WHY MIGRANTS REMITTANCES REDUCE INCOME INEQUALITY IN SOME COUNTRIES AND NOT IN OTHERS?*

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Résumé

According to the literature, the effect of remittances on income inequality in origin countries of migrants is not clear, whatever empirical approach is used. Aiming at clearing up this ambiguity, some authors took into account the historical, social or economic context of the home countries considered. The underlying idea of most of these studies is actually that the impact of remittances on income inequality depends on whom migrates, i.e. on the location migrants occupy in income distribution in their home country. However, to our knowledge, no macroeconomic study examining the remittances effect on inequality, consider the composition of migratory flows. To reveal at the macroeconomic level the position of migrants in income distribution at origin, we introduce in our equation of inequality non-linearities in the level of development of the recipient countries, in the costs of migration, in migrants networks and in the level of braindrain. Using a panel sample of 80 developing countries over the period 1970-2000, and even by factoring in the endogeneity of remittances, this paper provides evidence of some characteristics of home countries in which there is an inequality-decreasing effect of remittances on income inequality. It turns out that countries belonging to the Mediterranean Basin possess the characteristics revealed.

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1 Introduction

For many developing countries, international migrants remittances (financial flows arising from the cross-border movement of nationals of a country) have emerged as a significant source of external financing over the past two decades. During the last decade the remittances growth exceeded that of private capital flows and of foreign public aid. According to the last World bank estimations, since 2002 migrants remittances to developing countries would have more than doubled and would reach 251 billion dollars US in 2007 (figure that might be much higher given the unknown extent of unrecorded flows passing through informal channels). This magnitude added to their relative stability over time and to their potential macroeconomic effects generate a growing interest from the international community for these special capital flows. Even if research on remittances impacts in recipient countries is expanding, only few studies consider the role played by these flows on income distribution in the communities of origin. However, according to the World Bank (2006), income inequality has risen for 1980’s.

However, some studies examined the potential effect of migrants remittances on income distribution in the recipient countries, but they led to conflicting findings. While some papers indicate an inequality-increasing effect of remittances in countries of origin, a number of studies concludes on the contrary with an inequality-decreasing effect of these flows. But this contradiction is due to the fact that the effect of remittances on inequality depends on whom emigrates and so, on whom sends money back. We can imagine that if migrants come mainly from the poorest fringes of the population in their country of origin, remittances will benefit essentially to the poor, what will allow to reduce income inequality in the recipient countries. On the contrary, if migration costs are such as only the richest people can go away, it is logical to think that in this case remittances will reach only the richest households of home countries and thus increase income inequality.
The aim of this paper is to provide an empirical evidence that the relationship between international remittances and income inequality depends on whom migrates by introducing non-linearities in our income inequality equations. Whereas some authors (Jones, 1998 Stark and al., 1986, Koechlin and Leon, 2006) argued that the effect of remittances on inequality varies with the stage of migration history, we show that this effect depends on migration costs, on the level of development and the level of brain drain in home countries and finally, on network effects.

By estimating successively our equations with Ordinary Least Squares (OLS) and with instrumental variables, our findings suggest that:

- the more the mean income of the recipient country is high, the more remittances reduce income inequality,
- international remittances become more unequilizing as the costs of emigration increase,
- a level of development and/or a network of migrants high enough, dampens the increasing effect of remittances on inequality when the costs of emigration are important,
- the more the braindrain is important, the more remittances raise income inequality,
- the Mediterranean Basin is a region where remittances reduce significantly inter-households inequality.

The rest of the paper is structured as follows. First, we briefly summarizes the literature examining the impact of remittances on the income distribution which leads to conflicting findings. Then, we present different papers trying to explain this ambiguity, what leads us to consider the location of migrants in the income distribution. Section 2 describes
our theoretical model based on the Gonzales-König and Wodon’s one (2005). Section 3 consists in presenting the results of our econometrical regressions which allow us to reveal some characteristics of recipient countries for which remittances may reduce inequality. In section 4 we finally use our findings to examine the Mediterranean Basin case.

2 Remittances effect on income inequality: overview of the literature

2.1 The ambiguous effect of remittances on the distribution of income

Existing findings on the impact of remittances on income inequality are conflicting, whatever approach is used (remittances considered as exogeneous or regarded as a substitute for the domestic income the household would have earned if the emigrant had stayed home).

The simplest way to investigate the remittances effect on inter-households income distribution consists in considering these flows as an exogenous source of income that simply adds to the households’ current income. It consists often in breaking down the Gini coefficient according to the influence that every source of income has respectively upon this coefficient (Lerman and Yitzhaki 1985). This methodology allows to estimate the marginal effect of remittances on the Gini coefficient by considering that all other sources of income remain constant.

By treating remittances as a simple exogenous transfer of income by migrants, several authors highlight the inequality-decreasing effect of remittances on income distribution in the recipient countries. Ahlburg (1991, 1995, 1996) shows for example that in the Kingdom of Tonga, the Gini coefficient of the total income decreased from 0.37 to 0.34 thanks to the remittances reception. Similarly, Brown and Connell (1993) used an households survey of
1992 to show that income inequality decreases with remittances in Tonga and in Samoa Islands. However, according to the first studies on the remittances-inequality relation in the Pacific islands, it would seem that these flows have had in the first time an adverse effect on household income distribution, as much as only the richest households took part in emigration (Shankman 1976, Connell 1981).

However, as much as emigration often represents very high costs, it is possible to imagine that in some cases, the poorest families cannot afford to defray the cost of emigration and therefore do not benefit from overseas income transfers. It is in that way that Lipton (1980), Stahl (1982) and Stark, Taylor and Yitzhaki (1986) explain why migrants remittances can constitute “inequality accelerators” in migrant-source areas. Based on a similar method of decomposition, Leones and Feldman’s (1998) findings suggest that remittances were the reason of an increase in inequality within a Philippin village (remittances would be responsible for about the half of the income inequality increase in the village).

More recently, Rivera (2005) finds that international remittances tend to raise income inequality within Mexican rural households, whereas internal remittances have an inverse effect (because costs of internal migrations being less important, the poorest households are more likely to participate to this kind of migration). Wouterse’s findings (2008) are similar in the case of Burkina Faso. Yang and Martinez (2006), as for them, found no significant effect of international remittances on income distribution in Philippines.

By drawing inspiration from the New Economics of Labor Migration (NELM), other economists considered the direct effect of migrants remittances, but also the indirect one. It is possible to imagine that remittances have an effect on households income which receive them (by a positive way through the relaxation of income constraints\(^1\) or by a negative way through the phenomenon of moral hazard\(^2\)).

\(^1\)See Stark and Lucas (1985).
Taylor’s study (1992) on Mexico, is part of the first ones to have taken into account the indirect effects of remittances on the distribution of income. By considering only the direct effects of remittances on inequality, he finds that remittances have a positive effect on the Gini coefficient, albeit this effect diminishes over time (when migration becomes accessible for individuals of low-income households). Then, the author introduces the possible indirect effects of remittances and long term effects. He finds that the remittances amount in 1982 led to a decline of the Gini coefficient in 1988 of 0.01 percent.

Using the same database, Taylor and Wyatt (1996) improved this framework by unlocking the constraint according to which indirect effects are the same for all households. They assume that remittances have weaker indirect effects on the richest households which do not face liquidity constraints and which are able to insure themselves against shocks of production without relying on remittances. They find that the direct marginal effect of remittances on income inequality is negative and statistically significant albeit its magnitude is small (-0.07 percent). However, when indirect effects are also taken into account, the inequality-decreasing effect of remittances is higher (-0.26 percent), because indirect effect of remittances on income may be more important for households located in low steps of the income distribution.

Finally, some researchers have examined the distributional effect of migrants remittances by using a counterfactual approach. Instead of considering migrants remittances as an exogenous source of income, they look upon them rather as a potential substitute for domestic earnings. The focus of this approach is on determining whether inequality level are lower in the current scenario with migration and remittances, than in a scenario with no-migration. Oberai and Singh (1980) are the first ones who have used this approach to analyze the impact of remittances on inequality. They show that remittances sent by migrants living in towns to the rest of their family stayed in the campaign, tend to raise
income inequality within the rural region of Punjab in India.

By employing a similar approach, Knowles and Anker (1981) find only a very weak effect of this type of remittances on the total distribution of income in Kenya. The same methodology is also used by Adams (1991) to examine the effect of remittances on poverty and inequality in a sample of 1000 Egyptian households. Whereas remittances inclusion leads to a reduction of the percentage of population living under the poverty threshold, it draws away an increase of inequality. Rodriguez (1998) also uses a counterfactual methodology to measure the effect of remittances on inequality in a sample of 24 782 Philippine households. When considering remittances as exogeneous, he finds that these flows amplify inequality (measured by the Gini coefficient) by 1,3 percent. But by regarding migrants remittances as a substitute for the income migrants would have earned by staying in their country of origin, he finds that this effect becomes much more important (remittances increase this time inequality by 7,2 percent).

More recently, Ratha (2005), using a similar methodology, shows that migrants remittances reduced the Gini coefficient in Sri Lanka from 0,46 to 0,40. Looking at the case of Nepal, Lokshin and al. (2007) find that almost 20 percent of the decrease in poverty in this country during the decade 1995-2004 can be attributed to remittances. However, migrations and remittances seem to have had only a marginal effect on inequality in Nepal. When Brown and Jimenez (2007) suppose that remittances are an exogenous source of income, they lower income inequality in Tonga and Fiji. On the contrary, they seem to have no significant effect or to raise income inequality when the authors adopt a counterfactual analysis.

