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Abstract

This paper aims to quantify the effects from migration on net income distributions, disentangling the roles played by factor reallocation and remittances, and focusing on two (primarily) destination countries (Spain and Italy) and two (primarily) origin countries (Jordan and Iraq). Using LIS-ERF data sets for the four countries; the paper relies separately on a variant of a shift-share instrument to identify the effect of migration on inequalities at the regional level in Spain and Italy, and on quantile regression to estimate the impact of receiving remittances on per capita expenditure in Iraq and Jordan. The results suggest that migration increases inequality in both origin and receiving countries.

Keywords: Migration, income distribution, inequality, the Mediterrenean.
JEL Classifications: D31, D63, O15.

1 Introduction

The links between income inequality and factor mobility have been a topic of interest in the economics literature at least since Myrdal (1957). Naturally, flows of workers affect labor markets at both origin and destination (whether migration is internal or international), and consequences on income distributions arise from such variations of worker supply. The impact of such flows, however, is best answered empirically. The exact nature of the production apparatus as well as the degrees of substitutability between workers of different skills, of different origins and evolving in different segments of the labor market will determine the responsiveness of the wage distribution to variations in labor supply. Moreover, large shifts in the labor force may induce structural transformation, adding complexity to theoretical predictions on inequality effects from migration. Finally, remittances are likely to impact income distributions directly and indirectly both in origin and host countries, through effects on aggregate demand on the one hand (Blau and Kahn 2015), and labor supply through moral hazard on the other (Azam and Gubert 2005).

The Mediterranean Sea somewhat epitomizes a transnational labor market—although flows are highly regulated and a lot of migration irregular—and constitutes an excellent candidate for the study of linkages between migration flows and inequality. Southern European countries like Spain and Italy have seen large increases in their migrant populations over the last two decades, and conflicts such as the Syrian crisis have reshaped migratory equilibria in the Eastern Mediterranean region, with large inflows to countries such as Jordan, Turkey and Lebanon. The joint LIS-ERF database thus provides an interesting opportunity to study the interplay between population movements, transfers of remittances, skill and occupation structures, and the income distributions in the region.

This paper aims to quantify the effects from migration on net income distributions, disentangling the roles played by factor reallocation and remittances, and focusing on two (primarily) destination countries (Spain and Italy) and two (primarily) origin countries (Jordan and Iraq). It relies separately on a variant of a shift-share instrument to identify the effect of migration on inequalities at the regional level in Spain and Italy, and on quantile regression to estimate the impact of receiving remittances on per capita expenditure in Iraq and Jordan. Since quantile regression accounts for differential effects across the income distribution[1], appears an appropriate method to assess the treatment effect on a variable such as income/ total expenditure.

The paper is organized as follows; section two reviews the literature of migration and its impact on labor market and income distribution. Section three describes the context of each of our four countries and the data used. Section four presents the analysis of immigration and the income distribution in Spain and Italy. Section five discusses the emigration and the income distribution in Jordan and Iraq. Finally, section six concludes.

2 Related literature

Migrants impact labor markets in a number of ways. Generally not mirroring the native population, they bring different skills to the labor market and modify the relative quantities of skilled versus non-skilled workers. A seminal study by Card (1990) reports on the labor market impacts of the Mariel boatlift, upon which Cuban emigrants increased the population and labor force of the Miami metropolitan area by 7%. Card reveals that neither unemployment, nor wages among locals or earlier immigrants were seriously affected by the shock. Although Borjas (2017) later revisited the study finding negative effects, his findings were dismissed by later studies concluding on an insignificant impact (Clemens and Hunt 2019; Peri and Yasenov 2019). Looking at other historical episodes of mass integration of workers, Hunt (1992) and later Braun and Mahmoud (2014) found negative effects on wages and employment in France (from Algerian repatriates) and in Germany (from post-war expellees). Recently, the Syrian crisis and its resulting exodus of Syrians has led to a number of studies on the labor market impacts of war refugees (Akgündüz, Van den Berg, and Hassink 2015; Del Carpio and Wagner 2015; Ceritoglu et al. 2017; Fakih and Ibrahim 2016; David et al. 2018). A common finding in this literature is that refugees compete with workers which are similar to themselves, i.e. low-skilled and/or informal workers. Natives in those groups often bear the burden of immigration costs, whilst more skilled / formal workers may actually benefit from the relative supply of unskilled labor.

[1] In particular unconditional quantile regressions.

While the above literature usually identifies the impact of migration through exogenous historical events, most of the world's migrants are neither refugees, repatriates or the result of territorial recompositions. They are rational individuals who have chosen to leave a place of origin for a destination deemed more likely to be profitable, from a personal or a household point of view. Their destination countries, cities and areas are rarely the result of randomness. Similarly, the reaction from natives at the country, city and area level is unlikely to be neutral. Borjas (2006) shows that out-migration from one U.S. state to another as a response to immigration reduces the measured local impact of immigration on wages by 40% to 60%. In this context, the wage effects of migrants should clearly be measured at the national level.

