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**Do Remittances Promote More Economic Growth than Foreign Aid
in Latin American and Caribbean Countries?**

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Abstract

Research by The World Bank (2008) reveals that nations with the highest remittance inflows are the least aid recipient. Given the dependence of Latin American and Caribbean Countries (LACs) on these inflows as a source of development financing, this thesis examines the relationship and growth impact of remittance and aid transfers. The results of fixed effects panel estimations on 22 LAC economies for the 1979-2008 period suggest that remittances and foreign aid inflows are negatively associated with growth. This supports the altruistic and insurance motivation for countercyclical remittance and aid grants. Further statistical tests imply that they are substitutes and this relationship may also contribute to their negative association with growth. Policy recommendations are offered concerning the role of remittance and aid transfers as a growth strategy.

JEL Classifications: F24, F35, O47, C23

Key words: remittance, foreign aid, Latin American and Caribbean Countries, economic growth

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I. The Role of Remittances and Foreign Aid in Development

About 13% of US citizenry are foreign born, with Latinos forming the largest migrant group. Ratha (2003) and Orozco (2007) claim that remittances are “the most critical source of development financing in the modern global economy.” Remittance transfers from the diaspora to Latin American and Caribbean Countries (LACs) topped \$69.2 billion in 2008, eclipsing foreign direct investment and development assistance. After lifting nearly 40 million LAC citizens from absolute poverty over the past quarter century, researchers now question the growth impact of remittance inflows (The Inter-American Development Bank, 2009).

The prominence of aid groups like the International Monetary Fund, United Nations, and The World Bank has facilitated a surge in foreign aid grants to third-world nations as a growth strategy (Hjertholm and White, 2003). Burnside and Dollar (1997) seminal research argues that the effectiveness of foreign aid is contingent upon “sound economic policies.” These policies include reducing budget deficits, moderating inflation, and improving trade openness. Foreign aid funds are purported to improve infrastructural development and human capital (Sachs, 2005). The poorest of LAC nations remain dependent on both remittance and foreign aid income yet these economies have stagnant growth rates (Orozco, 2004).

The World Bank (2008) defines remittances as the sum of three components: workers remittances, migrant transfers, and compensation of employees. Workers remittances are private transfers from migrant workers in the host country to recipients in his country of origin. Income from migrants who have lived in the host country for less than a year is classified as compensation of employees. Migrant transfers are financial obligations that arise from the migration of individuals from one economy to another.

Since the purpose of this analysis is to examine the growth impact of foreign aid receipts, the standard criterion of Official Development Aid (ODA), administered by The Development Assistance Committee of the Organization for Economic Cooperation and Development is employed as opposed to military aid. To be considered ODA, a project must be undertaken by the government sector, promote economic development, and have a grant element of at least 25%. ODA is taken 'net' of interest and transfer payments.

Given the fact that remittances are cross-country transfers, empirical analyses of these flows are typically regional. Jongwanich (2007) examines the growth impact of remittances in South-East Asia and Pacific Economies. Mohammed and Sidiropoulos (2010) study Middle East and African Countries. Glystos (2002) analyzes Mediterranean Nations, while León-Ledesma and Piracha (2001) employ panel analysis on Eastern European Countries.

Seminal research by Chami *et. al* (2003) employ panel estimates on 113 developing economies over the 1970-1998 period. Their instrumental variables technique utilized the ratio of income in the country of origin to US income, the rate of interest to the US rate of interest, and distance from the country of origin to the US as instruments. Their results imply that while foreign investment flows are positively related to growth, remittances are negatively associated with growth. They conclude that remittances are more altruistic and insurance motivated transfers that are countercyclical in nature. However, their analysis was criticized for endogeneity and causality issues by lumping together all developing nations.

The LAC region has the highest proportion of their immigrants migrate to one country, the US, than any other region, World Bank (2008). This is due to its proximity and the density of migrant population already living in the US. I argue that analyzing this region addresses potential endogeneity and causality issues by controlling for variation in migration patterns, risk,

and the cost of migration. Furthermore, the LAC region is the highest remittance recipient and least aid dependent region. This thesis extends upon literature in the field by examining both the growth impact and relationship between remittances and foreign aid. Panel estimation and statistical tests on 22 LAC economies over a 30 year period (1979-2008) test this hypothesis.

II. Remittances and Foreign Aid: Relationship, Growth, Substitution Theory

Figure 1 depicts cumulative remittances and ODA per capita received by each world region over the 1979-2008 period. Research by the World Bank (2008) reveals that there is an inverse relationship between remittance and ODA receipts among economies. The LAC region, the top per capita remittance recipient region is the least aid dependent and The Middle East and North Africa (MENA), the top ODA per capita recipient region, is the least remittance dependent.

