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**Title:** Remittances and Growth

Is the effect, of remittances on growth, conditional on institutional quality?

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# Abstract

This paper researches the empirical relationship between remittances inflows and economic growth in the recipient country. The first research questions that is answered is; “Do remittance inflows have an effect on economic growth of the recipient country?” The second research question is: “Is the effect of worker remittances on economic growth conditional on institutional quality?” The respective conclusions are that there is little evidence that remittances have an effect on economic growth. Furthermore there is also little evidence that the effect of remittances is conditional on economic growth.

# Introduction

This paper will give empirical insights into the relationship between remittances and economic growth. In this paper I will use a combination of control variables used in the literature to analyze the effect of aid or remittances on growth.

The Western world has come a long way, from the 11 hour working days during the industrial revolution, to the welfare state with almost no mandatory working hours. This drastic improvement of living conditions has not happened in large parts of the rest of the world. There is still no consensus among historians to what exactly caused these big economic developments in the western world. From 1960 onward, mimicking these economic developments in other countries became an important topic on the global agenda. The big question on early development economists’ minds was; “What could western countries do to achieve economic development in the rest of the world?”

A lot of the literature of development economics has focused on the effectiveness of aid in achieving economic development (growth). One of these paper was by (Burnside & Dollar, 2000) they investigated the relationship between aid, growth and policies, and found evidence that the effectiveness of aid was very dependent on the policies that were used in the recipient country. After this paper another paper by Easterly, Levine, & Roodman, (New Data, New doubts: A Comment on Burnside and Dollar's "Aid, Policies, and Growth" (2000), 2003) cast doubt on the findings of Burnside & Dollar. The paper by Easterly included more data points and came to a contrasting conclusion namely that aid is not effective in increasing economic growth. In another paper (Dalgaard, Hansen, & Tarp, 2004) also find evidence for the effectiveness of aid but only on the long run.

Around 50 years of research on ODA[[1]](#footnote-1), has done little to provide conclusive evidence to what the exact effects are on recipient countries. At the time this paper is written there is still no broad consensus among development economist as to what exactly starts economic development and if aid contributes positively to economic development in the poorer parts of the globe.

I will add to the development literature by examining the empirical relationship between remittances and growth. Remittances have become a hot topic in development economics, they are estimated to be 4 times as large as the net ODA in 2014. Although Remittances have long been consistently higher than net ODA, the former is relatively neglected compared to the latter. From a policy perspective it is important to know that there are indications that remittances are more effective in stimulating growth compared to ODA. If there is sufficient evidence that remittances tend to increase growth more than ODA it could be more efficient to give tax breaks to the senders of remittances and in turn decrease the ODA.

The research questions I will answer are:

1. *“Do remittance inflows have an effect on economic growth of the recipient country?”*
2. “*Is the effect of worker remittances on economic growth conditional on institutional quality*?”

I answer the different questions by estimating model that tries to capture the effect of remittances on growth. I find that there is very statistically significant evidence that remittance inflows have a positive impact on growth. The results of this study are in line with previous studies on the remittances growth relationship but it should be noted that there is still no broad consensus in the literature. Furthermore my results should be interpreted with care because I do not control for a reverse causal relationship.

# Review of the literature

In the last decades the study of remittances has gained popularity among development economists. The empirical literature on remittance has not delivered conclusive evidence with respect to the total effect that remittances has had on growth. There are different ways for studying the effects of remittances on growth I will focus on studies that do a reduced form analysis to research the effect of remittances on growth.

The channels through which remittances can have a positive effect on economic growth are capital accumulation, labor force growth, and total factor productivity growth (Barajas, Chami, Fullenkamp, Gapen , & Montiel, 2009). The paper by Barajas, Chami, Fullenkamp, Gapen , & Montiel (2009) presents numerous way by which remittances could impact growth positively or negatively. A few examples by which remittances could positively impact growth are by direct financing of capital accumulation, and or improving the credit worthiness of a country. Ways by which remittances could impact growth negatively are through the exchange rate (Dutch disease) or through moral hazard problems. The paper by Barajas et al give more detailed enumerations of the different mechanism with their respective channels through which they are expected to operate. In addition remittances could positively impact growth by facilitating human capital formation and improving the financial system, (International Monetary Fund, 2005) and (World Bank, 2006). For now it suffice to say that in theory the total effects of remittances on growth could be positive or negative. It should be noted that the total effect could even be zero because of compensatory nature of the remittance effects on growth.

A study that found a negative effect of remittances on growth is Chami, FullenKamp, & Jajah, (2003). This was one of the first reduced-form cross country analysis. The authors performed panel analysis where they regressed the log of the growth of remittances to real GDP ratio on real GDP growth. They used a sample of 83 countries, and looked at the period from 1970 to 1998. The study also controlled for the effects of the initial GDP, regional effects, the inflation rate, gross capital formation to GDP ratios and net private capital formation to GDP ratio. They found that remittances have a slightly negative impact on growth. They addressed the endogeneity problem using the income gap and interest rate gap between the United States and the remittance receiving country as an instrument. Most of the studies, that came after Chami, FullenKamp, & Jajah (2003), focused on finding a better instrumental variable for addressing the reverse causality problem. In the paper Lucas R. E. (2005) , the author argues that the aforementioned instrument is biased.

