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Abstract

This paper investigates through which channels foreign aid impacts migration to donor countries. To disentangle the non-donor-specific channels (development and credit constraint channels) from the donor-specific channels (information and instrumentation channels), we use the fact that multilateral aid is not donor-specific contrary to bilateral aid. We estimate a gravity model derived from a RUM model of migration using an IV-2SLS strategy and the DEMIG-C2C and AidData datasets. We find that aid donated by a country increases migration to that donor through an information channel and especially for the poorest recipient countries. In addition, we find that aid weakly reduces migration to any country via a development channel.

Key words - Aid, Gravity, Migration

JEL classification - F22, F35, O15

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1 Introduction

The increased immigration pressure faced by developed countries has urged policy-makers to find ways to contain migration, especially from developing countries. Among several policy tools, foreign aid is seen as a way to promote living standards in developing countries and therefore to reduce incentives of individuals to emigrate. This development-friendly policy is often presented as more effective than physical and bureaucratic barriers to entry that often raise humanitarian concerns. For instance, in 2015, the European Commission presented a European Agenda on Migration to provide means of managing irregular as well as legal migration. Two of its objectives are related to foreign aid: addressing "the root causes [of migration] through development cooperation and humanitarian assistance" and implementing "stronger action to link migration and development policy."[1] Yet, the efficiency of such policies is unclear and there is no consensus in the literature regarding the impact of foreign aid on migration flows (see Clemens and Postel (2018) for a review of the literature).

Four main channels through which aid may impact migration have been identified so far (among others, see Angelucci 2015; Berthélemy et al. 2009; Dreher et al. 2019; Lanati and Thiele 2018b). First, aid reduces migration flows through a *development channel* by increasing disposable income in the origin country. Second, aid fosters migration through a *credit constraint channel* by providing individuals who wish to emigrate with the financial means to do so. Third, aid increases migration through an *information channel* by giving the population of the recipient country information on the donor country that in turn decreases the costs of migration to that particular country. Finally, the effect of aid also takes place through an *instrumentation channel* when the donor country uses bilateral aid strategically to push the recipient country into tightening its emigration policy. The first two channels are non-donor-specific while the last two ones are donor-specific since they point to a relationship between bilateral aid and the reverse bilateral migration flow. Existing empirical evidence is rather mixed. While some studies find evidence that aid reduces emigration and conclude that a development effect prevails, other studies find evidence that aid lowers the migration costs and the credit constraints of would-be migrants, which increases total emigration as well as emigration to the donor country. Overall, the question of whether foreign aid effectively decreases migration and especially through which channels remains unclear. This paper intends to address that issue.

This tension in the literature may be explained by the absence of a theoretically founded method to disentangle these channels. Existing studies generally attribute the impact of total bilateral aid – the sum of bilateral aid flows across all donor countries to a recipient country – to a non-donor-specific effect (development and credit constraint channels) and the impact of bilateral aid to a donor-specific effect (information and instrumentation channels). The identification of these effects yet suffers from the following caveats: bilateral aid flows and total bilateral aid flows may both include non-donor-specific and donor-specific effects. For instance, we cannot exclude

[1] A European Agenda on Migration, The European Commission, Brussels, 13.5.2015.

that aid from a specific donor country may also contribute to the alleviation of poverty in the recipient country (just as aid from any other country does). Similarly, a decrease in migration following an increase in total bilateral aid may not only be driven by a development effect, but also by reallocation effects across destination countries due to a change in the composition of information received by individuals.

In this paper, we revisit the aid-migration nexus and propose a strategy to identify the impact of foreign aid on migration with a special focus on the transmission channels at play, distinguishing between donor-specific and non-donor-specific effects. First, we build a random utility maximisation (RUM) model of migration allowing us to derive a gravity model from the aggregation of individuals' probability to migrate. This model describes the relationship between migration rates and foreign aid flows. It allows us to clearly identify the channels through which different types of aid may impact migration.

We then rely on this gravity framework to estimate the causal impact of foreign aid on migration rates. To this end, we use the DEMIG-C2C and AidData datasets from 1999 to 2010. To infer causality, we use an IV-2SLS strategy and a shift-share instrument (also known as a Bartik instrument; Bartik, 1991) that consists in re-weighting aid flows based on the spatial and sectoral distribution observed at the beginning of the period. To disentangle the channels, we estimate the impact of foreign aid from a donor to a recipient country on the reverse bilateral migration rate, as well as the impact of the remaining bilateral and multilateral aid received by the country. We then use these estimates to identify the channels through which aid can affect migration. Our identification strategy relies on the introduction of multilateral aid in the gravity model and on two features of this particular type of foreign aid. First, the effect of multilateral aid can *only* be associated to a non-donor-specific effect because the identity of the donor countries is unknown when aid is conveyed through a multilateral agency. Second, we consider that bilateral and multilateral aid flows have the same marginal impact on living standards in receiving countries.

We find that bilateral aid has a positive impact on the reverse migration rate, while multilateral aid has a negative impact on it. We find evidence that the effect of bilateral aid is mostly conveyed through an information channel. If that channel were the only one at play, then a 1% increase in bilateral aid would induce a 0.25% increase in the reverse bilateral migration rate. The magnitude of this effect is larger for the poorest countries. We also find evidence that a weak development effect is at play. A 1% increase in multilateral aid induces a 0.02% decrease in the bilateral migration rate. This effect is at play for the poorest countries only. In addition, the effect does not last over time which is in line with findings showing that foreign aid increases more domestic consumption than it promotes domestic investment. Finally, we do not find any evidence for the credit constraint channel nor the instrumentation channel to prevail respectively over the development or the information channel. Our results are robust to alternative instruments (that do not rely on the shift-share methodology), alternative specifications and alternative samples.

The contribution of this paper is twofold. First, we propose a new method to neatly identify the transmission channels through which foreign aid impacts migration. In doing so, we disentangle the channels that were previously misidentified in the literature and open the door to a research consensus on the global impact of foreign aid on migration. The paper most closely related to ours is a study by Lanati and Thiele (2018b). In this work, the authors revisit the aid-migration nexus using an econometric approach based on a gravity model of international migration. They obtain evidence of a negative relationship between the total bilateral aid that a country receives and its emigration rate. This result holds for very poor recipient countries suggesting that the credit constraint channel does not play a significant role in shaping migration decisions. Although our paper follows the same gravity-based approach, it differs from this study by introducing in the model the aid given by all the other donor countries (instead of the total aid received) and multilateral aid (which is new in this literature). This specification thus corrects for an omitted variable bias, and allows us to disentangle non-donor- and donor-specific effects of foreign aid. In addition, our approach corrects for an endogeneity bias using a shift-share instrument which is new to the literature. This instrument is built using aid data only, and passes the most recent tests required for such an analysis (Goldsmith-Pinkham et al., 2020).

Second, contrarily to most of the literature, we only find evidence for a limited development effect of aid prevailing over a credit constraint effect (if any). This result is coherent with the recent results of Clemens and Mendola (2020) who find that within low-income countries, the income elasticity of emigration demand is positive. Our results are also in line with findings of scholars showing a limited impact of aid on growth in recipient countries (Burnside and Dollar, 2000; Clemens et al., 2012): if aid has little impact on living standards in receiving countries, it is very unlikely that the development and credit constraint channels are large, as evidenced by Clemens and Postel (2018).

The remainder of the paper is organised as follows. In the next section, we review the transmission channels through which aid impacts migration and we build a RUM model of migration in which we highlight how aid impacts migration decisions and through which channels. In section 3, we present the data and our empirical strategy, as well as our method to disentangle the transmission channels. In section 4, we present the empirical results and a number of robustness tests. Section 5 concludes.

2 How aid impacts migration flows

2.1 The transmission channels

Four transmission channels have been highlighted in the literature so far. We distinguish here between channels related to the non-donor-specific effect and those related to the donor-specific effect of aid on migration flows. Empirical studies dealing with this question are listed in Table 1.

The non-donor-specific channels. Foreign aid received by a country can impact its economic situation and, in turn, its emigration rate. This indirect influence of aid on migration may run through two main channels with opposite consequences: a *development channel* and a *credit constraint channel*. As the link between emigration and economic development follows a bell-shaped pattern (De Haas, 2007), we can expect the relative strength of these two opposite channels to be different in countries with different wealth levels.[2]

If aid increases disposable income in the recipient country, then it should improve the quality of life of individuals located in that country, which, in turn, should decrease their migration intentions. This is true if aid contributes to the development of the recipient country in general or to the improvement of specific sectors such as the education or health sectors. Through this development channel, aid has a negative impact on migration flows.

Several papers find supportive evidence for the development channel hypothesis. Studying migrations from Southern Europe, Faini and Venturini (1993) point to a negative impact of development policies on migration flows in middle income countries. Morrison (1982) also finds supportive evidence for this channel, in the case of development projects in Mexico. Lanati and Thiele (2018a,b, 2020a) point out that an increase in total aid improves the quality of public services in the recipient country which in turn leads to a decrease in emigration rates from that country. This negative link between migration and foreign aid is also put forward in the case of rural development aid and governance aid by Gamso and Yuldashev (2018a,b). Similarly, Moullan (2013) shows that foreign health assistance from OECD countries reduces the medical brain drain through medical equipment endowments and practice improvements. Lanati and Thiele (2020b) show as well that development projects aimed at improving the quality of tertiary education in recipient countries lead to lower outflows of tertiary educated students to donor countries. Finally, Dreher et al. (2019) show that in the long run, foreign aid decreases refugee flows; Murat (2020) confirms this result for asylum applications from poor countries only.

However, when the impact of aid on the recipient country's economy is positive, it may help individuals afford the costs of migration. Development aid may imply an alleviation of the credit constraints faced by potential migrants and hindering their migration and location choices, or may facilitate their education (by decreasing its cost for instance), thereby increasing their chances to emigrate. Through this credit constraint channel, the impact of aid on migration is positive.

A number of papers find support for the credit constraint channel, pointing to different impacts across countries, skills and types of aid and migration. Faini and Venturini (1993) point to a positive impact of development policies on migration flows in relatively poor countries in Southern Europe. Focusing on Sub-Saharan African countries, Mughanda (2011) also finds supportive evidence for the credit constraint channel. In Latin American countries, Morrison (1982) reports

[2]Some scholars have shown that foreign aid may have detrimental effects on recipient economies (Castles et al., 2013). In that case, both channels mentioned above would run in the opposite direction. For clarity reasons, and because the bulk of existing literature does not corroborate this hypothesis, we do not investigate this potential effect in the remainder of the paper.

some suggestive evidence that economic development generates employment, allowing people to accumulate the funds required to finance their migration from the Dominican Republic to the U.S.. Angelucci (2015) shows that the entitlement of poor Mexican households to an antipoverty conditional cash transfer program increases migration to the United States, because these cash transfers relax financial constraints in international migration. Berthélemy et al. (2009) find that aid increases migration through an alleviation of the budgetary constraint especially for the unskilled, whereas Ontiveros and Verardi (2012) show that aid relaxes the credit constraint of the skilled. Lanati and Thiele (2020b) show that in-donor scholarships lead to higher outflows of tertiary educated students to donor countries. Finally, Murat (2020) finds that asylum applications from medium-income developing economies are weakly but positively related to aid transfers.

The donor-specific channels. On the one hand, bilateral aid may convey information on the donor country, thus decreasing the cost of migration to that particular country. Nowadays, aid is attributed by institutions and NGOs for specific projects. These projects are implemented by project leaders and their teams who often come from the donor countries, work in the field and are in contact with local populations. These individuals are likely to convey information on the donor countries. Such information decreases the cost of migration and lowers the risk associated to migrating to an unknown destination. Through this *information channel*, bilateral aid should have a positive impact on the reverse bilateral migration flows.

A limited number of papers consider the specific informational impact of bilateral aid flows on the reverse migration flows or stocks. Morrison (1982) mentions the information channel in the case of migration to the U.S. The author argues that "social, commercial and political ties" engendered by aid increase migration flows by reducing costs and information deficits faced by individuals. Berthélemy et al. (2009) as well as Ontiveros and Verardi (2012) find support for the information channel, especially in the case of skilled migrants. Lanati and Thiele (2018b) and Menard and Gary (2020) confirm the positive impact of bilateral aid on the reverse migration flows. Finally, Dreher et al. (2019) suggest that the image of destination countries should matter for emigration decisions of refugees, although they do not formally test this hypothesis, which is based on the evidence that foreign aid projects affect perceptions of the donor country among the local population of the recipient country (Dietrich et al., 2018; Tokdemir, 2017).

On the other hand, a donor country could use bilateral aid strategically in order to influence the emigration policy of the recipient country. In other words, a developed country can donate aid under the (explicit or implicit) condition that the recipient developing country decreases emigration of its citizens to the donor country. This *instrumentation channel* implies that bilateral aid has a negative impact on the reverse migration flows through an increase in the corresponding bilateral migration cost.

Azam and Berlinschi (2009) and Dreher et al. (2019) are the only ones focusing on this hypothesis. Azam and Berlinschi (2009) find evidence for the instrumentation channel and argue that foreign aid is probably an effective tool for reducing the inflow of migrants into developed countries. Focusing on refugees, Dreher et al. (2019) point to the existence of an instrumentation channel as they find that aid has a positive impact on the repatriation policies of the source countries.

2.2 Insights from a RUM model of migration with foreign aid

To highlight through which channels aid impacts migration decisions, we build a RUM model of migration with foreign aid. This model allows us to derive a gravity model that we estimate in the empirical part of the paper.

The model. We consider the migration decision of an individual i. At time t, she faces a choice among D destinations (including her own country o). To each possible destination corresponds a different level of net utility, depending on the characteristics of the individual and of each destination. Let $U_{iod,t}$ denote the net utility that individual i living in country o obtains from choosing to migrate to country d at time t. The individual chooses the destination d that maximises her net utility such that $U_{iod,t} = \max_{l \in \{1,\dots,D\}} U_{iol,t}$. Following Beine et al. (2015), we assume that she takes myopic decisions, deciding whether to migrate or not and where to at each period of her lifetime.