Nevertheless, the counterfactual approach can suffer from a problem of a self-selection bias if households are not randomly selected. Barham and Boucher (1998), Adams (2006) and Adams and al. (2008) verify then in their paper there is a selection bias, before examinin
the effect of remittances on inequality. Barham and Boucher (1998) find that remittances raise inequality when they are treated as a substitute for migrant’s domestic income (whereas they diminish inequality when they are considered as an exogenous source of income). On the contrary, from data on Ghana, Adams (2006) finds that the inclusion of remittances in households expenditures leads to a weak inequality reduction (-0.2 percent). By using also households data on Ghana, Adams, Cuecuecha and Page (2008) obtain a different effect of remittances on poverty and inequality according to they are internal or international remittances. International remittances would be more efficient to lower the poverty headcount, the poverty depth and the severity of poverty than internal remittances, but they find that international remittances increase more income inequality in Ghana than internal remittances. This finding might be explained by the fact that households receiving internal remittances and those receiving international remittances are not located in the same place in the income distribution.

The paper of Acosta and al. (2007) is one of the few studies examining the effect of remittances on inequality at the macroeconomic level (10 countries of Latin America and Caribbean). They find that remittances allow to reduce significantly, albeit slightly, income inequality in the recipient countries. Chauvet and Mesple-Somps (2006) use a panel sample of 64 developing countries over the period 1988-1998. They show that on average international remittances have a light income equalizing effect at origin.

In sum, empirical findings are not straightforward. They do not allow to know undoubtedly whether remittances reduce or increase income inequality within recipient countries. Results vary with the empiric approach used (remittances considered as exogeneous or as

They do also in this study a micro-econometric analysis, from which they obtain conflicting results. By using a counterfactual methodology, they show that remittances reduce income inequality in Paraguay, in El Salvador and in Guatemala because in these countries recipient households are predominantly located in low fringes of the income distribution, whereas in the 6 other sending countries, remittances seem to increase inequality because it is richest people who benefit from this source of income.
a substitute for home income), with the type of remittances considered (internal or international) and with the country examined. Consequently, there has been some efforts to explain the contradictory findings concerning the impact of migrants remittances on inequality in the recipient countries.

2.2 The remittances-inequality relationship is not monotonic

2.2.1 The role played by the historical background of the recipient countries

Few papers have explained conflicting findings concerning the effect of remittances on inequality by historical specificities of recipient countries, more precisely by their migratory history. They consider this relationship as a dynamic process. When migration to a new destination starts taking place, information about the host country and its employment capacities are still limited, what leads to high costs of emigrating. Consequently, only well-off households send some of their members abroad and enjoy remittances, what causes an increase of inequality within the home country. But over time, after the settlement of migrant networks in the foreign country, migration costs decline and access to the migration process become diffused across sending-area households (what is called “network effects”). By making migration affordable for households in the lowest levels of income distribution, the initially inequality-increasing effect of remittances can be reversed. Thus, Jones (1998) argues that the distributional effect of remittances depends on the stage of migration history of the sending-areas. He distinguishes three stages:

- *The innovative stage*, when only high-income members of the population can afford the high migratory costs (due to the lack of information), what leads to a rise of

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4See Portes and Rumbaut (1990) and Lipton (1980)
5See Massey, Goldring and Durand, 1994
inter-households inequality within the country of origin.

- **The early adopter stage**, when the size of the migrants network is high enough to allow individuals in low-income households to defray emigration costs, what leads to accruing of remittances to households located on the lowest stages of the income distribution and thereby to a reduction of income inequality in the recipient country.

- **The later adopter stage**, corresponding to the time that the accumulation of migrants remittances is so important that new inequalities appear between households with migrants and households without migrants.

By focusing on the rural income distribution in two Mexican villages, Stark, Taylor and Yitzhaki (1988) provide an empirical illustration of this theory. They find that in the Mexican village that has recently begun to send migrants abroad, international remittances had an unequalizing effect on income distribution. On the contrary, remittances from international migrants had an inequality-decreasing effect on the village that had a long history of participating in migration to the United States. By expanding the investigation to a large number of Mexican communities, McKenzie and Rapoport (2004) find that remittances are all the more equalizing that communities face high past emigration rates.

Koechlin and Leon (2006) generalize this result by using a cross section of 78 countries and by introducing in the inequality equation the remittances variable (positive sign) and its square (negative sign). Their findings provide evidence of the existence of an inverted U-shaped relationship between international remittances and income inequality

\[ 2.2.2 \text{ The role played by the socio-economical context of the sending-area} \]

McKenzie and Rapoport (2004) argue that, a priori, the effect of remittances on income inequalities
inequality cannot be determined because it depends upon the initial distribution level of income in the recipient countries. They show that remittances can intensify income inequality if their initial level is high, on the contrary, remittances can favour income smoothing when the initial inequality level is weaker.

Gonzales-König and Wodon (2005), as for them, show that the effect of remittances on the Gini coefficient depends on the average income of the regions of origin. From data on Honduras, they find that international migrants remittances tend to have a more equalizing effect on income in urban areas than in rural areas. This finding can be explained by the fact that in urban areas (richer), relatively poor people can defray the costs of emigration and can thus migrate.

Koechlin and Leon (2006) add that development of the financial sector and of the education level of the population can help home countries to reach the inequality-decreasing section of the curve faster.

2.2.3 The necessary consideration of whom migrates

In fact, the underlying idea of most of these studies is that the effect of migrants remittances on income inequality depends firstly on whom is migrating and remitting, in other words, on which step of the population they come from. Not having macroeconomic data on who is migrating, we focus on how remittances impact varies with: the income level at origin, the costs of migration migrants have to face up, the qualification of the migrants, and the importance of migrants networks. We argue that the location of migrants in income distribution can mainly be revealed by the means and the incentives individuals have to migrate, that are approximated by these conditional variables.

Emigration costs notably depend on the distance separating countries of origin and the main destination countries of their emigrants. As the main corridors of international
migrations show (Mexico-United-States, North Africa-South Europe, East Europe-Western Europe and within Middle-east countries), geographical proximity is an essential determinant of emigration, mainly because transport represents the main part of migration costs. Since relative proximity determines migration costs, it is likely to play a role in the composition of migratory flows: the more the distance separating the home country from the main destination countries is small, the more individuals of low-income households have the opportunity to take part in emigration. But as we will see later, emigration costs can be dampened by migrants’ networks (Stark, Taylor and Yitzhaki, 1996, 1998; McKenzie and Rapoport, 2004; Koechlin and Leon, 2006) and by the income per capita of the country of origin.

The composition of migratory flows depends also on the mean income at origin: the higher the mean income is, the more the poorer steps of the population can face up to the costs of migration. The development level of the country of origin represents also a determinant of the financial benefit people can drawn from migration. This hypothesis has been verified at the microeconomic level (Gonzales-König and Wodon, 2005), but to our knowledge, never at the macroeconomic level.

Finally, we can approximate the proportion of migrants who comes from the richer segments of the population by their qualification level. Since the more educated people of developing countries come from the high-income households, the more the braindrain is important, the more remittances are likely to have an inequality-increasing effect.

By testing how the impact of remittances on inequality varies with costs of emigration, with the income level and with the importance of the braindrain in the sending country (and how the income level and networks of migrants may mitigate the effect of the costs of emigration), we manage to distinguish some characteristics of a country “type” in which remittances would reduce income inequality.
3 The theoretical model

Our theoretical model is based on the Gonzalez-König and Wodon’s one (2005). They consider a two-period model with a household having two sources of income: the wage from one of the children and the wage from one adult. They suppose that only the child can migrate.

The family is considered as a single economic agent. Its utility depends on today’s consumption, $c_0$, on the present value of parents consumption in period 2, $c_p$, and on $c_s$ which is the consumption of the child who can have migrated or not. The family’s utility can thus be written:

$$U(c_0, c_p, c_s) = u(c_0) + \beta [V(c_p) + W(c_s)]$$ (1)

Where $\beta$ represents the discounting factor and $u$, $V$ and $W$ are continuously increasing concave functions.

During the first period, parents work and earn a wage $w$. If the son works too, he receives the same wage. If the child migrates, he receives no wage in the first period and their parents have to pay for migration costs $c$ ($c$ is supposed to be the same for all households). So total migration cost is composed by the direct migration costs $c$ and by the income loss $w$ following the departure of the child in the first period. In the second period, if the child has migrated, he earns a wage $w_m$ in the destination country, which is supposed to be the same for all migrants. Gonzalez-König and Wodon assume also that the market incompleteness induces that households have no access to borrowing for paying for migration costs in the first period. To simplify, the price of the current and future consumption is normalized to one. If the child decides to migrate in the first period, he will remit during the following period a part $\alpha$ of its wage to the rest of its family (they
suppose that remittances are mainly guided by altruism). But when \( w_m \leq w \), the child cannot migrate and there will be no remittances.

The constraints of the optimization problem are then:

\[
c_0 = 2w - \zeta (w + c)
\]

\[
c_p = w + \zeta (\alpha w_m)
\]

\[
c_s = w + \zeta ((1 - \alpha) w_m - w)
\]

With \( \zeta = 1 \) if the child migrates and 0 otherwise.

