ERASMUS UNIVERSITY ROTTERDAM

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Master Thesis Economics of Sustainability

The Substitution Effect:

Can Remittances Reduce Government Spending?

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Abstract

By analysing a sample of 62 developing countries around the globe, this research paper looks at the relationship between remittances and government spending from the years 2000-2020. It addresses the substitution effect, which argues that remittances can act as a substitute for government spending on public goods, thereby reducing government spending. Furthermore, the study uses an instrumental variable (IV) approach with distance to the closest remittance-sending country as an instrument for the levels of remittances. The IV approach finds that an increase in remittances is not associated with a decrease in government spending, as the substitution effect argues. On the contrary, remittances are associated with a significant increase in government spending. This suggests that the substitution effect theory does not hold and remittances can actually contribute to increased government expenditure. Additionally, the effect of remittances on government spending does not seem to significantly differ between left and right-oriented governments.

1. Introduction

Income gaps across and within countries, demographic changes, climate change and political instability are some of the main factors putting increased pressure on individuals to migrate (World Bank (n.d.). In this context, remittances as a source of income for families in low- and middle-income countries have gained increasing importance. The total value of remittance flows has been steadily increasing for the past 20 years and reached a value of around $650 billion in 2022 (KNOMAD, 2023a). This flow of monetary goods provides families in the countries of origin with a stable source of income to aid in meeting their general needs.

Previous research has to a large extent focussed on the effect of remittances on different aspects of economic development in the remittance receiving country. There is a general consensus that remittances can significantly boost economic growth in the receiving country (Giuliano & Ruiz-Arranz 2009; Acosta et al., 2008), while also decreasing the number of people living in poverty and the severity of poverty (Adams & Page 2005; Taylor et al., 2008). On a household level, remittances are shown to have a significant effect on the quantity and composition of spending. For instance, Clemens and Tiongson (2017) and Adams & Cuecuecha (2010), found that a family receiving remittances, increases relative spending, mainly on education and health care. Overall, remittances prove to be of high importance for developing countries in progressing development and increasing the standards of living for lower-income households.

Besides the effect of remittances on individuals and household spending, another branch of literature focussed more on the effect on government spending, institutions and governance in the remittance-receiving country. Tyburski (2014), Ahmed (2012) and Abdih et al. (2012) looked at the impact remittances can have on corruption and subsequently developed two hypotheses, the accountability perspective and the substitution effect. The accountability perspective argues that remittances can reduce corruption as they can be used as a resource for individuals to become more critical of the government. On the other hand, the substitution effect proposes that remittances can increase corruption. The mentioned substitution effect can occur as remittances may function as an alternative source of income, and can be used to access public goods, decreasing the necessity for governments to spend money on these public goods. Therefore, spending can instead be diverted to government patronage, which researchers argue increases the presence of corruption. However, research on specifically the substitution effect finds that the relationship between remittances and government spending, is limited. Gautam

(2014) finds that for a small sample of 6 countries, remittances do not directly act as a substitute for government spending. On the other hand, Mina (2019) researched high- and middle-income countries and finds that remittances are associated with a decrease in government spending.

This paper therefore adds to this research and looks at the effect of remittances on government spending looking at a sample of 62 developing countries and tests the hypothesis of the substitution effect for a larger sample size. Additionally, it provides a new insight, by investigating whether the effect differs for governments with different political orientations (eg. Centre, Left, Right) based on the Database of Political Institutions developed by the Inter-American Development Bank. According to Maux et al., (2019), Herwartz and Theilen (2017), and Bjørnskov & Potrafke, (2011) government orientation beliefs can have a significant impact on government spending. Therefore, the research question that will be answered is: *What is the effect of remittances on government spending, and does this effect differ based on a government's political ideology?*

Due to challenges with endogeneity between government spending and remittances and biassed estimates when running an OLS regression with fixed effects, the final results are based on an instrumental variable (IV) approach. Based on Abdih et al. (2012) a strong instrument for remittances is the distance to the closest large remittance sending country/region. With this approach, it was found that remittances lead to a significant increase in government spending, opposite to the substitution effect hypothesis developed in previous literature. Additionally, it was found that the impact of remittances on government spending does not seem to significantly differ for governments with different orientations, whether they are more left-wing, or right-wing. These results are in contrast with the substitution effect hypothesis and show that remittances do not seem to provide sufficient incentive for governments to decrease government spending but on the contrary increase spending.

This paper differs from previous papers, in that the research question looks more specifically at the effect of remittances on government spending, and whether remittances can act as a substitute for government spending. Research into this topic is limited, with most of the academic research looking at the effect of remittances on corruption and institutional quality (Abdih et. al., 2012; Ahmed 2012; Tyburski 2014). Although Gautam (2014), and Mina (2019) do look more specifically at the effect of remittances on government spending, these studies do not focus on a large sample of developing countries, which are the countries receiving the

most remittances. Therefore, this analysis adds to the previous papers, in that it will use data from a large sample of developing countries over a longer period of time, while also implementing an instrumental variable approach. Additionally, considering the importance that political ideology has on the role of the government in different countries, this research looks at whether the effect of remittances differs between countries with different ideologies. Overall, this can provide valuable insight into the effectiveness of remittances and not only their impact on individual private spending but also on public spending.

The following section, Section 2, provides an overview of relevant previous literature regarding remittances and government spending based on which the hypotheses are formed. Next, the data and empirical methodology used are described, followed by the presentation and discussion of the results in Section 5. After that, robustness checks are performed in Section 6 and ending with a conclusion.

2. Literature Review

2.1 Remittances

As of 2022, the World Bank (n.d.) estimated that 286 million people do not live in their country of birth and have migrated in some form. Some of the main reasons people turn to migration are to escape economic and political instability and improve their lives in terms of safety, income and education (Czaika & Reinprecht, 2022). Additionally, migrants often send back remittances to family members in their country of origin with the aim of increasing the financial capabilities of family members to access goods and services and meet their general needs. According to the International Organization for Migration (IOM), remittances are defined as "personal monetary transfers that a migrant worker makes to his/her relatives back in their country of origin" (IOM, 2009). The International Monetary Fund (IMF) states that personal remittances refer to all household-to-household transfers, plus the net earnings of migrant workers. More specifically it is defined as "current and capital transfers in cash or in kind between resident households and non-resident households, plus compensation of employees, less taxes and social contributions […] less transport and travel expenditure related to working abroad." (IMF, 2009).

The importance of remittances, especially to low- and middle-income countries (LMIC), can be seen on both a micro and macro level, with remittances representing a large and stable source of resources, which at times is even larger than the inflow of foreign direct investment (FDI) in some countries (IMF, 2009). KNOMAD (2023), estimated that in 2022, the value of remittance flows to LMICs was around $647 billion with the value consistently growing over the past years (excluding 2020, the year of Covid-19). Figure 1 below shows the significant growth and development of total personal remittances received around the world over time, while growth in FDI is slowing down, and has even decreased since 2006.

Figure 1: Remittances and FDI 2000-2022
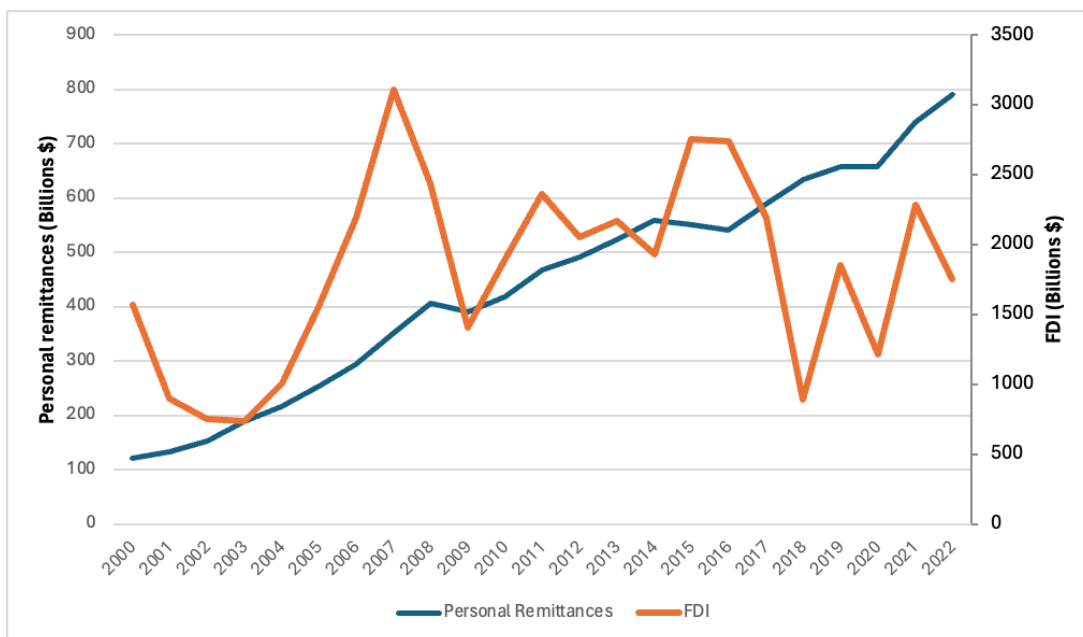
Note: Data from World Bank (2024a)

Considering the growing scale of remittances, extensive academic research has been done on a macro scale, on how remittances affect the receiving countries' economic development, and on a micro scale, looking at possible outcomes for households receiving remittances. Research done by Giuliano and Ruiz-Arranz (2009) found that migrants sending back remittances to their home countries had a significant effect on boosting economic growth and that this effect is larger in developing countries with a less developed financial system. Furthermore, Fayissa & Nsiah (2010) found that remittances have a positive effect on economic growth, as they help overcome liquidity constraints by providing alternative ways of financing investments. Acosta et. al. (2008) found a similar significant positive effect of remittances on economic growth in Latin America, while also finding that it can decrease inequalities and poverty in countries

receiving remittances. The effect of remittances on poverty is a widely studied topic with Adams & Page (2005), finding that remittances significantly decrease the share of people living in poverty. This negative correlation between remittances and poverty is further supported by research from Acosta et al., (2006), Cordova (2006), Taylor et al., (2008) and Yang & Martinez (2006).