Individual i's utility can be decomposed into a term $W_{od,t}$ representing a deterministic component of the utility in country d (for instance the expected wealth), and an individual-specific stochastic term $\varepsilon_{iod,t}$. To migrate from country o to country d at time t, the individual incurs a deterministic cost of migration denoted $C_{od,t}$ (with $C_{oo,t} = 0$)[3]. Then, her net utility of migrating from country o to country d at time t can be written:

$$U_{iod,t} = W_{od,t} - C_{od,t} + \varepsilon_{iod,t}. \tag{1}$$

As standard in the literature, we assume that $\varepsilon_{iod,t}$ is independent and identically distributed over individuals, destinations and time, and follows a univariate Extreme Value Type-1 distribution with a unit scale parameter.

The bilateral migration rate at time t, denoted $\text{Mig}_{od,t}$, is given by the ratio of the unconditional probability that an individual relocates from country o to destination d at time t and the unconditional probability that an individual remains in country o at time t. Following the results of McFadden (1974, 1984), it can be written as:

$$\ln \text{Mig}_{od,t} = W_{od,t} - W_{oo,t} - C_{od,t}. \tag{2}$$

[3]The bilateral migration cost between two countries is composed of two parts: a financial cost of migration *per se* (here denoted $C_{od,t}$) and a psychological cost of being away from home. Following Marchal and Naiditch (2020), we consider that the financial cost does not vary across individuals whereas the psychological cost differs across individuals; the latter is then included in the individual-specific stochastic term. Hereafter, for the sake of simplicity, any reference to the migration cost refers to the financial migration cost.

Table 1: Survey of empirical studies on the aid-migration nexus

Study	Causality	Period	Origin (recipient)	Destination (donor)	Migration data	Aid data	Aid type	Endo-geneity	Total aid	Bil. aid	Channels
Angelucci (2015)	Aid → Mig.	1998	Mexico	United States (Mexican states)	Census data[a]	Census data[a]	Cash transfers	Treatment	+		Cred.
Azam & Berlinschi (2009)	Aid→ Mig.	1995-2003	Low/lower middle-inc. c.	22 OECD c.	OECD	OECD	Disbursements	Additional controls	-		Inst.
Berthélemy et al. (2009)	Aid → Mig.	2000	187 c.	22 OECD c.	World Bank	OECD	Disbursements	System of equations	+	+	Cred. Info.
Dreher et al. (2019)	Aid → Refugees	1976-2013	141 c.	28 OECD c.	UNHCR	OECD	Disbursements	IVs	-	+/-	Dev. Info. Inst.
Gamso & Yuldashev (2018a)	Aid → Mig.	1995-2010	103 c.	20 OECD c.	IAB	AidData	Commitments	IVs, PSM		0/-	Dev.
Gamso & Yuldashev (2018b)	Aid → Mig.	1985-2010	101 c.	20 OECD c.	IAB	AidData	Commitments	IVs		0/-	Dev.
Lanati & Thiele (2018a)	Aid → Mig.	2004-2014	129 c.	25 OECD c.	OECD	OECD	Disbursements	System of equations	-	+	Dev.
Lanati & Thiele (2018b)	Aid → Mig.	1995-2014	141 c.	26 OECD c.	OECD	OECD	Disbursements	System of equations	-	+	Dev. Info.
Lanati & Thiele (2020a)	Aid → Mig.	2009-2016	125 c.	OECD	OECD	OECD	Disbursements	Two-step approach	-		Dev.
Lanati & Thiele (2020b)	Aid → Int. Student Flows	2008-2015	120 c.	17 OECD c.	UIS UNESCO	OECD	Disbursements	Two-step approach	-		Dev.
Menard & Gary (2020)	Aid → Mig.	2000-2010	153 c.	22 OECD c.	OECD	OECD	Disbursements	System of equations		+	Info.
Moullan (2013)	Aid → Physician Mig.	1998-2004	192 c.	16 OECD c. & South Africa	Bhargava and Docquier (2007)	OECD	Commitments	GMM	-		Dev.
Mughanda (2011)	Aid → Mig.	2004	Sub-Saharan c.	OECD	United Nations	OECD	Not mentioned		+		Cred.
Murat (2020)	Aid → Asylum applications	1993-2013	113 c.	14 OECD c.	UNHCR	OECD	Disbursements	IVs, system GMM		+/-	Cred. Dev.
Ontiveros & Verardi (2012)	Aid → Mig.	1975-2000	195 c.	6 developed c.	Defoort and Rogers (2008)	OECD	Disbursements	IVs, system GMM	+		Cred. Info.

Note: This table presents the main empirical results of the literature on the link between foreign aid and migration. The studies of Faini and Venturini (1993) and Morrison (1982) are not included in this table because they are solely based on descriptive statistics and do not contain any econometric analysis. [a]: Data come from the Mexico's antipoverty conditional cash transfer programme.

The bilateral migration rate depends only on the characteristics of the origin and destination countries and on the reverse bilateral migration cost. This is representative of the IIA property.[4] According to equation (2), any variable impacting utilities and migration costs, such as foreign aid received by country o, impacts migration rates. The main derivations are presented in appendix A.1.

Theoretical implications. We consider three types of foreign aid: the multilateral aid received by country o, the bilateral aid donated by country d to country o, and the bilateral aid donated by all donor countries but d to country o. Depending on the prevailing channel, multilateral and bilateral aid flows will have a different impact on migration rates. The results are summarised in Table 2.

First, in the case of multilateral aid flows, donor countries are unknown to the recipient country and have no direct control over the way the funds are used. Thus, the only active channels are the non-donor-specific ones. The impact of multilateral aid on migration to *any country* will be negative if the development channel prevails, and positive if the credit constraint channel prevails. Second, bilateral aid affects migration flows through non-donor-specific *and* donor-specific channels. Concerning the non-donor-specific effects, migration to country d should decrease with bilateral aid from *any* donor if the development channel prevails, and increase if the credit constraint channel prevails. Concerning the donor-specific channels, migration *to the donor country* should increase with bilateral aid *from the donor country* if the information channel prevails, and decrease if the instrumentation channel prevails. Third, because of the IIA property, bilateral aid received by country o from all donors but d does not impact bilateral migration from country o to country d through channels specific to donor d.

[4]Policies implemented by destination countries may *indirectly* impact migration rates to other countries, if they have an impact on the determinants of these migration rates, such as the utility in the origin country or the capacity to finance migration costs. Thus, we can introduce some form of multilateral resistance to migration in the model in line with Bertoli and Fernández-Huertas Moraga (2013) and Marchal and Naiditch (2020).

Table 2: The theoretical impact of foreign aid on migration rates

	Non-donor-specific channels		Donor-specific channels	
Prevailing channel:	Development	Credit constraint	Information	Instrumentation
Impact of multilateral aid on migration to country d				
$\frac{\partial \text{Mig}_{od,t}}{\partial \text{MultiAid}_{o,t-1}}$	$\leqslant 0$	$\geqslant 0$	$= 0$	$= 0$
Impact of bilateral aid from d on migration to country d				
$\frac{\partial \text{Mig}_{od,t}}{\partial \text{Aid}_{do,t-1}}$	$\leqslant 0$	$\geqslant 0$	$\geqslant 0$	$\leqslant 0$
Impact of bilateral aid from all other donors on migration to country d				
$\frac{\partial \text{Mig}_{od,t}}{\partial \text{Aid}_{\Lambda o,t-1}}$	$\leqslant 0$	$\geqslant 0$	$= 0$	$= 0$

Note: $\text{MultiAid}_{o,t-1}$ denotes the amount of multilateral aid received by country o at time $t-1$, $\text{Aid}_{do,t-1}$ denotes the amount of bilateral aid donated by country d to country o at time $t-1$, and $\text{Aid}_{\Lambda o,t-1}$ denotes the amount of bilateral aid donated by all the donor countries but d to country o at time $t-1$ (with $\Lambda = D \backslash \{d\}$).

3 Data and empirical strategy

3.1 Data

Migration data. We use the DEMIG-C2C dataset (version 1.2) from the International Migration Institute of the University of Oxford.[5] This dataset contains bilateral migration flows for 34 destination countries from 1946 to 2011. Destination countries include most OECD countries and some non-OECD countries.

The DEMIG-C2C dataset contains data as reported by national statistical offices. Given that countries adopt different definitions for migrants, the dataset includes several criteria to characterise migration flows. Countries report immigration flows by country of birth, by previous country of residency and/or by citizenship. To define the country of origin of the migrants, we favour the *previous country of residency* over the *country of citizenship* that we in turn favour over the *country of birth*. Note that only a few countries (e.g. the U.S.) use the *country of birth* to define immigrant individuals.

Furthermore, some countries distinguish between movements of foreign individuals into a country and movements of individuals returning to their home country (return migration), while others do not make the distinction (reporting movements of *all* individuals into their country). To build our migration variable, we use movements of foreign individuals when available (in order to exclude return migrants because return migration may be explained by different determinants), and movements of *all* individuals otherwise. Reported migration flows may or may not include irregular migrants as well as refugees.

[5] For more details, see the International Migration Institute.

Aid data. Data on foreign aid come from AidData (core release v3.1) from William & Mary's Global Research Institute.[6] This dataset is the most comprehensive information source to date tracking international financial aid flows. It contains commitment information for 96 donors expressed in constant U.S. dollars which consists in more than 1.5 million activities funded from 1947 to 2013.[7]

For each activity, the data contains the deflated financial value of money, goods or services declared by the donor. To differentiate bilateral from multilateral aid flows, we use the variable *donor*. We define bilateral aid flows as the sum of flows provided by a donor country to an aid recipient country (bilateral contributions and earmarked contributions made by donors to multilateral agencies).[8] We define multilateral flows as those provided by a multilateral agency from its regular budget. Individual donors have no control over the way multilateral agencies spend their regular budget according to the AidData documentation. This feature of the data is crucial as it allows us to consider that multilateral aid has no donor-specific effects on migration. For a given year, a recipient country is included in AidData only if it receives bilateral aid from at least one donor. Thus, a recipient country may be included in AidData but may not receive any multilateral aid. In this case, we consider multilateral aid as null (and not missing). Finally, AidData contains information on the distribution of aid across eight main sectors: social infrastructure and services; economic infrastructure and services; production sectors; general environmental protection; general budget support; action relating to debt; emergency assistance and reconstruction; administrative costs. We exploit variation across 3-digit sectors (47 sub-sectors) to build our instrumental variables.

AidData has become an alternative to the OECD-DAC database and is now used by a number of studies on foreign aid (Tierney et al., 2011; Bermeo and Leblang, 2015; Gamso and Yuldashev, 2018a,b). In the case of our study, the first advantage of using AidData over the OECD-DAC database is that it contains bilateral flows disaggregated by sectors, which is necessary information to our empirical strategy. Second, AidData provides information on the amount of aid donated as well as the number of projects implemented, which allows us to study how the intensity of the transfer of information from an aid donor to a recipient country affects migration.

Other data sources. The remaining dyadic variables of interest are taken from the GeoDist database developed by the CEPII which contains variables related to the geographical, cultural and linguistic distances between countries (Mayer and Zignago, 2011). We use the Gravity database of the CEPII that provides other dyadic variables as well as countries' GDP per capita

[6] For more details, see the Web page of AidData.

[7] AidData does not contain disbursements. We can therefore not use disbursement information in the context of our study.

[8] Donors keep control over how their donations are spent when their donations are earmarked (they may decide upon the recipient country, funded projects, conditions, etc.). These flows are therefore considered as bilateral flows as the initial donor of the aid is known by the recipient country.

to perform gravity-type analyses (Head et al., 2010). We also use aggregate data from the World Development Indicators of the World Bank such as population and bilateral migration stocks.[9]

Descriptive statistics. After merging these datasets, we obtain a sample made of 9,829 origin-destination-year observations covering 19 destination countries and 159 origin countries[10] over the period 1999-2010. We restrict our sample to this period as information on foreign aid by sectors is poorly available before 1999 and information on migration is poorly available after 2010. Our sample includes 9,679 observations for which we have information from both DEMIG-C2C and AidData and 938 observations for which we do not have information from AidData. To deal with missing aid flows *i.e.* with observations that are included in DEMIG-C2C but missing in AidData, we follow the approach of Moullan (2013) and do not replace missing aid flows by zeros. In doing so, we do not rule out the possibility that missing observations could be missing positive values.[11]

We report a number of summary statistics in appendix A.2, Table A.1. Our variable of interest is the bilateral migration rate between an origin country and a destination country. This rate is the ratio of the bilateral migration flow observed between the two countries to the population of the origin country. Our sample includes a small number of migration rates equal to zero (1.53%). On average, a recipient country receives about 804 million U.S. dollars of total bilateral aid per year and 1,145 million U.S. dollars of multilateral aid. Finally, we depict the statistical relationship between aid and migration flows in appendix A.2, Figures A.1, A.2 and A.3. We find a positive correlation between bilateral migration and bilateral aid that could indicate the prevalence of a credit constraint or an information channel. We also find a negative correlation between bilateral migration and multilateral aid that could indicate the prevalence of a development channel. These correlations are informative, but, since they do not control for endogeneity issues, they may not give an accurate picture of the relationship between migration and aid.

Finally, the correlations between the main explanatory variables included in equation (3) are presented in appendix A.2, Table A.2. This table shows moderate correlation coefficients and therefore no concerns of multicolinearity.

[9] For more details, see the World Bank Databank.

[10] We recall that a destination country also denotes an aid donor country, and an origin country denotes an aid recipient country.

[11] Reviewed papers do not usually provide any information on the way they deal with missing aid flows. Gamso and Yuldashev (2018a) replace missing flows by zeros, while Moullan (2013) explains that this would bias the results downward if missing flows are non-reported positive flows. Either way, both papers find evidence that aid deters migration through a development channel which seems to indicate that replacing missing data with zeros does not change the results.

