

The Welfare State and International Remittances*

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This version: November 21, 2019

Abstract

It is well known that a prudent agent will increase precautionary savings in response to greater uncertainty of future income. The welfare state, being an insurance or consumption-smoothing mechanism, reduces the negative welfare effect of future income uncertainty. Using a model of remittances and savings, we show that an immigrant will increase his remittances in response to a first-order risk decrease in future income. Using changes in the size and generosity of the welfare state as a measure of changes in future income risk, we empirically test the prediction of our model using panel data of remittance outflows from OECD countries. Our empirical analysis finds that there is a positive relationship between a more generous welfare state and remittance outflows.

JEL Classification: D13, E21, F22, F24, I38.

Keywords: first-order risk, immigrant, precautionary savings, remittances, welfare state.

*We thank the editor and two anonymous referees for very helpful comments. We also thank Kurt Annen and Oliver Masakure for comments.

1. Introduction

Economic and population growth coupled with growing differences between OECD countries and the developing world have led to an increasing wave of cross-country migration over a long period of time. The over-riding motivation for migration, internal or international, is the search for greener pastures or better economic fortunes. Associated with migration is the phenomenon of remittances by migrants from their host countries to their countries of origin. According to the World Bank (2006), remittance flows to developing countries were about \$167 billion in 2005. In fact, remittance flows to developing countries doubled between 2000 and 2005. Officially recorded remittance flows to developing countries were estimated to have reached \$404 billion in 2013, up 3.5 percent from 2012 (World Bank, 2014).

There are several motives for remittances. Lucas and Stark (1985) were the first to note that altruism is not the only motive for remittances. Based on the theory of strategic bequest by Bernheim et al. (1985), one may argue that family members in the home country may use the threat of depriving migrants of their rights to inheritance to secure remittances. Therefore, the prospect of future bequests may incentivize migrants to send remittances to their home country. Cox (1987) argues that altruism and exchange are major motives behind migrants' remittances. In their empirical work, Cox and Rank (1992) found that inter-vivos transfers (i.e., transfers between living persons) were more consistent with exchange than altruism. Amuedo-Dorantes and Pozo (2006) demonstrate that migrants send remittances to their home country to insure family members and themselves against income losses.

In a related but different strand of the literature, Djajic (1989), Galor and Stark (1990), and Dustman (1997) provide an explanation for the high savings rates of temporary migrants. In their theoretical models, they find that worsening economic conditions in the migrant's home country may induce him to save more. In particular, their models which have the flavor of the seminal papers by Leland (1968) and Sandmo (1970), find that temporary migrants invest more in precautionary savings the higher is the variance of their future income in the host country and/or home country.

There is, of course, a literature that studies the interaction between immigrants and the welfare state. Immigrants may be perceived as a drain on the welfare state if they receive tax-financed income transfers or as a solution to social security crises (e.g., Epstein and Hillman, 2003; Nannestad, 2007; Razin, Sadka, and Suwankir, 2011). Furthermore, the welfare state may affect the decision to immigrate (e.g., Levine and Zimmerman, 1999). In the case of intra-state or internal consumption or savings, there have been related studies of the effect of the welfare state (e.g., employment insurance and universal health care programs) on private savings (Hubbard et al., 1995; Gruber and Yelowitz, 1999; Engena and Gruber, 2001). However, there is no work on the effect of the welfare state on cross-border or international remittances. This paper fills this lacuna. Our paper focuses on the effect of the welfare state on remittances. Like Engena and Gruber (2001) and other econometric studies on savings under uncertainty, our approach obviates the relatively difficult task of estimating income uncertainty (see, for example, Carroll and Samwick (1998) and Engena and Gruber (2001) for a discussion of this difficulty).

In the current study, we discuss a model of savings under income uncertainty in the spirit of Leland (1968), Sandmo (1970), and Apps et al. (2014). Our main theoretical result is that an immigrant, in response to a first-order decrease in income risk reduces his savings and increases his current consumption and remittances.

It is well known that the welfare state acts as an insurance mechanism by smoothing consumption for agents in a world of uncertainty (e.g., Barr, 2001). Accordingly, the more generous is the welfare state (i.e., cash transfers, size and duration of unemployment benefits), the less is the negative welfare impact of future income risk. In our econometric analysis, we use changes in the size and generosity of the welfare state as a measure of changes in future income risk. Our empirical approach is consistent with studies like Engena and Gruber (2001) that use differences in state-contingent income streams available to workers through unemployment insurance programs as a source of variation for testing the presence of a precautionary savings motive.