When exogenous shocks are used to identify the effect of migration researchers are often left with a fairly homogenous population for which a local average effect is estimated. This can be contrasted with a heterogeneous immigrant population, originating from many countries, present in multiple sectors, professions and segments of the income distribution. This fact has prompted a literature on the impact of migration on income distributions. A series of articles rely on what is termed the Aggregate Production Function method (Blau and Kahn 2015). By assuming a nested production function (typically a nested CES function) and a competitive labor market, elasticities at different nests can be estimated from "down" to "top" in the manner of Card (2009). One of the advantages of the aggregate production function method is that once elasticities are estimated, they allow for counterfactual experiments on the wage effects resulting from artificially modifying the composition of the labor force. The method has its inconveniences, though. Mainly, the choice of a production structure is somewhat *ad hoc*. In theory, an infinity of production structures could be thought of, with different choices producing different estimates. Data provide little guidance as to which structure truly best represents the economy under scrutiny. Furthermore, OLS estimates of said production structures are subject to endogeneity as relative factor proportions are theoretically linked to relative factor wages. Another strand of the literature employs the so-called "spatial correlations" approach, comparing changes in the share of migrants and changes in wages at the local level. Examples of this approach include Card (2009), comparing the evolution of migration shares and wages in U.S. cities, or Dustmann, Fabbri, and Preston (2005), who carry out a similar study on British regions. As pointed out by Borjas (2006), the spatial correlations approach tends to recover a net effect of migration on wages at the local geographical level, once locals have adapted to immigrants through out-migration. This is obviously different from the impact of immigration to a closed economy, such as the United States as a whole. The debate on the responsiveness of natives and the bias it implies on coefficients obtained from spatial correlations is not settled, and Card (2009) argues that parameters estimated from cross-city and aggregate time series comparisons are mutually consistent. The above literature has mainly dealt with the labor market effects of migration in destination countries. Until Mishra (2007), the discussion about the labor market effects of emigration was almost exclusively theoretical, despite the fact that shocks to sending countries' labor markets are often as important-if not more important-than those to receiving countries. Mishra's study on the Mexican labor market suggests important effects of emigration : the outflow of Mexican workers to the US between 1970 and 2000 raised wages of the average Mexican worker by about 8%. She also finds that effects are heterogeneous across skill groups with a larger effect for high-skilled Mexicans. As such, emigration could be a possible means of explaining Mexico's increasing wage inequalities. Docquier, Ozden, and Peri (2013) simulate the impact of both immigration and emigration to and from OECD countries, finding that the latter increased inequalities in all countries studied. Evidence from Poland (Dustmann, Frattini, and Rosso 2015), Lithuania (Elsner 2013) and Porto Rico (Borjas 2008) also suggests that wages respond to the relative factor reallocations implied by emigration.

The above strands of the literature have discussed how migration affects labor market outcomes predominantly through factor reallocation. While labor market effects surely carry over to the income distribution, they are not the only ones to affect it. Another strand of the literature has attempted to investigate the role played by remittances in shaping inequalities. This strand has not produced a consensus concerning the effect of migration and remittances on the income distribution in origin countries. Some studies find that remittances have an unequalizing effect on the income distribution (Stark, Taylor, and Yitzhaki 1988; Barham and Boucher 1998; Möllers and Meyer 2014), while others find that remittances reduces the overall level of inequality (Rivera and Jorge 2005; Koczan and Loyola 2018). The inconclusiveness of the literature regarding the impact of remittances on income distribution may be explained by several factors; different types of migration; the migration history of the country, the income distribution of the sending households, the income group to which the remittances are sent and the average amount of remittances received (Stark, Taylor, and Yitzhaki 1988; Möllers and Meyer 2014; Koczan and Loyola 2018). As migration includes risks and costs, in addition to benefits, its impact on inequality will depend on the distribution of costs and benefits (Black, Natali, and Skinner 2006). The impact of migration on inequality may also vary over time. If costs are initially high, only wealthy individuals from an area will engage in migration. Later, as the migration network expands and information diffuse, migrants from lower income group will have better access to the migrants' labor market. Hence, inequality reduction may be a decreasing function of the time during which villages or countries have engaged in migration (Stark, Taylor, and Yitzhaki 1988; Black, Natali, and Skinner 2006). Moreover, the effect of remittances may differ according to the conditional expenditure distribution of the receiving households. For instance; Möllers and Meyer (2014) found that remittances have no impact on the extremely poor in Kosovo. And Bang, Mitra, and Phani V Wunnava (2018) found that remittances have positive marginal impact at all quantiles except the highest ones of the conditional distribution for households' expenditure in Nigeria.

As the impact of migration may differ according to the income group of the receiving households, estimating the impact of remittances on households' expenditure evaluated at the conditional mean is inadequate for studying its impacts on income distributions. Similarly, evaluating the effect of being a migrant on income at the conditional mean in destination countries hardly provides enough information to study the effects of immigration on the income distribution. Therefore, we use quantile regression to study the effects of migration at various positions in the income distribution. In this paper, we thus aim to compare the effect of remittances and migration status on income distributions in both destination and sending countries located around the Mediterranean, taking into account both direct effects from flows and displacement effects from migration. Our original contribution lies in the study of hitherto relatively unexplored economies (from a migration/inequality point of view) and in our comparative approach of sending and receiving countries.

3 Context and data

Our analysis is carried out using ERF-LIS surveys for two destination countries Spain (ES13) and Italy (IT14) and two origin countries Jordan (JO13) and Iraq (IQ12). Furthermore, a regional panel is constructed for Spain and Italy, and presented below. The summary statistics of the main variables used are presented in Table 1.

Table 1: Summary Statistics

Variable	Sample Size	Mean	Std. deviation	Min	Max
Iraq (2012)					
Per Capita expenditure	25146	2853.3	2885.2	116.7	147247
Remittances	25146	29	640.3	0	75000
Age of HH members	25146	45.9	13.9	11	104
Household size	25146	6.9	3.6	1	42
Jordan (2013)					
Per Capita expenditure	4850	1812.8	1434.4	193.4	23098.4
Remittances	4850	96.1	789.4	0	18500
Age of HH members	4850	48.5	14.5	16	97
Household size	4850	5.3	1	1	23
Spain (2013)					
Disposable per capita income	11965	11743.7	8604.4	-18146.5	132316.6
Share immigrant household heads	11965	0.074	0.026	0	1
Age of HH members	11965	48.7	19.4	9.7	98
Household size	11965	2.64	1.3	1	12
Italy (2014)					
Disposable per capita income	8151	12133.5	8726.2	-1691.4	187783.1
Share immigrants household heads	8156	0.066	0.25	0	1
Age of HH members	8156	55	19.4	10.75	101
Household size	8156	2.37	1.25	1	10

Source: Authors' computations using ERF-LIS data.