3.2 Identification of the impact of foreign aid on migration

Following existing literature, equation (2) can be rewritten as the following gravity equation:

$$\begin{aligned}\ln \mathrm{Mig}_{od,t} = &\beta_0 + \beta_1 \ln \mathrm{Aid}_{do,t-1} + \beta_2 \ln \mathrm{Aid}_{\Lambda o,t-1} + \beta_3 \ln \mathrm{MultiAid}_{o,t-1} \\ &+ B'\Gamma + \gamma_o + \gamma_d + \gamma_t + \epsilon_{od,t}\end{aligned} \quad (3)$$

$\ln \mathrm{Mig}_{od,t}$ is the natural logarithm of the bilateral migration rate from country o to country d at time t.[12] $\mathrm{Aid}_{do,t-1}$ denotes the flow of bilateral aid donated by country d to country o, $\mathrm{Aid}_{\Lambda o,t-1}$ is the flow of bilateral aid donated by other countries than d to country o and $\mathrm{MultiAid}_{o,t-1}$ denotes the total amount of multilateral aid donated to country o. Note that $\mathrm{Aid}_{\Lambda o,t-1}$ and $\mathrm{MultiAid}_{o,t-1}$ are increased by one in order to keep zeros once the variables are log-transformed. The impact of aid flows on migration decisions are probably not instantaneous so it seems sensible to assume that migration rates at time t are determined by the amount of foreign aid received at time $t-1$.

Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, and a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise. As an alternative to these dyadic variables, one could use a set of origin-destination fixed effects to lower the risk of omitted variable bias. However, we exclude this strategy as the migration rate exhibits little within variations[13]. Γ also includes the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$. γ_o, γ_d and γ_t respectively denote origin, destination and time fixed effects (FE). $\epsilon_{od,t}$ is the error term. In all estimations, we follow the literature by clustering standard errors within the origin-time dimension. One can expect unobserved time-varying and origin-specific factors to be correlated with migration decisions made at a given time.[14]

The main source of endogeneity that could bias the estimation of equation (3) is due to a reverse causality bias running from bilateral migration to bilateral aid. For instance, the lobbying of migrants from one origin country in their host country may lead to an increase in the reverse bilateral aid (Lahiri and Raimondos-Møller, 2000; Bermeo and Leblang, 2015). Similarly, a long tradition of emigration from one country to another may strengthen the relationship between the two countries and thus lead to important reverse public aid (Bermeo and Leblang, 2015). It has also been shown that some countries donate aid based on altruism while others attribute

[12] The baseline specification thus excludes zero migration rates. We will present a robustness test in which we do not log-transform the dependent variable and use a PPML estimator instead, in order to keep null migration rates into the sample.

[13] The mean of the dependent variable amounts to -11.304 and its standard deviation to 2.384. The between standard deviation amounts to 2.356 while the within standard deviation amounts to 0.460. The two variations do not sum-up since our panel is not balanced.

[14] Including both destination-year and origin-year fixed effects to fully control for multilateral resistance to migration (Beine et al., 2015) and to further reduce the bias of omitted variables does not affect our results regarding the effect of foreign aid on migration.

aid based on economic and political concerns (Berthélemy, 2006; Annen and Knack, 2020). Yet, these concerns may be correlated with migrants' decisions and therefore induce a simultaneity bias in our results. Another endogeneity threat comes from potential omitted variables that could determine migration decisions and be correlated with bilateral aid.

To obtain causal results, we rely on an instrumental variable (IV) strategy. The set of instruments chosen should impact bilateral aid flows but should not influence migration decisions. In addition, these instruments should be orthogonal to origin and destination country characteristics that could affect simultaneously bilateral aid flows and migration decisions. We do not instrument multilateral aid as it is less prone to be determined by the flow of migrants to a specific donor country.

To build the instruments, we rely on an imputation method based upon the seminal paper of Bartik (1991) and applied to the migration literature by Card (2001). These shift-share instruments are now standard in migration economics. We instrument $\text{Aid}_{do,t}$ and $\text{Aid}_{\Lambda o,t}$ with the following instruments:

$$\text{IV}_{do,t} = \sum_{s} \frac{\text{Aid}_{do,s,t_0}}{\text{Aid}_{s,t_0}} \text{Aid}_{s,t} \;\; \forall t > t_0 \tag{4}$$

$$\text{IV}_{\Lambda o,t} = \sum_{s} \sum_{d' \neq d}^{D} \frac{\text{Aid}_{d'o,s,t_0}}{\text{Aid}_{s,t_0}} \text{Aid}_{s,t} \;\; \forall t > t_0 \tag{5}$$

where s denotes the aid sector, t_0 denotes the first year a country pair enters the sample and $Aid_{s,t} = \sum_d \sum_o \text{Aid}_{do,s,t}$ represents the sum of bilateral aid flows attributed to sector s in the world at time t. Note that we consider all sectors but the sector "Emergency assistance and reconstruction" to build the shift-share instruments because this type of aid is circumstantial. In some specifications, we instrument the total bilateral aid received by country o ($\text{Aid}_{o,t}$) using the sum of $\text{IV}_{do,t}$ over all donor countries. The correlations among instrumental variables are presented in appendix A.2, Table A.3 and show no concern of multicolinearity regarding the baseline specification.

Our instruments rely on the distribution of aid across sectors and donor-recipient pairs observed at the beginning of the period. They are presumably exogenous as the initial distribution of aid across donor-recipient pairs in a given sector should not be correlated with recipient countries' emigration rates at time t. For instance, in equation (4), the approach consists in weighting the total aid in a given sector s at time t by the share of aid received from a donor d to a recipient o in this sector at time t_0. Doing so, we assume that, although the absolute amount of aid donated over the world for a specific sector may vary over time, the distribution of aid across sectors and donor-recipient pairs remains constant. We thus control for changes in the demand for aid as well as the supply of aid that could be caused by migrants. In other words, we only keep variations in the global demand for and supply of bilateral aid controlling for dyadic changes over time. For instance, our instrumental variable is cleaned from variations that could be induced by the stronger lobbying of migrants from country o living in country d than of migrants from country o living in other countries ($\forall d' \neq d$) (such a stronger lobbying could result in a change in the distribution of aid across donor-recipient pairs). Therefore, the local average treatment effect (LATE) resulting from the exposure to an increase in bilateral aid (measured by the shift-share instruments) captures the impact on bilateral aid that is exogenous to migration. The LATE does not capture the effects of endogenous changes in bilateral aid that could be caused by migrants in host countries. The validity of these instruments is further discussed later on in the paper.

In the literature, a limited number of instrumental variables have been proposed due to the difficulty to find an exogenous variable respecting the exclusion restriction. The fact that migration and aid are determined by very similar economic, political and historical factors makes the choice of an instrument challenging. In a recent paper, Dreher et al. (2019) instrument the share of aid by the interaction of the level of fractionalisation of the donor's government with the recipient's probability of receiving aid. Then, Gamso and Yuldashev (2018a,b) follow a method proposed by Lewbel (1997) that consists in using the second and third central moments of the aid distribution. We will use the latter instruments in a robustness test.

3.3 Identification of the transmission channels

Equation (3) allows us to study the transmission channels through which foreign aid may impact bilateral migration. Our strategy consists in distinguishing the impact of aid that *is not* specific to the donor countries (development and credit constraint channels) from the impact that *is* donor-specific (information and instrumentation channels). We first estimate the general effect of multilateral aid (β_3), which is independent from the donor and thus measures the non-donor-specific effect of aid. Then, we isolate the donor-specific effect of bilateral aid, which is the difference between the gross impact of bilateral aid on the reverse migration rate (β_1) and the impact it has through non-donor-specific effects (which depends on its relative importance compared to multilateral aid).

Identification of the non-donor-specific impact of aid Let us start by focusing on the non-donor-specific effects. To test if the development or the credit constraint channels are at play and which of these two channels prevails, we study the impact of multilateral aid flows received by country o on the migration rate from country o to country d.

The sign of β_3 should indicate which of the two non-donor-specific and conflicting channel prevails, whether both channels are simultaneously at play or not. A negative sign would indicate that aid decreases migration through its prevailing impact on development. On the contrary, a positive sign would provide evidence that aid increases migration rates because of its prevailing effect on individuals' credit constraints.

Identification of the donor-specific impact of aid. We now turn to the identification of the donor-specific effects. β_1 indicates by how much the migration rate from country o to country d is affected by the flow of aid donated by country d to country o (equation 3). This coefficient potentially encompasses non-donor-specific *and* donor-specific effects. For instance, when the amount of aid sent by a donor country to a recipient country increases, then information about the donor country received by residents of the recipient country may increase. This increase in aid may also impact the wealth of individuals in the recipient country, and thus impact migration through the development and credit constraint channels, just as aid from any donor may.

To isolate the impact of aid channelled via donor-specific effects, we study the impact of an increase in bilateral aid from country d to country o holding constant the full aid received by country o (defined by the sum of bilateral and multilateral aid flows received by country o) as well as the distribution of aid across other donor countries. In that case, the non-donor-specific channels do not change (since the full aid received by country o is constant), and the donor-specific channels that vary are only those related to the donor country d. At time t, if bilateral aid increases by x percent while multilateral aid decreases by y percent, with $y = x * (\mathrm{Aid}_{do,t-1}/\mathrm{MultiAid}_{o,t-1})$, then the full aid received by country o remains constant, as well as the distribution of aid across other donor countries. If $\mathrm{Aid}_{do,t-1}$ increases by 1 percent and $\mathrm{MultiAid}_{o,t-1}$ decreases by $\mathrm{Aid}_{do,t-1}/\mathrm{MultiAid}_{o,t-1}$ percent, then the migration rate changes by $[\beta_1 - \beta_3(\mathrm{Aid}_{do,t-1}/\mathrm{MultiAid}_{o,t-1})]$ percent. To obtain a mean coefficient, we average observations of the sample as follows $\left[\beta_1 - \beta_3(\overline{\mathrm{Aid}_{do,t-1}/\mathrm{MultiAid}_{o,t-1}})\right]$ and we bootstrap the statistics by resampling observations (with replacement) from our sample 100 times. Non-parametric bootstrap allows us to compute the standard errors associated to the coefficient and to infer its level of significance. This coefficient is related to effects specific to donor d; its sign and significance show which of the information or the instrumentation channel prevails (whether both channels are simultaneously at play or not).

Similarly, to measure the magnitude of the effects specific to all donors but d, we study the sign and significance of $\left[\beta_2 - \beta_3(\overline{\mathrm{Aid}_{\Lambda o,t-1}/\mathrm{MultiAid}_{o,t-1}})\right]$, which captures the change in the proportion of individuals who would migrate to country d due to a change in the distribution of aid across other donor countries than d (keeping the full aid received constant). In doing so, we test the presence of multilateral resistance to migration, since we look at how migration to country d varies with a change in aid received from alternative destinations.

Discussion. Our identification strategy of the transmission channels relies on two premises. We consider that multilateral aid is *cleaned* from donor-specific effects as it emanates from third-party agencies (it only includes contributions from agencies' regular budget to aid recipient countries and excludes earmarked contributions). First, the recipient country has presumably no knowledge of the origin of this aid. One could argue that the donor countries can still be identified by the recipient country; yet the fact that the aid flow comes from the regular budget of the agency that pulls contributions from several donors should blur its donor-specific content. Second, individual donor countries have presumably no control over the way the agency uses its regular budget (see the documentation of AidData). Finally, to confirm our premise, we estimate the (log) bilateral migration rate on origin-time, destination-time and dyadic fixed effects.

We then retrieve the destination-time variation (in other words the donor-time variation) and plot it against multilateral and bilateral aid flows. These descriptive facts are presented in appendix A.2, Figures A.4 and A.5, and show that changes in migration rates that are attributable to destination-time variations are poorly correlated with multilateral aid flows (while they are positively correlated with bilateral aid flows). The absence of correlation hence suggests that the recipient country has little information on the origin of multilateral aid.

Then, our identification strategy of the transmission channels relies on the fact that one dollar of aid contribution by a multilateral agency has the same non-donor-specific impact than one dollar of aid contribution from an individual donor, which implies that both types of aid have the same impact on living standards in receiving countries. Yet, this may not be the case. For instance, multilateral aid is frequently characterised as being relatively more focused on supporting development outcomes in developing countries, while bilateral aid is seen as more likely to be allocated based on donor strategic interests (Alesina and Dollar, 2000; Burnside and Dollar, 2000; Milner and Tingley, 2013; Schraeder et al., 1998).

Nevertheless, our assumption should hold for two reasons. In their review of 45 papers empirically testing the effectiveness of bilateral and multilateral aid flows on various development outcomes, Biscaye et al. (2017) study why bilateral and multilateral aid flows may (or may not) have different levels of effectiveness. On the one hand, multilateral aid may be more effective than bilateral aid: it is more likely to be allocated on development considerations, it allows to exercise conditionality more effectively, it is untied and more politically neutral, it enjoys more specialisation and expertise. On the other hand, bilateral aid can be given a more strategic orientation, accountability to individual donors is higher, institutional compatibility may be enhanced between bilateral donors and receiving countries. Yet, Biscaye et al. (2017) conclude that there is no consistent evidence on the fact that one aid flow is more effective than the other, which supports our identification strategy.

In addition, we study the distributions of both types of aid flows from 1999 to 2010 in appendix A.2, Figure A.6.The distribution of total bilateral aid (left panel) is quite similar to the distribution of multilateral aid (right panel). For instance, at the end of the period, bilateral and multilateral aid flows are mainly directed toward social infrastructure and services as well as economic infrastructure and services. In the case of bilateral aid, these sectors account for about 50% of the total in 2010, and in the case of multilateral aid, these sectors represent almost 60% in 2010. Overall, these facts are reassuring and further supports our identification strategy.