Remittances also have a significant impact on a smaller scale, affecting the spending of individuals and households receiving these remittances. Clemens and Tiongson (2017), for example, found that having a family member send back remittances significantly increases the household's spending on both health and education. Combined, it reduces borrowing and increases a household's savings. Furthermore, a number of studies have shown that remittances have a positive effect on household investment in human and physical capital. Adams & Cuecuecha (2010), find that households receiving remittances spend a smaller share of their income on food while increasing the share of income spent on education and housing. This view is supported by Osili (2004) who finds that investment in housing and remittances received are positively correlated, while Edwards & Ureta (2003) find that levels of education are significantly and positively affected by remittances.

2.2 Remittances and Governance

Besides the economic effects of remittances, academic literature has recently also been looking at the relationship between remittances and a country's governance, with several scholars investigating the effect of remittances on corruption. Throughout the literature on remittances and governance, two main hypotheses were developed. First is the accountability perspective as mentioned by Tyburski (2014). The accountability perspective argues that remittances can be used as a political resource for individuals to become more critical of the government and reduce corruption. Remittances could reduce the cost of political participation as individuals are less dependent on state programs, which could make them more likely to be critical of the government and vote for less corrupt individuals (Tyburski, 2014). Additionally, Tyburski (2014) argues that migrants may be especially critical of corruption because corruption can make remittances with the purpose of improving living standards less beneficial. These ideas around increased criticism and experiences living abroad can be transferred to families back home and aid in increasing pressure on the government to tackle corruption. Levit (1998) indeed found that these ideas from migrants abroad are shown to be transmitted to friends and

family in the home country, shaping political views and beliefs. The second hypothesis, and the focus of this research paper, is the substitution effect as mentioned by Ahmed (2012). This perspective states that remittances present a source of income for households, which allows individuals to more easily access public goods such as education, health services or social protection. As this alternative source of income is used to access public goods, it decreases the necessity for governments to spend money on these public goods. These government funds can then be used (in part) for private gains instead. Therefore, remittances allow individuals to be protected from poor government governance and decreased government spending, resulting in lower barriers and costs for a government to engage in negative spending behaviour (Ahmed 2012; Abdih et. al., 2012). Since corruption can take place in many forms and can be hard to quantify, researching it is a challenge. The hypothesis of the substitution effect provides an opportunity to look particularly at the effect of remittances on government spending rather than on corruption in general.

Overall, scholars have found evidence for both hypotheses, with research showing that in certain circumstances remittances can have a positive or negative effect on institutional quality and governance. While Ajide and Olayiwola (2021) found that remittances significantly decrease corruption in Nigeria, Abdih et al. (2012) looked at a cross-section of 111 different countries and found that remittances have a significant effect on institutional quality in the other direction, namely increasing corruption. Ahmed (2012), Tyburski (2014) and Abdih et al. (2012) argue that this substitution effect holds as they find a negative relationship between remittances and institutional quality. Berdiev et al. (2013) also found that remittances increase corruption and that this effect is more significant in non-OECD countries. The theory that the effect of remittances on corruption might be different for different countries is supported by Ahmed (2012), who finds that governments in autocracies use foreign aid and remittances as an excuse to reduce government spending, for private gain, leading to the substitution effect. Finally, Tyburski (2014)**,** found that the effect of corruption differs for more autocratic or more democratic regimes. In more autocratic regimes, remittances tend to increase corruption, while in more democratic regimes remittances significantly decrease corruption. It is argued that this is the case as authoritarian regimes are more resistant to political pressure from the population, and there are higher barriers and more challenges for critical political activity compared to a more democratic regime.

Besides the relationship between remittances and governance, a small number of studies have been done focusing more specifically on the substitution effect. Gautam (2014), finds that, for a select group of 6 countries researched between 2010-2012, although remittances decrease government expenditure relative to household expenditure, remittances do not act as a direct substitute. Furthermore, a paper by Mina, (2019) finds that for a cross-country analysis of high- and middle-income countries, remittances have a negative impact on government spending on public social protection programs, while Jannat et al. (2018), on the other hand, finds that for a case study in Bangladesh, remittances and government spending are positively correlated. This paper aims to add to the existing research by looking specifically at the substitution effect as presented by Ahmed (2012) and analyse whether remittances have an effect on government spending.

2.3 Government spending

When investigating the relationship between remittances and corruption Ahmed (2012) and Tyburski (2014) found that the political environment, whether the government is more autocratic or democratic, has a significant impact on the outcome of how remittances affect corruption. It is therefore likely that the effect of remittances on government spending can also significantly differ between countries. Previous research mainly looked at political factors, finding that the political environment of a country can significantly impact government spending, with Maux et al., (2019) mentioning it is a "widely accepted fact that left-wing governments spend and tax more than their right-wing counterparts". This is supported by research done by Herwartz and Theilen (2017) who found that the government ideology has a significant impact on government size and spending in different countries. Additionally, Bjørnskov & Potrafke (2011) found that the role of the government in the economy significantly differs between left and right-wing governments. On the other hand, Snyder & Yackovlev (2000), interestingly finds that while ideology does not lead to large differences in public spending, changes in government do. The evidence for government spending differing in different political environments raises the question if the effect of remittances on government spending will differ for left and right-wing governments. Therefore, the research question that this paper aims to answer is: *What is the effect of remittances on government spending, and does this effect differ based on a government's political ideology?*

2.4 Hypothesis

Based on the limited previous literature regarding the substitution effect (Mina, 2019) the hypothesis for this research paper is that remittances will be associated with a decrease in government spending. The mechanism here is that remittances provide a source of income for households in the home country which can be used to consume goods and services. Part of this income can go to the payment for and consumption of public goods. Individuals will, therefore, be less dependent on the government to provide and subsidise public goods, resulting in the government's ability to decrease spending without adverse effects for individuals, as the decrease in government spending is substituted by increased income and household spending ability through remittances.

Furthermore, research shows that left-wing governments often believe in more government intervention and therefore in general have higher government spending compared to right-wing governments (Maux et al., 2019; Herwartz and Theilen, 2017). The hypothesis is therefore, that since right-wing governments place less importance on government spending, they are more likely to see a larger decrease in government spending with higher amounts of remittances compared to left-wing governments. Right-wing governments already place less importance on government spending and leave more to the market, so having remittances as a substitute for government spending can encourage governments to further decrease spending.

Based on the mechanisms presented above, the following hypotheses are formed:
H1a: An increase in remittances is associated with a decrease in the level of government spending.

H1b: For countries with a left-oriented government, an increase in remittances will be associated with a smaller decrease in government spending than for countries with a right-oriented government.

3. Data

The data that will be used in this research paper consists of a panel data set comprising 62 countries (Appendix A), for the years 2000-2020, excluding 2001, as the IMF data used for

government expenditure was not available for 2001. From all global country data available, the developing countries, as listed by the UN country classification (UN, 2014), were selected. From these, the countries with almost all data points available for both remittances and government spending were used, with very few exceptions of countries missing 2 or 3 data points. As previously stated, the main dependent variable is total government expenditure as a percentage of GDP. This data was collected from the IMF, as considering their strong focus on public finances, data on government finances is of high quality and comparable across countries. According to the IMF (2022), the total government expenditure includes total expenditure on public goods and services and the net acquisition of nonfinancial assets." Additionally, research by Adams & Cuecuecha (2010) and Clemens & Tiongson (2017), find that remittances can most significantly impact household spending on mainly health and education. Therefore, these components of government spending are also viewed separately as dependent variables. The data on government spending on education and spending on health is provided by the World Bank (2024d) and World Bank (2024e) respectively. The main independent variable is 'Personal Remittances received as a percentage of GDP', which is used to measure the level of remittances a country is receiving, retrieved from the World Bank (2024b). This is made up of personal transfers and compensation of employees from individuals residing outside the country to residents of the country. These transfers can be in cash or in kind.

Additionally, to test whether the effect of remittances on government expenditure differs between governments with different political ideologies, data from the Database of Political Institutions developed by the Inter-American Development Bank is used. This database provides data on electoral results and political institutions and is one of the most complete and widely used databases when it comes to political economy and comparative political institutions (Cruz et al., 2021). Data on a political party's orientation is based on the following criteria:

Right: Right-wing, conservative, or Christian democratic parties
Left: Left-wing, communist, socialist, or social democratic
Centre: If parties are defined as centrist or can be best described as centrist. Not classified as centrist if a party is only centrist compared to other parties.
No Orientation: The party does not fit any of the above descriptions (eg. no focus on economic issues).