Gonzales-König and Wodon write then migration gains for the household as follows:

\[
G(w) = u(w - c) - u(2w) + \beta [V(w + \alpha w_m) - V(w)] + W((1 - \alpha) w_m) - W(w)
\]

The household will participate to migration only when migration gains are positive \((G \geq 0)\).

\( u(w - c) - u(2w) \) is the differential of the household utility in the first period depending on whether the child migrates or does not. \( V(w \omega + \alpha w_m) - V(w) \) represents the gain of utility following the child migration for those who stay in the country of origin in the second period and \( W((1 - \alpha) w_m) - W(w) \) is the migration gain of the child in the second period.

The adaptation of the Gonzales-König and Wodon’s model to our macroeconomic approach

The effect of remittances on income inequality depends on whom migrates. So, we aim at using some variables able to reveal indirectly the location of migrants in the income
distribution, that is to say the socio-economic origin of households for which \( G(w) \geq 0 \). According to the equation (3) we observe that the participation of households to migration depends on the level of wage at origin, which represents at the same time the financial ability and the financial gain of migration (through the differential of wage between countries of origin and of destination), and on the total migration costs.

Households will take part in migration only if the migration costs they face in the first period \((c + w)\), is inferior or equal to the wage gap between the sending country and the destination one, \( \beta (w_m - w) \). Nevertheless we can suppose that the very poor households, for which \( w \) is inferior or equal to the cost of emigration \( (w \leq c) \), cannot migrate. As the same time, if the household is located at the top of the income distribution, its wage is almost similar to the one in the destination country \((w \simeq w_m)\) and it will not be interessant to migrate, even if it can defray the migration cost.

However the theoretical model of Gonzalez-König and Wodon does not completely correspond to the macroeconomic approach we want to have in this study. Their model focuses on a specific country where income is not equaly distributed among people.

Since we want to adopt a cross-section and macroeconomic approach, we have to take into account two main elements which are not considered in the model of Gonzales-König and Wodon : migration costs varying with countries and the difference in level of development of home countries. Furthermore, we also consider the role played by the importance of income and of migrants networks in mitigating the effect of migration cost.

Now, to know who migrates, it is essential to consider the mean income, the costs of emigration but also, the importance of migrants networks.

- Costs of emigration and possibility to migrate

Gonzalez-König and Wodon suppose that all households face the same costs of emigration.
But in a cross-section study, we have to assume that migration cost households have to face up, differ between countries, at least because of their different geographical location. So, to take this difference in costs into account, we use alternatively the distance separating the sending country from the its main OECD destination country and passport cost in the sending country. We name $c_a$ ($c_b$) the migration costs faced by people living in a developing country which is far from (close to) the main destination country, or which applicates high (low) costs of passport (with $c_a > c_b$). However, it is possible that migration costs can be dampened by an income high enough, or by migrants networks (which are not at all considered by Gonzales-König and Wödon).

This table synthetizes the financial capacity of a household to emigrate according to its location in the income distribution and to migration cost.

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<thead>
<tr>
<th>COUNTRY</th>
<th>High costs</th>
<th>Low costs</th>
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<tbody>
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<td></td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Poor</td>
<td>? (1)</td>
<td>Migration (2)</td>
</tr>
</tbody>
</table>

**Note**: Writings in italics indicate that in these cases migration and remittances can lead to a reduction in income inequality.

We observe that whatever migration costs may be, the richer households can take part in the migratory process (cases 3 and 4). Concerning poor households, we can rightfully imagine that if migration costs are low, they can participate to emigration too. However, case 1 is ambiguous. We have to consider the level of development of the home country to know without any doubts, whether they can migrate or not (what we will see later).
Among these four cases, only the one corresponding to the emigration of poor people (case 2) can lead surely to a decreasing of inequality in the home country.

- Household income and emigration

We argue that the poorer of a rich country (country 2), will be better-off than the poorer of a less rich country (country 1). Consequently, it is possible that poor people of country 2 can defray costs of emigration whereas poor people of country 1 can not.

We name $w_1$ the mean wage of the relatively poor country and $w_2$ the mean wage of the relatively rich country, with $w_1 \leq w_2$. Poor people of the poorer country earn a wage $\bar{w}_1$ and rich people receive a wage $w_1$, with $\bar{w}_1 < w_1$. Similarly, poor people of the richer country earn a wage $\bar{w}_2$ and rich people receive a wage $\bar{w}_2$, with $\bar{w}_2 < w_2$.

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<th></th>
<th>COUNTRY</th>
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<td></td>
<td>Poor</td>
<td>Rich</td>
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<td></td>
<td>1</td>
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<tr>
<td>HOUSEHOLD</td>
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<tr>
<td>Poor</td>
<td>? (5)</td>
<td>Migration (6)</td>
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<tr>
<td>Rich</td>
<td>Migration (7)</td>
<td>No migration (8)</td>
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This table presents the financial interest of households in emigration according to their location in the income distribution and to the level of development of the country where they are living.

We assume here that the choice of the household to take part in migration depends only on the financial profits it can gain from it, in other words on the development difference between the host country and the home one (represented by the average income gap). Rich

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7A family is called “rich” or “poor” according to the relative location it occupies in the distribution of income at origin. It is not a measure of the absolute poverty but a measure of the relative poverty. Thus, some households living in richer developing countries are called “poor” even though they may live over the poverty threshold defined by the World Bank.
people from the richest countries have no financial incentives to migrate (because $w_2 \leq w_m$) and do no migrate. On the contrary, rich people from the poorest countries have a so bigger financial interest to participate to migration (because $w_1 < w_m$) and migrate. Likewise, whatever is the development level of the sending countries, poor people gain a financial interest to migrate ($w_1 < w_m$ et $\overline{w}_2 < w_m$). But we also have to consider the financial capacity to migrate if we want to clear up doubts on what happens in case 5. In this case, poor households can migrate only if migration costs are not too high. However, we can think that remittance transfers surely reduce income inequality in case 6.

To clear up the ambiguity characterizing cases 1 and 5, it is essential to consider at once the migration costs and the level of development, but also migration network effects.

- Who migrates?

If we want to know where migrants are located in the income distribution, we have to combine both conditions necessary to migrate (the financial capacity and the financial interest). We suppose that people migrate only if their wage at origin is lower than the average wage ($w < w_m$) and if the wage earned by their family in the country of origin is high enough to make migration affordable ($w > c$).

We suppose that for rich households from relatively richer developing countries, migration does not represent a significant financial interest, because the gap between the wage they earn in their home country and the one they can expect after migration, is too weak to compensate the psychologic costs of migration ($w_2 \simeq w_m$). So, migration does not constitute an optimal strategy for this kind of households.

On the contrary, we expect that rich households living in relatively poorer countries are incited to migrate because on one hand, their income is high enough to pay for migration
costs and because, on the other hand, the wage gap between the two countries offers them a significant expected financial gain ($w_1 < w_m$ and $w_1 > c$).

Whatever costs of migration may be, poor people from relatively rich developing countries would take part in migration because the wage gap is sufficiently high to incite them to migrate, and because even they are issued from the poorer fringes of the population, given that they live in a relative rich developing country they would be able to defray migration costs ($w_2 < w_m$ and $w_2 > c$). In this cases, we can then expect that remittances have a smoothing effect on inequality in the home country.

Concerning households belonging in lower levels of the income distribution in the poorest countries, even if it would be financially interesting for them to migrate, we assume that if migration costs are high they can not leave their home country ($w_1 < w_m$ but $w_1 < c_a$). But if they are living in a closer country (with lower costs of migration), we suppose that their income, even if it is not very high, allow them to overcome migration costs and to migrate ($w_1 < w_m$ and $w_1 > c_b$).

From net gains (G) drawn from migration by each kind of households, it is possible to know the socio-economic origin of families which would logically take part in migration in different groups of countries, and consequently whether remittances are able or not to reduce inequality within the home country considered.

By summarizing results in the following table, we observe that only cases 3’, 5’ and 7’ correspond to an inequality reduction. On the contrary, in cases 2’ and 4’ remittances may increase income inequality within home countries.

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8 All these propositions are illustrated by the diagramme in the appendix 1
Finally, we intend to introduce migration network effects in the Gonzales-König and Wodon’s model. We argue that a well developed migrants network is able, by lowering the constraint of costs and the risk associated with migration, to allow the emigration of poor households living in poor countries and confronted with high costs of migration (case 1’ in table 3).

The consideration of network effects induces to change the specification used in the basic model. We assume that the existence of a network allows to reduce migration costs which are then equal to c-\(r\) (avec \(r > 0\)). Contrary to the basic model, we suppose also that the expected wage \(w_m\) in the host country is stochastic. It contains a certain component \(\tilde{w}_m\) and an uncertain one \(\varepsilon_m\) (with \(E(\varepsilon_m) = 0\) and \(E(\varepsilon_m^2) = \sigma_{\varepsilon_m}^2\)) which is all the more weak that the household’s network is developed (\(w_m = \tilde{w}_m + \varepsilon_m\)). By introducing a network effect in the basic model, it is possible to show that the less the household’s network is developed (the more \(\varepsilon_m\) is expanded), the less expected gains from migration are important (see appendix 2A). Consequently, households having a large network are more likely to migrate than others, others things equal. Furthermore, effective gains are more important not only because networks allow to diminish the risk associated with migration, but also because it can reduce migration costs. Thus, the expected gain is more important for a poor household.
household having a network at its disposal than a poor household which have no network (see appendix 2B for the proof).