4 Empirical results

4.1 Main findings

Benchmark results. First stage results of our IV strategy are reported in appendix A.3, Table A.4 and second stage results are reported in Table 3, columns (1) to (4). Let us first focus on second stage results. In columns (1) to (3), we progressively include the variables of interest in order to lower concerns regarding multicolinearity issues. The results of our baseline specification are reported in column (3). This regression includes bilateral aid received by country o from country d as well as bilateral aid received by country o from all donors but d. This approach is similar to Murat (2020). In addition, it includes the amount of multilateral aid received by country o. In doing so, we find that a 1% increase in bilateral aid from country d to country o induces a 0.25% increase in the reverse bilateral migration rate. This result is similar to the results reported in column (1) and (2). The remaining amount of bilateral aid received has no significant impact on the migration rate. Finally, multilateral aid has a significant (at the 5 percent confidence level) and negative impact on the bilateral migration rate. We find that a 1% increase in this type of aid received by country o generates a 0.02% decrease in the bilateral migration rate. Although not reported, other covariates exhibit the expected sign and level of significance: distance and GDP per capita in the origin country have a negative impact on migration, while language proximity, colonial ties and the past bilateral migration stock have a positive impact on migration.

In column (4), we reproduce the standard specification used in the literature, in particular the specification proposed by Lanati and Thiele (2018b) and Berthélemy et al. (2009), including the bilateral aid flow from country d to country o ($\text{Aid}_{do,t-1}$) as well as the total bilateral aid received by country o ($\text{Aid}_{o,t-1}$) as explanatory variables. We find that a 1% increase in the bilateral aid flow induces a 0.25% increase in the reverse bilateral migration rate in the following year. In addition, we find that the effect of the total bilateral aid received by country o is not significant. The main caveat of this specification is that bilateral aid between a country d and a country o is included twice in the model (as $\text{Aid}_{do,t-1}$ and inside $\text{Aid}_{o,t-1}$). In addition, multilateral aid flows are omitted from this specification.

For each specification, we report the F-stat form of the Kleibergen-Paap statistic that provides a test for weak instruments when errors are clustered. In columns (1) to (3), the statistic is above the critical value which confirms that our instruments are strong enough predictors of the observed bilateral aid flows. In column (4), the statistic is below the critical value which does not allow us to conclude that our instruments are strong.

Let us now look at first stage results (reported in appendix A.3, Table A.4). For all specifications, we find that the instrumental variable is significantly and positively correlated with the endogenous variable of interest.

We now turn to the estimation of the transmission channels (Table 3, column 3). Baseline results are reported in the second part of the table. We find evidence for the presence of a development channel which is identified by the coefficient associated to multilateral aid (β_3). This result implies either that a development channel is at play while no credit constraint channel is at play, or that the development channel more than compensates the credit constraint channel.

Then, we find a positive and highly significant coefficient associated with the specific effect of donor d ($\beta_1 - \beta_3(\overline{\text{Aid}_{do,t-1}}/\overline{\text{MultiAid}_{o,t-1}})$. This result indicates that the information channel prevails (over the instrumentation channel, if any). A 1% increase in bilateral aid, keeping full

Table 3: Baseline specification

	ln $\text{Mig}_{od,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Regressions								
ln $\text{Aid}_{do,t-1}$	0.2529***	0.2503***	0.2507***	0.2517***	0.1277***	0.1275***	0.1278***	0.1298***
	(0.0222)	(0.0229)	(0.0230)	(0.0224)	(0.0071)	(0.0071)	(0.0071)	(0.0072)
ln $\text{Aid}_{\Lambda o,t-1}$		-0.0583	-0.0509			-0.0450***	-0.0416***	
		(0.0637)	(0.0655)			(0.0129)	(0.0127)	
ln $\text{MultiAid}_{o,t-1}$			-0.0187**				-0.0142**	
			(0.0076)				(0.0056)	
ln $\text{Aid}_{o,t-1}$				0.1573				-0.0487***
				(0.1790)				(0.0141)
Controls (Γ)	yes	yes	yes	yes	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	9,679	9,679	9,679	9,679	9,679	9,679	9,679	9,679
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	OLS	OLS	OLS	OLS
R-squared					0.8341	0.8343	0.8343	0.8343
Kleibergen-Paap rk Wald F-Stat.	491.611	8.427	7.607	2.152				
Stock-Yogo critical value (10% max. IV size)	16.38	7.03	7.03	7.03				
Transmission channels								
Non-donor-specific channel			-0.0187***				-0.0142**	
			(0.0076)				(0.0056)	
Channel specific to donor d			0.2508***				0.1283***	
			$(0.0214)^b$				$(0.0072)^b$	
Channel specific to all donors but d			-0.0458				-0.0318***	
			$(0.0692)^b$				$(0.0161)^b$	

Note: This table reports IV-2SLS second stage estimations (columns 1-4) and OLS estimations (columns 5-8). Column (3) shows our baseline estimation. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. b indicates that the standard errors associated to the coefficient has been obtained by non-parametric bootstrapping (with replacement; 100 iterations). Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

aid received as well as the composition of aid received from other donors constant, induces a 0.25% increase in the reverse bilateral migration rate. In other words, when a donor country increases its aid to a recipient country and when the amount of multilateral aid received by that country decreases by the same amount, then the bilateral migration rate from the recipient country to that particular donor country increases. This result implies that bilateral aid conveys information decreasing the corresponding bilateral cost of migration, in turn increasing the reverse migration rate. In addition, this coefficient is almost equal to the average effect of bilateral aid found in the baseline specification which further indicates that the effect of bilateral aid conveyed through non-donor-specific channels is small. On the contrary, we find no significant effect associated with the specific effect of other donors ($\beta_2 - \beta_3(\overline{\mathrm{Aid}_{\Lambda o,t-1}}/\overline{\mathrm{MultiAid}_{o,t-1}})$. This result points either toward the absence of multilateral resistance to migration in our sample, or toward the lack of variation over time within recipient economies.

The results of OLS regressions (Table 3, columns 5 to 8) show that the estimates suffer from a downward bias. In addition, the coefficients related to the remaining amount of bilateral aid (columns 6 and 7) as well as the total amount of bilateral aid (column 8) are significantly negative, showing that OLS coefficients tend to overestimate the impact of aid from other donors than d on migration to that country. We find a similar bias in the estimation of the transmission channels (column 7).

Heterogeneous effects. We now investigate whether foreign aid has a long-lasting effect on migration, and whether this effect differs across countries depending on their income level.

To further analyse the timing of the effect, we adapt our estimation strategy following the classification of aid proposed by Clemens et al. (2012) to identify early-impact aid flows. The authors define *early-impact aid* as: "[...] budget support or program aid given for any purpose and project aid given for real sector investments for infrastructure or to directly support production in transportation (including roads), communications, energy, banking, agriculture and industry. It excludes any aid flow that clearly and primarily funds an activity whose growth effect might arrive far in the future or not at all [...]". In what follows, we denote early-impact aid with the superscript e.

First stage results are reported in appendix A.3, Table A.5 and second stage results are reported in Table 4. In column (1), the coefficient associated to bilateral early-impact aid is significant and positive while the coefficient associated to multilateral early-impact aid is significant and negative. The magnitude of these coefficients is larger than in the baseline results which seems to indicate that early-impact aid has a stronger effect on migration decisions. Decomposing the channels, we find that the signs and significance of the coefficients associated to the donor-specific impact of early-impact aid are in line with the baseline results, but of larger magnitude as well.

To test the robustness of this effect, we perform two additional regressions that consists in modifying the baseline specification by lagging by two or five periods bilateral and multilateral aid flows. First stage results are reported in appendix A.3, Table A.5 and second stage results are reported in Table 4, columns (2) and (3). We find that the coefficient associated to bilateral aid remains significant and positive. In addition, the coefficient associated to multilateral aid becomes insignificant when aid is lagged by more than one period.

The new sets of instruments built with early-impact aid and with aid lagged by two and five periods adequately predict the endogenous variables (Table A.5).

Overall, the estimates associated to the donor-specific impact of aid are in line with the baseline results, but of larger magnitude for early-impact aid and of smaller magnitude when aid flows are lagged by more periods. In addition, this set of results indicates that while the effect of aid on migration conveyed through the donor-specific channels seems to last long, this is not the case for the non-donor-specific effects of aid. This result is in line with the literature providing evidence that foreign aid increases domestic consumption, but weakly promotes household investment (among others, see Temple and Van de Sijpe 2017).

We then investigate whether the impact of aid on migration may be conditioned by the level of development of the recipient country. Analysing the development conditionality enables us to take into account the fact that individuals located in different origin countries may have a different set of *reachable* destinations because they face different credit constraints (Marchal and Naiditch, 2020). Although heterogeneity in the set of reachable destinations could be controlled for using origin-year fixed effects (Beine et al., 2015), our baseline model does not allow us to include these fixed effects and may therefore suffer from a specification bias.

To address this issue, we implement two strategies. First, we start by splitting our sample of observations into two sub-samples: origin countries with an average GDP per capita ($\ln \overline{\text{GDPcap}}_o$) below the median and those with an average GDP per capita above the median[15]. This approach is in line with Lanati and Thiele (2018b). Second, we include an interaction term between the aid received and the GDP per capita of the recipient country. This approach is in line with Murat (2020). In this specification, the instrumental variable for the interaction of the aid variable with the GDP per capita is given by the interaction of the corresponding shift-share instrument with the GDP per capita.

First stage results are reported in appendix A.3, Table A.6 and second stage results are reported in Table 5. In columns (1) and (2), we distinguish countries with an average GDP per capita respectively below and above the median. Looking at results across columns, we find that bilateral aid from country d to country o has a significant and positive impact on reverse migration for both groups of countries, but that this impact is higher for the poorest countries. In addition, we find a negative and highly significant effect of multilateral aid only for the poorest countries. Regarding the transmission channels, we find a positive and highly significant coefficient associated with the information channel specific to the donor country for both types of countries, but higher for the poorest countries.

[15]We do not use the classification of countries by income groups proposed by the World Bank because most origin countries are low and middle income countries in our sample.

In column (3), we report the results of the model including the interaction of each aid variable with the income level of the aid recipient country. We find that the higher the development level of the recipient country, the lower the impact of bilateral aid on reverse migration. This result is coherent with the results shown in columns (1) and (2). In addition, we find that multilateral aid received by country o deters migration from country o to country d, but this negative impact decreases when income in country o increases. This last result provides strong evidence that a development channel is at play for the poorest countries. Note that we cannot estimate the coefficients for the transmission channels when we include interaction terms in the model.

Table A.6 shows that the sets of instruments used to implement these two strategies adequately predict the endogenous variables.

Table 4: Timing of the effect

	ln $\text{Mig}_{od,t}$		
	(1)	(2)	(3)
Regressions			
ln $\text{Aid}^{e}_{do,t-1}$	0.3178***		
	(0.0334)		
ln $\text{Aid}^{e}_{\Lambda o,t-1}$	0.0485		
	(0.0887)		
ln $\text{MultiAid}^{e}_{o,t-1}$	-0.0200**		
	(0.0078)		
ln $\text{Aid}_{do,t-2}$		0.2380***	
		(0.0237)	
ln $\text{Aid}_{\Lambda o,t-2}$		-0.0379	
		(0.0835)	
ln $\text{MultiAid}_{o,t-2}$		-0.0119	
		(0.0085)	
ln $\text{Aid}_{do,t-5}$			0.2339***
			(0.0309)
ln $\text{Aid}_{\Lambda o,t-5}$			-0.0167
			(0.1832)
ln $\text{MultiAid}_{o,t-5}$			-0.0216
			(0.0167)
Controls (Γ)	yes	yes	yes
Destination FE	yes	yes	yes
Origin FE	yes	yes	yes
Year FE	yes	yes	yes
Observations	6,886	8,274	4,664
Estimator	IV-2SLS	IV-2SLS	IV-2SLS
Kleibergen-Paap rk Wald F-Stat.	6.628	3.236	4.245
Stock-Yogo critical value (10% max. IV size)	7.03	7.03	7.03
Transmission channels			
Non-donor-specific channel	-0.0200***	-0.0119	-0.0216
	(0.0078)	(0.0085)	(0.0167)
Channel specific to donor d	0.3180***	0.2381***	0.2341***
	$(0.0320)^b$	$(0.0236)^b$	$(0.0346)^b$
Channel specific to all donors but d	0.0545	-0.0345	-0.0113
	$(0.1240)^b$	$(0.1043)^b$	$(0.2866)^b$

Note: This table reports IV-2SLS second stage estimations. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. b indicates that the standard errors associated to the coefficient has been obtained by non-parametric bootstrapping (with replacement; 100 iterations). Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table 5: Heterogeneity across income level

	ln $\text{Mig}_{od,t}$		
	(1)	(2)	(3)
Regressions			
ln $\text{Aid}_{do,t-1}$	0.3060***	0.1465***	0.3991***
	(0.0350)	(0.0335)	(0.0684)
ln $\text{Aid}_{\Lambda o,t-1}$	0.0118	-0.1023	-0.3045
	(0.1757)	(0.0695)	(0.2819)
ln $\text{MultiAid}_{o,t-1}$	-0.0988***	-0.0015	-0.2093***
	(0.0356)	(0.0066)	(0.0778)
ln $\text{Aid}_{do,t-1} * \ln \text{GDPcap}_{o,t-1}$			-0.0209**
			(0.0082)
ln $\text{Aid}_{\Lambda o,t-1} * \ln \text{GDPcap}_{o,t-1}$			0.0285
			(0.0355)
ln $\text{MultiAid}_{o,t-1} * \ln \text{GDPcap}_{o,t-1}$			0.0227***
			(0.0086)
ln $\text{GDPcap}_{o,t-1}$	-0.1887**	-0.0806	-0.7937
	(0.0755)	(0.0636)	(0.6356)
Controls (Γ)	yes	yes	yes
Destination FE	yes	yes	yes
Origin FE	yes	yes	yes
Year FE	yes	yes	yes
Observations	5,772	3,907	9,679
Sample	GDP below med.	GDP above med.	All
Estimator	IV-2SLS	IV-2SLS	IV-2SLS
Kleibergen-Paap rk Wald F-Stat.	22.451	19.596	4.917
Stock-Yogo critical value (10% max. IV size)	7.03	7.03	na
Transmission channels			
Non-donor-specific channel	-0.0988***	-0.0015	
	(0.0356)	(0.0066)	
Channel specific to donor d	0.3077***	0.1465***	
	$(0.0351)^b$	$(0.0321)^b$	
Channel specific to all donors but d	0.0647	-0.1021	
	$(0.2072)^b$	$(0.1223)^b$	

Note: This table reports IV-2SLS second stage estimations. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. b indicates that the standard errors associated to the coefficient has been obtained by non-parametric bootstrapping (with replacement; 100 iterations). Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

The donor-specific channels. Finally, we further investigate the donor-specific effect of aid on migration decisions. To this end, we first analyse the emigration rate from country o to all destinations but d (that we denote $\text{Mig}_{o\Lambda,t}$). We expect to find similar significance level and sign for the estimated coefficient associated to multilateral aid as this coefficient provides information about the prevalence of a non-donor-specific effect of aid. We also expect to find the opposite signs for the coefficients associated to bilateral aid variables than when studying the migration rate from country o to destination d.