Figure 1. Remittances and ODA per capita Received, 1979-2008

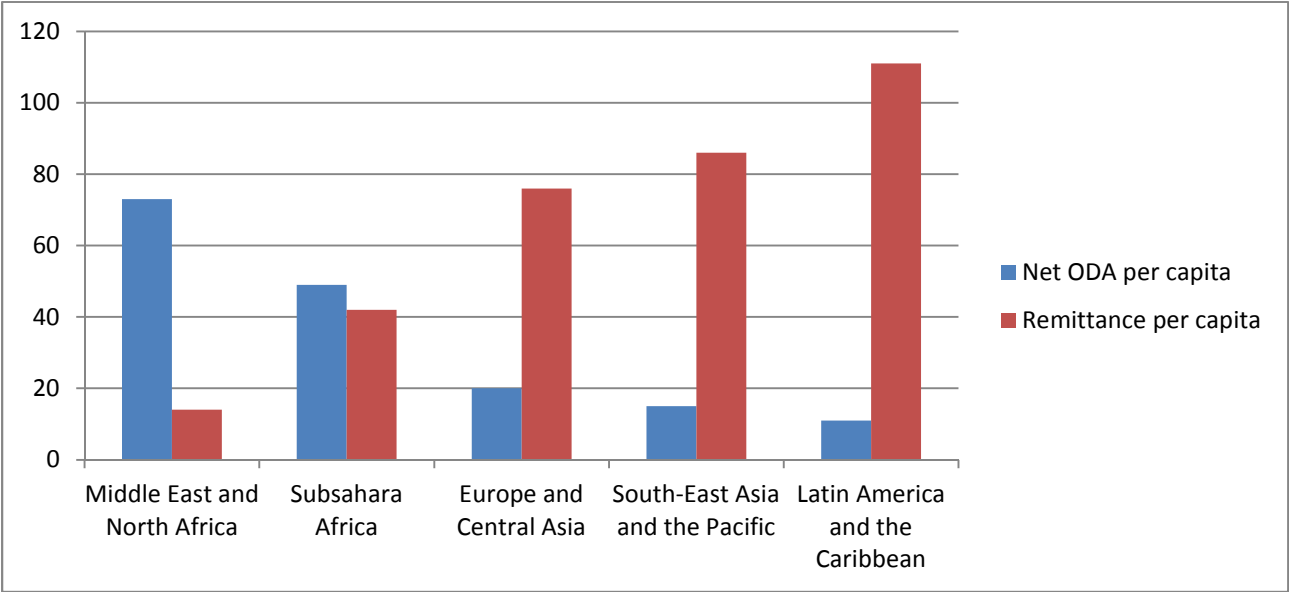
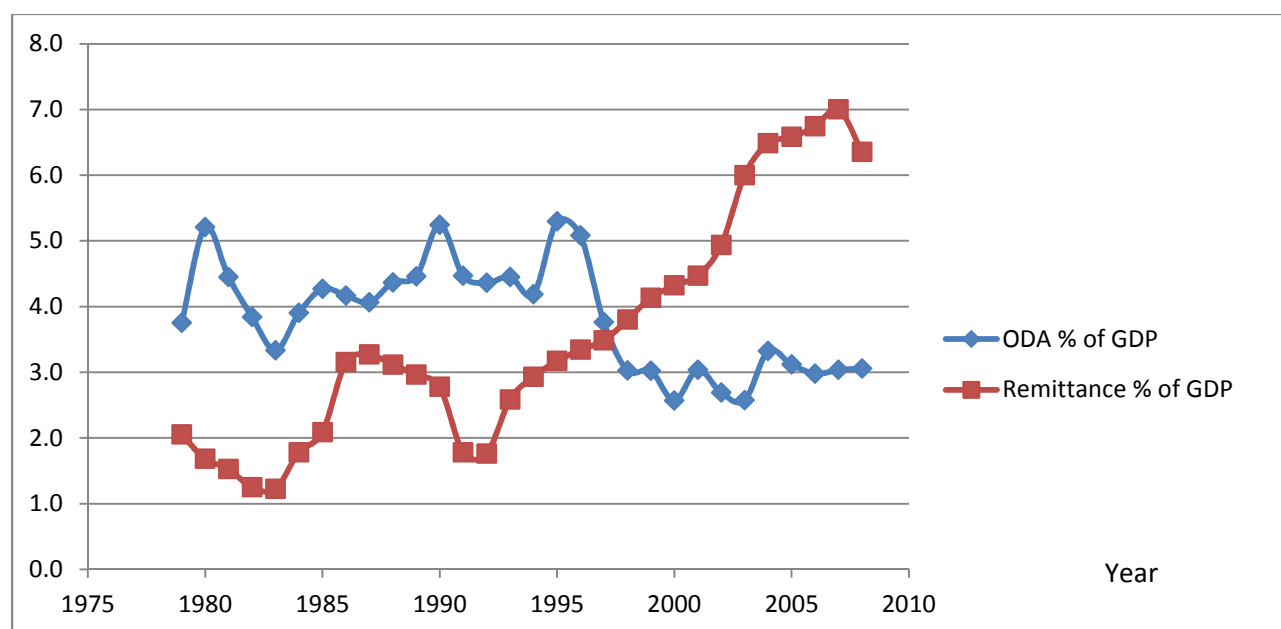


Figure 2 describes the trajectory of cumulative remittance and ODA receipts, as a percentage of the GDP, from migrants in the diaspora and aid groups, to Latin American and Caribbean Countries over the 1979-2008 period. The graph reveals that remittance transfers have surpassed ODA grants to LACs. In 1979, ODA represented 4% of GDP in LACs. As of 2008, aid grants now account for less than 3% of GDP, while remittance transfers have grown from 2% to nearly 7% of GDP. In 2008, 15 LAC Economies had remittance flows of 5% or more of the GDP. In contrast, only 5 LAC economies had ODA receipts of 5% or more of the GDP. Country specific data for remittance and ODA flows are presented in Appendix A.

Figure 2. Remittance and ODA to Latin American and Caribbean Countries, 1979-2008



What could plausibly explain this phenomenon? Are remittances and foreign aid substitutes as a source of development financing. More fundamentally, which promotes more growth and what are the effects of their substitutable relationship on growth? A number of factors play a role in the relationship and growth impact of remittances and foreign aid flows.

One explanation is that Middle-Eastern and North African Countries represent more of a strategic national interest to aid sending countries like the US, given their supply of oil reserves and their perceived breeding ground for terrorists. Foreign aid flows fund economic development programs that stabilize these nations.

Secondly, the density of LAC migrant population living in the US and relative proximity make remittance transfers less costly for LAC economies than other regions that are further away. Note that remittance transfers surged in the early 1990's period, while foreign aid flows subsided. This time period coincides with increased immigration to the US from the LAC region and a decline in US national interest in LACs after successful drugs and arms interdiction operations (Orozco, 2007).

The increase in remittance transfers to LACs is driven by the poorest of countries, like Haiti, Honduras, Guyana, and Nicaragua. These nations are heavily dependent on both remittance and aid flows for development financing, yet have low growth rates. The timing and magnitude of remittance and aid flows are also important. Remittances are typically frequent, small interfamilial donations, while foreign aid grants are large infrequent inter-governmental grants. From a political economy perspective, policymakers have imposed taxes on remittance flows and corrupt bureaucrats have mismanaged foreign aid grants (Solimano, 2003).

Research by Zateriouiz (2003) implies that industrial factors of production are often dynamic. More abundant and efficient factors in one part of the economy may substitute for losses in another sector. Yet this relationship does not promote growth. Bianovsky (2009) examines historical commodity returns for developing nations whose economies are dependent on substitutable commodities for growth. His results suggest that the substitutable relationship between these commodities may play a role in their weak growth impact.