In 2009, a paper by Catrinescu et al. casts doubt on the findings of Chami et al 2003. Catrinescu et al. argued that the instrument used is their study is better than the instrument used in Chami et al. 2003. They use lagged value of remittances as an instrument to address the endogeniety problem. Their study is a cross-country panel analysis of 135 countries[[2]](#footnote-2), for the time period 1970 to 2003. In the paper (Catrinescu, Leon-Ledesma, Piracha, & Quillin, 2009) the authors argue that the basic equation in Chami etal. is misspecified because it implies that worker remittances would have to increase annually for it to affect economic growth. They correctly state that the level of remittances to GDP should be included in the model instead of the growth of remittances to GDP. The paper by (Catrinescu, Leon-Ledesma, Piracha, & Quillin, 2009) also argue that there could be an interaction between “worker remittances” and “the quality of the institutions”. They present evidence for remittances having a positive effect on economic growth through the interaction with better institutional quality.

In a later study (Barajas, Chami, Fullenkamp, Gapen , & Montiel, 2009), the authors used a different instrumental variable namely the transaction cost of sending money abroad. The basic set of control variables that they use are the initial GDP-per-capita for each five-year period, five-year averages of the trade-to-GDP ratio, the M2-to-GDP ratio (both in logs), and the inflation rate. They found no relationship between remittances and economic growth.

In (International Monetary Fund, 2005) they use the distance between the migrants’ home country and their main destination country as an instrument. The study was a cross section analysis consisting of a panel of up to 101 countries, the time period they looked at was 1970–2003. They regressed the remittances to GDP ratio on real the real GDP per capita growth. The control variables they included where: log of initial income, education, log of life expectancy, investment, inflation, budget balance, trade openness, and financial development. They found no statistical evidence that remittance had an impact on economic growth.

There are also papers that studied the dynamic relationship between remittances and growth. Lucas, (1985) give evidences for remittances having an effect on the long run economic growth of the recipient country. He also found evidence for remittance having a negative effect on economic growth. He concluded that this negative effect, is a short run phenomenon and is caused by a loss labor supply due to immigration (of the potential remitters).

The big problem inherent to these kind of studies is the problem of reverse causality. As is shown above a lot of papers have tried to find good instruments that address this problem correctly. In their quest to find a good instrument, for side stepping the endogeneity problem, different researchers often use different instruments and come to different results. It has proven to be very hard to find a good instrument that is free of criticism. This has made the topic remittances a very controversial topic in the development economic literature. A broad discussion of the different instruments used is beyond the scope of this paper. This paper will research the empirical relationship between remittances and growth without accounting for reverse causality. Furthermore, because there is broad consensus that there is reverse causal relationship, the findings of this paper should be interpreted with care. Nevertheless in light of the fact that the research on this topic is relatively new, this paper will add to the literature by researching different possible characteristics of the remittances growth relationship.

# Methodology

The main questions, I ask in this study, are;

1. *“Do remittance inflows have an effect on economic growth of the recipient country?”*
2. “*Is the effect of worker remittances on economic growth conditional on institutional quality*?”

In this section I will elaborate on the mythology that I have employed to answer these research questions. The majority of the data that I use is from the World Bank, more detailed info will be given in the sections “Data” and “Appendix”. I will answer these research questions by means of a cross-country panel analysis. In this study I mainly regress the log of the ratio of worker remittances to GDP per capita on the log of the GDP per capita growth. There is no broad consensus with respect to this part the model specification, a detailed discussion about which specification is better is beyond the scope of this paper. I will include different control variables to see if the results are dependent on model specification. In all models I will make use of a standard set of control variables.

*Standard control variables*

Throughout all the models I assume that there are time-fixed effects and country specific effects, this also widely used assumption in the literature regarding cross country panel analysis. Dummy variables are used to correct for the individual country effects, the base country is Afghanistan. To correct for time-fixed specific effects I also employ dummy variable, with the base year being the first year in the respective sample. So in model where I do not use lagged variable the base year will be 1970 but I in model with for example a period lagged value, the base year will be 1971. All full models will be built out of levels, a level is a partial model. I keep adding control variables to the respective levels till the point that I can estimate the full models. This method gives more insight into the dynamics of the eventual model specification problems that could arise.

I use a combination of three significant control variables that are common to the remittances and the development aid literature. The standard three control variables that I employ where most famously used by William Easterly in (Easterly W. , Can foreign aid buy growth?). The first one is called “trade”, the variable is used to account for the effects that trade has on the economic growth in the respective country. The variable is constructed by taking the log of the trade to GDP ratio (trade/GDP). The second is “m2”, this variable is used as a measure for financial depth. The variable is constructed by taking lagged values of the log of the monetary base. The third control variable is “inf” this variable is constructed by taking the log of inflation in the respective countries.