Using seven different measures of the size or generosity of the welfare state as regressors and remittance outflows from OECD countries as the dependent variable over the period 1970 to 2016, we find that the econometric results are consistent with our theoretical predictions: there is a positive relationship between a more generous welfare state and international remittances (i.e., transfers beyond the borders of the welfare state). This result is robust to the extent that our econometric exercise takes into account time-invariant observables (fixed effects) as well as an instrumental variable approach to address the potential endog-

enous relationship between the measures of welfare state and remittance outflows.

The rest of this study is organized as follows. Section 2 presents a model of income uncertainty and remittances. Section 3 discuss the data used in our econometric analysis. The theoretical prediction is tested in section 4. Section 5 concludes.

2. Theory

Consider a risk-averse immigrant in a country who lives for two periods, 1 and 2. In period 1, he gets a *known* (labor) income of $y_1 > 0$ that must be allocated to consumption, c_1 , savings, s , and remittances, r (i.e., to his country of origin). In period 2, his (labor) income is y_2 ; this second-period income is uncertain with cumulative distribution function (*cdf*), $G(y_2)$.

Let the immigrant and his beneficiary in his home country have the same vNM utility function, $u(w)$, where $u'(w) > 0$ and $u''(w) < 0$. Following Leland (1968), Levhari and Srinivasan (1969), Kimball (1990), Apps et al. (2014), and many other scholars, we assume that the immigrant has expected utility in additively time-separable form. Then his problem is:

$$\max_{s,r,c_1} V = u(c_1) + \beta u(r) + \delta E(u(c_2)), \quad (1)$$

$$\text{subject to: } c_1 = y_1 - s - r \text{ and } c_2 = y_2 + s,^1$$

where E is the expectations operator, C_2 is consumption in period 2, $\beta \in (0,1)$ is the immigrant's discount factor, and $\delta \in (0,1)$ is the

¹ Without loss of generality, we assume that the interest rate is zero.

weight that the immigrant places on the utility of his beneficiary.

The formulation in (1) captures the fact that, for an altruistic immigrant, remittance is a second consumption good in period 1.² Indeed, one can think of our model as a two-person household model in which, based on economic ties, the immigrant and his beneficiary are members of the *same* household but live in different countries. Then our model with two consumption goods (i.e., own consumption and remittances) in period 1 can be re-cast within the framework of Apps et al. (2014).³ They extend the standard two-period model of savings with risk-averse agents and uncertainty from a single-person household to a two-person household.

They showed that a first-order increase in risk⁴ at the household equilibrium will cause an increase in saving.⁵

Returning to the problem in (1), we note that in any given period/state, the immigrant's optimal consumption and remittances depend on only the state of nature through the total

income, z , available in that state (see Gollier, 2001).⁶ Then the immigrant solves the following problem in period 1:

$$\max_{r, c_1} \Omega = u(c_1) + \beta u(r), \quad (2)$$

subject to $c_1 + r = z$,

where $z = y_l - s$ is the income to be allocated between the immigrant's own consumption and remittances.

The problem in (2) is the same as the problem in (4) in Apps et al. (2014). Applying proposition 1 in Apps et al. (2014) and noting that c_1^* and r^* are both increasing functions of $y_l - s^*$, it follows that, as first-order risk increases, the immigrant's own consumption, c_1^* , and his remittances, r^* , will both fall because his savings, s^* increases.⁷

A fall in the expected size or generosity of the welfare state (e.g., smaller social transfers) leads to an increase in first-order income risk.

² As mentioned in the introduction, there is a literature on different motives for remittances. We address this issue in subsequent analysis.

³ We thank Mike Hoy for drawing our attention to this paper.

⁴ A cumulative distribution function, represents an increase in first-order risk over a distribution if first-order stochastically dominates. An increase in first-order risk reduces the mean of a distribution.

⁵ Noting that the immigrant is the sole decision-maker of the household, the model can also be seen as a single-person household model. Eeckhoudt and Schlesinger (2008) prove the same aforementioned result in Apps et al. (2014) for a single-person household with only one consumption good in period 1. Notice that this result does not depend on higher-order derivatives (i.e., third and higher derivatives) of the utility function. Risk aversion is sufficient.

⁶ This is stated in proposition 79 in chapter 21 of Gollier (2001) as follows: "In a Pareto-efficient risk-sharing the consumption of each agent depends upon the state of nature only through the aggregate wealth available in that state."