The growth impact of remittances has not been as conclusive as expected and highly dependent on a number of factors, while foreign aid flows either have no impact or negative effects on growth in LACs. Mundaca (2005) panel analysis utilized two subsets of countries based on financial development over the 1990-2002 period. His results suggest that the growth impact of remittances is dependent upon financial development. When domestic credit from banks and monetary circulation were utilized to proxy for financial development, a 1 percentage point increase in remittances is associated with a 3.49% increase in GDP per-capita growth, *ceteris paribus*. When no variables were included to proxy for financial development, a 1 percentage point increase in remittances increased GDP per capita growth at a lower rate of 3.18%, *ceteris paribus*. Mundaca concludes that financial development better channels remittance flows to growth-promoting industries.

Sharma and Ramirez (2009) panel analysis on 23 LACs for the period 1990-2005 offer empirical evidence that the growth impact of remittances is a function of income. In a subset of low income countries, a 1 percentage point increase in remittances is related to a 0.9% increase in GDP per capita growth. In medium and high income LACs, remittances increased per capita growth by 1.9%. The authors suggest that upper income countries are more able to utilize remittances for productive purposes.

Similar arguments have been made by Ahortar and Adenutsi (2009), who employ dynamic panel estimations on 31 Latin American and Sub-Sahara African Countries over the 1996-2006 period. In dynamic terms, remittances have a negative effect on growth, but a positive impact on long-term growth in more trade open economies. Panel analysis by The Inter-American Development Bank (2006) over the 1971-2002 period found no statistically significant

relationship between foreign aid and economic growth, while Vargas (2009) argues that foreign aid flows are negatively associated with economic growth in LACs.

III. Literature Review

A. Motivation and Growth Theory: Human Capital

This analysis of previous literature explores the channels through which remittances and foreign aid impact growth within a ‘growth accounting’ framework. If remittances and aid grants are altruistically or insurance motivated to support relatives and hedge risks, such countercyclical flows are purported to improve human capital and attenuate natural disasters or political unrest. Assuming that remittance and aid transfers are investment driven, they spur capital accumulation and trade. To the extent that remittances promote efficiency and technological progress, reduce risk in the economy, or alter productive externalities, such transfers also affect total factor productivity.

Becker’s (1974) and (1991) ‘family economics’ analyzes the markets of interfamilial transfers and establishes the family as both the foundation of society and basic unit of economic measurement. Becker utilizes dynamic, inter-temporal, micro-models to examine parental ‘bequeath behavior.’ The results of his models imply that parents consider their offspring’s discounted future utility when making economic choices. Agarwal and Horowitz (2002) contend that Guyanese migrants exhibit such ‘bequeath behavior’ by altruistically remitting to augment the paltry wages and smooth consumption patterns of relative households.

Dorantes (2006) study of rural Mexico suggests remittance transfers act as an insurance arrangement between the migrant and his family. Remittance income compensates relatives for the principal invested in his education and other costs of migration or hedge against crop failure

and civil strife. Similar theoretical models by Nath and Sobhee (2007) imply that aid grants may be more altruistically motivated to maintain relationships with former colonies or insurance driven to hedge the risk of war and secure national interest in a foreign country.

An abundance of empirical evidence from LACs corroborates the altruism and insurance theory, where countercyclical remittance and aid flows improve human capital and mitigate natural disasters. The UN (2010) praised the flood of foreign aid grants for financing disaster relief efforts in the aftermath of Haiti's catastrophic earthquake. Further research by Lopez and Seligson (1991) suggests that remittance income attenuated revolutionary wars, hurricanes, and drought throughout Central America in the late 1980's and early 1990's. Funding from Migrant Home Town Associations and Migrant Remittance Networks rebuilt sturdier stone homes, community recreational facilities, electric gridlines, and water systems in ravaged villages.

Moreover, remittance recipients are often the poorest of households. By smoothing consumption patterns and augmenting their meager income, remittance receipts reduce both the incidence and severity of indigence (Lopez-Cordova, 2004 and Adams, 2005). Foreign aid funds have ameliorated the spread of infectious diseases and halted rampant malnourishment ailing Central American Nations and Haiti (OECD, 2006). Increases in both remittances and aid disbursements are associated with improved educational enrollment, retention, and performance, (Edwards and Ureta, 2003).

Research which questions the utilization of remittance and aid transfers as a human capital strategy exposes the prevalence of moral hazard. The US Food Program quelled starvation in rural Central American villages, but drove down the prices of farm crops, bankrupting farmers during farm seasons (The Cato Institute, 1986). Survey data of labor markets in Caribbean Basin Cities, by Itzigsohn (1995) suggests that remittance transfers occur

under asymmetric information. This makes accountability of remittance grants difficult given the distance separating remitter from recipient. Recipient households may rationally substitute unearned remittances for employment income, reduce labor market effort, and increase leisure consumption.

Stark et al. (1986) 'theory of migration and remittance diffusion' purports that remittance transfers initially promote inequality. Influxes of remittances are retrieved by educated and affluent families, until access to international migration diffuses downward through the income distribution. Evidence of such 'brain drain' by The World Bank (2006) and Rodriguez *et.al* (2001), suggests that 5 of every 6 trained Jamaican physicians and over 80% of Haitian professionals have emigrated to support dependent families.

Unintended consequences associated with remittance and aid flows also affect bureaucratic structures. According to Abdih *et. al* (2008) governments of remittance dependent economies have begun to tax remittance income, yet have larger fiscal deficits, higher perceived corruption scores, and respond slower to policy consensus of citizenry. Knack (2001) and Ryan and Coyne (2009) lament the flood of aid to the world's worst dictators, which erodes institutional quality and incentivizes rent-seeking behavior. Reliance on aid grants for development financing makes recipient economies even more vulnerable to economic shocks. Aid outlays are often grossly mismanaged, with very little emphasis on worker training and entrepreneurship. Arbitrary inflows of foreign aid also promote path dependence if these funds were donated by former colonial masters (Ovaska, 2003 and Moyo, 2009).

B. Motivation and Growth Theory: Capital Accumulation

Hoddinott (1994) and Brown (1997) decry the altruism and insurance motive as ‘naively underestimating the complexity of migrant behavior.’ Hoddinott describes the ‘inheritance effect’ of remittances, whereby migrants remit to increase their shares in family enterprises. Brown contends that investment opportunism in capital starved agricultural and real estate niche markets are core motives to remit. Their procyclical portfolio-theory is well versed in financial economics literature, where investment-driven remittances improve financial intermediation and capital accumulation.