*Ad1. What is the effect of remittance inflows on the economic growth of the recipient country?*

I estimate 2 models to answer question 1, the first model (1a) does not correct for the dynamic effects that remittances could have on the economic growth of the recipient country but the second model does correct for this (1b).

The full first model that I will estimate to answer question 1 is;

$g\_{i}= β\_{0}+β\_{1}g\_{it-1}+β\_{2}wr\_{i}+β\_{3}trade\_{i}+β\_{4}m2\_{i}+β\_{5}inf\_{i}+β\_{6}wr\^2\_{i}$ (1a)

Where i = an individual country, t = the time period, “*g*” is the growth rate of per capita income, “*wr*” is the log of worker remittances to GDP ratio. For statistical reasons, which I will get into in the next paragraph[[3]](#footnote-3), I have created two samples. In the both samples (“sample 1”), I only look at countries that have been classified by the World Bank as being “low income”, “lower middle income” or “upper middle income”. Therefor all the countries, in sample 1a, had a GNI less than, $12,616 in 2012.[[4]](#footnote-4) This sample is used for estimating model 1a. The last thing that I correct for is a possible quadratic relationship between *“wr”* and *“g”* by adding *“wr^2”* to the model*.*

It could be the case that remittances effect growth in the short run different then in the long run. As stated in the literature review, the paper (Lucas, 1985) give evidences for remittances having an different effect on short run economic growth than on the long run economic growth of the recipient country. I account for this possibility by including lagged versions of *“wr”* into the regression. I also account for the possible decreasing or increasing marginal effects by inserting *“wr^2”* (*wr* to the second power). This results in model 1b:

$g\_{i}= β\_{0}+β\_{1}g\_{it-1}+β\_{2}wr\_{i}+β\_{3}trade\_{i}+β\_{4}m2\_{i}+β\_{5}inf\_{i}+β\_{6}wr\_{it-1}+β\_{7}wr\_{it-2}+β\_{8}wr\_{it-3}+ β\_{9}wr\^2\_{i}+β\_{10}wr\^2\_{it-1}+ β\_{11}wr\^2\_{it-2}+ β\_{12}wr\^2\_{it-3}$ (1b)

*Ad2.* “*Is the effect of worker remittances on economic growth conditional on institutional quality?”*

In essence, question 2 revers to the possible existence of an interaction effect. I estimate 2 models to answer question 2, the first model (2a) does not correct for the dynamic effects that remittances could have on the economic growth of the recipient country but other model does correct for this (2b). Full model 2a, is estimated as follows;

$g\_{i}= β\_{0}+β\_{1}g\_{it-1}+β\_{2}wr\_{i}+β\_{3}trade\_{i}+β\_{4}m2\_{i}+β\_{5}inf\_{i}+β\_{6}cc\_{i}+β\_{7}ge\_{i}+β\_{8}psav\_{i}+β\_{9}rq\_{i}+β\_{10}va\_{i}+β\_{11}cc\_{i}\*wr+β\_{12}ge\_{i}\*wr+β\_{13}psav\_{i}\*wr+β\_{14}rq\_{i}\*wr+β\_{15}va\_{i}\*wr+$ (2a)

The possible interaction effect between worker remittances (*“wr*”) and institutional quality (“*cc,ge,psav,rq,va*”) is included in model 2a so that I can test its statistical significance. This will enable me to see if there is statistically significant evidence that the effect of worker remittances is conditional on institutional quality. *“cc, ge, psav, rq, va”* are used to measure 5 respective dimensions of institutional quality. Taken together these 5 variables are use to measure institutional quality in its totality. The variables *“cc,ge,psav,rq,va”* are published by the World Bank and is officially named the World Governance Indicators (WGI). The variables “*wr*” and “*cc,ge,psav,rq,va*” are also added separately to make sure that the interaction term does not proxy for worker remittances and /or institutional quality[[5]](#footnote-5). For estimating model 2a, I needed to use a separate sample namely sample 2a because the WGI is not available for all countries in all years[[6]](#footnote-6).

In the next model, I account for a possible lagged interaction effect of *wr* on *g*. I do this by adding 1 period lagged values of the interaction effect to the model. The result is model 2b;

$g\_{i}= β\_{0}+β\_{1}g\_{it-1}+β\_{2}wr\_{i}+β\_{3}trade\_{i}+β\_{4}m2\_{i}+β\_{5}inf\_{i}+β\_{6}wr\_{it-1}+β\_{7}wr\_{it-2}+β\_{8}wr\_{it-3} $ (2b)

I will use the results from these estimations to give an explicit answer to the research question stated above.

# Data

In the next section I will discuss the underlying data used in this study. All the data definition will be include in part B of the Appendix. All of the data use in the regression analysis is taken from the official website of the World Bank[[7]](#footnote-7). Furthermore the exact database which are used were the World Development Indicators (WDI) and World Governance Indicators (WGI). It should be note that the World Bank also relies on external source for certain data. As stated in the methodology section I use different samples for estimating the respective models. The reason I use 2 samples is because there is not enough data on the institutional quality, to cover the time period 1970 till 2011, for estimating model 2a en 2 b.