First stage results are reported in appendix A.3, Table A.7 and second stage results are reported in Table 6, column (1). In line with our expectations, we find that bilateral aid from a donor d to a country o has no significant impact on the emigration rate from country o to all destinations but d. On the contrary, the amount of aid received by country o from all donors but d has a positive and significant impact on the emigration rate from country o to all destinations but d. This results points toward the fact that a budget constraint and/or an information channel prevail over other channels. Finally, multilateral aid has a negative impact on this emigration rate, which suggests that a development channel prevails over a credit constraint channel. Nonetheless, the magnitude of this coefficient remains small: a 1% increase in multilateral aid decreases migration from country o to all countries but d by 0.04%.

Estimates for the transmission channels confirm that the origin of aid matters in individual location choices. In the baseline specification (Table 3), we show that the larger the amount of aid donated by a country d, the larger the migration rate toward this country. In Table 6, we confirm that a donor-specific information channel is at play (but weakly significant). A 1% increase in bilateral aid from all donors but d, keeping full aid received constant, induces a 0.54% increase in the *reverse* bilateral migration rate. This implies that bilateral aid from other donors conveys information decreasing the reverse bilateral costs of migration to these destinations.

Then, we further investigate the fact that aid conveys information on the donor country. A number of papers show that aid projects are implemented by individuals in the field and that their work can change the image that local populations have of the donor country (Dietrich et al., 2018; Tokdemir, 2017). Based on this evidence, we hypothesise that the intensity of the transfer of information should depend on the number of aid projects implemented (rather than on the amount of aid donated). To test this hypothesis, we analyse how the number of aid projects ($\text{NrAidPro}_{do,t-1}$, $\text{NrMultiAidPro}_{o,t-1}$) (rather than the amount of aid donated) impacts migration rates. We instrument these alternative aid variables using the same shift-share method as before.

First stage results are reported in appendix A.3, Table A.7 and second stage results are reported in Table 6, column (2). In line with our baseline results, we find that the number of aid projects from a donor d to a country o has a positive impact on the migration rate from country o to country d. The number of aid projects from all countries but d to a country o has a negative and significant impact on migration to country d. Here again, this result points toward a redirection effect. Finally, the effect of multilateral aid is no longer significant. It shows that while the *value* of aid has a significant impact on development (see Table 3), it does not seem to be the case for the *number* of aid projects.

Decomposing the transmission channels, we find that the donor-specific effect to country d is significant. The information channel prevails and is larger for the number of aid projects than for the amount of aid donated: A 1% increase in the amount of bilateral aid, keeping full aid received as well as the composition of aid received from other donors constant, induces a 0.25% increase in the reverse bilateral migration rate, while a 1% increase in the number of aid projects induces a 0.43% increase in the reverse bilateral migration rate. This result is in line with our hypothesis and corroborates the presence of a positive donor-specific effect of bilateral aid on reverse bilateral migration. Finally, we find a negative effect specific to all donors but d.

The sets of instruments used to investigate the donor-specific channels adequately predict the endogenous variables (Table A.7).

Table 6: The donor-specific channels

	ln $\text{Mig}_{o\Lambda,t}$	ln $\text{Mig}_{od,t}$
	(1)	(2)
Regressions		
ln $\text{Aid}_{do,t-1}$	-0.0108	
	(0.0139)	
ln $\text{Aid}_{\Lambda o,t-1}$	0.5330***	
	(0.2011)	
ln $\text{MultiAid}_{o,t-1}$	-0.0419**	
	(0.0174)	
ln $\text{NrAidPro}_{do,t-1}$		0.4381***
		(0.0294)
ln $\text{NrAidPro}_{\Lambda o,t-1}$		-0.6636***
		(0.2057)
ln $\text{NrMultiAidPro}_{o,t-1}$		0.0271
		(0.0454)
Controls (Γ)	yes	yes
Destination FE	yes	yes
Origin FE	yes	yes
Year FE	yes	yes
Observations	9,678	9,679
Estimator	IV-2SLS	IV-2SLS
R-squared		0.8377
Kleibergen-Paap rk Wald F-Stat.	7.660	13.274
Stock-Yogo critical value (10% max. IV size)	7.03	7.03
Transmission channels		
Non-donor-specific channel	-0.0419**	0.0271
	(0.0174)	(0.0454)
Channel specific to donor d	-0.0105	0.4335***
	$(0.0217)^b$	$(0.0345)^b$
Channel specific to all donors but d	0.5446*	-0.7518**
	$(0.2967)^b$	$(0.3670)^b$

Note: This table reports IV-2SLS second stage estimations. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. b indicates that the standard errors associated to the coefficient has been obtained by non-parametric bootstrapping (with replacement; 100 iterations). Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

4.2 Robustness

We now investigate the validity of our instrumentation strategy and present a number of robustness tests. The main results are summarised in Table 7 and corroborate the baseline findings.

Validity of the instrumentation strategy. The main concerns related to the use of shift-share instruments lie in the facts that (i) the initial distribution of aid across sectors and donors could be correlated with some variables affecting subsequent changes in migration decisions, and (ii) the total volume of aid received from *all* donors at time $t-1$ (the shift) could be correlated with the emigration of the recipient country at time t.

We perform two tests to address these concerns. First, for the Bartik instruments to be valid, the set of instruments used in the baseline specification (Table 3, column 3) should be uncorrelated with trends in migration prior to the period of interest. In addition, the instruments must be orthogonal to other variables that could affect simultaneously bilateral aid flows and migration decisions. We thus analyse the OLS correlations between the migration rate at the beginning of the period and the trend in the shift-share instrument over the period studied. The first year for which we study the migration rate is 2001 (the first two years of the sample are solely used to build and lag the IVs). Therefore, we consider the correlation between the migration rate as well as other variables of interest in 2001, and the variations in the shift-share instruments over 2001-2010. Then, we divide our sample in two sub-periods in order to analyse the correlation between the trend in the migration rate as well as other time-varying variables from 2001 to 2005, and the trend in the shift-share instruments from 2006 to 2010.

Results are reported in appendix A.3, Table A.8. First, we find no significant correlation between the migration rate in 2001 and the trend in the shift-share instruments over the period studied. Dividing the sample into two sub-periods also shows an insignificant correlation. Second, we find no significant correlation between other covariates and the trends in the shift-share instruments, except for the GDP per capita in the origin and destination countries.

Second, we follow a recent contribution by Goldsmith-Pinkham et al. (2020) explaining that if the exogeneity of the shift-share instrument relies on shares and not on the shock, then using a shift-share instrument in an IV-2SLS setup should be equivalent to using a GMM procedure with all sectoral shares as instruments. We follow this approach and provide results (in appendix A.3, Table A.9) that confirm that our identifying assumption is best interpreted in terms of sector shares, rather than in terms of changes in the aid volume. We also compute the Rotemberg weights. All weights are positive (with a mean equal to 0.027) which confirms that we can provide a LATE-like interpretation of the estimates.[16] Overall, the tests performed confirm the validity of the shift-share IVs.

[16]It also allows us to highlight the subset of sectors to which the estimates of interest are most sensitive to endogeneity. The largest sector shares are the following: Government and civil society, Communications, Food security assistance and other commodity assistance, and Debt relief.

Table 7: Summary of the results

Model			Average effects of bilateral aid		Transmission channels		
Specification	Estimator	Table	$\ln \text{Aid}_{do,t-1}$	$\ln \text{Aid}_{\Lambda o,t-1}$	$\ln \text{MultiAid}_{o,t-1}$/ non-donor	specific to donor d	specific to all donors but d
Main findings							
Baseline specification	IV-2SLS	3	0.2507***	-0.0509	-0.0187***	0.2508***	-0.0458
Baseline specification	OLS	3	0.1278***	-0.0416***	-0.0142**	0.1283***	-0.0318***
Timing of the effect - Early-impact aid	IV-2SLS	4	0.3178***	0.0485	-0.0200**	0.3180***	0.0545
Timing of the effect - 2-year lags	IV-2SLS	4	0.2380***	-0.0379	-0.0119	0.2381***	-0.0345
Timing of the effect - 5-year lags	IV-2SLS	4	0.2339***	-0.0167	-0.0216	0.2341***	-0.0113
Heterogeneity across income level - GDP < median	IV-2SLS	5	0.3060***	0.0118	-0.0988***	0.3077***	0.0647
Heterogeneity across income level - GDP > median	IV-2SLS	5	0.1465***	-0.1023	-0.0015	0.1465***	-0.1021
The donor-specific channels - Migration to other countries	IV-2SLS	6	-0.0108	0.5330***	-0.0419**	-0.0105	0.5446*
The donor-specific channels - Number of aid projects	IV-2SLS	6	0.4381***	-0.6636***	0.0271	0.4335***	-0.7518**
Robustness							
Alternative IVs - Regional aid	IV-2SLS	A.12	0.2637***	-0.0518	-0.0192***	0.2639***	-0.0462
Alternative IVs - Second & third central moments	IV-2SLS	A.12	0.0902***	-0.0236	-0.0139**	0.0935***	-0.0199
Alternative definition of migrants - Foreign only	IV-2SLS	A.14	0.2479***	-0.0596	-0.0191**	0.2481***	-0.0543
Including null migration rates	PPML (no IV)	A.14	0.0795***	-0.0069	-0.0004	0.0387^{na}	0.6895^{na}
Including zero aid flows	IV-2SLS	A.14	0.2166***	-0.0746	-0.0546	0.2170***	-0.0313
Alternative definition of multilateral aid	IV-2SLS	A.14	0.2504***	-0.0164	-0.0140**	0.2626***	0.3913

Note: This table summarises the main results presented in the paper. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. *na* indicates that the error could not be bootstrapped.

Then, we propose two alternative sets of instrumental variables that are not based on the shift-share methodology. First, we instrument $\text{Aid}_{do,t}$ and $\text{Aid}_{\Lambda o,t}$ using the amount of regional aid:

$$\text{IV}_{dO,t} = \sum_{s} \sum_{n \in O} \text{Aid}_{dn,s,t} \forall n \neq o \tag{6}$$

$$\text{IV}_{\Lambda o,t} = \sum_{d' \neq d} \sum_{s} \sum_{n \in O} \text{Aid}_{d'n,s,t} \forall n \neq o \tag{7}$$

where O denotes the set of countries in the broad geographic area of country o (country o excluded) such as Europe, East Asia, Middle East, North and Central America, etc. (the list of countries per broad regions is presented in Appendix A.3, Table A.10). The intuition is that the aid received by the set of countries located in the same geographic area than country o should be correlated to the aid received by country o. Yet, it should be poorly correlated to the emigration rate of country o and to the lobbying capacity of the diaspora of country o in foreign countries. This argument should especially be valid in case of low multilateral resistance to migration.

Second, following Gamso and Yuldashev (2018a,b), we use the second and third central moments of the aid distribution as a set of instruments: $[X - mean(X)]^2$ and $[X - mean(X)]^3$ where X denotes either $\ln \text{Aid}_{do,t-1}$ or $\ln \text{Aid}_{\Lambda o,t-1}$. This strategy can be adopted in an IV-2SLS set-up when no exogenous variable is available (Lewbel, 1997). In particular, the second and higher moments of an endogenous variable are unrelated to the error term in the presence of heteroscedasticity. Therefore, they can be used as instrumental variables in a two stage least square estimation.

First stage results for the two alternative sets of instruments are reported in appendix A.3, Table A.11. The new set of instruments built with regional aid adequately predicts the endogenous variables (columns 1a-1b). Results are weaker when using the second and third central moments as instruments, since the moments mainly predict bilateral aid (columns 2a-2b). Second stage results are reported in appendix A.3, Table A.12. In column (1), we report the results using regional aid to build the IV. In column (2), we report the results using the second and third central moments of aid as IVs. The results in both cases corroborate the baseline results: the coefficients associated to bilateral aid are positive and highly significant, the coefficients associated to the remaining amount of bilateral aid are not significant, and the coefficients associated to multilateral aid are negative and significant, which confirms the presence of a development channel. Regarding the identification of the channels, the signs and significance of the coefficients associated to the donor-specific impact of aid are in line with the baseline results.

Overall, this set of results corroborates the presence of an information channel specific to donor country d, and the presence of a development channel.

Sensitivity tests. To test the robustness of our results, we conduct several sensitivity tests regarding the definition of migration flows, the estimator chosen, missing aid flows, the definition of multilateral aid, and the validity of our specification.