The role of a financial intermediary is to provide insurance for depositors, raise capital, and apportion financial assets efficiently to industries which need it most (Diamond and Dybvig, 1983). Countries which have deeper capital markets experience quicker and more sustained economic growth (Beck *et. al*, 2000 and Levine, 2006). The impact of financial development on growth varies with a country’s stage of development (Rioja and Valev, 2003 and Honohan, 2003). Investment-driven remittance flows are associated with an increase in the savings rate, monetary circulation, and private sector loans in lesser developed countries (Aggrawal *et. al*, 2002 and Giuliani and Ruiz-Arranz, 2005).

Remittance grants not only improve financial intermediation, but also promote entrepreneurship by easing liquidity constraints and augmenting the capital stock. Studies by Woodruff and Zenteno (2007) and Massey *et. al* (1998) find that remittances financed homeownership and entrepreneurial enterprises in Mexico. In fact, one-fifth of the equity in urban Mexican small businesses is derived from remittance flows. Remittance outlays from migrant Home Town Associations funded financial cooperatives, rescued family farms, and renovated urban real estate in Central America (Aguinas, 2006). Commercial banks in LAC and

Arab countries have raised more than \$15 billion since 2000 from international capital markets for investment in small-business loans, by leveraging the securitization of future remittance flows (Ratha, 2005).

An extensive literature also examines the effects of foreign aid on savings and investment in lesser developed countries. Research which first analyzed the economic impact of foreign aid utilized a gap version of the Harrod-Domar Model, where aid flows closed the gap between the savings required to achieve a targeted rate of growth and the rate of growth that would occur without aid across various thresholds of development (Rosenstein-Rodan, 1961). More recent studies analyze the Feldstein-Horioka puzzle, that if capital is perfectly mobile, there would be a low correlation between a country's saving and domestic investment. If foreign aid is omitted, the correlation between savings and investment weakens, implying more financial openness than is actually the case (Isaakson, 2001). Additional panel analysis by Kumazawa and Payne (2005) suggests that foreign aid grants promote higher domestic investment rates in lesser developed economies.

Another vital feature of well-functioning financial markets is fiscal stability, which reduces risk and increases predictability in the financial system. It is critical that government debt markets in underdeveloped economies not 'crowd out' financial resources for productive industries (IDB, 2008). Central American governments have restructured debt and improved sovereign bond ratings via securitization of future remittance flows. These future flow securitization structures are typically rated investment grade, given the massive injections of remittances to these nations. A wider market of investors is attracted, lowering the interest rate, and lengthening the maturity (Ratha, 2007). Foreign aid in the form of debt forgiveness or trade

concessions such as the Caribbean Basin Project has had similar success in improving economic conditions for LACs (IDB, 2009).

C. Growth Theory: Total Factor Productivity

Dynamic models by Djajic (1986) and McCormick *et. al* (2001) imply that the spillover benefits of remittances increase the welfare of residents who are not remittance recipients. The remittance recipient country will have new trading partners and higher buying power. Assuming that remittance funds are channeled toward productive industries, they will improve efficiency and promote technological innovation. However, Acosta *et. al* (2007) and Amuedo-Dorantes and Pozo (2004) contend that persistent inflows of foreign currency from remittances inflict ‘Dutch Disease Effects’ by raising the real exchange rate and reallocating resources from the tradable to non-tradable sector. This reduces export competitiveness and increases the consumption of imports.

Remittance transfers may have positive political economy effects. If a larger constituency (remittance recipients) relies on remittance flows, they will pressure representatives for policies that increase competition and efficiency in the financial system. Furthermore, countercyclical remittance flows may attenuate business cycle fluctuations and reduce the risk premium of investment and asset holdings in the economy, Barajas *et. al* (2003).

Considering the theoretical framework discussed, the following empirical analysis examines the relationship and growth impact of remittances and foreign aid.

IV. Methodology

A. Data

This unbalanced panel analysis estimates a fixed-effects, log-linear growth model and statistical tests on 22 LACs over a 30-year period (1979-2008) to examine the relationship and growth impact of remittances and foreign aid. Due to data limitations on gross secondary enrollment among the poorest of LAC nations, the potential sample of countries was reduced from 35 to 22 countries. I argue that this sample size is consistent with the 21 countries utilized by Mundaca (2005) and the 23 countries employed by Sharma and Ramirez (2008).

As in any growth model, the dependent variable is the natural log of the real GDP per capita. However, Chami *et. al* (2003) utilized an alternative specification, the change in the natural log of the real GDP per capita. These results are presented in Appendix B. Remittance and aid flows are expressed as a percentage of GDP to capture their magnitude relative to a country's economic output. All control variables utilized in this analysis are derived from previous research and the theoretical underpinning in the field.

Considering the financial development and capital accumulation channel proposed by Aggrawal *et. al* (2002) and Guiliano (2005) who claim that remittance inflows augment the capital stock and ease liquidity constraints in financial markets, gross fixed capital formation is utilized to control for investment flows and the depth of a country's financial system. Gross 'fixed' capital formation corrects for volatility associated with inventory and extreme business cycle fluctuations. Consistent with the work of Adenutsi and Ahortor (2009), who find the growth effects of remittance grants dependent on openness, the sum of imports and exports as a percentage of GDP accounts for the degree of trade openness in each country. Furthermore, trade openness should also control for Acosta *et. al* (2007) and Amuedo-Dorantes and Pozo

(2004) theory that influxes of foreign currency from remittances raise the real exchange rate and reduce export competitiveness. If this negative externality is truly affecting total factor productivity, I argue that it will be reflected in trade openness.

The work of Lopez-Cordova (2005), OECD (2006), Edwards and Ureta (2003) implies that remittance and aid flows improve human capital. Gross secondary enrollment measures educational attainment, while life expectancy captures the level of health in a given country. The ‘sound economic policy’ assertion of Burnside and Dollar (1997) and Abdih *et. al* (2008) suggests that the growth impact of remittances and aid grants is contingent upon responsible governance and political stability. Inflation, measured by the annual percentage change in the Consumer Price Index and Central Government Debt as a percentage of GDP, proxy for the quality of a country’s institutions.

Data on economic growth, remittance, inflation, trade, gross fixed capital formation, and life expectancy are retrieved from the World Bank Development Indicators. ODA data is garnered from the Development Assistant Committee of the Organization for Economic Cooperation and Development Statistical Query. Data on gross secondary enrollment is taken from Harvard University Centre for International Development, while data on Government Debt is derived from the IMF World Economic Outlook and International Financial Statistics Databases. Table 3 describes variables employed in this analysis.