For model 1a and 1b I use sample 1, for model 2a and 2b I use sample 2. For a detailed description of the countries and time periods included in the different samples, please view table C in the appendix.

*Data on remittances*

The data on remittances are taken from the official website of the (World Bank, 2013), the specific database used was the World Development Indicators (WDI) database. Personal remittances comprise personal transfers and compensation of employees. The data is collected from national accounts of the balance of payments. It is no secret that the data on remittance is very poor, in quantity and quality. On the quantity side, it is poor because there are a lot of missing observations. On the quality side, it is bad because remittances are known to be under reported. Remittances inflow have proven to be have to measure especially because remittances do not always flow through official channels. Remittances are carried across the border personally or they are given in the form of goods. Furthermore recorded remittances flows could proxy for money laundering.

*Data on institutional quality*

The data on the institutional quality is collected from the official website of the World Bank, the specific database that is used is the World Governance Indicators (WGI). WGI covers five dimensions of institutional quality and political stability. The WGI covers 205 countries over the world but observations are only available for certain years between 1996 till 2011[[8]](#footnote-8). It should be noted that the years 1997, 1999 and 2001 are missing from original WGI the data set. I used the average of the respective years 1996 and 1998 to calculate the data for 1997 and in the same manner I calculated the values for the respective years 1999 and 2001. After selecting the countries that have GNI lower than $12,616 in 2012, I only have 139 countries in the sample (sample 3). Furthermore there are a lot of missing observations. This will put a strain on the validity of our regression analysis. The quality of the data on institutional quality of countries has been called in to question by different researchers. One of these skeptical papers was (Rodrik, 2004), the author argues that most of the data on institutional quality is based on perception which is inherently subjective. The same holds through for the WGI, the reason for this lies in the underlying data used to create the WGI. The WGI consists of 30 underlying data sources, of the following types; Surveys of households and firms, Commercial business information providers, Non-governmental organizations, Public sector organizations.

# Results

The results of the estimations for model 1a, 1b, 2a and 2b are presented in the respective tables 4, 5, 6, 7, in the appendix. Furthermore, for the models 1a, 1b, I used sample 1 and for model 2a and 2b I used sample 2. As stated in the methodology section I use level of the respective models to explore to which extend the result are robust to model specification. For all models with lagged values of variables the time period used is the number of annual time periods from 1970 till 2003 minus the number of lagged periods used in the model.

*Model 1a*

In the first level of this model worker remittances is regressed against growth and I control for the effect of the growth from the previous period (lagged). There is not one instance where the variable *wr* is significant throughout the different levels. The effect is positive and is not dependent on model specification. The adjusted R-squared of the models did not consistently improve when adding more control variables. The level with the highest adjusted R-squared was level 4.

*Model 1b*

Lagged values of the variable remittances were not significant throughout levels 1 to 6. The effect was positive for level 1 and 2 but after the variable m2 was inserted, the effect became negative, for the respective level 3, 4, 5 and 6. After level 6, I controlled for a possible quadratic relationship between the lagged values of *wr* and *g*. Level 7, 8 and the full model provide statistically significant evidence that there is a quadratic relationship. However, the results of the models are hard to interpret because the significance of the linear lagged values of *wr* is very dependent on model specification.

*Model 2a*

The interaction effect is mostly small and negative. Furthermore, there is only level that reports a significant interaction effect between *wr* and one of the WGI indicators, namely level 3. The WGI indicator for which I have found a significant, positive interaction effect is *“va”*. Level 1 has the highest adjusted R-squared and gives no significant evidence for the existence of an interaction effect.

*Model 2b*

The variable *wr* is not significant and the effect is small, throughout all the estimated levels. The lagged values of the interaction effect between *wr* and the WGI indicators are also not significant. The effect of the interaction between “*wr* and *cc*” and “*wr* and *va*” are positive. Whereas the other interaction effect, those between “*wr* and *ge*”, “*wr* and *psav*”, “*wr* and *rq*” are negative. It should be noted that all the estimated interaction effects are small. The full model 2b give the highest adjusted R squared.

# Conclusions

This study has brought to light a few of the many conflicting results of different studies on the empirical relationship between remittances and growth. The various source of these conflicting results the problems that are inherent to this type of research have been stated and. There is much research to be done before one can claim to have unraveled the true nature of the remittance growth relationship. In this section I will explicitly answer the research questions posed in de “Introduction” section and the “Methodology” section. The main questions, I asked in these sections, were;

1. *“Do remittance inflows have an effect on economic growth of the recipient country?”*
2. “*Is the effect of worker remittances on economic growth conditional on institutional quality*?”

*Ad 1*. *Do remittance inflows have an effect on economic growth of the recipient country?”*

The model 1a and 1b tried to test the hypothesis that worker remittances do have an effect on the economic growth in a country. Model 1a found no significant evidence for remittance inflows having an effect on economic growth of the recipient country. For model 1b there were only to levels (out of the 9) where remittances had a small negative effect on economic growth.