⁷ Proposition 2 in Apps et al. (2014) is also applicable to our model. In this case, consumption and remittances fall if the immigrant is prudent (i.e., the third derivative of his utility function is positive) and there is an increase in second-order risk (i.e., a mean-preserving spread in the probability distribution of future income). This is because the agent increases his savings in response to an increase in second-order risk. For the same result in the context of a single-person household, see Rothschild and Stiglitz (1971) and Kimball (1990). Crainich et al. (2013) showed that risk lovers are also prudent and are willing to accumulate precautionary savings. This led them to conclude that prudence is a very widespread trait of behavior because it is shared by both risk-loving and risk-averse agents.

That is, all other things being equal, income is lower in future states of the world with negative income shocks like being sick, losing your job, and the arrival of a child (maternity or paternity leave) because the welfare state is less generous. In effect, the fall in the generosity of the welfare state shifts the distribution of future income to the left (i.e., the original distribution, $G(y_2)$, first-order stochastically dominates the new distribution, $F(y_2)$). Accordingly, the following result holds:

Proposition 1: *As the expected generosity of the welfare state falls, an immigrant increases his saving but decreases his remittances and own consumption in the current period. Conversely, an increase in the expected generosity of the welfare state increases remittances and an immigrant's own consumption in the current period but decreases his saving.*⁸

In our model, no remittances are transferred in the second period. This assumption simplifies the analysis. What matters for our result is how future income uncertainty in period 2 affects current remittances in period 1. So long as the uncertainty in period 2 is resolved before the immigrant decides how much to remit in period 2, incorporating remittances in period 2 into the analysis will not affect our results.

We have assumed that the immigrant sends remittances for altruistic reasons. However,

consistent with other motives for remittances discussed in section 1, it is possible that a part of remittances may be for investment or savings in the immigrant's country of origin (e.g., to build a house for later consumption during his retirement in his home country). It is possible to isolate a savings motive from a consumption motive because, if an effect exists, our comparative statics results show that savings and remittances move in opposite directions in response to changes in the welfare state. If indeed remittances are for investment or savings in the migrant's home country, then a less generous welfare state should lead to an increase in remittances by an immigrant. Therefore, if we observe an increase in remittances in response to a more generous welfare state in the *host country*, it is reasonable to conclude that remittances are for the purpose of consumption in the home country of immigrants.⁹

To the extent that only immigrants with permanent residency status or work permits are eligible for the benefits of the welfare state, the effect of the welfare state on remittances is only applicable to certain groups of immigrants. Migrants who are part of *guest worker* programs are not eligible for the benefits of the welfare state. However, immigrants with work permits but without permanent residency sta-

⁸ In a different empirical analysis, one may replace remittances with charitable contributions (e.g., to World Vision; Heart and Stroke Foundation). Although the formal model focuses on income risk, agents may invest in precautionary saving in response to other risks such as health risk and the risks of unavoidable expenditures (e.g., home repairs).

⁹ Dustmann (1997) considers a model in which an immigrant's future income in both the host and home countries is subject to uncertainty. Uncertainty in future income in the immigrant's home country is not relevant to our analysis because an immigrant's eligibility for the benefits of the welfare state of the host country only kicks when s/he suffers a negative income shock in the host country or the welfare state in the host country protects him/her from the occurrence of negative shocks in the host country (e.g., employment protection).

tus may qualify for unemployment benefits. It is also important to make a distinction between a temporary immigrant and an immigrant with a temporary residency status. For example, there are immigrants who have permanent residency status in the host country but have *intentions* of returning to their home countries (e.g., after 5 to 20 years abroad). So it does not necessarily follow that temporary immigrants are not eligible for the benefits of the welfare state. Immigrants who have permanent residency status but intend to return to their home country or have temporary residency status will tend to remit for investment/insurance purposes while those who have permanent residency status and do intend to return permanently to their home countries will remit for consumption purposes (e.g., to help relatives or friends at home). In any case, if we observe an effect of changes in the welfare state on remittances, it is reasonable to conclude these remittances are largely driven by the actions of immigrants who are eligible for the benefits of the welfare state.¹⁰ And depending on the direction of the effect, we can, as argued above, determine whether the remittances are for pure consumption or savings in the home country. This latter effect is not our main focus.