Thus, in the case of a poor household living in a poor country we have still two possibilities:

<table>
<thead>
<tr>
<th>POOR COUNTRY</th>
<th>High costs</th>
<th>Low costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.a</td>
<td>Migration</td>
<td>Migration</td>
</tr>
<tr>
<td>1.b</td>
<td>Migration</td>
<td>Migration</td>
</tr>
</tbody>
</table>

POOR HOUSEHOLD

| Without network | No migration | Migration |

So, we test in the next section whether the remittances effect on income distribution depends on migratory costs, on the level of development of the home country, on its brain drain rate, but also whether development level and migration networks are able to mitigate the effect of migratory costs.

4 Econometric analysis of the non-monotonic relation between remittances and income inequality

4.1 Estimation strategy

In this section we employ quantitative evidence to test the hypotheses formulated before. We expect that remittances have non-linear effects on inequality depending on the location of migrants in the income distribution which can be revealed by the level of development of recipient countries, migration costs, migratory networks, and by the migrants’
To provide evidence of our hypotheses, we use successively different interactive terms \( \text{remittances} \times \text{conditional variable} \) in our regression analysis. The basic equation is always completed by introducing a set of control variables which are often used in inequality equations at the macroeconomic level (Deininger and Squire, 1997; Calderon and Chong, 2000, 2006, Koechlin and Leon, 2006 and some others\(^9\)). Firstly, as did Kuznets (1955), we control for a possible quadratic relation between the level of economic development and income inequality. We take also into account the financial development of the home country, the inflation level, the level of the public consumption, commercial and financial openness, and finally an institutional variable represented by the level of democracy.

Our time-series cross-sectional model takes so the following form:

\[
Gini_{it} = \alpha + X_{it}'\beta + \gamma Z_{it} + \delta_1 \text{wrh}_{it} + \delta_2 (\text{wrh}_{it} \times Z_{it}) + \mu_i + \eta_{it} \tag{3}
\]

Where \( X \) is the matrice of control variables, \( Z \) is the matrice of conditional variables (the development level, the migration costs and the braindrain level). \( \text{wrh} \) is the logarithm of remittances per capita, \( \mu_i \) is a country fixed effect and \( \eta_{it} \), the error term.

Two coefficients will draw mainly our attention: \( \delta_1 \) and \( \delta_2 \), which give respectively some information on the reaction of the Gini to remittances with a level of \( Z \) equals to zero and on the differential of the sensibility of the Gini to remittances for countries with a given \( Z \) level relatively to those with a \( Z \) level equal to zero.

- If \( Z \) is the level of economic development: \( \delta_2 \) is expected to be significantly negative, what would confirm the hypothesis according to which remittances reduce income inequality in rich countries.

\(^9\)See also Ahluwalia (1976); Li, Squire, and Zhou (1998); Papanek and Kyn (1986); Sudhir and Kanbur (1993); Milanovic (1996); and Kuznets (1955).
– If $Z$ is migration costs: $\delta_1$, measuring the impact of remittances in countries where migration costs are equal to zero, is expected to have a negative sign, and $\delta_2$ would have to be positive and statistically significant.

– If $Z$ is the level of brain drain: $\delta_2$ is expected to be statistically significant and positive, whereas $\delta_1$, which represents the sensibility of income inequality to migrants remittances in countries with a braindrain level equal to zero, would have to be negative.

4.2 The sample

Our sample varies with regressions from 248 observations (with 52 countries) to 324 observations (80 countries), according to the disponibility of control variables. It contains only developing countries over 1970-2000.

4.3 The variables

The dependent variable

The dependent variable is the Gini coefficient which measures the intensity of inequality within countries. Data used are drawn from the Milanovic database (2005) compiling three different databases: the one of Deininger and Squire, the one of the United Nations (WIDER) and the World Income Distribution database (WID). The combination of these three database allow us to have at our disposal of much more observations.

In order to consider differences concerning the calculation methodology from one dat-

\textsuperscript{10} In fact, it is the combination of two databases, WIDER and WID since the original series in the Deninger and Squire dataset are incorporated into the UN dataset.
tabase to another or from one year to another, we introduce in all our estimations three dummies capturing whether the coefficient has been calculated from consumption or income, whether variables used are measured in real or nominal terms and whether the basic unit of analysis is the person or the household.

The control variables

The interest variable

Our main interest variable is the remittances one. Data are drawn from the World Bank database (World Development Indicators). This variable include three categories: “unrequited transfers” which refer to money sent by migrants to family and friends to the home country, “migrant transfers” which are equal to the net worth of the migrants (considered here as individual’s change of residence for at least one year) and finally “compensation of employees” which represent funds sent back by temporary workers who work abroad for less than a year. This database provides informations for a lot of countries and over a long period. We use in our estimation the ratio of remittances receive by the home country on its total population.\(^{11}\)

The conditional variables

The level of development is measured by the logarithm of GDP per capita (World Development Indicators).

Migration costs have been measured alternatively by two different ways: the costs to obtain a passeport in percentage of GDP per capita (McKenzie 2005) and the geographic

\(^{11}\)Empirical findings obtained by using remittances per capita or the ratio of remittances to GDP are quite similar. So, we present only results of estimations using remittances per capita.
distance between a given sending country and its main destination country in kilometers (Spatafora 2005). There are both time-constant variables.

The importance of the brain drain for each country is defined as the ratio of highly skilled emigrants who are at least 25 years old to natives (sum of residents or emigrants) having the same level of skills and the same age.\textsuperscript{12} Data on emigration concern six of the most destination countries of the OCDE area (Australia, Canada, United-States, Great-Britain, France and Germany). They are available since 1975 on a five-year basis (the World Bank \textsuperscript{13}). Definitions, sources and descriptive statistics of the other control variables are presented in the appendix 3.

4.4 Econometric method

We start our estimates by using ordinary least squares with country specific effects. This methodology controls for heterogeneity between countries and thus for the structural variables which are stable over time for each country and for others time-constant variables which have been omitted. Two tests are involved: the Hausman test which allows to choice between specific fixed effects and specific random effects\textsuperscript{14} and the F-test that reflects the global significance of specific effects introduced. The result of the test highlight the significance of fixed effects in almost all regressions performed.

4.4.1 The endogeneity of migrants remittances

Several authors who analyzed the effect of remittances on income inequality raised the issue of the endogeneity of remittances (Koechlin and Leon, 2006 and Chauvet and Somps, \textsuperscript{12}To have more details about this database, see "Tendance de long terme des migrations internationales. Analyse à partir des 6 principaux pays receveurs", by Cécily Defoort.\textsuperscript{13}http://go.worldbank.org/9PRMDT0N70\textsuperscript{14}The Hausman test has always led us to choose the fixed effects specifications. The results are not reported in the tables for brevity.
At the microeconomic level, some authors protected or gurded themselves against a possible endogeneity bias by instrumenting remittances (Adams, Cuecuecha and Page, 2008).

In the case of remittances, several sources of endogeneity may be highlighted. On one hand, there may be a measurement error, because remittances statistics at the international level do not capture the volume of these flows that passes through informal channels. On the other hand, there may be an omitted-variable bias as exogenous shocks affecting developing countries (as price shocks, climatic shocks) which will be both correlated with the internal distribution of income but also with the volume of remittances. Finally, endogeneity may arise because of the existence of a double causality in the relationship between remittances and income inequality.

To tackle the endogeneity of remittances and of other explanatory variables in the estimates, authors who examined the relationship between remittances and income inequality adopted techniques of instrumental variables. For example, Koechlin and Leon (2006) used in their cross-sectional regressions, passport costs for instrumenting remittances, while in the panel estimation, they resorted to the System-GMM estimator in which remittances are instrumented by their lags. The approach adopted by Chauvet and Mesplé-Somps (2008) is not very different insofar as they instrumented remittances by remittances of the previous period. The identification strategy proposed by these authors is based on the idea that remittances of the previous period may have an impact on inequality of the current period only through their impact on current remittances. In this article we will use other instruments for remittances to enhance our first stage regression.

4.4.2 The identification strategy

Finding appropriate set of instruments that corrects for the endogeneity of remittances
has been a challenge for researchers. Two key features govern the selection of an instrument for remittances: it must be correlated with remittances, and its effect on the dependent variable must operate solely through its effect on remittances.

The literature has purposed a variety of instrumental variables for remittances, like GDP per capita or growth rate of host countries for example. However, these two variables did not prove to be really exogenous and not correlated with the economy of developing countries. GDP per capita in host countries may be linked to that of developing countries through the argument of income convergence across nations.

Faced with these criticisms, two other variables have then been suggested: the distance between the country of origin and the main destination of migrants, and a variable measuring the share of immigrant population in every developing country. Although, these two variables are correlated with remittances, they suffer from a lack of temporal variability. Another instrumental variable was also used in the literature: financial costs associated with remittances. But while interesting, this variable suffers from a lack of availability in time.