*Ad 2.* “*Is the effect of worker remittances on economic growth conditional on institutional quality*?”

As we have also seen the models 2a en 2b, give very little evidence that the effect of remittances on economic growth is dependent on institutional quality. There was only 1 level that presented evidence that there could be an interaction between remittances and institutional quality.

# Discussion

In this section I start with discussing the reasons why there is so much disparity between studies that research the remittances growth link. I end this section by discussing possible improvements that could be made to this study. The study (Barajas, Chami, Fullenkamp, Gapen , & Montiel, 2009) gives several reasons for this disparity of the results. The first one is the underlying data used to construct the time series, the main categories used are employee compensation (*ec*), migrant transfers (*mt*) and worker remittances (*wr),* all these categories have respective intrinsic characteristic that are very different from each other. The second reason for disparities, is the difference in methodologies used. The third one is that the countries and time periods that are included are obviously not the same in all studies. The fourth source of disparity stems from the difference in control variables used. The last reason for conflicting results is the fact that a lot of studies use different instrumental variables.

There are different ways in which this study could be significantly improved. The biggest limitations of this study is the fact that all coefficients estimated could be biased due to revere causality. Logically the biggest improvement this study could get would be to include an instrumental variable to address the endogeneity problem. However, I have shown that there is no literary consensus with respect to which instrumental variables should be used. Another improvement would be to use the ICRG (International Country Risk Guide) as a measure for institutional quality because it is comprised of a larger time period. This will also enable us to test if the of this study results are robust to a change of measurement instrument. A closer examination of the different OLS assumptions for each respective model would also improve this study. The last improvement would be incorporate threshold effects into the models and to explore their statistical significance.

The research on remittances is still in its early stages so it could be argued that there will undoubtedly be a breakthrough with respect to the possible effect of remittances on growth. The key to this breakthrough is not only finding an appropriate instrumental variable but also measuring institutional quality more objectively. The latter will prove to be very difficult in as quality itself is a subjective term.

# References

Amuedo-Dorantes, C., & Pozo, S. (2004, August). Workers' Remittances and the Real Exchange Rate: A Paradox of Gifts. *Elsevier, 32*(8), 1407–1417.

Barajas, A., Chami, R., Fullenkamp, C., Gapen , M., & Montiel, P. (2009). *Do Workers’ Remittances Promote.* International Monetary Fund .

Burnside, C., & Dollar, D. (2000). Aid, Policies and Growth. *American Economic Association, 90*(4), 847-868.

Catrinescu, N., Leon-Ledesma, M., Piracha, M., & Quillin, B. (2009). REMITTANCES, INSTITUTIONS, AND ECONOMIC GROWTH. *World Development, 37*(1), 81–92.

Chami, R., FullenKamp, C., & Jajah, S. (2003). *Are Immigrant Remittance Flows a Source of Capital for Development?* IMF Institute.

Collier, P. (2008). *The bottom billion.* New York: Oxford University Press.

Dalgaard, C.-J., Hansen, H., & Tarp, F. (2004, June). ON THE EMPIRICS OF FOREIGN AID AND GROWTH. *The Economic Journal, 114*, F191–F216.

Easterly, w. (2000). *Can Institutions Resolve Ethnic Conflict?* The World Bank Development Research Group.

Easterly, W. (n.d.). Can foreign aid buy growth? *Journal of Economic Perspectives, 17*, 23–48.

Easterly, W., & Levine, R. (1997, April). Africa's growth tragedy. *112*(4), pp. 1203-1250.

Easterly, W., Levine, R., & Roodman, D. (2003, July). New Data, New doubts: A Comment on Burnside and Dollar's "Aid, Policies, and Growth" (2000). *NBER Working Paper*(9846).

International Monetary Fund. (2005, April). Two Current Issues Facing Developing Countries. *World Economic Outlook*.

International Monetary Fund. (2005, April). World Economic Outlook, April 2005: Globalization and External Imbalances. *World Economic and Financial Surveys*.

Lucas, R. E. (1985, December). Mines and Migrants in South Africa. *The American Economic Review, 75*(5), 1094-1108.

Posner, D. N. (2004, October). Measuring ethnic fractionalization in Africa. *American Journal of Political Science, 48*(4), 849–863.

Rodrik, D. (2004). Getting Institutions Right.

The University of New York. (2009, December). *Global Development Network Growth Database*. Retrieved from NYU Development Research Institute: http://nyudri.org/resources/global-development-network-growth-database/

World Bank. (2006). Global Economic Prospects: Economic Implications of Remittances and.