3. Data

The dependent variable in our econometric analysis is remittance outflow per migrant from 32 remittance-source countries in the OECD

¹⁰ However, we are cognizant of the fact that some native-born citizens, albeit very few, in rich countries also send remittances to poorer countries.

sourced from the World Bank¹¹. The countries included in our sample are listed in Appendix A. Our principal independent variable is a measure of the size or generosity of the welfare state. We use seven different measures of the welfare state, all in per capita terms and sourced from OECD (2017):

- *Social spending*: social expenditure comprises cash benefits, direct in-kind provision of goods and services, and tax breaks with social purposes.
- *Family benefits public spending*: public spending on family benefits, including financial support that is exclusively for families and children.
- *Social benefits to households*: this measure includes social benefits other than social transfers and social transfers in kind.
- *Public spending on incapacity*: refers to spending due to sickness, disability and occupational injury. It includes disability cash benefits that are comprised of cash payments on account of complete or partial

¹¹ Remittance outflows are based on World Bank staff calculations from IMF Balance of Payments Statistics database and data releases from central banks, national statistical agencies, and World Bank country desks. Outflow data based on numbers reported by country authorities to IMF Balance of Payments. In an earlier version, we used bilateral remittances inflows as our dependent variable. The bilateral remittance inflows data were not available, so we had to extrapolate them from bilateral migration matrices and remittance inflows to OECD countries. While bilateral data offers large volume of data points for a richer empirical analysis, the fact that we had to extrapolate them created measurement errors which confounded our previous results.

inability to participate gainfully in the labor market due to disability.

- *Pension spending*: all cash expenditures, including lump-sum payments, on old-age and survivor pensions.
- *Public spending on labor markets*: includes public employment services, training, hiring subsidies and direct job creations in the public sector, as well as unemployment benefits.
- *Public unemployment spending*: public unemployment spending is defined as expenditure on cash benefits for people to compensate for unemployment.

We consider annual data from 1970 to 2016 for our analysis. For all seven welfare state measures, larger values indicate a more generous or bigger welfare state. If our theory holds, then we should expect a positive relationship between each of our measures of the welfare state and remittances.

Tables 1 and 2 present a summary of descriptive statistics for the seven measures of the welfare state. Table 2, in specific, shows the correlation matrix for the country averages of the alternative measures of the welfare state. As shown there, all measures of the welfare state are highly correlated with each other.

Table 1: *Descriptive statistics.*

Variables	Mean	Std. Dev.	Obs.
<i>Dependent variable (in nominal US dollars):</i>			
Remittance outflows per migrant	6,201.0	12,230.3	964
<i>Welfare state variables (per capita, nominal US dollars):</i>			
Social spending	4,759.5	6,257.7	1,504
Family benefits public spending	540.3	926.2	1,504
Social benefits to households	2,866.5	3,739.3	1,504
Public spending on incapacity	405.1	610.7	1,504
Pension spending	1,269.3	1,703.0	1,504
Public spending on labour markets	73.5	102.1	1,457
Public unemployment spending	214.3	338.8	1,504

Notes: Remittance outflows data were sourced from the World Bank. Welfare state variables were sourced from OECD.

Table 2: *Correlation matrix.*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Remittance outflows per migrant	1.00							
Social spending per capita	0.67	1.00						
Family benefits public spending per capita	0.69	0.95	1.00					
Social benefits to households per capita	0.65	0.99	0.94	1.00				
Public spending on incapacity per capita	0.64	0.92	0.91	0.93	1.00			
Pension spending per capita	0.51	0.82	0.74	0.81	0.79	1.00		
Public spending on labour markets per capita	0.47	0.82	0.76	0.81	0.74	0.61	1.00	
Public unemployment spending per capita	0.49	0.81	0.76	0.78	0.68	0.58	0.85	1.00

Notes: Remittance outflows data were sourced from the World Bank. Welfare state variables were sourced from OECD.

4. Empirical strategy and results

4.1 Baseline estimation

For a given OECD country i , denote the size or generosity of the welfare state at time t by \mathbf{W}_t . In what follows, we assume that an immigrant has a form of *adaptive expectations* such that they use past information to form expectations about the future (e.g., Chow, 1989; Colucci and Valori, 2011; and Parkin, 2008). Formally, at time t , an immigrant's expectation of the welfare state at time $t+1$ is $E_t(\mathbf{W}_{t+1}) = \mathbf{W}_{t-1}$. We therefore regress remittance outflows in period t on the welfare state at time $t-1$. Precisely, we model remittance flows using the following econometric specification:

$$\text{Outflows}_{i,t} = \beta_0 + \beta_1 \mathbf{W}_{i,t-1} + \tau_t + \kappa_i + \varepsilon_{i,t} \quad (3)$$

where $\text{Outflows}_{i,t}$ is the log of remittance outflows per migrant from country i at time t , $\mathbf{W}_{i,t-1}$ is a vector that contains the seven measures of the welfare state, τ_t is the time fixed effect, κ_i is the country fixed effect, and $\varepsilon_{i,t}$ is the error term.¹² We are interested in the coefficient β_1 and our theoretical model predicts that $\beta_1 > 0$. Given their high correlations as reported in Table 2, we include each of the seven measures of the welfare state only one at a time in the regressions.