We start by using a more homogeneous definition of migrant individuals. Until now, we built the variable measuring migration flows combining two definitions: flows of foreign individuals only for countries giving this information, and flows of foreign and national individuals for other countries. We now exclusively study flows of foreign individuals from the DEMIG-C2C dataset in order to exclude bilateral flows including return migrants. We denote the corresponding migration rate by $\text{Mig}^{f}_{od,t}$. First stage results are reported in appendix A.3, Table A.13 columns (1a-1b). Second stage results are reported in appendix A.3, Table A.14, column (1) and fully corroborate the baseline findings.

So far, we have analysed the logarithm of the migration rate as the dependent variable using a linear estimator which led us to exclude null migration rates from our sample. This choice was justified by the small percentage of zero migration rates (1.53%) as well as by the need to instrument endogenous variables and to bootstrap estimates. We now address the potential concern related to the use of such a linear estimator to analyse migration rates. Instead of using the logarithm of the migration rates, we use the migration rates (including zeros) and a PPML estimator (without instruments). Results are reported in appendix A.3, Table A.14, column (2) and confirm that bilateral aid has a positive and significant impact on the reverse migration rate. Yet, multilateral aid no longer has a significant impact on migration rates with this specification. Regarding the transmission channels, the level of significance is not available as the errors could not be bootstrapped.

Then, we change our strategy regarding missing aid flows. Until now, we have analysed the impact of aid on migration *conditional* on receiving aid. A number of available studies, however, replace missing aid flows by zeros. We therefore build an alternative sample in which we include zero aid flows. We consider donor-recipient pairs that appear at least two years in AidData. For each country pair, we replace missing values by zeros between the first and the last year for which we observe the pair (and thus for which a positive bilateral aid flow has been recorded at least once). This enables us to increase our sample by 938 observations. Because we now consider null bilateral aid flows, we increase these flows by one before log-transforming them. First stage results are reported in appendix A.3, Table A.13 columns (3a-3b). Second stage results are reported in appendix A.3, Table A.14, column (3). Here again, bilateral aid has a positive and significant impact on the reverse migration rate, while multilateral aid does not have a significant impact on migration.

We then use an alternative definition of multilateral aid. Until now, we have used a definition of multilateral flows based on the variable named *donor* included in AidData. Yet, this classification may wrongly consider a number of earmarked contributions made by donors to multilateral agencies as multilateral flows. This could generate a bias in our estimations as donors keep control over how their donation are spent when their donations are earmarked (they may decide upon the recipient country, funded projects, conditions, etc.). Therefore, these flows should be considered as bilateral flows and not as multilateral flows. The reason for this possible miss-classification is that the variable *multi-bi* which is part of the DAC-CRS codes provided by the OECD is missing for about 10% of the sample.[17] Yet, this variable is necessary to double-check that donations from multilateral agencies emanate from their regular budget and not from earmarked contributions. To address this caveat, we exclude observations for which the variable *multi-bi* is missing and define as bilateral flows observations for which the variable *multi-bi* is either 1, 3, 6, 7 or 8, and as multilateral flows those coded by 2 and 4. The advantage of this alternative definition is that multilateral flows are presumably cleaner from donor-specific effects as they earmarked contributions are now excluded with certainty. First stage results are reported in appendix A.3, Table A.13 columns (4a-4b). Second stage results are reported in appendix A.3, Table A.14, column (4). Results using an alternative definition of multilateral aid corroborate our baseline results: foreign aid impacts migration rates through an information channel specific to donor country d and a development channel.

Finally, we discuss the validity of our specification. First, we include the control variables progressively (in two-steps) in our baseline model to test if the stability of the results depends on the set of covariates included in the model. Then, we include origin-destination and time fixed effects in the specification to better control for unobserved dyadic factors. Lastly, we cluster errors within the origin-destination dimension to account for unobserved factors that could be correlated with migration decisions from an origin country to a destination country. First stage results are reported in appendix A.3, Table A.15. Second stage results are reported in appendix A.3, Table A.16. In Table A.16, columns (1) to (3), we show the robustness of the coefficient associated to the bilateral aid flow when adding the controls. The significance of the coefficient associated to the remaining amount of bilateral aid loses its significance as soon as dyadic control variables are included in the model (columns 2 and 3). On the contrary, the negative impact of multilateral aid is only significant when control variables are included into the model (columns 2 and 3). In column (4), we find that the impact of multilateral aid is not robust to the inclusion of origin-destination fixed effects although the sign of the coefficient remains unaffected. Finally, clustering errors within the origin-destination dimension only lowers the level of significance associated to multilateral aid. Overall, these sensitivity tests confirm our previous results.

5 Conclusion

In this paper, we revisited the aid-migration nexus. We explained that the question of whether foreign aid decreases or increases migration and through which channels is rather unclear. While some studies find evidence that aid from one country to another reduces emigration because a development effect prevails, other studies find evidence that aid lowers the migration costs and alleviates the credit constraints of would-be migrants, which increases total emigration as well as emigration to the donor country. We argued that this tension in the literature eventually reflects a failure to neatly disentangle non-donor-specific effects (development and credit constraint

[17] For more details, see the DAC and CRS code lists and the documentation of AidData.

channels) from donor-specific effects (information and instrumentation channels) through which aid effectively affects migration flows. We therefore proposed a theoretically founded strategy to address this caveat of the literature.

First, we built a random utility maximisation model of migration and derived a gravity model describing the relationship between bilateral migration and aid. Second, using DEMIG-C2C and AidData from 1999 to 2010, we estimated this model with an IV-2SLS strategy and a shift-share instrument. More precisely, we estimated the impact of aid from a donor to a recipient country on the reverse bilateral migration rate, as well as the impacts of remaining bilateral aid and multilateral aid received by the country. We consider that the coefficient associated with multilateral aid only relates to a non-donor-specific effect of aid. We then used this estimate to identify the transmission channels.

We found that aid from a donor country to a recipient country has overall a highly positive impact on the rate of migration taking place in the reverse direction: a 1% increase in the bilateral aid flow induces a 0.25% increase in the reverse bilateral migration rate. We also found that the remaining bilateral aid does not impact this migration rate, while multilateral aid has a small negative impact. A 1% increase in multilateral aid induces a 0.02% decrease in the bilateral migration rate.

We then analysed the channels through which these effects are conveyed. First, we found strong evidence that the effect of aid on migration is conveyed through a positive donor-specific effect: the information channel prevails over the instrumentation channel (if any). The magnitude of this effect is larger for the poorest aid recipient countries of our sample. Second, there seems to be a non-donor-specific channel at play: we found evidence for a negative non-donor-specific effect, suggesting that a development channel prevails over a credit constraint effect (if any). This effect is non-lasting and significant only for the poorest aid recipient countries of our sample. Our results emphasise the importance of differentiating donor-specific from non-donor-specific effects of foreign aid on migration to neatly interpret the results one can derive from a gravity-type analysis.

From a policy perspective, our results suggest that bilateral foreign aid used by donor countries as a *policy tool* to lower individuals' incentives to migrate from the aid recipient country to the donor country is rather inefficient, at least in the short run. From the perspective of a donor country wishing to decrease migration from a given recipient country more should be allocated to multilateral aid than to bilateral aid: according to our results, this would reduce immigration from that country (through the development channel, and a decrease in the information channel). There could also be strategic interactions between donors to the same recipient countries, since any donor country wishing to decrease immigration flows should try to decrease its bilateral aid to the origin countries of immigrants and invite other countries to increase their contributions to these countries. These interactions could be studied in further research.

Contrary to recent results on the aid-migration nexus but in line with the literature analysing the impact of aid on growth in recipient countries (Burnside and Dollar, 2000; Clemens et al., 2012), we find a development effect of small magnitude. This may imply that foreign aid does not reach amounts high enough to tackle the fundamental causes of migration. Whether *targeted* aid – as promoted by the European Commission[18] – could be more helpful to address migration causes still needs to be carefully examined.

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[18] For more information on the European policy for the period 2016-2020, see the fact-sheet *Partnership Framework on Migration one year on: Lessons learned, challenges and way forward*.

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A On-line Appendix

A.1 Derivations from the RUM model

According to equation (2), the bilateral migration rate at time t can be written as follows:

$$\ln \text{Mig}_{od,t} = W_{od,t} - C_{od,t} - W_{oo,t}. \tag{A.1}$$

For any variable X impacting utilities and migration costs, such as foreign aid received by country o, equation (A.1) implies that:

$$\frac{\partial \text{Mig}_{od,t}}{\partial X} = \left[\frac{\partial \left(W_{od,t} - C_{od,t} \right)}{\partial X} - \frac{\partial W_{oo,t}}{\partial X} \right] \text{Mig}_{od,t}. \tag{A.2}$$

The *development channel* implies that any increase in aid will increase the utility in the origin country of potential migrants such that:

$$\frac{\partial W_{oo,t}}{\partial \text{Aid}_{do,t-1}} \geqslant 0 \; \forall d. \tag{A.3}$$

On the other hand, the *credit constraint channel* implies that any increase in aid implies an alleviation of the credit constraint, which can be modelled through a decrease in all bilateral migration costs:

$$\frac{\partial C_{od,t}}{\partial \text{Aid}_{d'o,t-1}} \leqslant 0 \; \forall \left(d, d' \right). \tag{A.4}$$

The RUM model does not explicitly take into account the credit constraint of individuals[19]. We therefore follow the bulk of related papers and resort to this assumption to take into account the impact of aid on the credit constraint of potential migrants (Beine et al., 2015).

The *information and instrumentation channels* imply that when a donor country increases its aid to a recipient country, it has an impact on the corresponding bilateral migration costs. This impact is negative for the information channel:

$$\frac{\partial C_{od,t}}{\partial \text{Aid}_{do,t-1}} \leqslant 0 \; \forall d. \tag{A.5}$$

and positive for the instrumentation channel:

$$\frac{\partial C_{od,t}}{\partial \text{Aid}_{do,t-1}} \geqslant 0 \; \forall d. \tag{A.6}$$

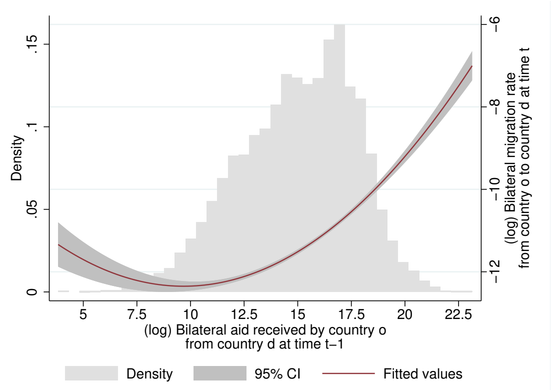
[19]The consequences of this omission are dealt with by Marchal and Naiditch (2020).

A.2 Descriptive Statistics

Table A.1: Summary statistics

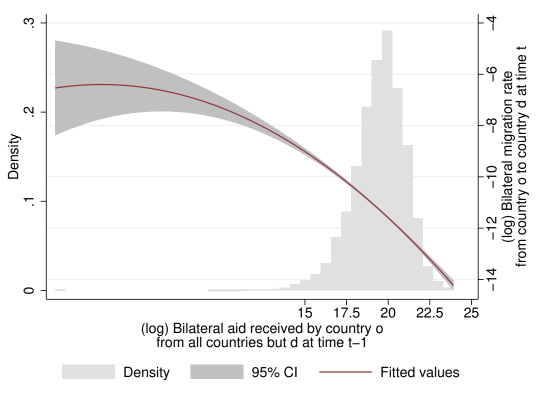
Variable	Mean	Std. Dev.	Min.	Max.	Obs.
Migration					
Bilateral migration rate (in percentage)	0.019	0.078	0	1.277	9,829
Foreign aid					
Bilateral aid (millions of current U.S.$)	44.448	202.022	0	11,118.684	9,155
Rest of bilateral aid (millions of current U.S.$)	759.415	1,420.320	0	24,517.656	9,155
Total bilateral aid (millions of current U.S.$)	803.863	1,478.801	0.269	24,518.291	9,155
Multilateral aid (millions of current U.S.$)	1,144.846	3,327.218	0	61,687.570	9,155
Control variables					
1990 bilateral migration stock (thousands of people)	23.289	177.480	0	4,662.233	9,829
Distance between capital cities (kilometres)	6,668.436	3,435.526	59.617	17,397.213	9,829
Common language	0.156	0.363	0	1	9,829
Colonial relationship	0.063	0.243	0	1	9,829
GDP per capita (origin country)	3,001.129	3,804.395	108.015	54,228.828	9,820
GDP per capita (destination country)	38,052.271	12,295.488	6,223.974	72,120.219	9,829

Figure A.1: Bilateral migration rates and bilateral aid



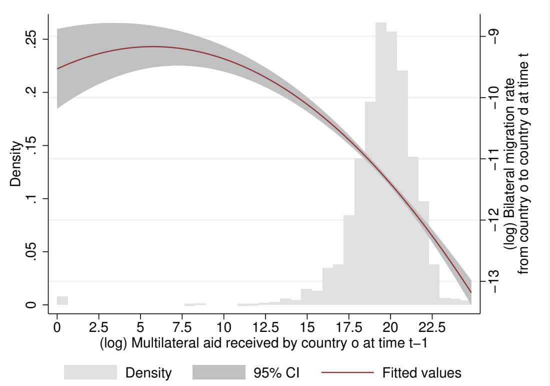
Note: We use a quadratic fit to plot the (log) amount of bilateral aid received by country o from country d against the (log) bilateral rate of migration from country o to country d (thus excluding zeros). We also report the distribution of observations used to compute this fit. Bilateral aid is at first negatively correlated with the reverse migration rate, yet the correlation quickly becomes positive. The negative relationship could indicate the weak prevalence of a development or an instrumentation channel, while the positive relationship could indicate the prevalence of a credit constraint or an information channel.