World Bank. (2013, Juli 3). *How we Classify Countries*. Retrieved from www.worldbank.org: http://data.worldbank.org/about/country-classifications

World Bank. (2013, juni 25). *World Bank*. Retrieved from Data Catalog: http://datacatalog.worldbank.org/

World Bank. (2013, Juli). *World DataBank World Development Indicators*. Retrieved from World Bank: http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators

# Appendix

1. **Tables**

Table 1: List of countries in sample 1 and 2

|  |  |  |  |
| --- | --- | --- | --- |
| AfghanistanAlbaniaAlgeriaAmerican SamoaAngolaAntigua and BarbudaArgentinaArmeniaAzerbaijanBangladeshBelarusBelizeBeninBhutanBoliviaBosnia and HerzegovinaBotswanaBrazilBulgariaBurkina FasoBurundiCambodiaCameroonCape VerdeCentral African RepublicChadChileChinaColombiaComorosCongo, Dem. Rep.Congo, Rep.Costa RicaCote d'IvoireCubaDjiboutiDominicaDominican Republic | EcuadorEgypt, Arab Rep.El SalvadorEritreaEthiopiaFijiGabonGambia, TheGeorgiaGhanaGrenadaGuatemalaGuineaGuinea-BissauGuyanaHaitiHondurasIndiaIndonesiaIran, Islamic Rep.IraqJamaicaJordanKazakhstanKenyaKiribatiKorea, Dem. Rep.KosovoKyrgyz RepublicLao PDRLatviaLebanonLesothoLiberiaLibyaLithuaniaMacedonia, FYRMadagascarMalawiMalaysiaMaldives | MaliMarshall IslandsMauritaniaMauritiusMexicoMicronesia, Fed. Sts.MoldovaMongoliaMontenegroMoroccoMozambiqueMyanmarNamibiaNepalNicaraguaNigerNigeria PakistanPalauPanamaPapua New GuineaParaguayPeruPhilippinesRomaniaRussian FederationRwandaSamoaSao Tome and PrincipeSenegalSerbiaSeychellesSierra LeoneSolomon IslandsSomaliaSouth AfricaSouth SudanSri LankaSt. LuciaSt. Vincent and the | GrenadinesSudanSurinameSwazilandSyrian Arab RepublicTajikistanTanzaniaThailandTimor-LesteTogoTongaTunisiaTurkeyTurkmenistanTuvaluUgandaUkraineUruguayUzbekistanVanuatuVenezuela, RBVietnamWest Bank and GazaYemen, Rep.ZambiaZimbabwe |

Table 2: Descriptive statistics of sample 1

Table 3: Descriptive statistics of sample 2

Table 4: Model 1a, in levels, sample 1: 1970-2011

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Level 1 | Level 2 | Level 3 | Level 4 | Full model 1a |
| *Constant* | 0.957628\* | -0.614009 | -0.795631 | -0.793141 | -0.790990 |
| $$g\_{t-1}$$ | 0.129852\* | 0.121111\* | 0.119506\* | 0.121106\* | 0.121233\* |
| *wr* | 0.029544 | 0.016717 | 0.015114 | 0.016591 | 0.018709 |
| *trade* |  | 0.374632\* | 0.324979\*\* | 0.406764\* | 0.406632\* |
| *m2* |  |  | 0.108861\*\*\* | -0.052254 | 0.050027 |
| *inf* |  |  |  | -0.080383\* | -0.080608\* |
| *wr^2* |  |  |  |  | 0.001578 |
| Adjusted $R^{2}$ | 0.222271 | 0.224397 | 0.224381 | 0.226324 | 0.225801 |
| *Observations* | 1808 | 1762 | 1736 | 1585 | 1585 |
| *Countries* | 139 | 139 | 139 | 139 | 139 |
| \*Significance at 1%,\*\* Significance at 5%, \*\*\*Significance at 10% |

Table 5: Model 1 b, in levels, sample 1: 1970-2011

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 | Level 6 |
| *Constant* | 0.955129\* | -0.631006 | -0.766992 | -0.754828 | -0.712166 | -0.744996 |
| $$g\_{t-1}$$ | 0.124706\* | 0.116581\* | 0.114677\* | 0.118435 | 0.110393\* | 0.105007\* |
| *wr* | 0.016941 | 0.005615 | -0.013278 | -0.024989 | -0.040741 | -0.040180 |
| *trade* |  | 0.377935\* | 0.325280\* | 0.420007 | 0.445322\* | 0.477347\* |
| *m2* |  |  | 0.099326 | 0.027080 | -0.015935 | -0.043308 |
| *inf* |  |  |  | -0.085248 | -0.081468\* | -0.082587\* |
| *wr(-1)* | 0.018422 | 0.015163 | 0.034133 | 0.047284 | 0.036837 | 0.052112 |
| *wr(-2)* |  |  |  |  | 0.031165 | 0.000344 |
| *wr(-3)* |  |  |  |  |  | 0.009301 |
| *wr^2* |  |  |  |  |  |  |
| *wr(-1)^2* |  |  |  |  |  |  |
| *wr(-2)^2* |  |  |  |  |  |  |
| Adjusted $R^{2}$ | 0.220551 | 0.222792 | 0.223021 | 0.227275 | 0.232190 | 0.234923 |
| *Observations* | 1750 | 1706 | 1680 | 1540 | 1493 | 1443 |
| *Countries* | 139 | 139 | 139 | 139 | 139 | 139 |
| \*Significance at 1%,\*\* Significance at 5%, \*\*\*Significance at 10% |