There could be a possible endogeneity of remittance outflows and welfare state. For now, we deal with this issue in two ways: first,

as shown above, we regress remittance outflows on the lag of \mathbf{W} ; and second, we include fixed effects. A fixed-effects regression will effectively control for endogeneity due to time invariant effects, such as heterogeneity in institutions across the OECD. However, fixed-effects regressions will not completely address endogeneity due to the possible interactions between remittance outflows and welfare state measures, or other time varying effects. We return to this issue in section 4.3.

Table 3 reports the results of our baseline OLS regressions with fixed effects. Our theory is supported by the empirical results: the estimated coefficient for across columns (1)-(7) are all positive and statistically significant at the 1% level. As shown in Table 3, the qualitative features of our results do not seem to depend on the measure of the size or generosity of the welfare state chosen. In terms of magnitude, social benefits to households has the biggest effect on remittance outflows while pension spending has the smallest effect. To put our results in perspective, a one percentage point increase in social benefits to households raises remittance outflows by 0.737 percentage points, while an increase in pension spending raise remittance outflows by only 0.448 percentage points, *ceteris paribus*. As much as 81% of the variation in remittance outflows per migrant is explained by the model.¹³

¹² We acknowledge that our analysis would have been richer if conducted with micro data on remittance motivations to complement our theoretical model on remittance decisions. While interesting, analysis of remittance data at the micro level is beyond the scope of our empirical analysis.

¹³ Our baseline results are insensitive to changing the dependent variable from outflows per migrant to outflows per stock of foreign born. These supplementary regressions with outflows per stock of foreign born as dependent variable are available upon request.

Table 3: *Baseline OLS regressions with fixed effects.*

Dependent variable: Log remittance outflows per migrant t	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log social spending per capita $t-1$	0.712*** (0.082)						
Log family benefits public spending per capita $t-1$		0.618*** (0.061)					
Log social benefits to households per capita $t-1$			0.737*** (0.102)				
Log public spending on incapacity per capita $t-1$				0.571*** (0.084)			
Log pension spending per capita $t-1$					0.448*** (0.103)		
Log public spending on labour markets per capita $t-1$						0.591*** (0.093)	
Log public unemployment spending per capita $t-1$							0.557*** (0.066)
Constant	1.924*** (0.649)	4.221*** (0.332)	2.091** (0.757)	4.546*** (0.443)	4.614*** (0.683)	5.420*** (0.341)	4.960*** (0.307)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	959	959	959	959	959	918	942
Adjusted R squared	0.81	0.81	0.81	0.81	0.81	0.81	0.81

*Notes: Remittance outflows data were sourced from the World Bank. Welfare state variables were sourced from OECD. *** indicates significance at the 0.01 level, ** indicates significance at the 0.05 level, and * indicates significance at the 0.10 level. Heteroscedasticity-consistent standard errors in parentheses.*

4.2 Regressions with additional controls

It is possible that the positive relationship between the different measures of the generosity or size of the welfare state and remittance outflows is due to omitted variables. For instance, a country may have a more generous welfare state because the country has a higher GDP per capita, which can positively affect remittance outflows. It is also likely that a country with a generous welfare state is a magnet for immigrants, which, in turn, could be responsible for higher remittance outflows.¹⁴ Thus, to properly isolate the effect of the welfare state on remittance outflows from other variables, we re-estimate equation (3) with additional control variables:

$$\text{Outflows}_{i,t} = \beta_0 + \beta_1 \mathbf{W}_{i,t-1} + \gamma \mathbf{X}_{i,t-1} + \tau_t + \kappa_i + \varepsilon_{i,t}, \quad (4)$$

where \mathbf{X} is a vector that contains the additional control variables. We include GDP per capita in country i at time $t-2$ and the stock of foreign-born population in country i at time $t-1$, foreign aid generosity (measured by foreign aid outflows) country i at time $t-1$, number of seasonal workers to proxy for immigrant type in country i at time $t-1$, and the number of

migrants from different regions¹⁵ in country i at time $t-1$ as additional regressors (all in logs).

Table 4 report the results of the OLS regressions with fixed effects and additional controls. The results confirm the previous findings regarding the existence of a positive relationship between the size or generosity of the welfare state and remittance outflows. As shown in columns (1) to (7) of Table 4, the estimated coefficients for the size or generosity of the welfare state are remarkably smaller than those previously estimated and shown in Table 3. The robustness of our results is shown by the fact that these coefficients are always significant at the 1% level, taking into account additional explanatory variables like GDP per capita, stock of foreign-born population, number of seasonal migrants, and number of immigrants from different regions.