Figure A.2: Bilateral migration rates and remaining bilateral aid



Note: We use a quadratic fit to plot the (log) amount of bilateral aid received by country o from *all* countries but d against the (log) bilateral rate of migration from country o to country d (thus excluding zeros). We also report the distribution of observations used to compute this fit. We find a concave relationship between the bilateral migration rate and the bilateral aid received by country o from *all* countries but d. The correlation between bilateral aid and the migration rate is at first weakly positive, and quickly becomes negative. The positive relationship could indicate the prevalence of a credit constraint or an instrumentation channel specific to other donors. The negative relationship could indicate that a development or an information channel specific to other donors prevail. This information channel specific to other donors summarises the fact that when other donors send more aid, they send more information about themselves, increasing incentives to migrate there and decreasing incentives to migrate to country d. Similarly, the instrumentation channel specific to other donors summarises the fact that when other donors send more aid, they may ask receiving governments to decrease migration flows to their economies, increasing incentives to migrate to country d.

Figure A.3: Bilateral migration rates and multilateral aid



Note: We use a quadratic fit to plot the (log) amount of multilateral aid received by country o against the (log) bilateral rate of migration from country o to country d (thus excluding zeros). We also report the distribution of observations used to compute this fit. We find a concave relationship between the bilateral migration rate and multilateral aid received by country o. Multilateral aid is at first positively correlated with migration. This relationship is driven by the bulk of observations that exhibit null multilateral aid flows. The correlation then becomes negative. Considering that multilateral aid flows are non-donor-specific and encompass only non-donor-specific effects of aid, the positive relationship could indicate the prevalence of a credit constraint channel while the negative relationship points toward the prevalence of a development channel.

Table A.2: Correlation matrix - Variables of interest

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ln $\text{Mig}_{od,t}$	1										
(2) ln $\text{Aid}_{do,t-1}$	0.320***	1									
(3) ln $\text{Aid}_{\Lambda o,t-1}$	-0.374***	0.264***	1								
(4) ln $\text{MultiAid}_{o,t-1}$	-0.194***	0.204***	0.551***	1							
(5) ln $\text{Aid}_{o,t-1}$	-0.322***	0.368***	0.956***	0.533***	1						
(6) ln $\text{Mig\_stock\_1990}_{od}$	0.574***	0.474***	0.090***	-0.179	0.168***	1					
(7) ln Dist_{od}	-0.267***	0.050***	0.131***	0.006	0.141***	-0.127***	1				
(8) Lang_{od}	0.381***	0.161***	-0.171***	-0.094***	-0.108***	0.309***	0.084***	1			
(9) Col_{od}	0.286***	0.217***	-0.095***	-0.033**	-0.051***	0.223***	-0.005	0.387***	1		
(10) ln $\text{GDP}_{o,t-1}$	0.284***	-0.222***	-0.319***	-0.161***	-0.318***	0.210***	-0.170***	0.068***	0.012	1	
(11) ln $\text{GDP}_{d,t-1}$	0.016	0.224***	0.037***	-0.002	0.049***	0.034***	0.126***	-0.038***	-0.143***	0.034***	1

Note: This table reports correlation coefficients between the dependent and the explanatory variables used in the empirical analysis. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

Table A.3: Correlation matrix - Instrumental variables

	(1)	(2)	(3)
(1) ln $IV_{do,t-1}$	1		
(2) ln $IV_{\Lambda o,t-1}$	0.098***	1	
(3) ln $IV_{o,t-1}$	0.248***	0.866***	1

Note: This table reports correlation coefficients between the instrumental variables used in the empirical analysis. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

Figure A.4: Correlation between destination-time variations in migration rates and multilateral aid flows

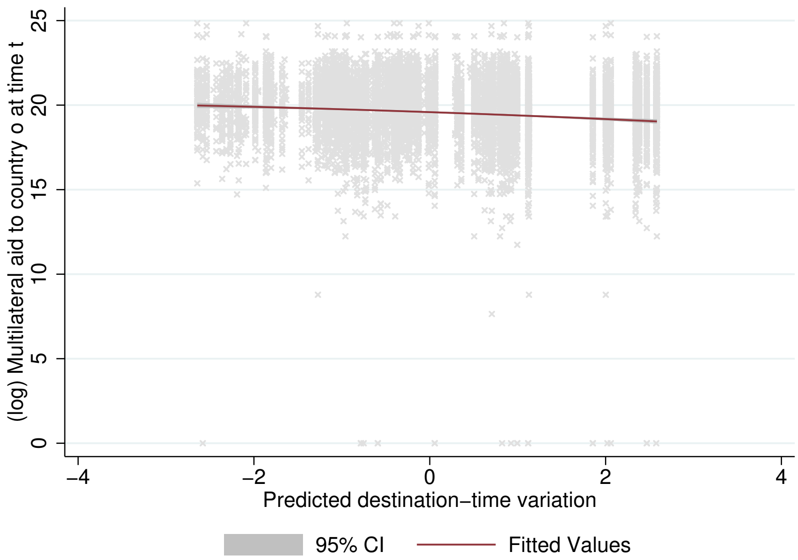


Figure A.5: Correlation between destination-time variations in migration rates and bilateral aid flows

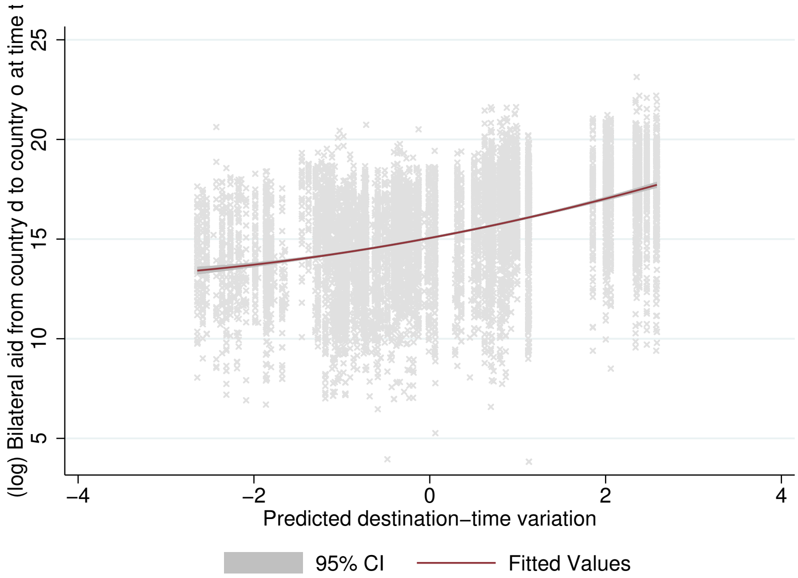
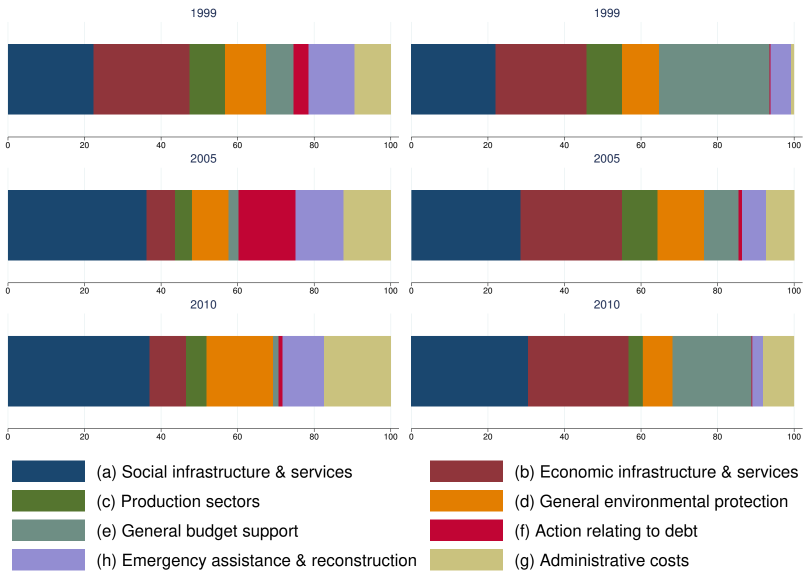


Figure A.6: Distribution of total bilateral and multilateral aid across sectors from 1999 to 2010



Note: Total bilateral aid is shown on the left panel and multilateral aid on the right panel.

A.3 Additional tables of results

Table A.4: Baseline specification - First stage results

	ln Aid$_{do,t-1}$	ln Aid$_{do,t-1}$	ln Aid$_{\Lambda o,t-1}$	ln Aid$_{do,t-1}$	ln Aid$_{\Lambda o,t-1}$	ln Aid$_{do,t-1}$	ln Aid$_{o,t-1}$
	(1a)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
ln IV$_{do,t-1}$	0.1558***	0.1531***	-0.0019	0.1530***	-0.0021	0.1554***	-0.0000
	(0.0070)	(0.0070)	(0.0023)	(0.0070)	(0.0023)	(0.0070)	(0.0009)
ln IV$_{\Lambda o,t-1}$		-0.0835***	0.1559***	-0.0862***	0.1521***		
		(0.0236)	(0.0435)	(0.0237)	(0.0438)		
ln IV$_{o,t-1}$						0.0519	0.1565**
						(0.0437)	(0.0754)
Controls (Γ)	yes	yes	yes	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes
Observations	9,679	9,679	9,679	9,679	9,679	9,679	9,679
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

Note: This table reports IV-2SLS first stage estimations associated to Table 3. Column (1) shows the first stage results of column (1) in Table 3; columns (2a-2b) report the first stage results of column (2) in Table 3 and so forth. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.5: Timing of the effect - First stage results

	$\ln \text{Aid}^e_{do,t-1}$	$\ln \text{Aid}^e_{\Lambda o,t-1}$	$\ln \text{Aid}_{do,t-2}$	$\ln \text{Aid}_{\Lambda o,t-2}$	$\ln \text{Aid}_{do,t-5}$	$\ln \text{Aid}_{\Lambda o,t-5}$
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
$\ln \text{IV}^e_{do,t-1}$	0.0870***	-0.0010				
	(0.0052)	(0.0029)				
$\ln \text{IV}^e_{\Lambda o,t-1}$	-0.0316**	0.0750***				
	(0.0128)	(0.0199)				
$\ln \text{IV}_{do,t-2}$			0.1613***	-0.0021		
			(0.0074)	(0.0029)		
$\ln \text{IV}_{\Lambda o,t-2}$			-0.0714***	0.1414**		
			(0.0245)	(0.0567)		
$\ln \text{IV}_{do,t-5}$					0.1768***	-0.0072***
					(0.0096)	(0.0022)
$\ln \text{IV}_{\Lambda o,t-5}$					-0.0873***	0.0871***
					(0.0316)	(0.0286)
Controls (Γ)	yes	yes	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes	yes	yes
Observations	6,886	6,886	8,274	8,274	4,664	4,664
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

Note: This table reports IV-2SLS first stage estimations associated to Table 4. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.6: Heterogeneity across income level - First stage results

	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$	ln $\text{Aid}_{do,t-1}$ $*\ln \text{GDP}_o$	ln $\text{Aid}_{\Lambda o,t-1}$ $*\ln \text{GDP}_o$
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(3c)	(3d)
ln $\text{IV}_{do,t-1}$	0.1414***	-0.0037***	0.1573***	-0.0031	0.0366	0.0190	-1.8465***	0.2079**
	(0.0083)	(0.0013)	(0.0132)	(0.0037)	(0.0319)	(0.0122)	(0.2187)	(0.0998)
ln $\text{IV}_{\Lambda o,t-1}$	-0.2008***	0.1131***	-0.0294	0.1683***	-0.2535*	0.3712***	0.1512	1.2256
	(0.0437)	(0.0165)	(0.0245)	(0.0580)	(0.1340)	(0.0930)	(1.0487)	(0.7578)
ln $\text{IV}_{do,t-1} * \text{GDP}_o$					0.0162***	-0.0029	0.4115***	-0.0305*
					(0.0044)	(0.0019)	(0.0324)	(0.0158)
ln $\text{IV}_{\Lambda o,t-1} * \text{GDP}_o$					0.0212	-0.0272*	-0.0993	0.0010
					(0.0166)	(0.0146)	(0.1349)	(0.1231)
ln $\text{GDPcap}_{o,t-1}$	0.1726	0.1871*	-0.2774*	-0.1881	0.2220	1.3271***	15.2580***	22.9986***
	(0.1326)	(0.1132)	(0.1534)	(0.1578)	(0.3846)	(0.3258)	(2.8919)	(2.5761)
Controls (Γ)	yes	yes	yes	yes	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	5,772	5,772	3,907	3,907	9,679	9,679	9,679	9,679
Sample	below med.	below med.	above med.	above med.	all	all	all	all
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

Note: This table reports IV-2SLS first stage estimations associated to Table 5. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.7: The donor-specific channels - First stage results

	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$	ln $\text{NrAidPro}_{do,t-1}$	ln $\text{NrAidPro}_{\Lambda o,t-1}$
	(1a)	(1b)	(2a)	(2b)
ln $\text{IV}_{do,t-1}$	0.1530***	-0.0021		
	(0.0070)	(0.0023)		
ln $\text{IV}_{\Lambda o,t-1}$	-0.0862***	0.1521***		
	(0.0237)	(0.0438)		
ln $\text{IV}^{nr}_{do,t-1}$			0.5152***	-0.0066
			(0.0143)	(0.0072)
ln $\text{IV}^{nr}_{\Lambda o,t-1}$			-0.2833***	0.3021***
			(0.0436)	(0.0536)
Controls (Γ)	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes
Observations	9,678	9,678	9,679	9,679
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

Note: This table reports IV-2SLS first stage estimations associated to Table 6. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. $\text{IV}^{nr}_{do,t-1}$ and $\text{IV}^{br}_{\Lambda o,t-1}$ denote the shift-share instrumental variables for $\text{NrAidPro}_{do,t-1}$ and $\text{NrAidPro}_{\Lambda o,t-1}$ respectively. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.8: Testing the exclusion restriction assumption

	$\triangle_{01-10} \ln \text{IV}_{do}$	$\triangle_{01-10} \ln \text{IV}_{\Lambda o}$	$\triangle_{01-10} \ln \text{IV}_{o}$
$\ln \text{Mig}_{od,01}$	-0.0043	0.0072	-0.0098
	(0.0089)	(0.0231)	(0.0120)
$\ln \text{GDPcap}_{o,01}$	-0.0239	0.0462	0.0796
	(0.0202)	(0.0559)	(0.1364)
$\ln \text{GDPcap}_{d,01}$	0.1033	0.4468**	0.0012
	(0.0742)	(0.2062)	(0.0444)

	$\triangle_{06-10} \ln \text{IV}_{do}$	$\triangle_{06-10} \ln \text{IV}_{\Lambda o}$	$\triangle_{06-10} \ln \text{IV}_{o}$
$\triangle_{01-05} \ln \text{Mig}_{od}$	0.0539*	0.0246	0.0586*
	(0.0285)	(0.0580)	(0.0339)
$\triangle_{01-05} \ln \text{GDPcap}_{o}$	0.0280	-0.4265**	-0.4151
	(0.0963)	(0.2062)	(0.5632)
$\triangle_{01-05} \ln \text{GDPcap}_{d}$	-0.8271***	0.4210	-0.0775
	(0.1985)	(0.4087)	(0.1749)

Note: This table reports OLS correlations. $\triangle_{xx-yy} \ln IV_{do}$ denotes the log-difference of $\ln IV_{do}$ (the difference between $\ln IV_{do}$ in 20yy and in 20xx). ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors are reported in parentheses.

