Senegal is characterized by temporary migrations towards urban areas, that should affect economic outcomes and policy analysis, especially regarding trade.

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[1] The model is calibrated on a recent social accounting matrix of Senegal dated from 2006 (Fall, 2011). We base our work on three important Senegalese household surveys: ESAM I (1996), ESAM II (2002) and ESPS (2005)

Three main challenges follow from the target of this paper: 1- the need to model the labor market as reflecting at the closest a dual-dual economy,[2], that means to distinguish urban sectors from rural ones and formal activities from informal ones; 2- treating the theoretical ambiguity of the motivations to remit, since there are many theoretical models; and 3- dealing with the credibility of the data on inter-household transfers and treating household heterogeneity which is essential and justifies the choice of a micro-macro framework.

In order to treat the first issue (and part of the third one), households are disaggregated as most as possible, following all available criteria in the all set of Senegalese households surveys, namely by region, milieu of living, marital status and number of children, occupation and degree of qualification. This gives us 265 representative households that allow working in a combined micro-macro simulation framework. Regarding the modeling of the labor market, this CGE-model presents a mechanism which endogenizes labor supply and a labor-market segmentation which distinguish the unskilled from the skilled workers. Besides, this CGE-model take into account the double dichotomy between urban and rural areas and formal and informal sectors. The modeling adopted is inspired from Stifel and Thorbecke (2003), but designed in order to match with our sectoral decomposition (34 sectors in the economy, allocated into formal/informal and urban/rural ones, instead of 4 representative sectors in Stifel and Thorbecke, 2003). [3]

The second challenge of this work is identifying the determinants of remittances which is puzzling and controversial within the theoretical literature. In the early 1980s, private income transfers have been increasingly recognized as a key economic fact that affects income distributions of an economy subject to political changes. Two main motivations have been considered to explain the decision to remit: altruism and exchange-motivated decision. Based on these two basic principles, numerous microeconomic models have been developed based successively on altruistic motive (Becker, 1974; Stark, 1985, 1995) and mutual exchange strategy (Cox, 1987; Cox, Eiser et Jimenez 1998), the latter being especially relevant in the case of intergenerational transfers (Laferrére and Wolff, 2001). Other common models rely on strategic game analysis (Stark and Wang, 2002), insurance strategy, moral hazard (Stark and Levhari , 1982; Rozenzweig, 1988; Lambert, 1994) and mixed motives (Lucas and Stark , 1985; Andreoni, 1989; and Cox and al., 199S8). Facing these many theoretical conceptions, it is important to check the robustness of our conclusions by implemented different micro-founded

[2] This expression borrowed from Stifel and Thorbecke (2003) refers to the double dichotomy between urban and rural areas and formal and informal sectors

[3] As underlined by Booters and Savard (2011), this kind of modeling brings new issues such as the need to obtain labor supply estimates that can be used in our combined micro-macro model. This last point can be treated by following the methodology suggested by Cogneau and Robilliard (2008) and Bourguignon and Savard (2008).

functions of transfers and then compare the outputs after simulating external shocks. By the same way, this procedure allows dealing with the third issue of this paper on data availability and credibility, by using a methodology that will be explained below.

The last issue addressed is the credibility of transfer data in household surveys. Reliable national data on bilateral remittances is most often not available or inaccurate. To solve this problem, we calculate bilateral remittances from total amounts of paid and received remittances. Following Ratha and Shaw (2007), we allocate the total remittances received among other households using a weight rule, specific to each micro-founded model that is implemented. We apply a three-step methodology for each model of transfers chosen: the first step consists in estimating bilateral transfers among households and using the theoretical motivations to remit as a distribution rule. The second step aims at implementing specific micro-foundations in our CGE model. Finally, the third step consists in implementing different scenarios of trade liberalization: an Economic Partnership Agreement between Senegal and Europe, a worldwide full trade liberalization and thirdly an increase of protectionism. This three-step procedure allows testing the robustness of the conclusions about the link between trade patterns, regional disparities and domestic transfers.

The contribution of this paper is to assess and deepen the link between trade liberalization poverty and income inequalities by taking into account domestic transfers as a potential redistributive system. Many CGE papers have included remittances but all of them have considered private cash exchanges as exogenous or fixed as a proportion of the migrant's income. These CGE applications totally ignore the economic literature on the microeconomic foundations of the motivations to remit. This is especially important if we intend to improve the understanding of economic consequences of trade policy on poverty.

That is why the paper is organized as following. A first section introduces some stylized facts to show the importance of remitting behavior. A second section comments the existing literature on remittances modeling in CGE analysis, to show the gaps in previous studies and justify this paper. A third section presents the model, especially the modeling of labor market and micro-founded transfers. Next, available data and needed manipulations are presented and dicussed. At final point, trade policies are simulated and their impact on economic outcomes and poverty are assessed, in comparaison with a model that does not include cash-transfers. For this last section, robustness checks are done, by using different micro-foundations of remitting behavior.