3.1 Spain

Spain witnessed a stunning increase in immigration from the mid-1990s well into the 21st century. Foreign arrivals stood at some meager 16.686 in 1996, increasing rapidly to 330.881 in the year 2000, and peaking at 920.534 in 2007 (Izquierdo et al. 2016). This migration episode rapidly increased the total population in Spain as well as the share of foreign nationals which rose from a mere 2% to over 12%. The period coincided with a global crisis, a rise in unemployment and a housing boom in Spain, spurring an emigration episode by foreigners and Spaniards alike. By 2011, net immigration of foreigners became negative, and by 2013, some 150.000 more foreigners left the country than entered.

We use five surveys covering the period of strong migration dynamics in Spain. The surveys each contain between 11.000 and 14000 households, in 19 regions. The main birth countries of immigrants as of 2016 are Morocco (20%), Ecuador (8.9%), Romania (7.8%) and Colombia (6.4%), and migrants are in general less educated than natives, with an average of 10.9 years of education in the 15 – 59 year range, versus 12.0 years for natives. The employment rate in the 18 – 59 year range stands at 60.5% for migrants versus 64.5% for natives. The discrepancy is mainly explained by a larger share of homestayers and a higher rate of unemployment among immigrants. As can be seen in Table 2, increasing migration has been accompanied by an increase in the Gini coefficient at the national level.

Table 2: Summary statistics for Spain

Year	National Gini	Share of migrant HH	Avg. obs. per region	Avg. HH inc. p.cap.
2004	0.342	0.052	722	8424.8
2007	0.351	0.075	685	11684.7
2010	0.365	0.071	690	11664.3
2013	0.385	0.081	630	13792.1
2016	0.381	0.099	723	14471.4

Source: Authors' computations using LIS data.

3.2 Italy

Italy has a long history of population flows. A prominent sending country to the Americas during late 19th century and early 20th century, with some 13 million leavers, the country transformed into a destination country in the mid-20th century. Strategically positioned in the Mediterranean, the country also acts as a port of entry for African migrants destined for European countries, something that has prompted political tensions in recent years. Italy is also a major destination for Eastern European migrants, with Romanians and Albanians alone accounting for more than 30% of immigrants in 2016 (Scotto, 2017: August 24). Contrary to what has been happeing in Spain, while the share of migrant headed households has increased in Italy—albeit at a slower rate than in Spain—national Gini has fallen (Table 3).

Similar to Spain, we use five Italian surveys covering the recent period. The surveys each contain around 8000 households, in 20 regions. The 2014 Italy dataset contains 8156 households, whereof 540 (6.6%) were headed by immigrants. The Italy data contains no information on the citizenship or country of birth of individuals. Immigrants are on average less educated than natives (10.2 versus 11 years of education for individuals in the 15 – 59 age range), but are slightly more often employed (59.6% for immigrants versus 57.6% for natives, 18 – 59 y.o.). The discrepancy is mainly due to individuals in education, with migrants being more often homestayers and slightly more unemployed. Excluding individuals in education, the migrant employment rate is lower than that of natives.

Table 3: Summary statistics for Italy

Year	National Gini	Share of migrants HH	Avg. Obs per region	Avg. Hh inc. P.cap.
2000	0.353	0.022	400	8916.5
2004	0.349	0.036	401	10317.8
2008	0.325	0.055	399	11512.7
2010	0.332	0.061	398	11819.4
2014	0.330	0.058	408	11897.4

Source: Authors' computations using LIS data.

3.3 Iraq

Iraq's population increased over the years to reach 33 765 000 in 2013 with a crude net migration rate of 2.7 during the period 2010-2015. The stock of international migrants decreased from 146 910 in 2000 to 95 780 in 2013. The two main destination countries for migrants and for refugees, in 2012-2013, are Syria and Jordan (UNICEF).

The conflicts and the instability in Iraq resulted in very low share of remittances inflow in GDP (0.2%) in 2013. According to the 2012 Iraqi household survey includes only 1% of the 25 146 households receives remittances. Most of the households receiving remittances live in urban areas (69%). On average, households who receive remittances have higher per capita expenditure.

Concerning the head's characteristics, we found that most of the households receiving remittances are male-headed households (81 %) and are married (81%). More than 60% of the households receiving remittances have a head with secondary education level or lower (Table 4). And for their employment status; 59% of them are employed (Table 5).

3.4 Jordan

Jordan is an upper middle-income economy with a population size of 7 274 000 in 2013 with a crude net migration rate of 11.31 during the period 2010-2015. Remit-

Table 4: Head's Education among those receiving remittances

Education level	Iraq 2012	Jordan 2013
Never attended school	26	19
Primary	20	9
Secondary	39	30
Post Secondary	8	15
Bachelor	6	22
Post Bachelor	0	6
Total	100	100

Source: Authors' computations using ERF-LIS data.

Table 5: Head's employment status among those receiving remittances

Employment Status	Iraq 2012	Jordan 2013
Employed	56	24
Unemployed	6	11
Not in labor force	39	65
Total	100	100

Source: Authors' computations using ERF-LIS data.

tances inflow represents an important share of GDP; an estimated 11.7 percent in 2013. The country is characterized by an important stock of international emigrants, that has increased over time to reach 2 925 780 in 2013. As of 2012- 2013, the two main destination countries for emigrants are Saudi Arabia and United Arab Emirates (UNICEF). Jordan's economy is highly affected by the Iraqi and Syrian crisis given that Jordan is one of the main destinations of refugees (World Bank, 2019). The 2013 Jordanian household survey includes 4 850 households of which with 6 % receive remittances. Most of the households receiving remittances live in urban areas (79 %). As found in Iraq, on average, households who receive remittances have higher per capita expenditure. Concerning the head's characteristics; most of the households receiving remittances are male-headed households (72 %) and are married (77 %). For the education level; Jordanian households' heads have higher education level compared to Iraq. Among those receiving remittances, less than 60 % have higher secondary education or lower. And 22 % have bachelor degree (Table 4). While for the employment status, 69 % of the households head are outside of labor force (Table 5).