4.3 Addressing endogeneity

The results reported in Tables 3 and 4 demonstrate some evidence of correlation between the various measures of the welfare state and remittance outflows from OECD countries. Nevertheless, there are several reasons why these results cannot be interpreted as causal. First, it is possible that there are many omitted determinants of remittance outflows that are naturally correlated with the welfare state measures. And second, remittance outflow data may suffer from measurement errors. The consequence of omitted variables and measure-

¹⁴ *One may argue that the welfare state affects remittances through an immigration effect wherein a more generous welfare state attracts more immigrants (a demand side effect). However, countries with more generous welfare states are likely to have more restrictive immigration policies (a supply side effect) because of the fear of a drain of immigrants on the welfare state. In theory then, the effect of the welfare state on remittances through this second channel is ambiguous.*

¹⁵ *The regions are South Asia; Eastern Europe; Middle East and North Africa (MENA); Sub-saharan Africa and Caribbean; Latin America; Eastern Europe; Pacific Islands; Western Europe; and Central Asia.*

Table 4: *Regression results with additional controls.*

Dependent variable: Log remittance outflows per migrant t	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log social spending per capita t_{-1}	0.378*** (0.045)						
Log family benefits public spending per capita t_{-1}		0.365*** (0.044)					
Log social benefits to households per capita t_{-1}			0.359*** (0.047)				
Log public spending on incapacity per capita t_{-1}				0.302*** (0.044)			
Log pension spending per capita t_{-1}					0.094* (0.049)		
Log public spending on labour markets per capita t_{-1}						0.156*** (0.046)	
Log public unemployment spending per capita t_{-1}							0.146*** (0.044)
Log GDP per capita t_{-2}	0.479*** (0.047)	0.482*** (0.045)	0.487*** (0.046)	0.526*** (0.047)	0.571*** (0.049)	0.562*** (0.048)	0.555*** (0.048)
Log foreign-born t_{-1}	-0.263*** (0.086)	-0.307*** (0.088)	-0.246*** (0.087)	-0.285*** (0.089)	-0.228** (0.089)	-0.239*** (0.089)	-0.225** (0.090)
Log foreign aid generosity t_{-1}	0.098 (0.069)	0.100 (0.069)	0.103 (0.070)	0.085 (0.072)	0.178** (0.073)	0.121 (0.077)	0.143* (0.075)
Log seasonal workers t_{-1}	0.165*** (0.050)	0.202*** (0.049)	0.164*** (0.051)	0.160*** (0.051)	0.128** (0.054)	0.141*** (0.052)	0.144*** (0.052)
Log Caribbean migrants t_{-1}	-0.050 (0.044)	-0.025 (0.044)	-0.040 (0.044)	-0.064 (0.045)	-0.070 (0.047)	-0.056 (0.047)	-0.067 (0.047)
Log South Asia migrants t_{-1}	-0.251*** (0.044)	-0.310*** (0.043)	-0.267*** (0.044)	-0.273*** (0.044)	-0.252*** (0.046)	-0.249*** (0.045)	-0.244*** (0.046)
Log Sub-Sahara Africa migrants t_{-1}	0.224** (0.105)	0.247** (0.101)	0.220** (0.105)	0.263** (0.107)	0.198* (0.112)	0.225** (0.109)	0.221** (0.109)
Log Latin America migrants t_{-1}	-0.066 (0.068)	-0.033 (0.068)	-0.061 (0.068)	-0.029 (0.071)	-0.075 (0.072)	-0.073 (0.070)	-0.084 (0.070)
Constant	-0.465 (0.746)	0.087 (0.712)	-0.196 (0.748)	0.390 (0.718)	1.092 (0.789)	1.296* (0.713)	1.175 (0.717)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	497	497	497	497	497	497	497
Adjusted R squared	0.82	0.82	0.82	0.82	0.82	0.82	0.82

Notes: Remittance outflows data were sourced from the World Bank. Welfare state variables, migrant-related variables, and foreign aid were sourced from OECD. *** indicates significance at the 0.01 level, ** indicates significance at the 0.05 level, and * indicates significance at the 0.10 level. Heteroscedasticity-consistent standard errors in parentheses.

ment errors is that the welfare state variables may be endogenous.

To deal with endogeneity, we used the lag of the welfare state in our regressions, the results of which are reported in Tables 3 and 4. One may claim that this is an *ad hoc* solution. A standard solution is to use instrumental variables in a two-stage least-squares regression. The instrument must satisfy two properties: first, the instrument must be significantly correlated with the measures of the size or generosity of the welfare state (inclusion restriction); and second, the instrument must be uncorrelated with the error term of the original equation (exclusion restriction).