Furthermore, based on previous research, it was argued that both economic and political factors can influence government spending and should be included as control variables. Berdiev et al., (2013) and Ahmed, (2012) find that Total GDP and GDP per capita can act as significant controls. The authors find that government spending varies significantly at different levels of development, with total GDP and GDP per capita acting as a good proxy for development level. Furthermore, Ricciardulli (2019) argues that official development assistance should be accounted for as the effect it has on government expenditure could be similar to remittances. It is argued that with higher levels of development aid, governments could have fewer incentives to spend money on public goods, as these are already partly being financed by the development aid. Therefore, there could exist a negative correlation between development assistance and government spending. Additionally, to control for political and governance factors, the World Governance Indicators are included as control variables. These indicators include Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. The World Governance Indicators provide a comparable measure of institutional quality and governance across countries (Kaufmann & Kraay, 2023). Institutional quality is shown to affect government size as strong institutions are required to monitor government spending and ensure it is well-regulated and allocated efficiently (Nawaz & Khawaja, 2020). The control variables used will therefore be, GDP per capita, development aid received and the six World Governance Indicators, with all the data coming from the World Bank database.

All variables used and their sources can be found tin Table 1 The descriptive statistics for each of the variables used are shown in Table 2 below, with the frequency of each political orientation shown in Table 3. Besides a number of relevant controls, both time and country fixed effects are relevant to include to reduce the bias of estimates. Due to the panel data set consisting of countries from different regions of the world, there will be large differences in economic, social and institutional factors. This unobserved heterogeneity between countries should be accounted for by including country-fixed effects. Additionally, in the time period studied, 2000-2020, many of the countries have faced certain time-specific economic shocks which could influence the government spending in a country, for example, the economic crisis in Argentina in the early 2000s or the financial crisis in 2008 which affected multiple countries. To account for these trends over time, time-fixed effects are also included.

Table 1: Variables

Variable	Explanation	Source
GovExp	Government expenditure as % of GDP	IMF
Remittances	Personal remittances as % of GDP	World Bank
DevAid	Net official development assistance and official aid received (current US$, millions)	World Bank
GDP per capita	GDP per capita, PPP (current international $, thousands)	World Bank
Total GDP	Total GDP PPP (constant 2017 international $, billions)	World Bank
Voice and Accountability	Estimate, range -2.5 to 2.5	World Governance Indicators
Political Stability	Estimate, range -2.5 to 2.5	World Governance Indicators
Government Effectiveness	Estimate, range -2.5 to 2.5	World Governance Indicators
Regulatory Quality	Estimate, range -2.5 to 2.5	World Governance Indicators
Rule of Law	Estimate, range -2.5 to 2.5	World Governance Indicators
Control of Corruption	Estimate, range -2.5 to 2.5	World Governance Indicators

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GovExp	1240	25.626	9.388	6.247	56.306
Education	978	4.183	1.576	1.012	10.315
Health	1240	5.625	1.994	1.756	13.68
Remittances	1234	5.678	6.765	0	44.127
DevAid	1169	632.302	714.207	-938.59	5374.78
GDP per capita	1240	9.444	8.18	.757	55.273
Total GDP	1240	430.216	979.083	2.07	9152.23
Voice and Accountability	1240	-.211	.684	-2.124	1.293
Political Stability	1240	-.458	.747	-2.81	1.278
Government Effectiveness	1240	-.331	.625	-2.17	1.563
Regulatory Quality	1240	-.228	.607	-2.243	1.536
Rule of Law	1240	-.442	.593	-1.737	1.519
Control of Corruption	1240	-.477	.609	-1.597	1.718

Table 3: Orientation frequency

	Freq.	Percentage
No Orientation	539	44.18
Centre	102	8.36
Left	362	29.67
Right	217	17.79
Total	1220	100.00

4. Methodology

Using this data, an OLS regression including control variables will be performed to test the hypotheses presented above. Additionally, to account for within and between variations in the panel data and reduce the bias of the results, both country and time-fixed effects, for the different countries and years, will be included in the regression.

$$(1)\ GovExp = \beta_0 + \beta_1 lnRemittances_{it} + \beta_2 Centre + \beta_3 Left + \beta_4 Right$$
$$+ \beta_5 X_{it} + \beta_6 a_C + \beta_7 a_Y + \varepsilon_{it}$$

$$(2)\ GovExp = \beta_0 + \beta_1 lnRemittances_{it} + \beta_2 Centre + \beta_3 Left + \beta_4 Right + \beta_5 Rem * Centre$$
$$+ \beta_6 Rem * Left + \beta_7 Rem * Right + \beta_8 X_{it} + \beta_9 a_C + \beta_{10} a_Y + \varepsilon_{it}$$

Equation (1) represents the initial OLS regression equation to answer the main hypothesis, with $GovExp$ representing the level of government spending in a certain country (*i*) at a specific time period (*t*). β_0 simply represents the constant if all variables were equal to 0, while β_1 is the main coefficient of interest representing the change in government spending resulting from a change in remittances received. The data for remittances is included in the natural logarithm form to allow for the data to be more normally distributed. Furthermore, the different orientations (orientation categories described above) are included controlling for the different government orientations, with *No Orientation* being the reference category. Additionally, X_{it} represents all the additional control variables included, with a_C and a_Y representing the country and year fixed effects, respectively. Equation (2) in addition to the previously mentioned variables includes an interaction variable between each orientation and the level of remittances received as a percentage of GDP. These are indicated by Rem*Left, Rem*Right and Rem*Centre, with all coefficients being compared to the effect of remittances on government spending for the reference category, *No Orientation*. This allows for a comparison between the

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different orientations and seeing whether the effect of remittances on government spending varies for different government ideologies. Additionally, besides government expenditure as a dependent variable, spending on education and health was also used as the dependent variable, with the rest of the regression equations being kept constant.

Despite the inclusion of several control variables and both individual and time-fixed effects, answering this question comes with significant challenges surrounding the endogeneity estimates. Firstly, although research by Berdiev et al., (2013) and Ahmed, (2012) shows that total GDP and GDP per capita are relevant controls as they significantly influence government spending, they could also be correlated with the independent variable, remittances, with higher amounts of remittances being sent to developing countries with lower GDPs (KNOMAD, 2023a). This correlation between the controls, total GDP and GDP per capita, and the independent variable remittances, known as multicollinearity, could lead to less accurate coefficient estimates. Therefore, in the robustness checks the regressions are tested again but without the total GDP and GDP per capita controls to see if the estimates significantly differ. Additionally, it is a significant challenge to take into account all the economic, political and social/cultural variables that could have an impact on both remittances and government spending. Therefore, omitted variable bias presents significant issues resulting in possible endogeneity of the estimates. Additionally, not only could remittances have an effect on government spending, but the relationship could also go the other way around with government spending impacting the level of remittances. For example, with lower levels of spending on health and education, people could feel a larger need to send remittances resulting in higher levels of remittances. This possibility of government spending affecting the level of remittances presents a further challenge of reverse causality. Overall, the challenges mentioned regarding omitted variables and reverse causality among others, could generate biased estimates.

To account for these challenges, an IV approach using an IV for remittances will be used. A previous paper by Abdih et al. (2012) looking at the relationship between remittances and institutional quality, used distance to the closest remittance-sending country/region as an IV for the level of remittances received. The assumption is that the closer a country is to a country that is a large source of remittances, the more likely people are to emigrate there and send money back home. Abdih et al. (2012) use Western Europe, the United States and the Arab Gulf as the largest remittance-sending regions. As a proxy for Western Europe, France is used and as a proxy for the Arab Gulf, Saudi Arabia is used. For countries in Latin America and the

Caribbean the distance to the United States is used, for countries in Africa, the average between the distance to France and Saudi Arabia is used and for countries in Asia, the distance to Saudi Arabia is used. This paper uses data from Mayer & Zignago (2011), and takes the distance from a given country of interest to the capital of France, USA, Saudi Arabia or the average of France and Saudi Arabia's capital, depending on the region.

5. Results

5.1 OLS and Fixed Effects

To test the hypotheses, the two different specifications, without and with interaction terms were run, with the dependent variables being GovExp, Education and Health, with Table 4 showing the results of the various specifications. All results shown include all the control variables and both country and time-fixed effects. In columns (1) and (2), for total government spending, the coefficients for remittances are found to be positive but not significant at a 10% level. In column (2) however, the results do indicate that there are differences between centre, left and right governments. These results for the interaction terms Rem*Centre, Rem*Left and Rem*Right are all compared to data points for which the political orientation was unclear (*No Orientation*). The coefficients of the interaction term for both centre and right-wing governments are negative and significant at a 5% level, with a value of -0.950 and -0.821 respectively. This indicates that compared to countries with governments that have an unclear political orientation, having a centrist orientation, an increase in remittances by 1% is associated with a decrease in government spending by 0.950/100=0.00950 percentage points while having a Right orientation is associated with a decrease in government spending by 0.00821. For Left orientated governments, the effect of remittances on government spending does not significantly differ to governments in the reference category, *No Orientation*. When testing whether the coefficients for Rem*Right and Rem*Left are the same, the results show that they do significantly differ, at a 1% significance level, with a p-value of 0.00590. The results provide evidence that government spending decreases more for right-oriented governments than for left-oriented governments. However, for the developing countries in our sample, the average growth in government spending over the time period was 1.909%. So, a 0.00950 or 0.00821 percentage point decrease in total government spending for the centre and

right-oriented governments compared to *No Orientation* represents quite a small magnitude change compared to the average change.