4 Immigration and the income distribution in Spain and Italy

4.1 Intra-regional patterns

In this section, we make use of the regional panel data from Spain and Italy to investigate the link between immigrant concentration, and income inequality. Our first set of regressions employ random and fixed effects and simply regress a series of measures of inequality on the share of immigrants at the regional level. Observations are households, and immigrant households are defined as households headed by an immigrant.[2] Given that immigrants are generally characterized by a more precarious status in the labor market, more often work informally and are less educated than natives, their concentration in a region likely shifts the mean and median of the income distribution to the left. The literature has shown that competition from migrants in the labor market is likely to worsen outcomes of those workers who are at similar qualification levels and compete for the same types of jobs. However, immigration tends to be beneficial for natives who are complementary to low-skilled workers. The end result on inequalities is hard to foresee, but clearly, if low-skilled workers generally earn less and medium and high-skilled workers more, an increase in inequalities is a plausible result.

We first address this question at the regional level. Do regions which have experienced more immigration end up with more unequal income distributions? It is clear that migrants often send remittances to origin households in their home countries. This information is however lacking from the survey data, such that our focus lies on net disposable income prior to remittances. Information on household transfers is available, but it is hard to say whether this variable contains international transfers or not. We believe that our results reflect pre-remittance inequalities, and may thus understate true inequalities in *standard of living*.

The results for Spain are shown in Table 6. Coefficients for Gini are positively related

[2] The definition of an immigrant in LIS surveys varies. The following criteria are applied, by order of priority: data provider classification as immigrants; individuals who self-define them-selves as immigrants; individuals who are the citizen/national of another country; individuals who were born in another country. For both Spain and Italy, migrants are those who are either non-citizens, or who are citizens but where born abroad.

Table 6: Results for Spanish regions

Spain	Gini			
	Random effects		Fixed effects	
	β	S.E.	β	S.E.
Year				
(ref: 2004)				
2007	0.0005447	0.0053687	0.0018841	0.0054415
2010	0.0178835***	0.005299	0.0188161***	0.0053322
2013	0.0332299***	0.0054987	0.0351364***	0.0056465
2016	0.0253114***	0.0060985	0.0289348***	0.0065757
Share of migrant households	0.2240033***	0.0777706	0.1298707	0.1005689
Constant	0.3241788***	0.0079178	0.3295249***	0.0069223
	p90/p10			
	Random effects		Fixed effects	
	β	S.E.	β	S.E.
Year				
(ref: 2004)				
2007	-0.2264678	0.2888948	-0.07971	0.2761951
2010	0.6103653**	0.2851966	0.7108923**	0.2706455
2013	1.153075***	0.2957951	1.364287***	0.2865985
2016	0.5671767*	0.3276268	0.9735295***	0.3337616
Share of migrant households	12.72836***	4.152088	2.029502	5.104575
Constant	4.350804***	0.4208163	4.955407***	0.3513533
	p10/p50			
	Random effects		Fixed effects	
	β	S.E.	β	S.E.
Year				
(ref: 2004)				
2007	0.0187574	0.0114009	0.0136166	0.0112274
2010	-0.0213522*	0.0112903	-0.0248144**	0.0110018
2013	-0.0424666***	0.0116055	-0.0499475***	0.0116503
2016	-0.0164693	0.0125505	-0.0310354**	0.0135675
Share of migrant households	-0.7877379***	0.1392047	-0.3992867*	0.207503
Constant	0.492384***	0.0135655	0.4697773***	0.0142826

to the share of migrants at the regional level, but only significant in the random effects model. The relationship suggests that an increase in the share of migrants of 1 percentage point provokes an increase in the Gini coefficient by 0.1 - 0.2 percentage points. Looking at the percentile ratios p90/p10 and p10/p50, they both also suggest that migration widens the gap between the lowest earners on the one hand and the highest or median earners on the other hand.

Qualitatively, the results for Italy are similar to those from Spain. A panel of 20 regions was used, containing information on migration shares and income for five different years (2000, 2004, 2008, 2010 and 2014). The results are shown in Table 7. As for Spain, the results for the Gini coefficient are contained in the 0.1 - 0.25 range, without being significant (the relatively low number of observations is likely an issue). Similarly, the ratio of the 9th to 1st decile (p90/p10) is positive and larger than 2. For Spain, this result is significant in the random effects model, while for Italy it becomes significant in the fixed effects model. Lastly, and similar to Spain, the ratio of the 1st decile to the 5th (p10/p50) is negatively related to the share of migrants households, with estimates contained in the -0.2 - -0.8 range for both countries. For Italy, however, only the fixed effects estimate is significant. Firpo, Fortin, and Lemieux (2009) point out that conditional quantile regressions such as the ones used here do not give us the impact of a variable (such as remittances) on the unconditional distribution of income. To account for this, we also run so called unconditional quantile regressions relying on recentered influence functions. It turns out that the results were very similar to those obtained with conditional quantile regression.[3]

Migration is rarely an exogenous event. It could be that migrants are attracted to particular regions, which happen to be associated with higher income inequality. Through the use of panel data, we remove some of these concerns, but a dynamic selection may still prevail: if say, the concentration of wealth leads the relatively wealthy to offer more unskilled job opportunities for foreign labor, and this is known in origin countries, migrants may want to go to those regions where income inequality is relatively high. To correct for the endogeneity of migration, the literature has often made use of so-called *shift-share* instruments. The spatial distribution of migrants is interacted with yearly flows by country of origin. We follow this approach for Spain, instrumenting the share

[3]Results are available upon request.