To avoid all these pitfalls, Chami et al (2008) purposed a new instrumental variable. Thus, in the absence of direct observation of remittances costs over time, another variable might capture general trends in remittances throughout the world: the ratio of remittances to GDP of all recipient countries except the country considered. Admittedly, this instrument does not eliminate all endogeneity, but it represents a significant improvement over internal, lag-driven instruments and over previous attempts at obtaining an external instrument. By excluding the remittances-to-GDP ratio of the country in question, the variable is free of a direct causal link with other domestic macroeconomic variables. We calculated this variable for each country, as the ratio of remittances received by all other countries to the sum of their population.
In this article, remittances for each country are instrumented by the value of remittances of the previous period and by the instrument proposed by Chami and al (2008). We also use the income gap between the sending country $i$ and the main destination countries $j$. Data on this variable are taken from Spatafora (2005). Following Milanovic (2005), we also instrument almost all of our other explanatory variables (trade openness, FDI as a percentage of GDP, government consumption as a percentage of GDP) by their lagged value. Finally, interactive variables were instrumented by the product of excluded instruments of remittances and each variable $Z$. We use the estimator derived from the generalized method of moments (GMM) which is more efficient than the traditional 2SLS method.

Two tests are needed to validate our instrumental variables strategy. First, the Hansen test of over-identification to assess the validity of our instrumental variables, ie, the lack of correlation between these variables and the error term of the structural equation. Then, the strength of selected instruments is apprehended by two statistics: partial-F and Shea’s $R^2$ derived from the first stage estimations.

We could also use the dynamic panel System-GMM estimator to estimate these models. How interesting it may be, this strategy would cause us to lose a significant number of observations in the estimates. Consequently we choice not to control for the dynamic properties of our dependent variable.

4.5 Estimations results

For each of our theoretical hypothesis, two regressions have been conducted: one by using the method of ordinary least squares with country fixed effects and the other by resorting to the generalized method of moments (GMM). Interesting results have been obtained concerning the coefficients of control variables. In most cases, the Kuznet’s curve is validated. Trade openness and government consumption are factors exacerbating signif-
icantly income inequality in developing countries, while a greater democratization tends to have an inequality-decreasing effect, what is consistent with our expectations. For the other control variables, no statistically significant relationship was detected.

4.5.1 Remittances, income level and inequality

The findings appear in Table I in Appendix 4 (columns 1 and 2). We find a significant and negative impact of remittances in interaction with the level of income per capita, but when the variable enters the equation in an additive manner, the coefficient is positive and significant. However, the coefficient of the interaction term in the regression with instrumentation is higher in absolute value than the one estimated by ordinary least squares (in the first case the coefficient is -1.80 whereas in the latter case, the coefficient is -0.70).

Thus, for a level of development corresponding to the sample average (the sample average of the logarithm of GDP per capita is 6.90) and for a one standard deviation of the logarithm of the remittances (ie 1.97), inequality should increase by 2 units.\textsuperscript{15} This is a shift in the mean level of inequality of Egypt to that of Côte d’Ivoire.

So, remittances tend to be favorable to a reduction of income inequality in countries that have a relatively high level of development. Indeed, as we suggested in our hypotheses, the poor in these countries can cope with the costs of migration, while the upper classes have no great interest to migrate. It follows that it is mostly the poor in relatively wealthy developing countries who migrate and repatriate funds, what is likely to reduce income inequality in these countries.

\textsuperscript{15}This result is obtained on the basis of the estimated coefficients of the equation in column 2 (with instrumentation).
4.5.2 Remittances, passport costs and income inequality

The results of both estimates (columns 3 and 4 in Table I) support our theoretical hypothesis according to which remittances increase inequality in countries where migration costs are relatively more important. The Gini sensitivity to remittances is greater (in absolute value) when we control for the endogeneity of regressors. We also note that the coefficient of remittances is significantly negative.

In terms of quantifying the total effect of remittances on inequality, it holds that for an average cost of passports (ie 5.51%) and for a one standard deviation in the logarithm of remittances per capita, additional inequalities are approximately 3. This is a shift in the mean level of inequality of Tunisia to that of Tanzania.

4.5.3 Remittances, brain drain and income inequality

Results are also reported in Table I (columns 7 and 8). We crossed the logarithm of remittances per capita to the rate of initial brain drain of each country (the values of the series in 1975). In line with our expectations, the coefficient of the interaction term is statistically significant and positive, while the coefficient of remittances is negative and corresponds to the sensitivity of the Gini to remittances in countries with low-skilled migrants. Brain drain helps to reveal the social origin of migrants of a country: if people who migrate are highly skilled workers, it is likely that the majority of these individuals belongs to the wealthier fringes of the population and that remittances increase income inequality.

According to our findings, for an average level of initial brain drain (28%) and a one standard deviation of the logarithm of remittances per capita, the additional level of inequality income is 0.2.
4.5.4 Remittances, remoteness and income inequality

The results of estimates that take into account distance between the country of origin and the main host country (columns 5 and 6 of Table I) are rather fragile. Only the estimation by ordinary least squares validate our hypothesis. The fragility of our results may come from our measure of distance. Indeed, the distance between a country of origin and the main destination of its international migrants presents the major drawback to be constant over time. This reflects the assumption that the main country of destination of migrants for one given developing country is the same throughout the period. However, the stylized facts highlight the existence of new migration corridors.

To overcome this limit, we construct a new distance variable, which takes into account temporal dynamics in the destinations chosen by migrants from a given country. These evolutions concerning the preferred destinations also reveal the importance of networks which are able to facilitate the migration toward a given country. So, by weighting each of the bilateral distance between country $i$ and country $j$ (the OECD), by the importance of country $j$ in the migration of populations from country $i$, we reap a double dividend. On one hand, this strategy allows us to solve the problem of the lack of temporal variability of the previous measurement of the distance and on the other hand, through this new variable, we capture to what extent the network effect is important to mitigate the impact of distance in the ability to migrate.

Hence, it is possible to empirically modelise the assumption that the network effect would mitigate the effect of distance cost in the relationship between remittances and income inequality. However, the network effect is a strategy at the household level to face migration costs. One can also reasonably argue that a high level of income can help to dampen the effect of migration costs on the sensitivity of the Gini to remittances. In this sense, we take into account a purely autarkic strategy of households in the management of
migration costs. Thus, individuals belonging to relatively wealthy countries can more easily cope with the costs that individuals living in countries with lower income. In the following section, we analyze empirically to what extent the level of income and the importance of migration network could mitigate the impact of migration cost in the remittances-inequality relationship.

4.5.5 Remittances, migration costs and income inequality: The role of networks and income

From an econometric estimation, we try to assess to what extent the effects of migration costs can be mitigated on the one hand by networks effects, and on the other hand, by the level of income.

4.4.5.1. The impact of migration networks

We want here to model empirically the hypothesis that the existence of migration networks reduces the cost constraints at the household level, which would create a negative impact of remittances on the Gini (remittances would support a reduction in income inequality). To achieve this, we build a new variable \( d_{it} \) as follows:

\[
d_{it} = \sum_j \left( \frac{mig_{i,t}}{mig_{ij,t}} \right)^2 \times distance_{ijt} \tag{4}
\]

with:

- \( mig_{i,t} \): the total volume of migrants from a given developing country living in the OECD-6

\[16\] The idea that the existence of migration networks reduces the impact of migration cost in the remittances-inequality relationship can be modelized only from variable distance because we can exploit bilateral data between exporting labor and recipient countries, what is not possible with data on the cost of passports.
mig_{ijt}: the volume of migrants from a developing country i in a developed country j at year t

\left( \frac{\text{mig}_{ijt}}{\text{mig}_{ijt}} \right)^2: the inverse of the network effects in a bilateral sense. By weighting for a given country i, each bilateral distance by the inverse of the network effect, we reduce the distance with the largest recipients.

A variation in variable d_{it} reflects an increasing or decreasing effect of the network on the costs of remoteness.

The following empirical model is specified:

\[ Gini_{it} = \alpha + X_{it} \beta + \delta \text{wrh}_{it} + \gamma_1 d_{it-1} + \gamma_2 (\text{wrh}_{it} \times d_{it-1}) + \mu_i + \eta_t \]  

(5)

with \( \delta < 0 \) et \( \gamma_2 > 0 \). \( \delta \) measures the impact of remittances in countries where the effects of networks reduces to nearly zero, the constraint of remoteness. \( \gamma_2 \) measures the differential impact of remittances on inequality between distant countries which have weak networks and those who have larger networks. The variable \( d_{i} \) is introduced in the model with a delay of one period to take into account the idea that historical migration rates explain current migration and thus network effects (Calero et al, 2008).

Results are presented in Table II (Appendix 5). In line with our expectations, there is a significant and negative impact of remittances on the Gini coefficient and a positive impact of the interaction term (column 2). These findings corroborate our hypothesis that remittances reduce income inequality in countries for which network effects are important. Indeed, networks facilitate migration and thus reduce the costs related to the remoteness of a country. When the network is effective for one country, one can logically suggest that even poor individuals can afford to migrate given the availability of information and the
support of the network.

4.5.5.2. Income level, migration costs, remittances and inequality

The following model is constructed to measure to what extent the effects of migration costs in the remittances-inequality relationship can be mitigated by the level of income:

\[
Gini_{it} = \alpha + X_{it} \beta + \delta w_{rh_{it}} + \gamma_1 Z_{1it} + \gamma_2 (Z_{1it} \times w_{rh_{it}}) + \gamma_3 (Z_{1it} \times Z_{2i}) + \gamma_4 (w_{rh_{it}} \times Z_{2i}) + \gamma_5 (w_{rh_{it}} \times Z_{1it} \times Z_{2i}) + \mu_i + \eta_{it}
\]  

(6)

where \( Z_{1it} \) represents the logarithm of GDP per capita of each country and each year, while \( Z_{2i} \) measures the importance of passport costs in a country. This last variable is expressed as a percentage of GDP per capita.