1 Stylized facts

2 Literature Review

Regarding the existing literature of CGE models, the main statement is that no CGE-based study has taken into account the literature on microeconomic foundations of remittances. In fact this literature is even never quoted as bibliographic reference in these studies. When integrating remittances in CGE models, authors either suppose that they are exogenous, or they suppose that they are a fixed proportion of the migrant's income. One study supposes that remittance is an isoelastic function of the migrant's income.

Supposing that remittances are exogenous is obviously the simplest way to include these transfers in CGE models. However this option may be considered as too simplistic, or even misleading. This type of study often examines the impact of a variation (even a removal) of remittances by x percent. Considering that they are exogenous implies that this is equivalent to a variation in capital inflows, for example foreign aid, by x percent. A variation of remittances is not equivalent to a variation in foreign aid for at least two reasons. First a variation of remittances may be associated with a variation in migration and also to a variation in the labor supply in the home country (and also in the destination country of migration). Second while a variation in foreign aid may be considered as exogenous, a variation of remittances may be related to other variables like levels of wages in the host country or levels of real income in the home country. Therefore it is difficult to assume an exogenous variation in remittances.

3 The model

3.1 A dual-dual economy

3.2 Microfoundations of transfers

Table 1 presents the alternative specifications of transfers' function that are micro-founded. In brief, five functions are used: the three precursory and well-known models developed by Stark and Lucas (1985) based on pure altruism, pure self-interest and strategic motive; and two models which are based on insurance and investment motives. If the three first specifications are based on the migrant's nature and temperament, the two others put the accent on the purpose of cash-transfers more than the motive. This approach should be especially appropriated to the case of Senegal, for which migration is mainly temporary and has for purpose consumption smoothing and risk-sharing.

Title	**Specification**	**Explanatory variables**
Pure Altruism	$T = \gamma^m Y^m - (1-\gamma^m) Y^h$	Migrant's income; home income; degrees of altruism of migrant and home agent
Pure Self Interest	$T = \frac{\nu}{2+\nu} Y^m$	Migrant's income; weight given by migrant to home service
Strategic motivation	$\frac{(1+\pi)}{2} Y^m - Y^h \leq T \leq \frac{(1-\pi)}{2} Y^m$	Migrant's income; home income productivity gap between migrant and home agent
Mutual Exchange	$\alpha S \leq T \leq Y^m \phi(S, v)$	Migrant's income; quantity of service; price of this service; weight given by migrant to home service
Investment Motivation	$T = \frac{Y^m}{2} - \frac{\mu(1-\psi/2)}{2}$	Migrant's income; scale parameter reflecting technology; labor marginal productivity
Insurance Motivation	$T = T(+\Delta, -(1-\pi), +\chi, -\xi)$	Migrant's and household's risk aversions, depending on income Size and probability of income shock

Table 1: List of Microeconomic Foundations of Remittances

4 Data issues

The study of remittances is data-demanding. Walmsley, Ahmed and Parsons (2007) consider that "the lack of data has been the biggest impediment to the analysis of temporary and permanent migration between countries." The lack of data on remittances is even more severe concerning domestic remittances. This is an important issue that has been widely underlined by the literature (Ratha and Shaw, 2007; Jimenez-Martin, Jorgensen and Labeaga 2007; Frankel 2012). As far as international remittances are concerned there has been progress during the last years.

Two types of data were initially available: first remittance data from Ratha (2004) that is to say total remittances received by country based on IMF balance of payments statistics and available for 212 countries. Second Parsons, Skeldon, Walmsley and Winters (2005) have constructed a bilateral matrix on the number of foreigners by home and host countries (matrix of 225 by 226 countries).

With the help of these data they construct a matrix of bilateral remittances (from the host country to the home country) by allocating remittances across source regions under the assumption that the share of remittances to income is constant. Putting differently they suppose that a Pakistani who has migrated to Bangladesh send to his home country the same share of his income as a Pakistani who has migrated to the United States. There is no empirical study that confirms this assumption. Ratha and Shaw (2007) have derived bilateral remittance flows indirectly using bilateral migrant stock data (and some estimates) and assumptions about the remittance behavior of migrants. The authors use in turn three different allocation rules, namely weights based on migrant stocks abroad, on migrant incomes (proxied by a share of GDP per capita at a macro level), and bidirectional incomes of the migrants and the recipients in the home country. The authors are the first to use allocation rules based on migrant and/or recipient incomes, inspired from altruistic motives but only applied at the macro-level.

Information we have at our disposal is total amounts of transfers versed and received by each household, with details on the origin or destination. Thus we need to disaggregate those total amounts in order to construct a bilateral matrix of transfers. For that, we choose to stay in the same spirit of Ratha and Shaw (2007) but by adapting the methodology to the microeconomic vision of this paper. Actually, instead of using macro stylized facts, we base our analysis on specific theoretical models that offer optimal transfer specifications, coming from the migrant's maximizing behavior, which answers to different motives. The theoretical models we choose to allocate total remittances are the five models presented in Table 1, which will be used to implement an optimal function of transfers in our CGE model. So, in brief, micro-foundations allow us to both estimate bilateral inter-household remittances and evaluate the cushioning role of these transfers in case of external

shock

5 Simulations and results on Macro and Micro variables

To be completed and updated.