Table 4: OLS regression results

	(1) GovExp	(2) GovExp	(3) Education	(4) Education	(5) Health	(6) Health
LnRemittances	0.204	0.370	-0.147***	-0.112*	-0.129***	-0.185***
	(0.196)	(0.251)	(0.0525)	(0.0668)	(0.0442)	(0.0569)
Rem*Centre		-0.950**		-0.155		-0.0128
		(0.385)		(0.0957)		(0.0872)
Rem*Left		-0.133		-0.0235		0.126*
		(0.308)		(0.0792)		(0.0698)
Rem*Right		-0.821**		-0.150*		0.0459
		(0.334)		(0.0846)		(0.0756)
Centre	-0.705	0.601	0.0691	0.278	0.218*	0.197
	(0.537)	(0.778)	(0.136)	(0.195)	(0.121)	(0.176)
Left	0.705	1.169*	0.0671	0.147	0.365***	0.196
	(0.455)	(0.675)	(0.127)	(0.177)	(0.103)	(0.153)
Right	0.825*	2.070***	0.0123	0.234	0.254**	0.184
	(0.472)	(0.683)	(0.126)	(0.175)	(0.107)	(0.155)
Constant	23.84***	23.29***	4.187***	4.065***	5.296***	5.378***
	(0.694)	(0.761)	(0.176)	(0.194)	(0.157)	(0.173)
Observations	1141	1141	897	897	1141	1141
R^2	0.314	0.325	0.159	0.167	0.252	0.257
Individual FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES

Note: Standard errors in parentheses, $^*p<0.10$, $^{**}p<0.05$, $^{***}p<0.01$. Columns (1) and (2) have total government expenditure as the dependent variable. Columns (3) and (4) have government spending on education as the dependent variable. Columns (5) and (6) have health expenditure as a dependent variable. LnRemittances represents the level of remittances measured in GDP per capita in natural logarithm form. Rem*Centre, Rem*Left and Rem*Right represent the interaction terms between LnRemittances, and the dummy variable for a government having a Centre, Left or Right orientation, with No Orientation being the reference category. All columns include both time and individual fixed effects.

In columns (3) and (5) the overall effect of remittances on spending on education and health is found to be different to total government spending. An increase in remittances by 1% is associated with a decrease in government spending on education by 0.00147 percentage points, and a decrease in spending on health by 0.00129 percentage points, both significant at a 1% level. These results for both spending on education and health are in support of hypothesis H1a,

that an increase in remittances decreases government spending. With spending on education growing by 1.620% on average across our sample, a decrease of 0.00147 percentage points only represents a small effect. Spending on health has an average growth rate of 1.768% in our sample, so again, a decrease of 0.00129 percentage points with an increase of remittances by 1% is relatively small. Column (4) shows that for right-oriented governments, the effect of remittances on spending on education is different to the reference category, *No Orientation,* at a 10% significance level, with a coefficient of -0.150. This indicates that for a certain level of remittances, spending on education for a right-oriented government is expected to decrease compared to the reference category. For both left and centre orientations the coefficient is also negative, however, they are not significant at a 10% level. Additionally, when testing whether Rem*Left and Rem*Right are the same, the test is significant, with a p-value of 0.0298, indicating it can be rejected at a 5% significance level. This supports hypothesis H1b, that the effect of remittances is different for left and right-oriented governments, and that for right-oriented governments spending, specifically on education will decrease more than for left-oriented governments.

In column (6), the results show that for left-oriented governments, the effect of remittances on spending on health is different to the reference category, *No Orientation,* at a 10% significance level, with a coefficient of 0.126. This indicates that for a certain level of remittances, spending on health for a left-oriented government is expected to increase compared to the reference category. For centre-oriented governments, the coefficient is negative, while for right-oriented governments the coefficient is positive, however, for both the estimate is not significant at a 10% level. Nevertheless, when testing the null hypothesis that Rem*Left and Rem*Right are the same, the test is not significant at a 10% level, with a p-value of 0.155, meaning we cannot reject the null hypothesis. Despite the coefficient for Rem*Left being positive and significant and the coefficient for Rem*Right being insignificant, there is not enough evidence to support hypothesis H1b, that the effect of remittances on government spending is different for left and right-oriented governments. Overall, there is some evidence provided that remittances decrease spending on health and education, however, it seems to have no effect on total government spending. Additionally, for both total government spending and spending on education, significant differences between right and left-oriented governments are found, with right-oriented governments decreasing spending more than left governments.

Nevertheless, as mentioned, the fixed effects regression, shown in Table 4, comes with significant challenges regarding endogeneity, omitted variable bias and possible reverse causality between government spending and level of remittances. In an attempt to account for these limitations, the section below shows the results of the IV test.

5.2 Instrumental Variable

Table 5 below shows the results from the IV first stage regression with total government spending, with Table 6 and Table 7 showing the first stage output for spending on education and health respectively. These first-stage regression results test whether using distance to the closest and largest remittance-sending country is a strong instrument for the level of remittances. Column (1) in each of the tables shows the first stage regression for the model without the interaction terms between remittances and orientation. In these cases, it is only tested if the instrument is strongly correlated to LnRemittances. In all three cases, the instrument, distance, is significantly negatively correlated to remittances at a 1% level. This indicates that a larger distance to the closest remittance-sending country is associated with a lower level of remittances. Additionally, the general rule for identifying a strong instrument is if the test statistic is larger than 10 (Andrews et al., 2018). In this case, the test statistic for the IV distance is significantly larger than 10 in all three models, at 25.46 in Table 5, 21.76 in Table 6 and 25.46 in Table 7, indicating a strong instrument for each, and that distance can be used as an IV for remittances in the second stage regression. Besides being a strong instrument, its relevance must also be argued. The main assumption is that workers from countries that are closer to a country that provides a large source of remittances are more likely to emigrate than workers from countries that have to cover a larger distance. Smaller distances likely make immigration and adaptation easier, making it more accessible for workers and providing more opportunities to send back remittances. On the other hand, although a country's institutional quality is found to be impacted by geographic factors such as coastal area (Abdih, 2012), it is unlikely that distance to the closest remittance-sending country will have a similar correlation to government spending.

Columns (2), (3), (4) and (5) in Tables 5, 6 and 7 represent the first stage regressions for the models that include the interaction terms between remittances and government orientation. Column (2) tests the IV distance for the overall level of remittances, without interaction with a specific orientation. Columns (3), (4) and (5) test whether the IV is strong for the value of

remittances in the interaction terms. All the relevant coefficients for the given interaction terms are found to be negative and significant at a 1% level. All relevant coefficients that show whether the IV is a strong IV for the required variable are made bold. This is the case for the three different dependent variables, total government spending, spending on education, and spending on health.

Table 5: First stage IV Total Government Spending

	(1)	(2)	(3)	(4)	(5)
	LnRemittances	LnRemittances	Rem*Centre	Rem*Left	Rem*Right
Distance	**-0.000454***	**-0.000414***	-0.00000821	-0.0000279	-0.00000501
	(0.0000178)	0.0000297	.0000103	0.0000188	.0000121
Dist*Centre		0.000135**	**-0.000231***	0.0000574	.0000288
		0.0000568	0.0000198	0.0000359	.0000231
Dist*Left		-0.000160***	0.0000217	**-0.000587***	.0000232
		0.0000424	0.0000148	0.0000268	.0000173
Dist*Right		0.00000412	0.00000300	0.0000478	**-.000447***
		0.0000527	0.0000183	0.0000333	.0000214
Centre	0.501	-0.0860	2.378***	-0.256	-.0628
	(0.127)	0.273	0.0950	0.173	.111
Left	0.0223	0.759***	-0.0693	3.569***	-.0627
	(0.0810)	0.209	0.0726	0.132	.0850
Right	0.190	0.176	0.0114	-0.212	3.141***
	(0.100)	0.236	0.0821	0.149	.0960
Constant	3.591***	3.311***	0.0539	0.00793	-.0180
	(0.139)	0.185	0.0645	0.117	.0754
Observations	1137	1137	1137	1137	1137
R^2	0.529	0.535	0.569	0.602	0.698

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Here total government expenditure is the dependent variable. Column (1) shows the first stage regression results for the model that does not include interaction term, it only looks at the overall effect. LnRemittances is the level of remittances as a % of GDP in the natural logarithm form. Distance represents the distance from a country's capital to the closest remittance-sending region. Columns (2), (3) (4) and (5), show the first-stage regression results for the model including interaction terms. In Column (2), distance is the instrument for LnRemittances, while in Columns (3), (4) and (5), distance is used as an instrument for remittances in the corresponding interaction terms, Dist*Centre, Dist*Left and Dist*Right.