Results are presented in Table III (Appendix 5). Consistent with our hypothesis, we obtained the result that the level of development mitigates the impact of cost in the sensitivity of inequality to transfers. According to the results of column 2, we obtained a significantly negative coefficient (at 10%) of the double product and migration costs induce a positive impact of remittances on income inequality (the coefficient of the product of remittances with passport cost is statistically positive).

5 The specificity of the Mediterranean Basin

Following our results, we can identify an archetype of a developing country in which remittances are favorable to the poorest segments of the population. We will now test the
hypothesis that Mediterranean countries fulfill most of these conditions and that remittances reduce income inequality within the population in this region of the world.

To test this hypothesis, we will adopt a three-step approach. As a first step, we calculate, based on the previous regressions, the sensitivity of remittances in each country of the basin and compare on a graph these values to the average of other countries in the sample. In a second step, we rely on statistical tests based on mean differences on the conditional variables between Mediterranean countries and other developing countries. We try to answer several questions: (i) Are the Mediterranean countries relatively more developed? (ii) Are passports costs relatively lower in these countries? (iii) Are Mediterranean countries relatively closer to the main locations of their international migrants? (iv) Is brain drain relatively lower in this region? In a third step, we estimate a model explaining income inequality in which remittances are in interaction with a dummy variable that takes the value 1 if the country in question belongs to the Mediterranean Basin and 0 otherwise.

If our hypothesis is validated, then we should obtain a significantly negative coefficient of the interactive variable, which identifies the differential impact of remittances between Mediterranean countries and the other developing countries. The coefficient of remittances when the variable is introduced additively, will identify the impact in the other developing countries outside the Mediterranean Basin. This coefficient is expected to be positive or insignificant.

5.1 Comparison of the semi-elasticity of income inequality with respect to remittances

For each country in the Mediterranean Basin, we calculate the derivative of $\text{ginirelative}$ to remittances when the conditional variables $Z$ are valued at their average level in each

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$^{17}$To perform this analysis we relied on the results of models estimated with instrumentation, except for the model with the variable distance for which the results obtained by ordinary least squares are used.
country. On the basis of the model (1), it refers strictly to:

\[ \frac{\delta Gini_i}{\delta wrh_i} = \hat{\delta}_1 + \hat{\delta}_2 \times Z_i \]

This value is compared to that taken in the sample of other developing countries that are not part of the basin. We calculate a value common to all these countries to facilitate the comparison in the chart. This value is given by:

\[ \frac{\delta Gini}{\delta wrh} = \hat{\delta}_1 + \hat{\delta}_2 \times \bar{Z} \]

where \( \bar{Z} \) represents the average level of \( Z \) in the sample of other developing countries outside the Mediterranean Basin.

**Case 1: \( Z = \) level of development**

We construct a scatter plot (Graph 1 in Appendix 6.1.) in which the x-axis reports the values of the logarithm of GDP per capita and the y-axis, the derivatives calculated for each country of the Mediterranean Basin and for all other developing countries outside the Basin.

For most countries of the Basin, the derivative of Gini with respect to remittances is negative, in some country like Israel, the impact is greatest in absolute terms. In contrast, the sensitivity of the Gini with respect to remittances is strictly positive in other developing countries. These results corroborate our hypothesis that remittances reduce income inequality in the Mediterranean Basin because this region is relatively richer (more developed), and because those who are migrating abroad in this region are the poor.
Case 2: \( Z = \) Passport costs

In the x-axis, we have the passport costs as a percentage of GDP per capita and in the y-axis the derivatives calculated. As before, we observe that the majority of Mediterranean countries (except Bosnia, Turkey and to a lesser extent Lebanon) have a negative sensitivity of income inequality with respect to remittances (Graph 2 in Appendix 6.1.). Israel once again appears as the country where, given the level of passports cost, remittances have a strong negative effect on the inequality index. This result confirms our hypothesis that Mediterranean countries are located in region of the world where remittances can reduce inequality if we take into account migration costs approximated by the cost of obtaining a passport. Finally, the sensitivity of the Gini coefficient with respect to remittances in other developing countries is positive.

Case 3: \( Z = \) Remoteness

When we look at remoteness (a proxy of transport costs for example), we observe a high concentration of Mediterranean Basin countries around the central value 0 (Graph 3 in Appendix 6.1.). In most cases, these countries have a negative sensitivity of Gini with respect to remittances, although some outliers can be identified (Lebanon and Israel). The response of the Gini to remittances in other developing countries is positive and greater than 0.5. Finally, countries of the Mediterranean Basin in which the contribution of remittances in reducing inequality is the greatest (because closer to the main countries of destination of migrants) is Croatia (HRV code).

Case 4: \( Z = \) Importance of brain drain

The last graphical analysis takes into account the intensity of brain drain in the cal-
culation of the derivative (Graph 4 in Appendix 6.1.). Once again, it appears that most countries of the Mediterranean Basin is located in the (zone of reference) area where the derivative is negative, while the rest of the developing countries is located in the region where the derivative is positive. However, we are in the presence of a few outliers. They include Israel, Egypt and Lebanon, where the composition of the workforce abroad is not diverse enough to ensure a negative effect of remittances on income inequality. The country of the Basin which presents the most significant impact over the period is Algeria.

It is clear from the above analysis that the Mediterranean region should benefit from the positive effects of remittances in reducing inequality. Although we have highlighted a few outliers, the fact remains that the majority of these countries is generally located in the area where inequality is reduced through remittances received by households. From statistical tests based on mean difference between the two sub-samples (the sample of the mediterranean countries and the sample of other developing countries), we will ensure that the findings of previous graphical analysis statistically hold.

5.2 Statistical tests based on mean differences between the two sub-samples

We successively test the null hypothesis that the difference of average values of the conditional variables $Z$ between the two sub-samples is statistically equal to zero against two alternative hypotheses: (i) the difference is significantly positive or (ii) negative. Test results are presented in Table IV.
Table IV. Statistical tests based on mean differences on the conditional variables

<table>
<thead>
<tr>
<th>Conditional variables (Z)</th>
<th>GDP per capita</th>
<th>Passport cost</th>
<th>Distance</th>
<th>Brain drain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z0=1850</td>
<td>Z1=3007</td>
<td>Z0=5.77</td>
<td>Z1=2732</td>
<td>Z0=1922</td>
</tr>
<tr>
<td>Z0-Z1&lt;0</td>
<td>0</td>
<td>0.99</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Z0-Z1=0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Z0-Z1&gt;0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Index 1 refers to the sample of countries of the Mediterranean basin and 0, to that of other developing countries. Values in the table represent the p-values associated with the hypothesis.

Results of the tests of mean difference on the conditional variables do not reject our hypothesis. We find that the Mediterranean countries compared to other developing countries: (i) are more developed, (ii) have low migration costs and (iii) export to the developed countries a more diverse workforce in terms of qualifications. These results are consistent with the previous graphical analysis. The Mediterranean basin is one of the regions of the developing world where remittances increase income of the lowest deciles of the income distribution. It is now necessary to test this intuition with a simple econometric model.

5.3 The specificity of the Mediterranean Basin revealed by an econometric model

To test the hypothesis that remittances significantly reduce income inequality in the Mediterranean basin, we rely on the following specification:

\[
Gini_{it} = \alpha + X_{it} \beta + \phi_1 w_{rh_{it}} + \phi_2 (w_{rh_{it}} \times Med_i) + \mu_i + \eta_{it} \tag{7}
\]

where \(X\) is the matrix of control variables, \(Med\) a dummy variable that takes the value 1
if the country belongs to the mediterranean basin and 0 otherwise. Our hypothesis will be validated if the coefficient $\phi_2$ associated with the remittances variable in interaction with the dummy $Med$ is significantly negative when the coefficient $\phi_1$ is positive. Under this formulation, the differential impact of migrants remittances on income inequality between the mediterranean basin and the rest of the developing countries is given by $\phi_2$. The impact of remittances on inequality in other developing countries outside the mediterranean basin is measured by the coefficient $\phi_1$. Finally, $(\phi_1 + \phi_2)$ identifies the impact of migrants remittances on income inequality in the Mediterranean basin.

The results of estimations by OLS with country fixed effects are presented in Table V (Appendix 6.2.).

In line with our expectations, we find a negative differential impact of migrants remittances on income inequality between the mediterranean countries and other developing countries. This result corroborates our hypothesis that the Mediterranean countries greatly benefit from remittances for reducing income inequality.

6 Concluding Remarks

This article examines the relationship between migrants remittances and income inequality in developing countries. We have argued that the ambiguous impact of remittances on income inequality comes from the existence of non-linearities in the level of development, in the costs of migration and in the skill levels of international migrants. Indeed, these non-linearities enabled us to reveal the socio-economic status of the migrants from these countries, the main determinant of the sign of the impact of remittances on the distribution of income. If it is individuals from the wealthy step of the population (often better educated) who migrate the most, then the funds returned by the latter will maintain the already existing inequalities. Conversely, if the poor are migrating in majority (perhaps
because migration costs are low), then remittances will reduce income inequality in the country.