Model 1b continued

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Level 7 | Level 8 | Full model 1b |  |  |  |
| *Constant* | -0.686948 | -0.639079 | -0.653468 |  |  |  |
| $$g\_{t-1}$$ | 0.121420\* | 0.109222\* | 0.103598\* |  |  |  |
| *wr* | -0.101061\*\*\* | -0.119133\*\* | -0.113231\*\* |  |  |  |
| *trade* | 0.414710\* | 0.441423\* | 0.467058\* |  |  |  |
| *m2* | -0.001559 | -0.058229 | -0.085020 |  |  |  |
| *inf* | -0.089127\* | -0.083780\* | -0.084026\* |  |  |  |
| *wr(-1)* | 0.149096\* | 0.109451 | 0.116084 |  |  |  |
| *wr(-2)* |  | 0.077680 | 0.059611 |  |  |  |
| *wr(-3)* |  |  | 0.000222 |  |  |  |
| *wr^2* | -0.031912\*\* | -0.040353\* | -0.038147\*\* |  |  |  |
| *wr(-1)^2* | 0.045408\* | 0.033048\*\* | 0.029510\*\*\* |  |  |  |
| *wr(-2)^2* |  | 0.029010\*\* | 0.027043\*\*\* |  |  |  |
| *wr(-3)^2* |  |  | 0.004619 |  |  |  |
| Adjusted $R^{2}$ | 0.233241 | 0.242034 | 0.243449 |  |  |  |
| *Observations* | 1540 | 1493 | 1443 |  |  |  |
| *Countries* | 139 | 139 | 139 |  |  |  |
| \*Significance at 1%,\*\* Significance at 5%, \*\*\*Significance at 10% |

Table 6: Model 2 b, in levels, sample 2: 1996-2011

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Level 1 | Level 2 | Level 3 | Full model |  |
| *Constant* | 1.194412\* | 0.500112 | 0.956742 | 0.546353 |  |
| $$g\_{t-1}$$ | 0.119772\* | 0.124783\* | 0.121915\* | 0.110671 |  |
| *wr* | 0.004967 | -0.000830 | 0.005819 | 0.013034 |  |
| *trade* |  | 0.157967 | 0.211635 | 0.317816 |  |
| *m2* |  |  | -0.181789 | -0.145589 |  |
| *inf* |  |  |  | -0.101333 |  |
| *cc* | 0.163215 | 0.195860 | 0.205377 | 0.162273 |  |
| *ge* | 0.313671 | 0.316801 | 0.372015\* | 0.469383 |  |
| *psav* | 0.005762 | -0.015245 | 0.030563 | -0.061851 |  |
| *rq* | 0.004918 | 0.005100 | 0.003885 | -0.027054 |  |
| *va* | 0.105029 | 0.067790 | 0.065004 | 0.129385 |  |
| *cc\*wr* | -0.099478 | -0.123919 | -0.118989 | -0.101130 |  |
| *ge\*wr* | -0.084854 | -0.089629 | -0.113041 | -0.080459 |  |
| *psav\*wr* | -0.025397 | -0.021296 | -0.031458 | -0.005744 |  |
| *rq\*wr* | -0.050033 | -0.052287 | -0.034446 | -0.035272 |  |
| *va\*wr* | 0.166686\* | 0.196906 | 0.202515\* | 0.136036\*\* |  |
| Adjusted $R^{2}$ | 0.330664 | 0.322556 | 0.322016 | 0.324621 |  |
| *Observations* | 1089 | 977 | 977 | 977 |  |
| *Countries* | 139 | 139 | 139 | 139 |  |
| \*Significance at 1%,\*\* Significance at 5%, \*\*\*Significance at 10% |

Table 7: Model 2 b, in levels, sample 2: 1996-2011

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Level 1 | Level 2 | Level 3 | Level 4 | Full model |
| *Constant* | 1.182096\* | 1.138517\* | 0.457324 | 0.874786 | 0.436475 |
| $$g\_{t-1}$$ | 0.106004\* | 0.107346\* | 0.110092\* | 0.109066\* | 0.097900\* |
| *wr* |  | 0.065765 | 0.063893 | 0.069480 | 0.037265 |
| *trade* |  |  | 0.156647 | 0.197832 | 0.363543\*\* |
| *m2* |  |  |  | -0.161044 | -0.180683 |
| *inf* |  |  |  |  | -0.116207\* |
| *cc(-1)* | -0.033822 | -0.055186 | -0.060055 | -0.056934 | -0.193187 |
| *ge(-1)* | 0.227998 | 0.214266 | 0.234620 | 0.246049 | 0.487788\*\* |
| *psav(-1)* | -0.155417 | -0.126011 | -0.133579 | -0.103083 | -0.141581 |
| *rq(-1)* | 0.036720 | 0.061832 | 0.060799 | 0.068805 | -0.024428 |
| *va(-1)* | 0.308749\* | 0.320255\* | 0.309098\*\*\* | 0.316606\*\* | 0.436190\* |
| *wr(-1)*  | 0.013131 | -0.040292 | -0.048692 | -0.049171 | 0.001736 |
| *cc(-1)\*wr(-1)* | 0.052124 | 0.063053 | 0.042780 | 0.041566 | 0.123932 |
| *ge(-1)\*wr(-1)* | -0.082342 | -0.071697 | -0.087315 | -0.101670 | -0.193254 |
| *psav(-1)\*wr(-1)* | -0.002198 | -0.018370 | -0.020575 | -0.022696 | -0.012057 |
| *rq(-1)\*wr(-1)* | -0.086839 | -0.099471 | -0.091022 | -0.077340 | -0.024285 |
| *va(-1)\*wr(-1)* | 0.059644 | 0.062580 | 0.090683 | 0.090785 | 0.010760 |
| Adjusted $R^{2}$ | 0.326154 | 0.327678 | 0.317811 | 0.315677 | 0.328753 |
| *Observations* | 1077 | 1073 | 1044 | 1032 | 964 |
| *Countries* | 139 | 139 | 139 | 139 | 139 |
| \*Significance at 1%,\*\* Significance at 5%, \*\*\*Significance at 10% |