Table 6: First Stage IV Spending on Education

	(1)	(2)	(3)	(4)	(5)
	LnRemittances	LnRemittances	Rem*Centre	Rem*Left	Rem*Right
Distance	**-0.000427***	**-.000303***	-0.00000155	-0.000000693	-0.00000339
	0.0000196	0.0000366	0.0000135	0.0000232	0.0000165
Dist*Centre		0.0000345	**-0.000258***	0.0000329	0.0000305
		0.0000639	0.0000236	0.0000405	0.0000288
Dist*Left		-0.000259***	0.0000163	**-0.000615***	0.0000253
		0.0000481	0.0000177	0.0000305	0.0000217
Dist*Right		-0.000117	0.00000635	0.0000243	**-0.000452***
		0.0000584	0.0000216	0.0000371	0.0000263
Centre	0.520***	0.401	2.475***	-0.141	-0.0781
	0.139	0.309	0.114	0.196	0.139
Left	0.159*	1.382***	-0.0336	3.775***	-0.0742
	0.0876	0.242	0.0893	0.154	0.109
Right	0.341**	0.871***	0.0725	-0.0359	3.0978***
	0.111	0.270	0.0996	0.171	0.121
Constant	3.290***	2.516***	0.0318	-0.165	-0.00657
	0.155	0.231	0.0852	0.147	0.104
Observations	893	893	893	893	893
R^2	0.546	0.563	0.562	0.656	0.664

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Here government spending on education is the dependent variable. Column (1) shows the first stage regression results for the model that does not include interaction term, it only looks at the overall effect. LnRemittances is the level of remittances as a % of GDP in the natural logarithm form. Distance represents the distance from a country's capital to the closest remittance-sending region. Columns (2), (3) (4) and (5), show the first-stage regression results for the model including interaction terms. In Column (2), distance is the instrument for LnRemittances, while in Columns (3), (4) and (5), distance is used as an instrument for remittances in the corresponding interaction terms, Dist*Centre, Dist*Left and Dist*Right.

Table 7: First Stage IV Spending on Health

	(1)	(2)	(3)	(4)	(5)
	LnRemittances	LnRemittances	Rem*Centre	Rem*Left	Rem*Right
Distance	**-0.000454***	**-.0004144***	-0.00000821	-0.0000279	-0.00000501
	0.0000178	0.0000297	0.0000103	0.0000188	0.0000121
Dist*Centre		0.000135**	**-0.000231***	0.0000574	0.0000288
		0.0000568	0.0000198	0.0000359	0.0000231
Dist*Left		-0.00016***	0.0000217	**-0.000587***	0.0000232
		0.0000424	0.0000148	0.0000268	0.0000173
Dist*Right		0.00000412	0.00000300	0.0000478	**-0.000447***
		0.0000527	0.0000183	0.0000333	0.0000214
Centre	0.501***	-0.0860	2.378***	-0.256	-0.0628
	0.127	0.273	0.0950	0.173	0.111
Left	0.0223	0.759***	-0.0693	3.569***	-0.0627
	0.0805	0.209	0.0726	0.132	0.0849
Right	0.190*	0.176	0.0114	-0.212	3.141***
	0.100	0.236	0.0821	0.149	0.0960
Constant	3.591***	3.311***	0.0539	0.00793	-0.0180
	0.139	0.185	0.0645	0.117	0.0754
Observations	1137	1137	1137	1137	1137
R^2	0.524	0.535	0.5687	0.6017	0.698

Note: Standard errors in parentheses, * p < 0.10, ** p < 0.05, *** p < 0.01. Here spending on health is the dependent variable. Column (1) shows the first stage regression results for the model that does not include interaction term, it only looks at the overall effect. LnRemittances is the level of remittances as a % of GDP in the natural logarithm form. Distance represents the distance from a country's capital to the closest remittance-sending region. Columns (2), (3) (4) and (5), show the first-stage regression results for the model including interaction terms. In Column (2), distance is the instrument for LnRemittances, while in Columns (3), (4) and (5), distance is used as an instrument for remittances in the corresponding interaction terms, Dist*Centre, Dist*Left and Dist*Right.

After determining that distance is a strong IV for the required variables the second stage regression is run, with the results shown in Table 8. In column (1), with total government expenditure as the dependent variable, we find that the coefficient for remittances is significant and positive, at 2.349. This indicates that a 1% increase in remittances received, is an associated increase in government expenditure by 0.02349 percentage points. The effect seems to be slightly larger than what was found in the fixed effects regression, 0.02349 compared to 0.00950, however, the magnitude is still relatively small compared to the average change of almost 2% in government spending over the time period. The result, however, is in contrast to

hypothesis H1a, in which it was expected that the government would decrease spending as remittances increased.

Table 8: Second stage IV

	(1)	(2)	(3)	(4)	(5)	(6)
	GovExp	GovExp	Education	Education	Health	Health
LnRemittances	2.349***	6.561***	0.135**	0.247	0.388***	1.783***
	(0.287)	(0.609)	(0.0603)	(0.167)	(0.0647)	(0.140)
Rem*Centre		-6.394***		0.269		-1.445***
		(1.802)		(0.345)		(0.415)
Rem*Left		-6.279***		-0.166		-2.118***
		(0.729)		(0.178)		(0.168)
Rem*Right		-4.874***		-0.193		-1.758***
		(0.935)		(0.211)		(0.215)
Centre	-2.277**	4.841*	0.258	-0.172	0.00512	1.434**
	(0.948)	(2.577)	(0.188)	(0.466)	(0.213)	(0.593)
Left	2.975***	8.898***	0.799***	0.918***	1.484***	3.456***
	(0.589)	(0.919)	(0.116)	(0.187)	(0.133)	(0.212)
Right	-1.559**	3.830***	0.333**	0.521**	0.441***	2.414***
	(0.745)	(1.397)	(0.152)	(0.265)	(0.168)	(0.322)
Constant	17.93***	12.21***	4.040***	3.959***	4.402***	2.557***
	(0.811)	(1.114)	(0.155)	(0.224)	(0.182)	(0.256)
Observations	1137	1137	893	893	1137	1137
R^2	0.267	0.233	0.311	0.291	0.248	0.177

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. These are the results for the IV approach, where Distance is used as an instrument for LnRemittances, and interaction terms, Rem*Centrem Rem*Left and Rem*Right. Columns (1) and (2) have total government expenditure as the dependent variable. Columns (3) and (4) have government spending on education as the dependent variable. Columns (5) and (6) have health expenditure as a dependent variable. Rem*Centre, Rem*Left and Rem*Right represent the interaction terms between LnRemittances, and the dummy variable for a government having a Centre, Left or Right orientation, with No Orientation being the reference category.

Column (2) takes into account how the different governmental orientations change the effect of remittances on total government expenditure. The coefficient for the reference category, *No Orientation*, where orientation is unclear, is 6.561, and significant at a 1% level. However, the coefficients for all interaction variables, Rem*Centre, Rem*Left or Rem*Right, are negative, but also significant at a 1% level. This implies that for all of the centre, left or right-oriented

governments, the effect of remittances on government expenditure is significantly smaller compared to the reference category. When performing a test to test whether the coefficients of Rem*Left and Rem*Right are significantly different, the test gives a p-value of 0.0747. The test result therefore implies that there are significant differences in the effect of remittances on government spending between left and right-oriented governments, at a 10% significance level. With Rem*Left having a larger coefficient than Rem*Right, -6.279, compared to -4.874, the results are the opposite of what was hypothesised in H1b. Although the results present evidence that the effect of remittances on government spending differs between left and right governments, left-oriented governments seem to reduce government spending more than right-oriented governments. Overall, there is no evidence that remittances significantly decrease government spending, and although the results suggest that the effect could differ for left and right-oriented governments, it is not in the direction hypothesised.

Columns (3) and (4) show the IV regressions run using government spending on education as the dependent variable. The results in column (3) are similar to the results with total government expenditure in column (1), as the coefficient for remittances is positive at 0.135 and significant at a 1% level. The magnitude of the coefficient again only represents a small change of 0.00135 percentage points, compared to the average growth in spending on education of 1.620%. The coefficients for all the interaction terms in column (4) are not significant at a 10% level, indicating they do not significantly differ from the reference category. Testing for differences between orientations left and right gives a p-value of 0.850, indicating the effect of remittances on government spending on education does not differ significantly between government orientations.

Finally, column (5) and (6) show the results of the IV regression with spending on health as the dependent variable. The results in column (5) show that overall, an increase in remittances by 1% is associated with an increase in spending on health, by 0.00388 percentage points, significant at a 1% level. This is only a small magnitude compared to the average growth of 1.768% of spending on health, and the opposite of H1a. In column (6), the coefficients of the interaction terms are all found to be negative and significant at a 1% level. Testing whether the coefficients of Rem*Left and Rem*Right are significantly different, we find that they are significantly different, at a 5% level, with a p-value of 0.0474. However, the coefficient of Rem*Left, is larger than Rem*Right, indicating that spending on health decreases more for left than right oriented governments.