Based on a sample of 80 developing countries observed over the period 1970-2000, our econometric estimates validated all our theoretical assumptions. Remittances usually reduce inequality in countries: (i) relatively more developed, (ii) where passport costs are relatively low, and (iii) where international migrants are on average relatively less skilled. Furthermore, the level of income and the importance of migration networks reduce the impact of migration cost on the sensitivity of income inequality with respect to remittances. These findings hold even after factoring in endogeneity of remittances. From these results, we were able to identify three main characteristics of a country in which remittances reduce income inequality (high average income, low migration cost and low brain drain). It was found that Mediterranean countries for the most part, have these criteria. The negative impact of remittances on the Gini of income in this region has been confirmed empirically.

From the taxonomy constructed in this article, one can logically assumes that with regard to regions like sub-Saharan Africa (less developed, remote and characterized by high exodus of skilled labor), remittances could exacerbate income disparities between segments of the population. Microeconometric studies, however, would be interesting to further explore the relationship between remittances and the income distribution in developing countries.
References


Appendix 1: Strategy of migration varies with the level of income and the migration costs

Poor country 1

- **High costs 1.a**
  - Poor household: \( w_1 < w_m \)  \( w_1 < c_a \)  \( G < 0 \)
  - Rich household: \( w_1 < w_m \)  \( w_1 > c_a \)  \( G > 0 \)

- **Low costs 1.b**
  - Poor household: \( w_1 < w_m \)  \( w_1 > c_b \)  \( G > 0 \)
  - Rich household: \( w_1 < w_m \)  \( w_1 > c_b \)  \( G > 0 \)

Rich country 2

- **High costs 2.a**
  - Poor household: \( w_2 < w_m \)  \( w_2 > c_a \)  \( G > 0 \)
  - Rich household: \( w_2 = w_m \)  \( w_2 > c_a \)  \( G < 0 \)

- **Low costs 2.b**
  - Poor household: \( w_2 < w_m \)  \( w_2 > c_b \)  \( G > 0 \)
  - Rich household: \( w_2 = w_m \)  \( w_2 > c_b \)  \( G < 0 \)
Appendix 2: The role played by networks of migrants for poor households in poor countries

2.A

Consider a household without network of migrants. In this case $\tilde{w}_m$ contains an uncertain component, and utilities have now to be expressed as expectations:

$$E(U(c_0,c_p,c_s)) = u(c_0) + \beta E[V(c_p) + W(c_s)]$$

Constraints of the optimization problem become so:

$$c_0 = 2w - \zeta(w + c)$$

$$\tilde{c}_p = w + \zeta[\alpha(\tilde{w}_m + \varepsilon_m)]$$

$$\tilde{c}_s = w + \zeta[(1 - \alpha)(\tilde{w}_m + \varepsilon_m) - w]$$

Gains of migration can then be written as follows:

$$E(G(w)) = u(w-c) - u(2w) + \beta[E[V(w + \alpha(\tilde{w}_m + \varepsilon_m))] - V(w) + W((1-\alpha)(\tilde{w}_m + \varepsilon_m)) - W(w)]$$

Then, the derivative of the expected gain with respect to $\tilde{w}_m$ becomes:

$$\frac{\delta E(G(w))}{\delta \tilde{w}_m} = \beta E[V'(w + \alpha \tilde{w}_m) + (1 - \alpha)[W'(1-\alpha)\tilde{w}_m] = 0$$

By using the equation (2) of the model of Gonzales-König and Wodon we obtain:

$$\frac{\delta E(G(w))}{\delta \tilde{w}_m} = \beta EV'(w + \alpha \tilde{w}_m)$$

We then carry out a Taylor expansion at the 2nd order around $\tilde{w}_m$. We reach the following expression:

$$EV'(w + \alpha \tilde{w}_m) = V'(w, \alpha \overline{w_m}) + E(\varepsilon_m)[V''(w, \alpha, \overline{w_m})] + \frac{1}{2}E(\varepsilon_m^2)V'''(w, \alpha, \overline{w_m}) + E(\varepsilon_m^3 \theta)$$

For households having a very developed network of migrants, $\sigma_{\varepsilon_m}^2$ is equal to zero (because we assume that their expected income is certain). Thus, the more important is the risk (the lower is the network of migrants), the lower will be the expected gains from migration.

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2.B

We examine in this part the difference between the gains of migration earned by a household having a network at its disposal, and those get by a household not possessing any network.

Let $G_r$ be the gains of migration in case the household has a network at its disposal. From the equation (2) of the model of Gonzales-König and Wodon we obtain:

$$G_r = [U(w - c + r) - U(2w)] + \beta[V(w + \alpha m) - V(w)] + [W((1 - \alpha)m - W(w)] \quad (8)$$

Likewise, let $G_{nr}$ be the gains of migration in case the household has no network. Gains of migration will so be equal to:

$$G_{nr} = [U(w - c) - U(2w)] + \beta[EV(w + \alpha m) - V(w)]$$

$$+ \beta[EW(1 - \alpha)(m - \varepsilon_m) - W(w)] \quad (9)$$

By substracting the gains without network from the gains with network we have:

$$(6) - (7) = U(w - c + r) - U(w - c) + \beta[V(w + \alpha m) - EV(w + \alpha m) - \varepsilon_m]$$

$$+ \beta[W((1 - \alpha)m - EW((1 - \alpha)(m + \varepsilon_m)) \quad (10)$$

Supposing that individuals have risk aversion, (4)-(5) is positive. We so have $G_r > G_{nr}$
## Appendix 3: Descriptives statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Observations</th>
<th>Mean</th>
<th>Standard dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gini</td>
<td>576</td>
<td>39.89019</td>
<td>11.48169</td>
<td>17.8</td>
<td>66.25</td>
</tr>
<tr>
<td>Remittances per capita (log)</td>
<td>1930</td>
<td>2.069188</td>
<td>1.977283</td>
<td>-3.755226</td>
<td>6.551673</td>
</tr>
<tr>
<td>GDP per capita (log)</td>
<td>3078</td>
<td>6.891317</td>
<td>1.192762</td>
<td>4.532693</td>
<td>9.818113</td>
</tr>
<tr>
<td>Passport cost</td>
<td>2697</td>
<td>5.514023</td>
<td>10.31864</td>
<td>0</td>
<td>60.15</td>
</tr>
<tr>
<td>Distance (log)</td>
<td>3627</td>
<td>7.619468</td>
<td>.7918658</td>
<td>5.520634</td>
<td>8.9986</td>
</tr>
<tr>
<td>brain drain</td>
<td>654</td>
<td>36.50693</td>
<td>15.93155</td>
<td>0</td>
<td>81.12417</td>
</tr>
<tr>
<td>Med</td>
<td>3937</td>
<td>.1023622</td>
<td>.3031625</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Government consumption (%GDP)</td>
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<td>15.1961</td>
<td>6.80017</td>
<td>0</td>
<td>64.39249</td>
</tr>
<tr>
<td>Inflation</td>
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<td>58.31789</td>
<td>442.1906</td>
<td>-17.64042</td>
<td>11749.64</td>
</tr>
<tr>
<td>Democracy</td>
<td>2511</td>
<td>3.26364</td>
<td>3.868942</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>FDI</td>
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<td>2.019289</td>
<td>8.383426</td>
<td>-28.62425</td>
<td>348.1892</td>
</tr>
<tr>
<td>M2/GDP</td>
<td>2895</td>
<td>60.13202</td>
<td>567.7536</td>
<td>.8687639</td>
<td>18798.83</td>
</tr>
<tr>
<td>Age dependency ratio</td>
<td>3720</td>
<td>43.62971</td>
<td>5.827445</td>
<td>28.19713</td>
<td>53.7682</td>
</tr>
<tr>
<td>Trade openness</td>
<td>3028</td>
<td>67.7908</td>
<td>37.63363</td>
<td>5.314175</td>
<td>280.361</td>
</tr>
</tbody>
</table>
## Appendix 4: Estimations results - Table I: Impact of remittances on income inequality in developing countries (1970-2000)

<table>
<thead>
<tr>
<th></th>
<th>Conditional variables (Z)</th>
<th>GDP per capita (log)</th>
<th>Passport cost</th>
<th>Distance (log)</th>
<th>Remigrants (Z)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS-FE</td>
<td>FE-IVGMM</td>
<td>OLS-FE</td>
<td>FE-IVGMM</td>
<td>OLS-FE</td>
</tr>
<tr>
<td>GDP per capita (log)</td>
<td>20.448*</td>
<td>-3.294</td>
<td>33.468***</td>
<td>32.757***</td>
<td>13.325</td>
</tr>
<tr>
<td>(log (GDP per capita))^2</td>
<td>-1.646**</td>
<td>0.080</td>
<td>-2.485***</td>
<td>-2.396***</td>
<td>-1.121</td>
</tr>
<tr>
<td>Financial development (M2/PIB)</td>
<td>0.040*</td>
<td>0.033</td>
<td>0.014</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.040*</td>
<td>0.033</td>
<td>0.014</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Foreign direct investments (%GDP)</td>
<td>0.135</td>
<td>0.06</td>
<td>0.007</td>
<td>0.115</td>
<td>0.134</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.000</td>
<td>0.001</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Age dependency ratio</td>
<td>-0.323</td>
<td>-0.363</td>
<td>-0.392</td>
<td>-0.582**</td>
<td>-1.24</td>
</tr>
<tr>
<td>Government consumption (%GDP)</td>
<td>0.204*</td>
<td>0.320**</td>
<td>0.177*</td>
<td>0.219**</td>
<td>0.122</td>
</tr>
<tr>
<td>Democracy</td>
<td>-0.187</td>
<td>-0.239*</td>
<td>-0.279**</td>
<td>-0.250**</td>
<td>-0.177</td>
</tr>
<tr>
<td>Remittances per capita (log)</td>
<td>5.464**</td>
<td>13.403**</td>
<td>-0.518</td>
<td>-1.450**</td>
<td>-5.156</td>
</tr>
<tr>
<td>log (Remittances per capita)×Z</td>
<td>-0.697*</td>
<td>-1.792**</td>
<td>0.273***</td>
<td>0.544**</td>
<td>0.742*</td>
</tr>
</tbody>
</table>