Table 3 - Variable Definitions

Variable Name	Variable Description
<i>Growth_{it}</i>	Natural log of the real GDP per capita
<i>Remit_{it}</i>	Remittances received, as a percentage of the GDP
<i>Aid_{it}</i>	Net ODA received, as a percentage of the GDP
<i>Capital_{it}</i>	Gross Fixed Capital Formation, as a percentage of the GDP
<i>Trade_{it}</i>	The sum of exports and imports, as a percentage of the GDP
<i>Education_{it}</i>	Gross Secondary Enrollment, as a percentage of the eligible school age population
<i>Health_{it}</i>	Life Expectancy at Birth
<i>Inflation_{it}</i>	Inflation, as a percentage change in the CPI
<i>Debt_{it}</i>	Central Government Debt, as a percentage of the GDP

A. Empirical Analysis

Consider equation 1 below, the Unrestricted Model, where growth is a function of remittances and ODA received, capital, trade, education, health, inflation, and government debt for country i at time t .

$$Growth_{it} = \beta_0 + \beta_1 Remit_{it} + \beta_2 ODA_{it} + \beta_3 Capital_{it} + \beta_4 Trade_{it} + \beta_5 Education_{it} + \beta_6 Health_{it} + \beta_7 Inflation_{it} + \beta_8 Debt_{it} + \alpha_i + v_{it} \quad (1)$$

The random effects estimator assumes that α_i is randomly distributed and independent of the control variables. The fixed effects estimator α_i controls for country-specific unobservable heterogeneity such as corruption or culture that may be correlated with the independent

variables. The Hausman Model Specification formally tests which of the two models should be utilized. The X^2 (26.57) of the Hausman Test is significant at the 1% significance level compared to the X^2 statistic (20.09), confirming the employment of the fixed effects model in the growth equation¹. Results using random effects estimation are presented in Appendix C.

The Wald F-test discerns whether a subset of control variables jointly have a statistically significant effect on the dependent variable, once another set of variables have been controlled for. In this analysis, I first examine whether gross fixed capital formation, trade openness, life expectancy, gross secondary enrollment, inflation, and government debt jointly have an effect on growth rates, once remittances and ODA have been controlled for.

Consider the 6 exclusion restrictions in equation 2 below. If the null hypothesis is true, then capital, trade, education, health, inflation, and debt jointly have no effect on growth, once remittance and ODA have been controlled for and should be excluded from the model. The t-test only looks at the significance of each variable one at a time, while the F-test looks for joint significance. However, before examining the relationship between remittances and ODA in the growth equation I first analyze the growth impact of the control variables employed. In other words, are foreign aid and remittances the only determinant of growth or does the economic environment under which these flows occur impact growth as well?

$$\begin{aligned}
 H_0: \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0 \\
 H_1: \text{The } \beta\text{'s do not jointly equal } 0
 \end{aligned}
 \tag{2}$$

¹ **H₀**: $\beta_{(FE)}$ and $\beta_{(RE)}$ consistent, but only $\beta_{(RE)}$ is efficient
H₁: $\beta_{(FE)}$ is consistent and $\beta_{(RE)}$ is inconsistent

In the restricted model, growth is strictly a function of remittances and ODA received.

For simplicity, henceforth I refer to equation 3 below as Restricted Model 1.

$$Growth_{it} = \beta_0 + \beta_1 Remit_{it} + \beta_2 ODA_{it} + \alpha_i + v_{it} \quad (3)$$

B. Expected Results

Previous research yields conflicting results on the growth impact of remittances and ODA in LACs, therefore the coefficients on $Remit_{it}$ and Aid_{it} may be positive or negative. Secondly, the motivation for such flows may determine their growth impact. If remittances and foreign aid flows to LACs are more altruistic or insurance driven to attenuate natural disasters and smooth consumption patterns for the poor, such countercyclical flows should be negatively associated with growth (Chami *et al.*, 2003). Assuming that remittance and aid transfers are investment driven for asset accumulation and small business development, such procyclical flows are expected to be positively associated with growth. The policy environment (moral hazards) discussed in the literature, associated with these flows may also play a role in their growth impact.

It is expected that the coefficients on $Capital_{it}$ and $Trade_{it}$ should be positive, indicating that greater capital stock and trade liberalization promotes growth. Almost all cross country empirical analysis argue that trade channels resources to more efficient industries, augmenting output, and improving standards of living. However, I leave open the possibility for potential ‘Dutch Disease’ Effects of remittance flows. Sharma and Ramirez (2009) also find a statistically

significant negative relationship between openness and growth in lesser developed LAC economies, which they attribute to the fact that these nations import more consumer goods and export primary goods that are notoriously volatile in their behavior over time.

Similarly, the coefficients on *Education_{it}* and *Health_{it}* should have a positive effect on growth, suggesting that a highly skilled and healthy workforce promotes productivity and efficiency. In contrast, the coefficients on *Debt_{it}* and *Inflation_{it}* are expected to be negatively related to growth. Consistent with financial economics and political economy theory, government debt markets ‘crowd out’ private investment, while inflation erodes purchasing power and predictability in financial markets. Growing economies typically experience inflation, but LACs faced a number of currency crises which inflicted hyperinflation (Hegerty, 2010).

V. Results and Analysis

Table 5 below present results of the Unrestricted and Restricted Model 1 fixed-effects log-linear Growth Models with robust standard errors on LACs over the 1979-2008 period. My results imply that both remittances and ODA are negatively associated with GDP per capita growth. In the Restricted Model 1, the Coefficient on *Remit_{it}* and *Aid_{it}* suggest that a 1 percentage point increase in remittances is associated with a -1.2% decline in GDP per capita growth and a 1 percentage point increase in ODA is affiliated with a -2.3% reduction in GDP per capita growth, *ceteris paribus*. The negative relationship between remittances and ODA on growth is stronger in the Unrestricted Model. A 1 percentage point increase in remittances is related to a -1.9% decline in GDP per capita growth and 1 percentage point increase in ODA is associated with a -2.7% decline GDP per capita growth, *ceteris paribus*.