Table 7: Results for Italian regions

	Gini			
	Random effects		Fixed effects	
	β	S.E.	β	S.E.
Year				
(ref: 2000)				
2004	-0.0069936	0.0090045	-0.0080371	0.0091443
2008	-0.026436***	0.0100198	-0.0288493***	0.0105942
2010	-0.0221761**	0.0104741	-0.0250233**	0.0112264
2014	-0.0205807**	0.010283	-0.0232516**	0.0109615
Share of migrant households	0.1314252	0.14745	0.2044313	0.179481
Constant	0.3182686***	0.0103504	0.316695***	0.0073134
	p90/p10			
	Random effects		Fixed effects	
	β	S.E.	β	S.E.
Year				
(ref: 2000)				
2004	-0.311393**	0.147364	-0.374888**	0.143333
2008	-0.5109441***	0.1647182	-0.6577971***	0.1660595
2010	-0.2645417	0.1724613	-0.4377997**	0.1759697
2014	-0.0991051	0.1692051	-0.2616366	0.1718166
Share of migrant households	2.55957	2.469051	7.002156**	2.813288
Constant	4.128599***	0.1783652	4.032837***	0.1146352
	p10/p50			
	Random effects		Fixed effects	
	β	S.E.	β	S.E.
Year				
(ref: 2000)				
2004	0.0096365	0.0123307	0.0155379	0.0120367
2008	0.0351353***	0.0136522	0.0487843***	0.0139452
2010	0.0118129	0.0142455	0.027916**	0.0147774
2014	-0.0138821	0.0139958	0.0012241	0.0144287
Share of migrant households	-0.2940591	0.1965961	-0.7069683***	0.2362518
Constant	0.5023004***	0.0134674	0.5112008***	0.0096267

of migrants with:

$$\tau_{it} = \frac{\sum_j \sigma_{ij} N_{tj}}{P_{i,t-1}} \tag{1}$$

Where σ_{ij} is the share of country *j* migrants residing in region *i* in 2001, N_{tj} the number of migrants of origin country *j* who arrive in the country in year *t*, and $P_{i,t-1}$ the population of region *i* in year *t-1*. Information on inflows (N_{tj}) only exists for main countries, and from 2008. Instead, we draw on information from the municipal registry on the stock of foreign born in the country. We thus use as our measure of arrivals the change in stock between *t-1* and *t*. This information as well as information on population by region come from the National Statistical Institute (INE), and information on shares by origin country at the regional level come from an IPUMS census extract from 2001.

Commonly, instrumental variables rely on historical figures to associate increases in migration with migrants' spatial distributions. In our case, this is not a viable strategy for two reasons: firstly, up until the end of the 1990s Spain remained a country where the immigrant population represented an extremely low share of population. Second, and related, there is no reliable data on the distribution of the immigrant population prior to the late 1990s. However, the main cause for concern when deciding on the lag of the initial spatial distribution is that it should be uncorrelated with present-day shocks calling for a similar spatial distribution. In the case of Spain, however, immigration from all origins and to all regions increased heavily over the period, with migrants representing some 3% of the population in 2001, increasing to 12% in 2011, subsequently decreasing to about 10% by 2016. Furthermore, Jaeger, Ruist, and Stuhler (2018) and Goldsmith-Pinkham, Sorkin, and Swift (2018) study shift-share (or *Bartok*) instruments, arguing that they confound short-term and long-term adjustments to immigration. In particular, Jaeger, Ruist, and Stuhler (2018) show that the bias from lagged supply shocks is proportional to the extent to which the instrument predicts current inflows better than past inflows. In our analysis, the instrument predicts present inflows reasonably well, but does a poor job at predicting past inflows. We therefore believe that the bias associated with lagged labor market adjustments is minor and that the 2001 settlement configuration interacted with the size of arrivals by period is a reasonable instrument for immigration.

Table 8: Random effects generalized least squares (IV), Spanish regions

	Gini		p10/p50		p90/p10	
	β	S.E.	β	S.E.	β	S.E.
First stage						
2007	0.022	0.003	0.022	0.003	0.023	0.003
2010	0.023	0.007	0.022	0.007	0.024	0.007
2013	0.056	0.010	0.056	0.010	0.061	0.011
2016	0.082	0.017	0.082	0.017	0.088	0.018
Instrument	0.797***	0.224	0.786***	0.223	0.917***	0.235
Constant	0.024	0.008	0.024	0.008	0.019	0.008
Observations	94.0		94.0		94.0	
Second stage						
Share of immigrants	0.185	0.160	-1.439***	0.388	21.320***	7.691
2007	0.002	0.005	0.030	0.014	-0.328	0.241
2010	0.019	0.006	-0.013	0.013	0.546	0.238
2013	0.034	0.006	-0.027	0.018	0.999	0.248
2016	0.027	0.010	0.011	0.029	0.257	0.516
Constant	0.326***	0.009	0.530***	0.020	3.809***	0.288
Observations	94		94		94	

Table 8 shows the results of the instrumental variable approach. The coefficient for Gini has decreased and is no longer significant. Coefficients for decile ratios remain significant and have roughly doubled in size. The results for p10/p50 suggest that a region that goes from no immigrants to a share of 10% migrants should see its p10/p50 ratio decrease by .15. In other words, the income of an individualat the 10th percentile in terms of the income of the median individual at 50th percentile would drop by 15%, a large effect. Similarly, a region going from no immigration to 10% immigrants would see the relative income of an individual at the 90th percentile versus an individual at the 10th percentile double.

4.2 Distinguishing migrants by origin

Spain and Italy do not only attract labor migrants. In the case of Spain, a substantial share of foreigners are Europeans, who have relatively low incentives to integrate a labor market with double digit unemployment, and relatively low wages compared to other countries in the euro zone. However, Spain's location and role as a major tourist destination implies that many Europeans settle down in the country in later stages of life. This migration may have different implications for income inequality, if for example Western European immigrants are composed of a relatively wealthy group who can afford having a second residence in Spain. Knowing the origin of migrants in Spain, we thus compare the relative contributions to income inequalities of immigrants from five different regions (Africa, the Americas, Asia & the Middle East, Western Europe, Eastern Europe).