5.3 Discussion

H1a: An increase in remittances is associated with a decrease in the level of government spending

Using the results from the IV approach, there is no evidence in support of H1a. The results showed that overall, for the data sample used, remittances can be associated with an increase in government spending, rather than a decrease. This is found to be the case for total government spending, and also government spending on education and spending on health. A possible reason the theory of the substitution effect does not hold is due to the positive effect remittances can have on government finances. Singer (2012) finds that migrant remittances are associated with greater government tax revenues, through greater consumption taxes and overall household consumption. Greater tax revenue increases the government's budget, allowing greater overall expenditure, which could explain the positive relationship. This is also supported by the extensive research done on remittances boosting economic growth and reducing poverty (Giuliano & Ruiz-Arranz, 2009; Acosta et al., 2008; Adams & Page, 2005; Acosta et al., 2006), which could increase government revenues and spending. This is confirmed by Ziesemer (2012) who finds that in developing countries, governments increase tax revenues and increase spending on education when receiving remittances, and that at low levels of remittances tax revenues significantly increase. An increase in tax revenue can likely increase the government's budget to increase spending in the desired areas of the economy.

H1b: For countries with a left-oriented government, an increase in remittances will be associated with a smaller decrease in government spending than for countries with a right-oriented government.

The results in Table 8 present limited evidence in support of hypothesis H1b. Although there is some evidence that the effect of remittances on government spending slightly differs between left and right-oriented governments, the results provide evidence the effect is in the opposite direction as hypothesised. Namely, there is a larger decrease in government spending for countries with a left-oriented government. Both Maux et al., (2019) and Bjørnskov & Potrafke (2011) state that there are significant differences between how left and right-oriented governments spend, and that the difference might not necessarily be in terms of the size of government expenditure, but which area they spend on. The results provide some evidence for

this, as significant differences are only found in spending on health and not education. Maux et al., (2019) state that left-wing governments tend to spend more on social services while right-wing regimes spend on other expenditure programs. Although the political ideology might have a small impact on the effect of remittances on government spending, other factors regarding the regime type could have larger effects (eg. democratic versus authoritarian regime). For example, Tyburski (2014) and Ahmed (2012) both find that there are significant differences between democratic and authoritarian regimes when researching the effect of remittances on public institutions and corruption. These different regime types, democratic and authoritarian, could also influence the relationship between remittances and government spending, however further research is needed to establish the nature of the relationship.

6. Robustness Checks

6.1 Multicollinearity

One of the challenges as mentioned could be the multicollinearity issue presented due to the possible correlation between the level of remittances and GDP per capita and total GDP. The correlation matrix below tests the correlation size between the variables mentioned. Although neither has very high levels of correlation, of between 0.8-1, there is a significant correlation between both, with especially remittances and GDP per capita showing a relatively large correlation.

Table 9: Correlation matrix

	LnRemittances	Total GDP	GDP per capita
LnRemittances	1.0000		
Total GDP	-0.3654***	1.0000	
	(0.000)		
GDP per capita	-0.5145***	(0.000)	1.0000
	(0.000)		

Note: Standard errors in parentheses, $^{*}\,p < 0.10$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$. Shows the correlation between variables from 0-1.

The initial fixed effects regression was rerun without total GDP and GDP per capita controls as a first robustness check. This includes all models with total government spending, government spending on education and spending on health as dependent variables. Overall, the results in the robustness check in Table 10, without GDP per capita and total GDP as control variables are very similar to the original results in Table 4. The signs for all relevant coefficients are the same, only the significance level for a select few of the coefficients differ. In general, the conclusions from the fixed effects regression without the GDP controls are the same as with the GDP controls. Namely, there is some evidence that remittances reduce government spending, especially spending on education and health, and that right-oriented governments tend to decrease spending more than left-oriented governments.

Table 10: OLS regression excluding Total GDP and GDP per capita controls

	(1)	(2)	(3)	(4)	(5)	(6)
	GovExp	GovExp	Education	Education	Health	Health
LnRemittances	0.280	0.437*	-0.0996*	-0.0482	-0.106**	-0.162***
	(0.193)	(0.249)	(0.0522)	(0.0659)	(0.0437)	(0.0566)
Rem*Centre		-0.932**		-0.190**		-0.00858
		(0.386)		(0.0964)		(0.0877)
Rem*Left		-0.129		-0.0537		0.126*
		(0.309)		(0.0798)		(0.0702)
Rem*Right		-0.829**		-0.214**		0.0386
		(0.334)		(0.0843)		(0.0758)
Centre	-0.704	0.571	0.105	0.364*	0.221*	0.195
	(0.538)	(0.780)	(0.138)	(0.196)	(0.122)	(0.177)
Left	0.797*	1.242*	0.131	0.253	0.393***	0.223
	(0.455)	(0.676)	(0.128)	(0.177)	(0.103)	(0.154)
Right	0.863*	2.097***	0.104	0.403**	0.270**	0.209
	(0.469)	(0.677)	(0.126)	(0.172)	(0.106)	(0.154)
Constant	23.13***	22.67***	3.715***	3.596***	5.072***	5.156***
	(0.579)	(0.653)	(0.148)	(0.164)	(0.131)	(0.148)
Observations	1141	1141	897	897	1141	1141
R^2	0.308	0.318	0.134	0.147	0.241	0.247

Note: Standard errors in parentheses, $^* p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$. Columns (1) and (2) have total government expenditure as the dependent variable. Columns (3) and (4) have government spending on education as the dependent variable. Columns (5) and (6) have health expenditure as a dependent variable. All columns exclude Total GDP and GDP per capita as control variables. LnRemittances represents the level of remittances measured in GDP per capita in natural logarithm form. Rem*Centre, Rem*Left and Rem*Right represent the interaction terms between LnRemittances, and the dummy variable for a government having a Centre, Left or Right orientation, with No Orientation being the reference category. All columns include both time and individual fixed effects.

Similar to the fixed effects regression, the IV regression was also run again without GDP per capita and total GDP, as a robustness check. First-stage regression results for this IV regression are presented in Appendix B. Overall, the results are similar to the IV estimates where GDP per capita and total GDP are included in the regression. The sign of all relevant coefficients is the same as in the original IV regression in Table 8. While there are some minor differences in the significance of a few coefficients, the conclusion drawn from the results is the same. There is no evidence in support of H1a, that remittances are associated with a decrease in government spending. In this robustness check all the tests evaluating whether there are differences between Rem*Right and Rem*Left are insignificant, indicating there is no evidence that there is a difference between left and right-oriented governments. It is not in the direction hypothesised in H1b.

Table 11: Second stage IV excluding Total GDP and GDP per capita controls

| | (1) | (2) | (1) | (2) | (3) | (4) |
	GovExp	GovExp	Education	Education	Health	Health
LnRemittances	2.942***	9.753***	0.156**	0.424**	0.476***	2.285***
	(0.353)	(1.002)	(0.0628)	(0.209)	(0.0717)	(0.204)
Rem*Centre		-4.854**		0.243		-1.346***
		(2.446)		(0.361)		(0.498)
Rem*Left		-10.32***		-0.375*		-2.723***
		(1.164)		(0.223)		(0.237)
Rem*Right		-8.869***		-0.409*		-2.384***
		(1.387)		(0.247)		(0.282)
Centre	-1.600	2.541	0.295	-0.180	0.0632	1.242*
	(1.080)	(3.500)	(0.187)	(0.482)	(0.219)	(0.712)
Left	2.791***	12.34***	0.773***	1.063***	1.409***	3.932***
	(0.672)	(1.364)	(0.116)	(0.215)	(0.137)	(0.278)
Right	-1.972**	8.053***	0.308**	0.714**	0.316*	3.017***
	(0.853)	(1.961)	(0.151)	(0.287)	(0.173)	(0.399)
Constant	26.33***	19.56***	4.374***	4.186***	5.225***	3.424***
	(0.574)	(1.109)	(0.0988)	(0.167)	(0.117)	(0.226)
Observations	1137	1137	893	893	1137	1137
R^2	0.0366	.	0.300	0.256	0.194	.

Note: Standard errors in parentheses, $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. These are the results for the IV approach, where Total GDP and GDP per capita are excluded as controls, and Distance is used as an instrument for LnRemittances and interaction terms, Rem*Centrem Rem*Left and Rem*Right. Columns (1) and (2) have total government expenditure as the dependent variable. Columns (3) and (4) have government spending on education as the dependent variable. Columns (5) and (6) have health expenditure as a dependent variable. Rem*Centre, Rem*Left and Rem*Right represent the interaction terms between LnRemittances, and the dummy variable for a government having a Centre, Left or Right orientation, with No Orientation being the reference category.

Despite the IV approach addressing the large issue of endogeneity present in the original OLS regression results, significant challenges remain, especially surrounding the data used, and the measuring of the main variables of interest, remittances and government spending. A brief published by the United Nations highlighted that there are certain challenges that come with measuring remittances (Alvarez et. al., 2015). Consistent over the different methodologies, a main limitation for example is that many remittances are sent through informal channels that can be hard to measure and determine the magnitude. Initially, data on remittances from the World Bank is used. They define remittances as the sum of personal transfers and compensation for employees (eg. wages). The World Bank provides its own estimates for remittances based on the country's balance of payments. As a robustness check, another source of remittance data will be used. This data comes from UN Trade & Development (2023), which compiles different sources of formal remittance data such as the IMF balance of payments data, Economic Intelligence Unit data and World Bank data and generates remittance estimates. Despite this, the data from the UN Trade & Development. (2023), has a larger number of missing values, meaning there are slightly fewer observations to work with.