Previous empirical studies found that economic policy orientation is a significant factor that affects the level of spending of governments. For instance, an empirical study carried out in the early 1990s across 15 OECD countries and covering a period of 28 years found that left-wing majority governments have a tendency to spend a little more than those of the right after several years in power (Blais et al., 1993). In the current study, we use the measure of economic policy orientation developed by Cruz, et al. (2016) as an instrumental variable for the welfare state variables. The economic policy orientation variable is coded using the following criteria: 1 if the government is defined as conservative, Christian democratic, or right-wing; 2 if centrist; and 3 if the government is defined as communist, socialist, social-democratic or left-wing. The data coverage for the economic policy orientation variable is from 1970 to 2016.

The results of the two-stage least-squares regressions with the one period lag of economic policy orientation as the instrument are reported in Table 5. The first stage regressions

across columns (1) to (7) confirm the previous findings in the literature: the higher the economic policy orientation measure (i.e., when governments are communist, socialist, social-democratic or left-wing), the higher the welfare spending. Moreover, these estimates are statistically significant at the 1% level which proves that the instrument is strong in terms of predicting welfare state expenditures. The strength of the instrument is further supported by the partial *F* statistics which are all greater than 10 across columns (1) to (7). The results of the second stage regressions show that the estimated coefficients for the size or generosity of the welfare state have the same sign as those shown in Tables 3 and 4 but significantly larger in magnitude. The larger second stage estimates in Table 5 suggest that the OLS coefficients in Tables 3 and 4 are downward biased.

Our identification strategy relies on the assumption that economic policy orientation has no direct effect on remittance outflows other than its effect through size or generosity of the welfare state. We admit that this exclusion restriction assumption is quite strong as there might be a concern that economic policy orientation of the government could influence immigration policy and the origin and type of immigrant, and in turn affect remittance outflows, which may render the instrument invalid.¹⁶ To address this concern, we ran another regression with the second lag of the welfare state variable as an additional instrument and then conducted an overidentification test to check the validity of the instruments. As shown in Table 6, the results of the regressions

¹⁶ *Our controls may alleviate this problem. But to err on the side of caution, we ran another regression to reinforce the robustness of our results.*

with an additional instrument did not alter the qualitative features of our previous results. The high p values (all greater than 0.05) from the overidentification tests reveal that the identification strategy is valid, that is the instruments satisfy our exclusion restriction.

5. Conclusion

This paper has taken the first step of investigating the effect of the welfare state on international remittances. Our analysis showed that a more generous welfare state leads to an increase in international remittances. This suggests that the welfare state has a more far-reaching and transnational effect than previously thought.

An extension to our analysis is to tease out the different motives for remittances according to the age of the immigrant. Uncertainty in future income may induce immigrants – who intend to return home – to increase transfers to, for example, build a retirement home in their countries of origin while permanent immigrants are less likely to respond in this way. But this may also depend on the age of the immigrant. If he plans to return home and is

closer to a mandatory retirement age, he may respond differently to future income uncertainty than a younger immigrant would.

If remittances are for the consumption of family members (e.g., parents and siblings) in an immigrant's country of origin and if there are at least two immigrants from the same family, there is an incentive for each immigrant to free-ride on the contributions of his relative (family member) because remittances become a public good (e.g., Konrad et al., 2002). How this free-riding interacts with uncertainty in future income may be an interesting avenue of research. However, the availability of data is a major constraint for this research.

Appendix: List of countries

Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Rep., Latvia, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Rep., Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States