These results are consistent with the findings Chami *et. al* (2003) and Vargas (2009) who both suggest that remittances and aid funds are altruistic and insurance motivated transfers that are negatively associated with growth. Remittance and foreign aid are countercyclical flows that attenuate natural disasters, political unrest, and smooth consumption patterns for the poor. Hence, remittance and ODA receipts increase as economic growth decline in LACs. Contrary to Mundaca (2005) and Sharma and Ramirez (2009), remittance and ODA income are not primarily investment driven growth promoting funds that depend on financial development. The period of time over which my analysis reports results (1979-2008) may also contribute to the difference in findings. Mundaca (2005) and Sharma and Ramirez (2009) analysis utilized the 1990 to 2005 and 1990-2003 time periods respectively. Secondly, when controlling for the economic environment under which these flows occur the negative relationship between these transfers and growth is even stronger. This suggests that the policy environment in these countries may also affect the growth impact of remittance and ODA.

Results for the coefficient on $Trade_{it}$ are similar to the findings of Sharma and Ramirez *et. al* (2008). A 1 percentage point increase in trade openness is associated with a -0.3% decline in GDP per capita growth, *ceteris paribus*. As discussed previously, ‘Dutch Disease Effects’ or the fact that these nations import more consumer goods and export primary goods that are notoriously volatile in their behavior over time may explain such results. As expected, government debt is negatively related to growth, while capital is positively related to growth in LAC Economies (IDB, 2008). The coefficient on $Debt_{it}$ suggests that a 1 percentage point increase in Government Debt is associated with a reduction of -0.9% in GDP per capita growth. The coefficient on $Capital_{it}$ implies that a 1 percentage point increase in the capital stock is related to a 0.7% increase in GDP per capita growth, *ceteris paribus*. Consistent with

financial economics and political economy theory, government debt markets 'crowd out' investment and increase risk in the economy. Greater capital stock funds investment and business development, which drives growth.

Table 4: Fixed Effects Regression Results (Dependent Variable = lnGDP per capita)

$$Growth_{it} = \beta_0 + \beta_1 Remit_{it} + \beta_2 ODA_{it} + \beta_3 Capital_{it} + \beta_4 Trade_{it} + \beta_5 Education_{it} + \beta_6 Health_{it} + \beta_7 Inflation_{it} + \beta_8 Debt_{it} + \alpha_i + v_{it} \quad (1)$$

Regressor	Unrestricted Model Coefficient (Std. Error)	Restricted Model 1 Coefficient (Std. Error)
Constant	8.701 (0.784)	7.741 (0.061)
Remit_{it}	-0.019** (0.005)	-0.012* (0.005)
Aid_{it}	-0.027*** (0.005)	-0.023** (0.003)
Capital_{it}	0.007** (0.003)	-
Trade_{it}	-0.003* (0.001)	-
Education_{it}	0.037 (0.013)	-
Health_{it}	0.006 (0.002)	-
Inflation_{it}	0.001 (0.000)	-
Debt_{it}	-0.009*** (0.001)	-
Unrestricted F (21, 443) = 61.97 Restricted 1 F(33, 881) = 63.81	Unrestricted R ² within = 0.79	Restricted 1 R ² within = 0.23
n=22 countries, average t=22.8 years		
Includes year dummy variables	<i>Hausman X²</i> (26.57)***	<i>Hausman X²</i> (114.91)***

*** 1% significance level, **5% significance level, *10% significance level

The F-test statistic tests whether the increase in the R^2 from the restricted to the unrestricted model is large enough to warrant rejection of the null hypothesis that capital, trade, education, health, inflation, and debt jointly have no effect on growth, once remittance and ODA have been controlled for and should be excluded from the model. With 6 numerator and 500 denominator degrees of freedom, the null hypothesis is rejected at the 1% significance level when compared to the critical value $F_{q,n-k-1}$, 2.12. Capital, trade, health, education, inflation, and debt jointly have a statistically significant effect on growth once remittance and ODA have been controlled for. The unrestricted model is utilized further to test the relationship between remittances and ODA in the growth equation.

Figure 5: Restriction F-test $F: \frac{(R_{ur}^2 - R_r^2)/q}{(1 - R_{ur}^2)/df_{ur}} = 237.5$

What is the likelihood that remittances and foreign aid are indeed perfect substitutes in the unrestricted growth equation? A simple t-test is employed, where the null hypothesis of this test suggests that the coefficient on remittance is the same as the coefficient on foreign aid. The alternative hypothesis is that the coefficient on remittance is opposite that of foreign aid. Failing to reject the null hypothesis reveals that remittances and foreign aid flows are substitutes. I hypothesize that the t-test employed should reveal that foreign aid and remittances are substitutes in the growth model. The t-statistic on the new combined variable in Restricted Model 2 should not be significant. This relationship may also help explain their ineffectiveness as a growth strategy.

$$\begin{aligned} H_0: \beta_1 &= \beta_2 \\ H_1: \beta_1 &\neq \beta_2 \end{aligned} \tag{5}$$

In the context of the growth equation, this is expressed as follows:

$$Growth_{it} = \beta_0 + \beta_1 Remit_{it} + \beta_1 ODA_{it} + \beta_2 Capital_{it} + \beta_3 Trade_{it} + \beta_4 Education_{it} + \beta_5 Health_{it} + \beta_6 Inflation_{it} + \beta_7 Debt_{it} + \alpha_i + v_{it} \quad (6)$$

Simplifying equation 6 yields equation 7, henceforth referenced as Restricted Model 2.

$$Growth_{it} = \beta_0 + \beta_1 (Remit + ODA)_{it} + \beta_2 Capital_{it} + \beta_3 Trade_{it} + \beta_4 Education_{it} + \beta_5 Health_{it} + \beta_6 Inflation_{it} + \beta_7 Debt_{it} + \alpha_i + v_{it} \quad (7)$$

If the T-test on β_1 is not significant, I cannot reject the null hypothesis that the effects of remittances are the same as foreign aid in the growth equation.

$$H_0: \beta_1 = 0$$

$$H_1: \beta_1 \neq 0 \quad (8)$$

The results of Restricted Model 2 in Table 6 below suggest that the coefficient on β_1 is not significant. I cannot reject the null hypothesis that the effects of remittances are the same as foreign aid in the growth equation. In other words, remittance and foreign aid flows are perfect substitutes and this relationship may also contribute to their ineffectiveness as a growth strategy. Recall that Bianovsky (2009) and Zateriouiz (2003) found that substitutable relationships in the commodity and industrial markets of developing economies may impede their growth impact, especially in economies that are dependent on these factors of production. Further results for Restricted Model 2 are similar to the Unrestricted Model. As expected, capital is positively related to growth and debt is negatively related to growth. The coefficient on $Capital_{it}$ suggests that a 1 percentage point increase in gross fixed capital formation is affiliated with a 5% increase in GDP per capita growth, *ceteris paribus*. The coefficient on $Debt_{it}$ implies that 1 percentage point increase in government debt is associated with a reduction of -0.3% in GDP per capita

growth, *ceteris paribus*. Trade is negatively related to GDP per capita growth. The coefficient on $Trade_{it}$ implies that a 1 percentage point increase in trade openness is associated with a -0.4% decline in GDP per capita growth, *ceteris paribus*.