Table 9 shows the results from a random effects and fixed effects regression by migrant group. It turns out that for the Gini coefficient, migrants from Asia do contribute significantly to increasing income inequalities, even when fixed effects are accounted for. On the other hand, when decomposing migrant shares by origin, there is no significant effect on the p10/p50 and p90p10 ratios. Estimates are very imprecise, however, and a too big conclusion should not be drawn from the exercise. It could be noted, however, that despite the huge standard errors in the p90p10 regression, the group of Asian migrants also have the largest impact on this explanatory variable.

4.3 Interregional effects

The previous results suggest that immigration impacts intra-regional inequality measures, and that these seem driven by the bottom of the income distribution. In this section, we discuss the impact of immigration on inequality between regions. Since the Gini coefficient cannot be rewritten in terms of a between and a within group inequality, we follow Jenkins (1995) and decompose the mean logarithmic deviation[4] for Spanish and Italian regions for each year in the data into its between and within components.

Unsurprisingly, most of the variation comes from within regions. But through which channels does migration influence interregional inequalities ? In the above decomposition, the between-group component is the resulting inequality index that would arise if all individuals had their region's mean income. Thus, migration can change interregional inequality through changing the mean income. In the previous regressions, we

[4]From the class of Generalized Entropy measures.

Table 9: Results from Spanish regions, by migrant origin

Gini	RE		FE	
	β	S.E.	β	S.E.
2007	-0.0081378	0.0088916	-0.0032781	0.0102991
2010	0.008499	0.010516	0.0121136	0.0123134
2013	0.0304538***	0.0107312	0.0307644**	0.0116281
2016	0.0221642*	0.0133914	0.0245515	0.0153063
Africa	0.2688593***	0.0713953	0.021169	0.0846463
Americas	-0.0085453	0.1326916	-0.0914133	0.1461287
Western Europe	0.0802185	0.3504101	0.3375647	0.2988447
Eastern Europe	-0.1152902	0.2768827	0.3357828	0.3606087
Asia	1.285021**	0.5795333	1.001635*	0.5484661
Constant	0.3353261***	0.0071127	0.3370227***	0.0036926
p10/p50	RE		FE	
	β	S.E.	β	S.E.
2007	0.047958***	0.0152496	0.0226622	0.0166892
2010	0.0107418	0.0173393	-0.0111813	0.0212839
2013	-0.0315752	0.0195407	-0.039085*	0.0215808
2016	-0.0067572	0.0207535	-0.0244936	0.0245411
Africa	-1.092356***	0.087503	0.0090581	0.1463432
Americas	-0.4822812	0.3648219	-0.1258913	0.3877586
Western Europe	0.7075908	0.7861999	-0.7149008	0.950229
Eastern Europe	-0.004642	0.6365227	-1.038854	0.9412985
Asia	-0.965936	1.840356	0.5040458	1.806175
Constant	0.4538977***	0.0147648	0.4462234***	0.0074352
p90/p10	RE		FE	
	β	S.E.	β	S.E.
2007	-0.7367813	0.3673458	-0.0881102	0.4324445
2010	0.1101453	0.4804614	0.6588426	0.6477324
2013	1.187373	0.5343672	1.317479	0.6073456
2016	0.5506429	0.3939715	0.9424357	0.5571187
Africa	27.57599	2.985162	-0.3069226	4.510171
Americas	5.827624	7.421513	-1.767408	8.192476
Western Europe	-35.61186	24.33197	-5.495649	22.94235
Eastern Europe	-17.76587	12.14287	15.8774	14.90221
Asia	56.14589	50.95121	19.47779	43.39516
Constant	4.884924***	0.3504104	5.082385***	0.0959601

Table 10: Mean logarithmic deviations, regional decomposition (Spain, Italy)

Spain			*Italy*		
Year	Mean log deviation		Year	Mean log deviation	
	Within-group	Between-group		Within-group	Between-group
2016	0.264	0.013	**2014**	0.213	0.021
2013	0.258	0.021	**2010**	0.196	0.028
2010	0.235	0.013	**2008**	0.175	0.024
2007	0.212	0.015	**2004**	0.193	0.032
2004	0.207	0.013	**2000**	0.202	0.032

have not shown the effect on income. Adding the mean regional income as a dependent variable in previous regressions (results not shown), we do not find a significant effect neither in Spain nor in Italy (although in Spain, the point estimate is negative whereas in Italy it is positive).

4.4 Quantile Regression

Another way of establishing whether migration contributes to increasing or decreasing inequalities is to look at quantile regressions. Such approach accounts for the heterogeneous impact of migration on income distribution (Kwak, 2010; Bang et al, 2018). The potential income Y_M is given by the following quantile function, conditional on a set of exogenous variables $X = x$

$$Y_M = q(M, x, u) = \alpha_\tau M + X'\beta_\tau + u; \tag{2}$$

Where q(.) is a conditional quantile function with error term u. M is a binary indictor for migration status. And X is a set of covariates including age, gender and education of the head, in addition to the household's size and geographical location. The parameter of interest, α_τ, reflects the effect of the migration status on the log per capita income distribution (for more details see Kwak 2010 and Bang et al 2016).

Examining the different coefficients at different deciles gives us a better idea of what is going on. We thus use the individual dataset here, regressing the log per capita income at the household level on the set of covariates. Table 11 shows the result of this exercise for Spain (2013). Being a migrant indeed carries a per capita income penalty, and this penalty is decreasing as one moves higher up in the income distribution. Thus, in the poorest deciles, being a migrant is worse than in wealthier deciles. This evidence is consistent with decreasing p10/p50 ratios and increasing p90/p10 ratios in our regional panel, and suggests that migrants do have an impact on the income distribution, and that this impact is strongest at the bottom of the distribution.