Table 5: *Instrument variable regressions (two-stage least-squares).*

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log remittance outflows per migrant t							
Log social spending per capita $t-1$	2.351*** (0.722)						
Log family benefits public spending per capita $t-1$		2.110*** (0.598)					
Log social benefits to households per capita $t-1$			2.195*** (0.654)				
Log public spending on incapacity per capita $t-1$				2.212*** (0.743)			
Log pension spending per capita $t-1$					2.809** (1.297)		
Log public spending on labour markets per capita $t-1$						2.364*** (0.781)	
Log public unemployment spending per capita $t-1$							1.872*** (0.543)
Log GDP per capita $t-2$	0.197 (0.192)	0.395*** (0.135)	0.248 (0.173)	0.542*** (0.133)	0.186 (0.299)	0.603*** (0.132)	0.474*** (0.120)
Log foreign-born $t-1$	-1.108*** (0.158)	-1.133*** (0.142)	-1.044*** (0.149)	-1.063*** (0.162)	-1.329*** (0.343)	-1.302*** (0.196)	-1.473*** (0.195)
Log foreign aid generosity $t-1$	-0.534 (0.347)	-0.725* (0.373)	-0.523 (0.331)	-0.891* (0.485)	-0.768 (0.655)	-1.142** (0.578)	-0.570* (0.336)
Log seasonal workers $t-1$	0.107 (0.126)	0.307* (0.157)	0.087 (0.118)	0.132 (0.137)	-0.014 (0.177)	-0.132 (0.135)	-0.120 (0.097)
Log Caribbean migrants $t-1$	-0.548*** (0.160)	-0.777*** (0.200)	-0.481*** (0.140)	-0.493*** (0.169)	-0.485** (0.229)	-1.263*** (0.383)	-1.151*** (0.307)
Log South Asia migrants $t-1$	0.285** (0.125)	-0.075 (0.140)	0.245** (0.116)	-0.112 (0.171)	0.695** (0.281)	0.349** (0.163)	0.736*** (0.197)
Log Sub-Saharan Africa migrants $t-1$	0.902* (0.462)	1.754*** (0.654)	0.853** (0.434)	1.296** (0.650)	0.774 (0.710)	2.043** (0.860)	1.314** (0.549)
Log Latin America migrants $t-1$	-0.343 (0.231)	-0.552** (0.267)	-0.308 (0.215)	-0.083 (0.194)	-0.611 (0.494)	-0.756** (0.374)	-0.627** (0.292)
Constant	-10.533*** (3.408)	-5.420*** (1.961)	-8.599*** (2.771)	-6.292*** (2.437)	-7.478** (3.641)	2.086 (2.106)	-0.771 (1.373)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	332	332	332	332	332	332	332
First stage results							
Economic policy orientation $t-1$	0.009*** (0.054)	0.010*** (0.053)	0.010*** (0.003)	0.010*** (0.002)	0.007*** (0.003)	0.009*** (0.002)	0.011*** (0.002)
First stage partial F stat.	36.49***	94.91***	40.06***	78.02***	22.05***	72.04***	54.45***
First stage R squared	0.26	0.44	0.24	0.37	0.25	0.40	0.38

Notes: Remittance outflows data were sourced from the World Bank. Welfare state variables, migrant-related variables, and foreign aid were sourced from OECD. *** indicates significance at the 0.01 level, ** indicates significance at the 0.05 level, and * indicates significance at the 0.10 level. Heteroscedasticity-consistent standard errors in parentheses.

Table 6: Instrument variable regressions with additional instrument (two-stage least-squares)

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log remittance outflows per migrant t							
Log social spending per capita $t-1$	1.522*** (0.283)						
Log family benefits public spending per capita $t-1$		1.411*** (0.267)					
Log social benefits to households per capita $t-1$			1.568*** (0.304)				
Log public spending on incapacity per capita $t-1$				1.328*** (0.353)			
Log pension spending per capita $t-1$					0.816* (0.459)		
Log public spending on labour markets per capita $t-1$						0.642*** (0.190)	
Log public unemployment spending per capita $t-1$							0.806*** (0.154)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overidentification test chi square	1.322	1.247	0.933	1.424	3.134	3.045	2.435
Overidentification test p value	0.2501	0.263	0.334	0.232	0.076	0.081	0.119
Observations	332	332	332	332	332	332	332
First stage results							
Economic policy orientation $t-1$	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.008*** (0.002)	0.006*** (0.003)	0.007*** (0.002)	0.007*** (0.002)
Log welfare state variable $t-2$	0.295*** (0.056)	0.298*** (0.056)	0.272*** (0.056)	0.208*** (0.057)	0.125*** (0.053)	0.328*** (0.053)	0.387*** (0.052)
First stage partial F stat.	41.92***	103.44***	43.74***	88.78***	21.00***	88.96***	64.26***
First stage R squared	0.33	0.49	0.31	0.39	0.26	0.47	0.47

Notes: Remittance outflows data were sourced from the World Bank. Welfare state variables, migrant-related variables, and foreign aid were sourced from OECD. Control variables include log GDP per capita $t-2$, log foreign-born $t-1$, log foreign aid generosity $t-1$, log seasonal workers $t-1$, log Caribbean migrants $t-1$, log South Asia migrants $t-1$, log Sub-Saharan Africa migrants $t-1$, and log Latin America migrants $t-1$. *** indicates significance at the 0.01 level, ** indicates significance at the 0.05 level, and * indicates significance at the 0.10 level. Heteroscedasticity-consistent standard errors in parentheses.

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