Table A.9: Sector shares as instruments

	ln $\text{Mig}_{od,t}$					
	(1)	(2)	(3)	(4)	(5)	(6)
ln $\text{Aid}_{do,t-1}$	0.2576***	0.2840***	0.2553***	0.2730***	0.2558***	0.2732***
	(0.0221)	(0.0153)	(0.0232)	(0.0144)	(0.0233)	(0.0142)
ln $\text{Aid}_{\Lambda o,t-1}$			-0.0474	-0.0254	-0.0370	-0.0077
			(0.0835)	(0.0194)	(0.0872)	(0.0093)
ln $\text{MultiAid}_{o,t-1}$					-0.0174*	-0.0154***
					(0.0090)	(0.0056)
Controls (Γ)	yes	yes	yes	yes	yes	yes
Destination dummies	yes	yes	yes	yes	yes	yes
Origin dummies	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes
Observations	9,389	9,389	9,389	9,389	9,389	9,389
Estimator	IV-2SLS	GMM	IV-2SLS	GMM	IV-2SLS	GMM

Note: This table reports IV-2SLS second stage estimations and GMM estimations. First stage results for the IV-2SLS estimations are available upon request to the authors. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.10: Alternative instrumental variables - List of countries per broad regions

Africa, North of Sahara: Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Tunisia.
Africa, South of Sahara: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, France, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, United Republic of, Togo, Uganda, Zambia, Zimbabwe.
Europe: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, France, Hungary, Ireland, Latvia, Lithuania, Macedonia, the former Yugoslav Repu, Malta, Moldova, Republic of, Poland, Russian Federation, Slovakia, Slovenia, Turkey, Ukraine.
Far East Asia: Brunei Darussalam, Cambodia, China, Indonesia, Korea, Republic of, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Philippines, Singapore, Thailand, Viet Nam.
Middle East: Bahrain, Iran, Islamic Republic of, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen.
North & Central America: Antigua & Barbuda, Bahamas, Barbados, Belize, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago.
Oceania: Fiji, Kiribati, Marshall Islands, Micronesia, Federated States of, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu.
South & Central Asia : Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Georgia, India, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan, Uzbekistan.
South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.

Table A.11: Alternative instrumental variables - First stage results

	$\ln \text{Aid}_{do,t-1}$	$\ln \text{Aid}_{\Lambda o,t-1}$	$\ln \text{Aid}_{do,t-1}$	$\ln \text{Aid}_{\Lambda o,t-1}$
	(1a)	(1b)	(2a)	(2b)
$\ln \text{IV}_{dO,t-1}$	0.2300***	-0.0019		
	(0.0119)	(0.0037)		
$\ln \text{IV}_{\Lambda O,t-1}$	0.1514***	0.3984***		
	(0.0448)	(0.0513)		
$[\ln \text{IV}_{do,t-1}]''$			0.0078***	-0.0021
			(0.0025)	(0.0014)
$[\ln \text{IV}_{do,t-1}]'''$			0.0202***	-0.0004**
			(0.0011)	(0.0002)
$[\ln \text{IV}_{\Lambda o,t-1}]''$			0.0450***	-0.0262
			(0.0087)	(0.0178)
$[\ln \text{IV}_{\Lambda o,t-1}]'''$			0.0025***	0.0023*
			(0.0005)	(0.0012)
Controls (Γ)	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Observations	9,677	9,677	9,679	9,679
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

Note: This table reports IV-2SLS first stage estimations associated to Table A.12. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. $''$ and $'''$ denote the second and third central moments of the aid distribution respectively. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.12: Alternative instrumental variables - Second stage results

	$\ln \text{Mig}_{od,t}$	
	(1)	(2)
Regressions		
$\ln \text{Aid}_{do,t-1}$	0.2637***	0.0902***
	(0.0223)	(0.0105)
$\ln \text{Aid}_{\Lambda o,t-1}$	-0.0518	-0.0236
	(0.0561)	(0.0170)
$\ln \text{MultiAid}_{o,t-1}$	-0.0192***	-0.0139**
	(0.0073)	(0.0056)
Controls (Γ)	yes	yes
Destination FE	yes	yes
Year FE	yes	yes
Origin FE	yes	yes
Observations	9,677	9,679
Estimator	IV-2SLS	IV-2SLS
Kleibergen-Paap rk Wald F-Stat.	33.415	9.409
Stock-Yogo critical value (10% max. IV size)	7.03	7.56
Hansen J-stat (p-value)		0.1683
Transmission channels		
Non-donor-specific channel	-0.0192**	-0.0139**
	(0.0073)	(0.0056)
Channel specific to donor d	0.2639***	0.0935***
	$(0.0244)^b$	$(0.0121)^b$
Channel specific to all donors but d	-0.0462	-0.0199
	$(0.0924)^b$	$(0.0189)^b$

Note: This table reports IV-2SLS second stage estimations. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. b indicates that the standard errors associated to the coefficient has been obtained by non-parametric bootstrapping (with replacement; 100 iterations). Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.13: Alternative variables, estimator and sample - First stage results

	ln Aid$_{do,t-1}$	ln Aid$_{\Lambda o,t-1}$	ln Aid$_{do,t-1}$	ln Aid$_{\Lambda o,t-1}$	ln Aid$_{do,t-1}$	ln Aid$_{\Lambda o,t-1}$
	(1a)	(1b)	(3a)	(3b)	(4a)	(4b)
ln IV$_{do,t-1}$	0.1532***	-0.0022	0.2151***	0.0772***	0.1564***	-0.0040***
	(0.0070)	(0.0023)	(0.0108)	(0.0125)	(0.0073)	(0.0010)
ln IV$_{\Lambda o,t-1}$	-0.0833***	0.1518***	-0.1017***	0.0689	-0.1654***	0.0772***
	(0.0235)	(0.0439)	(0.0215)	(0.0429)	(0.0263)	(0.0107)
Controls (Γ)	yes	yes	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes
Observations	9,644	9,644	10,846	10,846	8,883	8,883
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

Note: This table reports IV-2SLS first stage estimations associated to Table A.14. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.14: Alternative variables, estimator and sample - Second stage results

	$\ln \text{Mig}^{f}_{od,t}$	$\text{Mig}_{od,t}$	$\ln \text{Mig}_{od,t}$	$\ln \text{Mig}_{od,t}$
	(1)	(2)	(3)	(4)
Regressions				
$\ln \text{Aid}_{do,t-1}$	0.2479***	0.0795***	0.2166***	0.2504***
	(0.0229)	(0.0099)	(0.0298)	(0.0254)
$\ln \text{Aid}_{\Lambda o,t-1}$	-0.0596	-0.0069	-0.0746	-0.0164
	(0.0656)	(0.0150)	(0.0843)	(0.1739)
$\ln \text{MultiAid}_{o,t-1}$	-0.0191**	-0.0004	-0.0546	-0.0140**
	(0.0077)	(0.0073)	(0.0639)	(0.0066)
Controls (Γ)	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Observations	9,644	9,829	10,617	8,752
Estimator	IV-2SLS	PPML	IV-2SLS	IV-2SLS
Kleibergen-Paap rk Wald F-Stat.	7.511		2.982	19.552
Stock-Yogo critical value (10% max. IV size)	7.03		7.03	7.03
Transmission channels				
Non-donor-specific channel	-0.0191**	-0.0004	-0.0546	-0.0140**
	(0.0077)	(0.0073)	(0.0639)	(0.0066)
Channel specific to donor d	0.2481***	0.0387^{na}	0.2170***	0.2626***
	$(0.0232)^{b}$	(0.0795)	$(0.0583)^{b}$	$(0.0231)^{b}$
Channel specific to all donors but d	-0.0543	0.6895^{na}	-0.0313	0.3913
	$(0.0848)^{b}$	(0.0066)	$(0.2732)^{b}$	$(0.3079)^{b}$

Note: This table reports IV-2SLS second stage estimations and PPML estimates. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors clustered within origin-time pairs are reported in parentheses. b indicates that the standard errors associated to the coefficient has been obtained by non-parametric bootstrapping (with replacement; 100 iterations). na indicates that the error could not be bootstrapped. Γ includes the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.15: Alternative specifications - First stage results

	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$	ln $\text{Aid}_{do,t-1}$	ln $\text{Aid}_{\Lambda o,t-1}$
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(5a)	(5b)
ln $\text{IV}_{do,t-1}$	0.1997***	-0.0065**	0.1531***	-0.0021	0.1530***	-0.0021	0.1530***	-0.0021
	(0.0078)	(0.0026)	(0.0070)	(0.0023)	(0.0070)	(0.0023)	(0.0125)	(0.0029)
ln $\text{IV}_{\Lambda o,t-1}$	-0.1706***	0.1609***	-0.0876***	0.1530***	-0.0862***	0.1521***	-0.0862***	0.1521***
	(0.0289)	(0.0428)	(0.0237)	(0.0437)	(0.0237)	(0.0438)	(0.0280)	(0.0527)
Controls (Γ)	no	no	dyadic only	dyadic only	yes	yes	yes	yes
Destination FE	yes	yes	yes	yes	yes	yes	yes	yes
Origin FE	yes	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	9,679	9,679	9,679	9,679	9,679	9,679	9,679	9,679
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS
Cluster	origin-year	origin-year	origin-year	origin-year	origin-year	origin-year	origin-destination	origin-destination

Note: This table reports IV-2SLS first stage estimations associated to Table A.16. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors are reported in parentheses. Γ may include the (log) distance in kilometres between the capital cities of countries o and d, a dummy variable equal to one if the two countries share a common official language and zero otherwise, a dummy variable equal to one if the two countries had a colonial relationship and zero otherwise, the (log) bilateral stock of emigrants in 1990 and the (log) GDP per capita of the origin and destination countries at time $t-1$.

Table A.16: Alternative specifications - Second stage results

	ln $Mig_{od,t}$	$Mig_{od,t}$	ln $Mig_{od,t}$	ln $Mig_{od,t}$	ln $Mig_{od,t}$
	(1)	(2)	(3)	(4)	(5)
ln $Aid_{do,t-1}$	0.5371***	0.2511***	0.2507***		0.2507***
	(0.0231)	(0.0230)	(0.0230)		(0.0511)
ln $Aid_{\Lambda o,t-1}$	-0.3431***	-0.0433	-0.0509		-0.0509
	(0.1320)	(0.0656)	(0.0655)		(0.0984)
ln $Multi_{o,t-1}$	-0.0071	-0.0197**	-0.0187**	-0.0066	-0.0187*
	(0.0130)	(0.0077)	(0.0076)	(0.0041)	(0.0099)
ln $Dist_{od}$		-0.8090***	-0.8085***		-0.8085***
		(0.0379)	(0.0380)		(0.0850)
$Lang_{od}$		0.5137***	0.5134***		0.5134***
		(0.0473)	(0.0473)		(0.1076)
Col_{od}		0.9637***	0.9634***		0.9634***
		(0.0798)	(0.0798)		(0.1784)
ln $MigStock\_1990_{od}$		0.2326***	0.2328***		0.2328***
		(0.0089)	(0.0089)		(0.0198)
ln $GDPcap_{o,t-1}$			-0.1163**	-0.0243	-0.1163*
			(0.0475)	(0.0374)	(0.0654)
ln $GDPcap_{d,t-1}$			-0.2381	0.0347	-0.2381
			(0.1769)	(0.0937)	(0.1796)
Destination FE	yes	yes	yes	no	yes
Origin FE	yes	yes	yes	no	yes
Origin-destination FE	no	no	no	yes	no
Year FE	yes	yes	yes	yes	yes
Cluster	origin-year	origin-year	origin-year	origin-year	origin-destination
Observations	9,679	9,679	9,679	9,567	9,679
Estimator	IV-2SLS	IV-2SLS	IV-2SLS	OLS	IV-2SLS
Kleibergen-Paap rk Wald F-Stat.	6.893	7.801	7.607		5.155
Stock-Yogo critical value (10% max. IV size)	7.03	7.03	7.03		7.03

Note: This table reports IV-2SLS second stage estimations. ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors are reported in parentheses. Column (3) shows the baseline specification. In column (4), bilateral aid and the rest of bilateral aid are not included as these variables exhibit little time variation.