Table 11: Results from a quantile regression on income, Spain (2013)

	Standard quantile regression								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Immigrant	-0.7421158***	-0.639921***	-0.572449***	-0.5242055***	-0.479713***	-0.4371251***	-0.392143***	-0.3460363***	-0.2736858***
	-0.080328	-0.0604722	-0.0481192	-0.0400278	-0.0335799	-0.0289152	-0.026486	-0.0273412	-0.034598
Age	0.0205659***	0.0168846***	0.0144541***	0.0127163***	0.0111136***	0.0095794***	0.0079591***	0.0062982***	0.003692***
	-0.000949	-0.0007254	-0.000594	-0.0005146	-0.0004603	-0.0004292	-0.000424	-0.0004483	-0.0005369
Female	-0.1511314***	-0.1348004***	-0.1240182***	-0.1163088***	-0.1091988***	-0.1023931***	-0.0952049***	-0.0878369***	-0.0762751***
	-0.0305106	-0.0231928	-0.0186671	-0.0157209	-0.013378	-0.0116781	-0.0107456	-0.0109404	-0.0133681
Education:									
-Primary	0.2148522***	0.2266264***	0.2344***	0.2399583***	0.2450844***	0.2499911***	0.2551736***	0.2604857***	0.2688214***
	-0.0404481	-0.0309273	-0.0251405	-0.021462	-0.0186362	-0.0167058	-0.015804	-0.0162871	-0.0195603
-Secondary	0.3924731***	0.3580708***	0.3353574***	0.319117***	0.3041393***	0.2898028***	0.2746603***	0.2591392***	0.2347835***
	-0.0421902	-0.0320594	-0.0258263	-0.0218	-0.018641	-0.0164052	-0.0152668	(0.0156789	-0.0191698
-Some tertiary	0.0682957	0.068621	0.0688364*	0.0689901**	0.0691318**	0.0692675***	0.0694109***	0.0695578***	0.0697883***
	-0.064591	-0.0487795	-0.0389785	-0.0325886	-0.0275104	-0.0238631	-0.0219731	-0.0226418	-0.028312
-Bachelor and more	0.386618***	0.3736029***	0.36501***	0.3588659***	0.3531995***	0.3477757***	0.342047***	0.336175***	0.3269608***
	-0.0628239	-0.0474396	-0.0379148	-0.0317164	-0.0268059	-0.0233005	-0.0215178	-0.0222199	-0.0277796
Rural	-0.0250575	-0.04816	-0.0634176***	-0.074325***	-0.0843843***	-0.094013***	-0.1041831***	-0.1146074***	-0.1309651***
	-0.029707	-0.0226649	-0.0183574	-0.0155956	-0.0134494	-0.0119508	-0.0112065	-0.0115052	-0.0138919
Household members	-0.0932973***	-0.1139308***	-0.1275537***	-0.1372942***	-0.1462774***	-0.1548761***	-0.1639581***	-0.1732672***	-0.1878751***
	-0.0116176	-0.0090571	-0.0074371	-0.0063416	-0.0054149	-0.00464	-0.0040147	-0.0036802	-0.0039539
Constant	7.170071***	7.737955***	8.112888***	8.380971***	8.62821***	8.864865***	9.114825***	9.371034***	9.773076***
	-0.0987988	-0.0749683	-0.0605853	-0.0515481	-0.0452366	-0.0411822	-0.039839	-0.0415964	-0.0502583

5 Emigration and the income distribution in Jordan and Iraq

In this section, we use a quantile regression model to tackle the impact of receiving remittances from emigrant on the log per capita expenditure distribution in two origin countries; Jordan and Iraq. In this case, M variable in equation (2) equals 1 if the household in the origin country receives remittances, 0 otherwise. The parameter of interest, , reflects the effect of receiving remittances on the log per capita expenditure distribution. And X, the set of covariates that would affect the per capita expenditure distribution such as gender, education and employment of the head, in addition to the household's geographical location.

However, self-selection into segments of the income distribution is a cause for concern with general quantile regression. To tackle the endogeneity of remittance; Instrumental Variable Quantile Regression (IVQR) method (Chernozhukov and Hansen 2004; Bang, Mitra, and Phanindra V Wunnava 2016; Bang, Mitra, and Phani V Wunnava 2018) are therefore used to deal with said selection and provide robust estimates of the impact of migration on per capita expenditure distribution. Such methodology has been used to assess the impact of migration on income inequality in several papers over the last years (Bang, Mitra, and Phanindra V Wunnava 2016; Bang, Mitra, and Phani V Wunnava 2018).

Following the literature, the financial inclusion and the extensive presence of banks' branches in the country may increase receiving remittances from destination countries with no effect on the per capita expenditure. Hence, we instrument receiving remittances with the number of banks' branches in Jordan and Iraq governorates (results not shown). However, we do not find a significant effect neither in Iraq nor in Jordan.

5.1 Results from a quantile regression

Using the individual datasets for Jordan (JO13) and Iraq (IQ12); table 12 and table 13 show the result of regressing the log per capita income at the household level on a set of covariates including remittance, our variable of interest.

As found in part of the literature (Stark, Taylor, and Yitzhaki 1988; Barham and Boucher 1998; Möllers and Meyer 2014), receiving remittances have an unequalizing effect on the income distribution. Receiving remittances significantly increases the household per capita expenditure of all income groups in both countries; Jordan and Iraq. However, this positive impact may differ according to the conditional expenditure distribution of the receiving households. In Jordan, the per capita expenditure of a household who receive remittances is 28% higher than a household who receive no remittances in the bottom quintile compared to 47% higher in the highest income quintile. Similarly, in Iraq, per capita expenditure of a household receiving remittance is 15% higher than households without remittances in the lowest income group. While in the highest income group, the per capita expenditure of households who receive remittance is 45% higher compared to their counterparts who receive no remittances.

For the other covariates; the results show that education play a positive significant role in increasing per capita expenditure, especially for the low income households. And as found in Ramadan, Hlasny, and Intini (2018), female headed household have higher per capita expenditure compared to the male-headed households.