6.2 Alternative data sources

Additionally, data collected on government spending differs significantly per country and per source. For data on government expenditure, the IMF uses the Government Finance Statistics methodology (IMF, n.d.), which has detailed data on government expenses. Data collection is consistent across countries and is widely used to analyse fiscal policy and government size. On the other hand, the World Bank data, used for the robustness check below, uses national account data as sources for their data on government expenditure. However, sources often use different methodologies to collect the data. Additionally, the World Bank data for example states that it does not include any spending on military expenditures that are part of the government capital formation (World Bank, 2024c), while the IMF data on government expenditure does not exclude it. As a result, the values between the World Bank data and IMF data on government spending differ slightly. Therefore, as a robustness check, all regressions are run again, using these alternative data sources for remittances and government spending. For remittances, data is collected from UN Trade & Development (2023). Furthermore, alternative data on government spending is collected from the World Bank (2024c). Similar comprehensive data

from another source was not found for total spending on education and health, so this robustness check only looks at total government spending.

Table 12: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GovExp	1240	25.626	9.388	6.247	56.306
Remittances	1234	5.678	6.765	0	44.127
GovExp2	1235	13.914	4.314	3.46	27.94
Remittances2	1033	6.117	6.599	.02	42.73

Note: GovExp from IMF (2022), Remittances from World Bank (2024b), GovExp2 from World Bank (2024c), Remittances2 from UN Trade & Development (2023).

The results from the robustness checks in Table 13 are similar in terms of the sign of the coefficient, compared to the original results found when performing the initial fixed effects regression. Column (1) in Table 13 shows a positive and significant coefficient at a 5% level for remittances. While the coefficient in the original regression in Table 4 was also positive, it was not significant. When including the interaction variable in column 8, the coefficient for remittances is again positive and significant at a 5% level compared to an earlier positive and insignificant result. While only the coefficient for Rem*Right in the original regression was negative and significant, in Table 13, both the coefficients for Rem*Left and Rem*Right are negative and insignificant. Despite both coefficients being insignificant, testing whether the effect for Rem*Right and Rem*Left are the same, the results show there is a significant difference, similar to the original results in Table 4.

Table 13: OLS regression Alternative data

	(1) GovExp2	(2) GovExp2
LnRemittances2	0.433**	0.518**
	(0.204)	(0.212)
Rem*Centre		-0.633***
		(0.238)
Rem*Left		-0.0628
		(0.187)
Rem*Right		-0.337
		(0.211)
Centre	0.312	1.329***
	(0.304)	(0.506)
Left	0.779***	1.079**
	(0.264)	(0.436)
Right	0.352	0.995**
	(0.271)	(0.462)
Constant	13.11***	12.85***
	(0.544)	(0.566)
Observations	942	942
R^2	0.0275	0.0288
Individual FE	YES	YES
Time FE	YES	YES

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. LnRemittance is based on data from UN Trade & Development (2023), and Government expenditure data is from the World Bank (2024c). Government spending is the dependent variable. LnRemittances represents the level of remittances measured in GDP per capita in natural logarithm form. Rem*Centre, Rem*Left and Rem*Right represent the interaction terms between LnRemittances, and the dummy variable for a government having a Centre, Left or Right orientation, with No Orientation being the reference category. All columns include both time and individual fixed effects.

Table 14: Second stage IV Alternative data

	(1)	(2)
	GovExp2	GovExp2
LnRemittancess2	0.521***	1.998***
	(0.156)	(0.321)
Rem*Centre		-0.659
		(0.867)
Rem*Left		-2.484***
		(0.389)
Rem*Right		-1.612***
		(0.478)
Centre	-1.027**	-0.589
	(0.462)	(1.291)
Left	0.134	2.669***
	(0.295)	(0.510)
Right	-0.785**	1.150
	(0.394)	(0.830)
Constant	14.30***	12.22***
	(0.474)	(0.666)
Observations	941	941
R^2	0.272	0.224

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dependent variable total government spending from World Bank (2024c). Distance is used as an instrument for LnRemittances, and and interaction terms, Rem*Centrem Rem*Left and Rem*Right. Columns (1) and (2) have total government expenditure as the dependent variable. Columns (3) and (4) have government spending on education as the dependent variable. Columns (5) and (6) have health expenditure as a dependent variable. Rem*Centre, Rem*Left and Rem*Right represent the interaction terms between LnRemittances, and the dummy variable for a government having a Centre, Left or Right orientation, with No Orientation being the reference category.

When using the alternative data sources to perform the IV test, the results are similar in direction and significance but only differ slightly in magnitude. The first stage regression is shown in Appendix C, and similar to the original data finds that the instrument of distance to the closest large remittance-sending country is a strong instrument. Additionally, the coefficient for remittances is positive and significant at a 1% level in both columns (1) and (2). The coefficients for the interaction variables, Rem*Left and Rem*Right are also negative and significant at a 1% level. Additionally, similar to the original results, the test finds that there is a significant difference on the effect of remittances between left and right-oriented governments. However, the results are also opposite of what was hypothesised, with government expenditure decreasing more for left-oriented governments than for right-oriented governments.

7. Conclusion

This research paper adds to the literature researching the effect remittances can have on government spending in a country and expanding the research to test whether the effect differs for governments with different ideologies. A main theory used regarding the effect of remittances on government spending is the substitution effect theory which argues that remittances can perform a similar role as government spending, thereby working as a substitute. Previous literature looking into this did so for a select group of countries, or high to middle-income countries. In this study on the other hand, A large selection of developing countries was used to test the theory, as developing countries are where the majority of remittances are sent (KNOMAD, 2023a).

Using an IV approach, it was found that an increase in remittances is not associated with a decrease in government spending but the contrary. Remittances are associated with a statistically significant increase in government spending. Additionally, only limited evidence is found that there are significant differences between different government orientations regarding the effect of remittances on government spending. Although left and right-oriented governments have different beliefs about the role and size of the government in terms of spending, this does not seem to be significantly impacted by the level of remittances received. Overall, the results imply that besides the positive impact remittances have on household income and consumption, the impact they can have on the country-wide economy can lead to a larger government budget and higher government spending, regardless of the government's political orientation. These results therefore support the large literature on the benefits that remittances can have in supporting a country's economic development, through the positive impact remittances can have on government spending, rather than remittances being a substitute for government spending.

7.1 Limitations and further research

As with other empirical studies, there are a number of limitations that come with this research. First of all, there are possible significant omitted variables that were not controlled for in the regressions, which could present biased results. A significant variable that was not included was the level of democracy in a country, whether it is a more democratic or authoritarian regime. The reason this variable was not included is because for a very large number of

countries in the sample used this data is not available, or only available for a short time period. Additionally, the total value of remittances is challenging to accurately measure due to the informal methods in which remittances are often sent. Although an attempt is made to account for this through robustness checks, data for certain countries might be more reliable than for other countries. Furthermore, the data for total government expenditure encompasses a very large range of sectors and goods and services that fall under the government's budget. Although this is accounted for by looking specifically into spending on education and health, future research could benefit from taking a more detailed look at specific aspects of government spending and how remittances impact different areas of government spending. Additionally, future research could investigate whether the effect of remittances on government spending differs between regions, eg Latin America, Africa and Asia.

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9. Appendices

Appendix A: List of countries

- Albania
- Algeria
- Argentina
- Azerbaijan
- Bangladesh
- Barbados
- Belize
- Benin
- Bolivia
- Bosnia and Herzegovina
- Brazil
- Burkina Faso
- Cambodia
- Chile
- Colombia
- Costa Rica
- Dominican Republic
- Ecuador
- El Salvador
- Gabon
- Georgia
- Ghana
- Guatemala
- Guinea
- Guinea-Bissau
- Haiti
- Honduras
- India
- Indonesia
- Israel

- Jordan
- Kenya
- Lebanon
- Madagascar
- Malaysia
- Mexico
- Moldova
- Mongolia
- Morocco
- Namibia
- Nicaragua
- Niger
- Oman
- Pakistan
- Panama
- Paraguay
- Peru
- Philippines
- Russian Federation
- Senegal
- Slovak Republic
- South Africa
- Sudan
- Tajikistan
- Tanzania
- Thailand
- Togo
- Tunisia
- Uganda
- Ukraine

- Jamaica   - Uzbekistan

Appendix B: First stage regressions **robustness check multicollinearity**

Table 15: First Stage IV Total Government Expenditure, excluding total GDP and GDP per capita controls