Table 6: Restricted Model 2 Regression Results (Dependent Variable lnGDP per capita)

$$Growth_{it} = \beta_0 + \beta_1(Remit + ODA)_{it} + \beta_2Capital_{it} + \beta_3Trade_{it} + \beta_4Education_{it} + \beta_5Health_{it} + \beta_6Inflation_{it} + \beta_7Debt_{it} + \alpha_i + v_{it} \quad (7)$$

Regressor	Unrestricted Model Coefficient (Std. Error)	Restricted Model 2 Coefficient (Std. Error)
Constant	8.701 (0.784)	8.731 (0.716)
<i>Remit_{it}</i>	-0.019** (0.005)	–
<i>Aid_{it}</i>	-0.027*** (0.005)	–
<i>(Remit Aid)_{it}</i>		-0.012 (0.003)
<i>Capital_{it}</i>	0.007** (0.003)	0.050** (0.003)
<i>Trade_{it}</i>	-0.003* (0.001)	-0.004* (0.001)
<i>Education_{it}</i>	0.037 (0.013)	0.031 (0.016)
<i>Health_{it}</i>	0.006 (0.002)	0.006 (0.002)
<i>Inflation_{it}</i>	0.001 (0.000)	0.001 (0.000)
<i>Debt_{it}</i>	-0.009*** (0.001)	-0.003** (0.001)
Unrestricted F (21, 443) = 61.97 Restriction2F (21, 443) = 62.81	Unrestricted Model R ² within = 0.79	Restricted Model 2 R ² within = 0.80
n=22, average t=22.8 years Includes year dummy variables		<i>Hausman X²</i> (128.9)***

VI. Conclusion

The purpose of this thesis is to compare the growth impact of remittances and foreign aid and examine their relationship in the growth model. This analysis offers evidence within the context of fixed-effects panel estimation and statistical tests on Latin American and Caribbean Countries over the 1979-2008 period, which suggests that remittances and foreign aid flows are negatively associated with growth. Such results question the utilization of foreign aid and remittance flows to LACs as a growth strategy. Easterly (2001) and Moyo (2009) note that there is a contradiction between the nature of arbitrary cross country transfers such as remittance and aid flows and their expectations as a growth strategy. Countercyclical altruistic and insurance motivated remittance and aid transfers are designed to attenuate natural disasters, political unrest, and smooth consumption patterns for the poor. Such flows are not procyclical growth promoting investment funds. Hence, remittance and aid transfers from the donor country increases as economic conditions deteriorate in the recipient nation. More fundamentally, remittances and foreign aid are substitutes as a source of development financing and this relationship may also play a role in their negative association with growth.

Policies which better channel remittance and aid flows toward investment, productive purposes would allow these transfers to serve more competently as a growth strategy. The countries of Jamaica and Dominica provide an enlightening example. Foreign aid in the form of conditional debt forgiveness and trade concessions allowed the Jamaican and Dominican Governments to pour more funds into training and technology programs for farm and mineral mining workers. As a result, the thriving bauxite, aragonite, crafts, and sugar cane industries have lifted rural villages from dire poverty. Remittances may also act as a source of growth if more proactive, business savvy policies were enacted by the political directorate. Honduras and

El Salvador are two inspiring examples of countries in which remittances account for more than 10% of GDP and have the potential to promote growth under a more conducive policy environment. The El Salvadoran Government vowed to match the remittances of Migrant Home Town Associations Small Business Development Fund. A number of thriving marine exports, eco-tourism lodges, and craft enterprises have been initiated. The Honduran Government has also worked with the Migrant Remittance Network and the Inter-American Development Bank to pool savings from migrant remittances into financial cooperatives for the poorest and most remote villages of Honduras (Solimano, 2003).

The growth equation utilized in the empirical analysis was modeled contemporaneously. Further research should examine the time aspect of remittance and aid flows. Research by the Congressional Budget Office (1997) finds that the trajectory of foreign aid flows is highly correlated with a country's stage of development over time. Similarly, migration studies by Acosta *et. al* (2006) contend that migrants remit less the longer they live in a foreign country, spending more funds on assimilating and inculcating themselves into the foreign culture. Dynamic panel or lagged models that better capture the relationship and growth impact of remittance and foreign aid over time may improve upon this paper empirically. One may argue that the impact of remittances and aid follow a distributed lag pattern, such that there is some immediate effects on human capital and infrastructural development. As standards of living and opportunities improve over time, remittance and aid funds are eventually channeled toward growth-promoting investment purposes.

As discussed earlier, analyses of remittance flows are typically regional. Another avenue that will expound upon this work is to examine whether this relationship holds across different regions. Recall the findings of the World Bank (2008) who reveal that the highest remittance

recipient nations are the least aid dependent and vice versa. Could this same phenomenon exist in South-East Asia and the Pacific, the region that is the second highest remittance recipient? A study of the Middle East and North Africa region, the highest foreign aid dependent and least remittance recipient may reveal that foreign aid flows substitute for the decline of remittance outlays, yet their growth impact may not be as conclusive as expected.

Finally, there are any number of channels through which remittances and foreign aid are purported to promote growth, including human capital, capital accumulation, and total factor productivity. Further analysis of these channels, the moral hazards and poor policy environment associated with them may also contribute to the literature and explain why the growth impact of foreign aid and remittances have not fulfilled the expectations of recipients and policymakers.