Finally, being an employed head in Jordan would yield a significant increase in the per capita expenditure compared to household's head who is outside labor force. This effect increases with the income quantile. However, being employed head in Iraq has a negative significant effect on per capita expenditure for all income groups. This surprising result requires more investigation in future research.

Table 12: Results from a quantile regression on income, Jordan (2013)

Standard quantile regression									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Remittance	0.149**	0.201***	0.235***	0.266***	0.295***	0.325***	0.356***	0.396***	0.453***
	0.060	0.059	0.055	0.054	0.056	0.060	0.065	0.075	0.091
Female	0.153***	0.171***	0.184***	0.195***	0.205***	0.216***	0.227***	0.241***	0.262***
	0.039	0.033	0.031	0.030	0.030	0.031	0.034	0.038	0.046
Education:									
-Primary	0.122***	0.109***	0.099***	0.091***	0.083***	0.076***	0.067**	0.057*	0.042*
	0.0371	0.032	0.030	0.029	0.028	0.029	0.031	0.035	0.042
-Secondary and Post Secondary	0.221***	0.212***	0.205***	0.0.200***	0.194***	0.189***	0.183***	0.176***	0.166***
	0.031	0.027	0.025	0.024	0.025	0.027	0.030	0.036	
-Bachelor and more	0.615***	0.608***	0.603***	0.599***	0.594***	0.590***	0.586***	0.580***	0.572***
	0.042	0.036	0.033	0.032	0.032	0.033	0.036	0.040	0.048
-Unemployed	-0.145***	0.188***	0.216***	-0.241***	-0.266***	-0.290***	-0.315***	-0.348***	-0.396***
	0.041	0.035	0.038	0.032	0.032	0.033	0.036	0.040	0.049
-Employed	-0.037	-0.070***	-0.092***	-0.112***	-0.131***	-0.150***	-0.170***	-0.200***	-0.232***
	0.027	0.023	0.021	0.021	0.021	0.022	0.023	0.026	0.031
Rural	-0.063***	-0.070***	-0.075***	-0.079***	-0.084***	-0.088***	-0.092***	-0.098***	-0.107***
	0.21	0.018	0.017	0.016	0.017	0.018	0.018	0.020	0.024
Constant	6.463***	6.725***	6.900***	7.054***	7.206***	7.356***	7.513***	7.716***	8.008***
	0.037	0.030	0.027	0.026	0.026	0.026	0.028	0.034	0.042

Table 13: Results from a quantile regression on income, Iraq (2012)

	Standard quantile regression								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Remittance	0.278**	0.306***	0.327***	0.346***	0.365***	0.385***	0.406***	0.431***	0.469***
	0.053	047	0.044	0.043	0.045	0.048	0.052	0.060	0.073
Female	0.168***	0.171***	0.173***	0.176***	0.178***	0.180***	0.183***	0.186***	0.190***
	0.021	0.018	0.017	0.017	0.017	0.017	0.019	0.021	0.026
Education:									
-Primary	0.040***	0.027**	0.018*	0.009	0.000	-0.008	-0.018	-0.029**	-0.046***
	0.013	0.012	0.011	0.011	0.011	0.011	0.013	0.014	0.017
-Secondary and Post Secondary	0.219***	0.206***	0.196***	0.0.188***	0.179***	0.171***	0.161***	0.150***	0.132***
	0.014	0.013	0.012	0.012	0.012	0.012	0.014	0.015	0.019
-Bachelor and more	0.447***	0.432***	0.420***	0.409***	0.399***	0.388***	0.376***	0.362***	0.342***
	0.023	0.021	0.019	0.019	0.019	0.020	0.022	0.025	0.031
-Unemployed	-0.118***	-0.156***	-0.185***	-0.211***	-0.237***	-0.264***	-0.293***	-0.328***	-0.379***
	0.035	0.031	0.029	0.028	0.029	0.30	0.033	0.038	0.046
-Employed	0.118***	0.126***	0.132***	0.138***	0.143***	0.149***	0.155***	0.163***	0.174***
	0.015	0.013	0.012	0.012	0.012	0.012	0.013	0.015	0.018
Rural	-0.254***	-0.262***	-0.269***	-0.275***	-0.281***	-0.287***	-0.294***	-0.302***	-0.314***
	0.11	0.010	0.009	0.009	0.009	0.010	0.010	0.0112	0.015
Constant	6.713***	6.979***	7.183***	7.366***	7.547***	7.733***	7.937***	8.178***	8.539***
	0.017	0.014	0.013	0.013	0.013	0.013	0.015	0.017	0.022

6 Concluding remarks

The present paper uses the ERF- LIS data to identify the effect of migration on inequalities at the regional level in two destination countries (Spain and Italy). Additionally, the paper estimates the impact of receiving remittances on per capita expenditure in two origin countries (Iraq and Jordan) using quantile regression. For the destination countries, the results indicate that the increasing share of migrants in the Italian and Spanish regions results in an increase in the Gini coefficients in both countries. Additionally, migration widens the gap between the lowest earners on the one hand and the highest or median earners on the other hand.

Since both the impact of migration on the income of the receiving households in the origin country, and the effects of being a migrant on income of the migrant household in destination countries may differ according to household's income group, a quantile regression is used for Spain, Iraq and Jordan. The results show that being a migrant in Spain carries a per capita income penalty that decreases at higher income groups. In the origin countries, receiving remittances increases the per capita expenditure for all income groups. However, this positive impact increases with income level. This means that remittances increases inequality in the origin countries.

It worth noting that the used methodology has two caveats. First, the macroeconomic effects of migration that may affect the total expenditure/income are not taken into consideration. Emigration may indeed result in wage changes in the origin countries, such that locals with similar endowments as emigrants see their wages increase, affecting the income distribution. Second, other instrumental variables have to be considered in future versions of the paper to better tackle the endogeneity issue of remittances and of being migrant.

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