	(1) LnRemittances	(2) LnRemittances	(3) Rem*Centre	(4) Rem*Left	(5) Rem*Right
Distance	**-.0004173***	**-.0003078***	0.00000482	-.0000159	0.00000138
	.1437391	.0000311	0.00000987	.0000179	.0000233
Dist*Centre		.0001628**	**.0000139***	.0000628*	.0000345
		.0000627	.0000199	.000036	.0000233
Dist*Left		-.0003215***	.0000139	**-.000606***	.0000112
		.0000448	.0000142	.0000257	.0000166
Dist*Right		-.0001387**	0.00000152	.0000317	**-.0004559***
		.0000566	.0000179	.0000324	.000021
Centre	.3685385**	-.3146567	2.347524***	-.2930182*	-.0971006
	.1437391	.3017668	.0957048	.1730233	.1118653
Left	.0441823	1.509253***	-.0390211	3.657182***	-.012062
	.0907227	.2203983	.0698989	.1263692	.0817019
Right	.2286927**	.7801867***	.0223511	-.1476636	3.169631***
	.1126292	.2521348	.0799641	.1445659	.0934667
Constant	2.157471***	1.681347***	-.0364746	-.1949544**	-.1495783**
	.1210452	.1563743	.0495938	.0896599	.0579681
Observations	1137	1137	1137	1137	1137
$R2$	0.391	0.430.	0.561	0.598	0.692

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is total government expenditure. Total GDP and GDP per capita are excluded as controls. Column (1) shows the first stage regression results for the model that does not include interaction term, it only looks at the overall effect. LnRemittances is the level of remittances as a % of GDP in the natural logarithm form. Distance represents the distance from a country's capital to the closest remittance-sending region. Columns (2), (3) (4) and (5), show the first-stage regression results for the model including interaction terms. In Column (2), distance is the instrument for LnRemittances, while in Columns (3), (4) and (5), distance is used as an instrument for remittances in the corresponding interaction terms, Dist*Centre, Dist*Left and Dist*Right.

Table 16: First stage IV Education excluding Total GDP and GDP per capita controls

	(1)	(2)	(3)	(4)	(5)
	LnRemittance	LnRemittances	Rem*Centre	Rem*Left	Rem*Right
Distance	**-.0004093**	**-.0002129***	-0.00000064	.0000105	0.0000056§
	.0000218	.0000376	.0000129	.000022	.0000157
Dist*Centre		.0000588	**-.0002513***	.0000392	.0000359
		.0000696	.0000238	.0000407	.000029
Dist*Left		-.0004049***	0.00000945	**-.0006352***	0.00000869
		.0000496	.0000169	.000029	.0000206
Dist*Right		-.0002397***	-0.00000862	0.00000891	**-.0004641***
		.0000612	.0000209	.0000358	.0000255
Centre	.3522983	.1896474	2.432999***	-.1854462	-.1160158
	.155886	.3367348	.1150345	.1968201	.1401458
Left	.1913644	2.085975***	-.0063661	3.870006***	.003349
	.1913644	.2490822	.0850908	.1455875	.1036656
Right	.3150204	1.357843***	.0666229	.017929	3.140571***
	.1236317	.2817707	.0962578	.1646938	.1172702
Constant	2.052511	1.113997	-.0474409	-.3668054***	-.172041**
	.1400796	.198397	.0677759	.1159622	.0825709
Observations	893	893	893	893	893
$R2$	0.427	0.479	0.551	0.652	0.658

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is government expenditure on education. Total GDP and GDP per capita are excluded as controls. Column (1) shows the first stage regression results for the model that does not include interaction term, it only looks at the overall effect. LnRemittances is the level of remittances as a % of GDP in the natural logarithm form. Distance represents the distance from a country's capital to the closest remittance-sending region. Columns (2), (3) (4) and (5), show the first stage regression results for the model including interaction terms. In Column (2), distance is the instrument for LnRemittances, while Columns (3), (4) and (5), test whether distance is a strong instrument for remittances in the corresponding interaction terms, Dist*Centre, Dist*Left and Dist*Right.

Table 17: First stage IV Health excluding Total GDP and GDP per capita controls

	(1) LnRemittances	(2) LnRemittances	(3) Rem*Centre	(4) Rem*Left	(5) Rem*Right
Distance	-.0004173***	-.0003078***	-0.00000482	-.0000159	0.00000138
	.0000199	.0000311	0.00000987	.0000179	.0000115
Dist*Centre		.0001628**	-.0002255***	.0000628	.0000345
		.0000627	.0000199	.000036	.0000233
Dist*Left		.0000627***	.0000139	-.000606	.0000112
		.0000448	.0000142	.0000257	.0000166
Dist*Right		-.0001387**	-1.52e-06	.0000317	-.0004559
		.0000566	.0000179	.0000324	.000021
Centre	.3685385**	.0000566	2.347524***	-.2930182	-.0971006
	.1437391	.3017668	.0957048	.1730233	.1118653
Left	.0441823	1.509253***	-.0390211	3.657182	-.012062
	.0907227	.2203983	.0698989	.1263692	.0817019
Right	.2286927**	.7801867***	.0223511	-.1476636	3.169631
	.1126292	.2521348	.0799641	.1445659	.0934667
Constant	2.157471***	1.681347***	-.0364746	-.1949544	-.1495783
	.1210452	.1563743	.0495938	.0896599	.0579681
Observations	1137	1137	1137	1137	1137
$R2$	0.391	0.430	0.561	0.598	0.692

Note: Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is expenditure on health. Total GDP and GDP per capita are excluded as controls. Column (1) shows the first stage regression results for the model that does not include interaction term, it only looks at the overall effect. LnRemittances is the level of remittances as a % of GDP in the natural logarithm form. Distance represents the distance from a country's capital to the closest remittance-sending region. Columns (2), (3) (4) and (5), show the first-stage regression results for the model including interaction terms. In Column (2), distance is the instrument for LnRemittances, while Columns (3), (4) and (5), test whether distance is a strong instrument for remittances in the corresponding interaction terms, Dist*Centre, Dist*Left and Dist*Right.

Appendix C: First stage regressions robustness check alternative data sources

Table 18: First stage IV Alternative data

	(1) LnRemittances2	(2) LnRemittances2	(3) Rem*Centre	(4) Rem*Left	(5) Rem*Right
Distance	-0.000430***	.0000597***	-.0000119	-.0000422**	0.00000289
	(0.0000191)	.0000258	.0000108***	.0000187	0.00000990
Dist*Centre		.0000597	-.0002539	.0000666*	0.00000764
		.0000508	.0000212	.0000369	.0000195
Dist*Left		-.0000814**	.0000245	-.0005007***	.0000177
		.0000375	.0000156	.0000272	.0000144
Dist*Right		.0000346	.0000167	.0000799**	-.0004685***
		.0000491	.0000205	.0000357	.0000189
Centre	0.570***	.2228163	2.504994***	-.2507084	.0175833
	(0.137)	.2355398	.0983018	.1711318	.0904742
Left	0.149*	.4678864**	-.0832534	3.274795***	-.0153811
	(0.0873)	.1816218	.0757993	.1319576	.0697635
Right	0.414***	.2241686	-.0427113	-.3464862**	3.459768***
	(0.414)	.2103991	.0878094	.1528658	.0808173
Constant	2.211***	3.772483***	.0863521	.237277**	.0001276
	(0.149)	.162638	.0678764	.1181649	.0624716
Observations	1120	941	941	941	941
R^2	0.436	0.643	0.624	0.624	0.830

Note: Standard errors in parentheses, $^{*} p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$. The dependent variable is total government expenditure from the World Bank (2024c). Total GDP and GDP per capita are excluded as controls. Column (1) shows the first stage regression results for the model that does not include interaction term, it only looks at the overall effect. LnRemittances is the level of remittances as a % of GDP from UN Trade & Development (2023) in the natural logarithm form. Distance represents the distance from a country's capital to the closest remittance-sending region. Columns (2), (3) (4) and (5), show the first-stage regression results for the model including interaction terms. In Column (2), distance is the instrument for LnRemittances, while in Columns (3), (4) and (5), distance is used as an instrument for remittances in the corresponding interaction terms, Dist*Centre, Dist*Left and Dist*Right.

Appendix D Coefficient tests

Table 19: Fixed Effects Total GovExp

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	7.620	0.00590

Table 20: Fixed Effects Education

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	4.740	0.0298

Table 21: Fixed Effects Health

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	2.020	0.155

Table 22: IV Total GovExp

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	3.180	0.0747

Table 23: IV Education

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	0.0400	0.850

Table 24: IV Health

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	3.930	0.0474

Table 25: Robustness Check Multicollinearity: Fixed Effects Total GovExp

Null Hypothesis	F-statistic	P-value

Rem*Left=Rem*Right	7.920	0.00500

Table 26: Robustness Check Multicollinearity: Fixed Effects Education

Null Hypothesis	F-statistic	P-value
Rem*Left=Rem*Right	7.570	0.00610

Table 27: Robustness Check Multicollinearity: Fixed Effects Health

Null Hypothesis	F-statistic	P-value
Rem*Left=Rem*Right	2.410	0.121

Table 28: Robustness Check Multicollinearity: IV Total GovExp

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	1.840	0.175

Table 29: Robustness Check Multicollinearity: IV Education

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	0.0500	0.820

Table 30: Robustness Check Multicollinearity: IV Health

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	2.450	0.118

Table 31: Robustness Check Alternative data: Total GovExp2

Null Hypothesis	Test-statistic	P-value
Rem*Left=Rem*Right	3.570	0.0593

Table 32: Robustness Check Alternative data: IV Total GovExp2

Null Hypothesis	Test-statistic	P-value

Rem*Left=Rem*Right	4.480	0.0344