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Appendix A: List of LACs Remittance and ODA Received, %GDP 1979-2008

	ODA		Remittances	
	Mean	(Std. Dev.)	Mean	(St. Dev.)
Antigua and Barbuda	2.78	(1.09)	1.90	(0.17)
Argentina	0.00	(0.00)	0.07	(0.05)
Aruba	0.17	(0.39)	1.67	(1.09)
Bahamas, The.*	-	-	0.14	(0.13)
Barbados	2.93	(1.44)	0.52	(0.67)
Belize	4.64	(2.33)	5.53	(3.69)
Bolivia	1.20	(2.12)	7.68	(3.14)
Brazil	0.07	(0.25)	0.04	(0.03)
Chile	0.00	(0.00)	0.13	(0.14)
Colombia	1.27	(0.94)	0.32	(0.18)
Costa Rica	0.67	(0.80)	1.32	(0.29)
Cuba*	-	-	-	-
Dominica	8.37	(3.51)	12.59	(7.78)
Dominican Republic	5.63	(2.59)	1.05	(0.76)
Ecuador	3.43	(3.01)	1.09	(0.57)
El Salvador	9.63	(5.39)	4.64	(3.38)
Grenada	10.30	(3.20)	7.60	(6.84)
Guatemala	3.47	(4.23)	1.61	(0.73)
Guyana	7.70	(9.85)	15.86	(9.78)
Haiti*LDC	19.55	(6.06)	12.15	(8.73)
Honduras	5.63	(6.92)	7.82	(2.67)
Jamaica	8.50	(4.81)	3.04	(2.65)
Mexico	1.40	(0.81)	0.06	(0.04)
Netherland Antilles	0.50	(0.55)	5.74	(0.82)
Nicaragua	7.06	(4.78)	13.47	(7.61)
Panama	1.43	(0.90)	0.74	(0.71)
Paraguay	2.27	(1.53)	1.32	(0.56)
Peru	1.16	(0.60)	1.12	(0.52)
St. Kitts and Nevis	1.90	(3.56)	4.98	(3.75)
St. Lucia	4.00	(1.79)	4.40	(2.63)
St. Vincent and the Grenadines	6.52	(2.35)	7.45	(4.92)
Suriname	0.60	(1.16)	6.76	(5.47)
Trinidad and Tobago	0.33	(0.48)	0.16	(0.20)
Uruguay	0.22	(0.44)	0.26	(0.22)
Venezuela, R. B.	0.00	(0.00)	0.05	(0.03)

*The Bahamas Department of Statistics do not record remittance flows

*Haiti is the only Least Developed Country in LAC, requiring significant remittance and aid inflows

*US Embargo against Cuba prohibits remittance and ODA receipts

Chami *et. al* (2003) specified the difference in the natural log of real GDP per capita for growth rate to address potential time series issues, namely non- stationary. Economic data can be plagued with non-stationary if expressed in their original units of measurement, exhibiting trend, cycles, or other non-stationary behavior. One way to address non-stationary in growth equations is to take the difference in the ln of real GDP per capita.

Appendix C: Results Using Chami *et al.* (2003) $\Delta \ln$ of real GDP per capita

$$Growth_{it} = \beta_0 + \beta_1 Remit_{it} + \beta_2 ODA_{it} + \beta_3 Capital_{it} + \beta_4 Trade_{it} + \beta_5 Education_{it} + \beta_6 Health_{it} + \beta_7 Inflation_{it} + \beta_8 Debt_{it} + \alpha_i + v_{it} \quad (1)$$

	Unrestricted Model	Restricted Model 1	Restricted Model 2
Regressor	Coefficient (Std. Error)	Coefficient (Std. Error)	Coefficient (Std. Error)
Constant	0.457 (0.052)	0.378 (0.051)	0.602 (0.539)
<i>Remit_{it}</i>	-0.692** (0.223)	-0.231* (0.015)	–
<i>Aid_{it}</i>	-0.356*** (0.251)	-0.244** (0.016)	–
<i>(Remit Aid)_{it}</i>	–	–	-0.202 (0.165)
<i>Capital_{it}</i>	0.802*** (0.262)	–	0.768** (0.289)
<i>Trade_{it}</i>	-0.067 (0.058)	–	-0.062 (0.056)
<i>Education_{it}</i>	0.192 (0.116)	–	0.235 (0.114)
<i>Health_{it}</i>	0.039 (0.074)	–	0.763 (0.179)
<i>Inflation_{it}</i>	0.004 (0.002)	–	0.004 (0.002)
<i>Debt_{it}</i>	-0.006* (0.001)	–	-0.006* (0.015)
Unrestricted F(21, 443) = 0.78 Restriction 1 F(32, 781) = 1.17 Restriction 2 F(23,604) = 0.81	R ² within=0.24	R ² within=0.09	R ² within=0.16
n=21 average t=20.7 includes dummy variables			

*** 1% significance level, **5% significance level, *10% significance level

Appendix D: Random Effects GLS Regression Results

$$Growth_{it} = \beta_0 + \beta_1 Remit_{it} + \beta_2 ODA_{it} + \beta_3 Capital_{it} + \beta_4 Trade_{it} + \beta_5 Education_{it} + \beta_6 Health_{it} + \beta_7 Inflation_{it} + \beta_8 Debt_{it} + \alpha_i + v_{it} \quad (1)$$

	Unrestricted Model	Restricted Model 1	Restricted Model 2
Regressor	Coefficient (Std. Error)	Coefficient (Std. Error)	Coefficient (Std. Error)
Constant	7.102 (0.074)	7.913 (0.124)	7.982 (0.124)
<i>Remit_{it}</i>	-0.032*** (0.005)	-0.045*** (0.004)	–
<i>Aid_{it}</i>	-0.062*** (0.007)	-0.053*** (0.005)	–
<i>(Remit Aid)_{it}</i>	–	–	-0.021 (0.015)
<i>Capital_{it}</i>	0.019*** (0.003)	–	0.015*** (0.003)
<i>Trade_{it}</i>	-0.001 (0.000)	–	-0.001* (0.000)
<i>Education_{it}</i>	0.011 (0.001)	–	0.010 (0.002)
<i>Health_{it}</i>	0.023 (0.003)	–	0.088 (0.054)
<i>Inflation_{it}</i>	-0.000 (0.000)	–	0.001 (0.000)
<i>Debt_{it}</i>	0.001** (0.000)	–	0.002*** (0.001)
Unrestricted F(21, 553) ** Restricted 1 F(30, 712) *** Unrestricted F(22, 601) **	R ² within = 0.65	R ² within = 0.49	R ² within = 0.67
n=22, average t=20.7 includes year dummy variables			

*** 1% significance level, **5% significance level, *10% significance level