**Note:** The variables which are suspected of endogeneity are: remittances, remittances*Z, trade openness, foreign direct investment, and government consumption. \( R^{2} \)-Shea (1.2) reflect respectively the \( R^{2} \) of Shea for the significance of the instruments associated with remittances and remittances*Z. In parentheses we have \( t \) statistics corrected for heteroscedasticity. * significant at 10%, ** significant at 5% and *** significant at 1%.
Appendix 5 : The role of migration networks and income

Table II: Migration networks, remittances and inequality

<table>
<thead>
<tr>
<th>Dependent variable : GINI</th>
<th>OLS-FE 1</th>
<th>FE-IVGMM 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita (log)</td>
<td>37.442***</td>
<td>39.833***</td>
</tr>
<tr>
<td></td>
<td>(3.63)</td>
<td>(4.03)</td>
</tr>
<tr>
<td>(log GDP per capita)^2</td>
<td>-2.747***</td>
<td>-2.753***</td>
</tr>
<tr>
<td></td>
<td>(4.01)</td>
<td>(4.12)</td>
</tr>
<tr>
<td>Financial development (M2/PIB)</td>
<td>0.008</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>(0.31)</td>
<td>(0.62)</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.038*</td>
<td>0.039*</td>
</tr>
<tr>
<td></td>
<td>(1.70)</td>
<td>(1.87)</td>
</tr>
<tr>
<td>Foreign direct investment (%GDP)</td>
<td>0.136</td>
<td>0.141</td>
</tr>
<tr>
<td></td>
<td>(1.11)</td>
<td>(1.21)</td>
</tr>
<tr>
<td>Age dependency ratio</td>
<td>-0.167</td>
<td>-0.162</td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(0.75)</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(1.10)</td>
<td>(1.44)</td>
</tr>
<tr>
<td>Democracy</td>
<td>-0.229*</td>
<td>-0.337***</td>
</tr>
<tr>
<td></td>
<td>(1.66)</td>
<td>(2.62)</td>
</tr>
<tr>
<td>Government consumption (%GDP)</td>
<td>0.188</td>
<td>0.305**</td>
</tr>
<tr>
<td></td>
<td>(1.56)</td>
<td>(2.51)</td>
</tr>
<tr>
<td>Remittances per capita (log)</td>
<td>-0.763</td>
<td>7.460*</td>
</tr>
<tr>
<td></td>
<td>(0.39)</td>
<td>(1.94)</td>
</tr>
<tr>
<td>d (log)</td>
<td>0.674*</td>
<td>-0.050</td>
</tr>
<tr>
<td></td>
<td>(1.67)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>(log Remittances per capita)×(log(d))</td>
<td>0.056</td>
<td>0.379**</td>
</tr>
<tr>
<td></td>
<td>(0.58)</td>
<td>(1.99)</td>
</tr>
<tr>
<td>Constant</td>
<td>-95.754**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.54)</td>
<td></td>
</tr>
</tbody>
</table>

Number of observations 299 274
Number of countries 76 60
R^2 0.22 0.17
R^2-Shea1 0.22
R^2-Shea2 0.22
Hansen (p-value) 0.13

Note : The variables which are suspected of endogeneity are : remittances, remittances*d, trade openness, foreign direct investment and government consumption. R^2-Shea (1.2) reflect respectively the R^2 of Shea for the significance of the instruments associated with remittances and remittances*d. In parentheses we have t statistics corrected for heteroscedasticity. * significant at 10%, ** significant at 5% and *** significant at 1%.
Table III. Income level, migration costs, remittances and inequality

<table>
<thead>
<tr>
<th>Dependent variable: GINI</th>
<th>OLS-FE 1</th>
<th>IV-GMM-FE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita (log)</td>
<td>28.589*</td>
<td>2.004</td>
</tr>
<tr>
<td></td>
<td>(1.91)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>(log(GDP per capita))^2</td>
<td>-2.290**</td>
<td>-0.926</td>
</tr>
<tr>
<td></td>
<td>(2.52)</td>
<td>(0.62)</td>
</tr>
<tr>
<td>Financial development (M2/PIB)</td>
<td>0.020</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(0.62)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Age dependency ratio</td>
<td>-0.321</td>
<td>-0.760***</td>
</tr>
<tr>
<td></td>
<td>(1.43)</td>
<td>(2.99)</td>
</tr>
<tr>
<td>Democracy</td>
<td>-0.289**</td>
<td>-0.272*</td>
</tr>
<tr>
<td></td>
<td>(2.16)</td>
<td>(1.93)</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.023</td>
<td>-0.010</td>
</tr>
<tr>
<td></td>
<td>(1.03)</td>
<td>(0.36)</td>
</tr>
<tr>
<td>Foreign direct investment (%GDP)</td>
<td>0.158</td>
<td>0.692*</td>
</tr>
<tr>
<td></td>
<td>(1.26)</td>
<td>(1.85)</td>
</tr>
<tr>
<td>Government consumption (%GDP)</td>
<td>0.163*</td>
<td>0.270**</td>
</tr>
<tr>
<td></td>
<td>(1.69)</td>
<td>(2.21)</td>
</tr>
<tr>
<td>Remittances per capita (log)</td>
<td>-3.100</td>
<td>4.065</td>
</tr>
<tr>
<td></td>
<td>(0.86)</td>
<td>(0.53)</td>
</tr>
<tr>
<td>(log(GDP per capita))×(Passeport cost)</td>
<td>1.222</td>
<td>0.921</td>
</tr>
<tr>
<td></td>
<td>(0.99)</td>
<td>(0.51)</td>
</tr>
<tr>
<td>(log(Remittances per capita))×(GDP per capita)</td>
<td>0.377</td>
<td>-0.678</td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(0.68)</td>
</tr>
<tr>
<td>(log(Remittances per capita))×(Passport cost)</td>
<td>1.407</td>
<td>2.839*</td>
</tr>
<tr>
<td></td>
<td>(1.34)</td>
<td>(1.92)</td>
</tr>
<tr>
<td>(log(Remittances per capita))×(Passport cost)×(log(GDP per capita))</td>
<td>-0.187</td>
<td>-0.395*</td>
</tr>
<tr>
<td></td>
<td>(1.05)</td>
<td>(1.68)</td>
</tr>
<tr>
<td>Constant</td>
<td>-59.804</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.36)</td>
<td></td>
</tr>
</tbody>
</table>

| Number of observations   | 283      | 201         |
| Number of countries      | 60       | 53          |
| R²                       | 0.28     | 0.08        |
| R²- Shea1                | 0.29     |             |
| R²- Shea2                | 0.29     |             |
| R²- Shea3                | 0.36     |             |
| R²- Shea4                | 0.36     |             |
| Hansen (p-value)         | 0.23     |             |

Note: In parentheses we have t statistics corrected for heteroscedasticity. * significant at 10%, ** significant at 5% and *** significant at 1%. All interactive variables including remittances are instrumented by the product of remittances instruments and conditional variables Z. The indices 1 to 4 before the R²-Shea refer respectively to the significance of the instruments associated with remittances and all other interactive variables including remittances in order of appearance in the table above.
Appendix 6: The specificity of Mediterranean Basin

6.1. Graphical analysis

![Graphical analysis of GDP per capita and brain drain in Mediterranean countries and other countries.](image)

- **Mediterranean countries**
- **Other countries**
6.2. Regression results

Table V: The specificity of the mediterranean basin in the remittances-inequality relationship

<table>
<thead>
<tr>
<th>Dependent variable: GINI, OLS with countries fixed effects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita (log)</td>
<td>32.460***</td>
</tr>
<tr>
<td>(log (GDP per capita))^2</td>
<td>-2.484***</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.046**</td>
</tr>
<tr>
<td>Age dependency ratio</td>
<td>-0.258</td>
</tr>
<tr>
<td>Foreign direct investment (%GDP)</td>
<td>0.114</td>
</tr>
<tr>
<td>Inflation</td>
<td>0.000</td>
</tr>
<tr>
<td>Government consumption (%GDP)</td>
<td>0.158</td>
</tr>
<tr>
<td>Financial development (M2/GDP)</td>
<td>-0.010</td>
</tr>
<tr>
<td>Democracy</td>
<td>-0.219</td>
</tr>
<tr>
<td>Remittances per capita (log)</td>
<td>0.501</td>
</tr>
<tr>
<td>(log (Remittances per capita))×Med</td>
<td>-4.278***</td>
</tr>
<tr>
<td>Constant</td>
<td>-56.000</td>
</tr>
</tbody>
</table>

| Number of observations                                   | 310       |
| Number of countries                                      | 77        |
| R^2                                                       | 0.19      |

Note: In parentheses, we have t statistics corrected for heteroscedasticity. *significant at 10%, ** significant at 5% et *** significant at 1%.