1. **Data definitions**

GDP per capita growth (annual %)

Annual percentage growth rate of GDP per capita based on constant local currency. GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

Source: World Bank national accounts data, and OECD National Accounts data files

Personal remittances, received (% of GDP)

Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees.

Source: World Bank staff estimates based on IMF balance of payments data, and World Bank and OECD GDP estimates.

Trade (% of GDP)

Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

Source: World Bank national accounts data, and OECD National Accounts data files.

Money and quasi money (M2) as % of GDP

Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2; it corresponds to lines 34 and 35 in the International Monetary Fund's (IMF) International Financial Statistics (IFS).

Source: International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.

Inflation, consumer prices (annual %)

Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

Source: International Monetary Fund, International Financial Statistics and data files.

Control of Corruption: Estimate

Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

Source: Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data available at www.govindicators.org.The WGI are produced by Daniel Kaufmann (Brookings Institution), Aart Kraay (World Bank Development Research Group) and Massimo Mastruzzi (World Bank Institute). Please cite Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators: Methodology and Analytical Issues". World Bank Policy Research Working Paper No. 5430 (http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=1682130). The WGI do not reflect the official views of Brookings Institution, the World Bank, its Executive Directors, or the countries they represent.

Government Effectiveness: Estimate

Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

Source: Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data available at www.govindicators.org.The WGI are produced by Daniel Kaufmann (Brookings Institution), Aart Kraay (World Bank Development Research Group) and Massimo Mastruzzi (World Bank Institute). Please cite Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators: Methodology and Analytical Issues". World Bank Policy Research Working Paper No. 5430 (http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=1682130). The WGI do not reflect the official views of Brookings Institution, the World Bank, its Executive Directors, or the countries they represent.

Political Stability and Absence of Violence/Terrorism: Estimate

Political Stability and Absence of Violence/Terrorism captures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

Source: Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data available at www.govindicators.org.The WGI are produced by Daniel Kaufmann (Brookings Institution), Aart Kraay (World Bank Development Research Group) and Massimo Mastruzzi (World Bank Institute). Please cite Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators: Methodology and Analytical Issues". World Bank Policy Research Working Paper No. 5430 (http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=1682130). The WGI do not reflect the official views of Brookings Institution, the World Bank, its Executive Directors, or the countries they represent.

Regulatory Quality: Estimate

Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

Source: Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data available at www.govindicators.org.The WGI are produced by Daniel Kaufmann (Brookings Institution), Aart Kraay (World Bank Development Research Group) and Massimo Mastruzzi (World Bank Institute). Please cite Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators: Methodology and Analytical Issues". World Bank Policy Research Working Paper No. 5430 (http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=1682130). The WGI do not reflect the official views of Brookings Institution, the World Bank, its Executive Directors, or the countries they represent.

Voice and Accountability: Estimate

Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

Source: Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data available at www.govindicators.org.The WGI are produced by Daniel Kaufmann (Brookings Institution), Aart Kraay (World Bank Development Research Group) and Massimo Mastruzzi (World Bank Institute). Please cite Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi (2010). "The Worldwide Governance Indicators: Methodology and Analytical Issues". World Bank Policy Research Working Paper No. 5430 (http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=1682130). The WGI do not reflect the official views of Brookings Institution, the World Bank, its Executive Directors, or the countries they represent.

1. Official Development assistance [↑](#footnote-ref-1)
2. The study uses different sub samples for some models [↑](#footnote-ref-2)
3. See section “Data” [↑](#footnote-ref-3)
4. The (World Bank, 2013) [↑](#footnote-ref-4)
5. See (Catrinescu, Leon-Ledesma, Piracha, & Quillin, 2009) [↑](#footnote-ref-5)
6. See section on Data [↑](#footnote-ref-6)
7. See the internet source: (World Bank, 2013) [↑](#footnote-ref-7)
8. The years for which I have observation are; 1996,1998,2000,2002,2003,2004,2005,2006,2007,2008,2009,2010,2011 [↑](#footnote-ref-8)