

# Understanding Guyana's Recent Growth Process<sup>\*</sup>

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## Abstract

Using an Instrumental Variables approach we estimate a growth model and control for the key factors that relax and tighten Guyana's foreign currency constraint (*FCC*). We find that government current expenditure and the structure of private investment tighten the *FCC* and therefore, reduce economic performance. On the contrary, exports and foreign direct investment relax the *FCC* and by extension, improve economic performance. Secondary level schooling, University graduates and government capital expenditure are indirect or non-foreign currency intensive sources of economic growth. But only University graduates are consistent with lower economic performance. Though remittance inflow relaxes the *FCC*, it is neither statistically significant nor causally related to the growth process in Guyana. The paper argues that Guyana requires industrial policies to reduce its high import penetration and diversify its limited export portfolio.

**Keywords:** Industrial policies, Foreign currency constraint, Guyana, Growth

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# 1 Introduction

Member states of the Caribbean Community that are dependent on tourism find that their business cycles are synced to those in North American and European economies. The reverse is true for non-tourism natural resource dependent economies like Guyana but all CARICOM member states share one important common feature — relatively high import penetration ratios. This reality places foreign currency at the centre of economic life in these small and open economies. In this article, we estimate a growth model using the Instrumental Variables approach with the conceptual understanding that the inflows and outflows of foreign currencies are the basis of the growth process in Guyana. Thus, our choice of control variables is determined by the extent to which these relax or tighten the foreign currency constraint.

This is the first econometric work in the Guyana growth literature to focus exclusively on Guyana's recent growth process and also the first to use a non-linear model of remittances on economic growth in a times series framework. Since Guyana's business cycles are inversely related to those in North American and European economies and remittance inflows to Guyana are positively related to the economic performance in these economies, contrary to other empirical work (Kumar (2013), Bettin and Zazzaro (2012), Giuliano and Ruiz-Arranz (2009) and Giuliano and Ruiz-Arranz (2009)) — remittances are inversely related to the growth process in Guyana. But this relationship is not causal and only reflects the lack of synchronization of business cycles. The differences between our work and the literature on remittances and economic growth are the specifications of the growth model and type of empirical study. Much of the literature estimates panel regressions and only controls for the basic growth co-variates. The Guyana case reveals that there is no causal relationship but also no statistically significant relationship between remittances and economic growth when we control for exports, investment, foreign direct investment, government expenditure and human capital variables. Our findings demonstrate that one must be cautious when drawing policy conclusions from panel regressions.

To the best of our knowledge, this is the first work to control for disaggregated government spending in a growth model applied to the Guyana case. We find that government current and capital expenditures reduce and increase economic growth respectively. Guyana's limited export portfolio and high import penetration make government's current expenditure pro-cyclical,

which worsens downturns. The finding that exports are key to Guyana's growth process, particularly the exports of primary commodities, reveals that there is hardly a captain of the proverbial ship in Guyana's growth story. Economic performance in Guyana is guided by the ebb and flow of foreign investment and commodity prices. We find that domestic private investment reduces growth, primarily because of its over-investment in nontradable economic activities. The absence of the proverbial captain explains why Guyana's productive structure remains low-skills intensive, which encourages migration of human capital. We argue that to take control of the Guyana economy requires a captain in the ship through the creation and effective management of an industrial policy regime.

The remainder of the article is organized as follows. Section 2 outlines a brief literature review, section 3 presents our conceptual framework and this informs our empirical analysis in section 4. Section 5 offers a brief discussion and finally, section 6 concludes.

## **2 A Brief Review of the Literature**

Guyana is one of the major remittance recipient countries in the world (Kumar (2013)) and expressed as a ratio of GDP, remittances far exceed foreign direct investment (FDI). One of the few studies that try to empirically estimate the effects of remittance inflow on Guyana's growth process is Kumar (2013). Kumar estimates an augmented Solow growth model using an ARDL bounds testing method and covers the period 1982-2010 — he finds that remittances increase economic growth in both the short and long run. His empirical model controls for capital stock, overseas development assistance and financial deepening as proxied by credit to the private sector.

We remain sceptical of the key finding. No explanation is given as to why financial deepening and overseas development assistance are negative and insignificant in both the short and long run. But our primary concern with this empirical study is the application of Solow's growth model to a small and highly open economy. By construction, Solow's model assumes away the role of government since it focuses on the long run and ergo, assumes away the problem of deficient demand. Rodrik (1998) empirically verifies that small open economies have

relatively bigger governments and since Guyana has a relatively young and small private sector, the role of government is likely to be pivotal to its growth process. It follows that one must explicitly account for the role of government. Further, Kumar (2013) failed to account for the elephant in the room, the extreme openness of Guyana's economy — this makes Guyana particularly vulnerable to adverse external shocks and thus, serves as a key factor explaining its growth process.

Bettin and Zazzaro (2012) undertake a panel study of 66 developing countries (including Guyana) from 1970-2005 to ascertain the effect of remittances on economic growth and how these interact with financial development and institutions across space and time. This study finds that remittances are growth intensive in Guyana. But we argue that this study has similar limitations as in Kumar (2013) outlined above. Giuliano and Ruiz-Arranz (2009) undertake a similar study but has a better specified model since they control for government expenditure, openness and human capital etc. Their panel dataset covers 100 countries (including Guyana) from 1972-2002 and they conclude that remittances increase investment in countries with less developed financial systems.

Giuliano and Ruiz-Arranz (2009)'s finding is especially relevant to Guyana since Khemraj (2008) describes Guyana's financial system as one of financial stagnation. But it is important to note here that Roberts (2009) surveyed Guyana's recipients of remittances and found that only 7% of remittances are used for investment purposes, while the great majority are used to support consumption pattern. Also, Constantine (2016b) provides empirical evidence that show how the bottom 50% of Guyana's income distribution lost half of its mean income since 1998, which corresponds with the period when remittance inflow accelerated in Guyana (Kumar (2013)). This finding supports Roberts (2009)'s claim that remittance inflow in Guyana is consumption intensive and casts doubt on Giuliano and Ruiz-Arranz (2009)'s principal finding in the context of Guyana.

Levine (2005) argues that financial development is important to the growth process and Aggarwal et al. (2011) estimate the extent to which remittance inflow promotes financial development. Using a panel of 109 countries (including Guyana) from 1975-2007, these authors conclude that remittance inflow promotes financial development and by extension, economic

growth. But Khemraj (2008) demonstrates how Guyana's financial system is characterized by oligopolistic banking, excess reserves and high interest rate spreads. It follows that remittance inflow to Guyana hardly improves its financial system in any meaningful way and therefore, undermines Aggarwal et al. (2011)'s finding in the context of Guyana.

Ganga (2002) studies the competitiveness of Guyana's export sector and the role the latter plays in the overall growth process. The paper demonstrates that the export of goods increased at an annual rate of 9.2% between 1992-1997 but experienced a subsequent slowdown at an annual rate of 4.8% between 1998 and 2001. These export performances mirror Guyana's economic boom and bust within the same periods. Supporting evidence is provided in Armendariz et al. (2007), they also explain the growth slowdown between 1997-2005 as deterioration in terms of trade. Staritz et al. (2007) explain this growth deceleration as a decline in private investment and since much of the export sector is operated by the private sector, this finding is consistent with the literature. Weisman (2003) sides with this terms of trade explanation but also argue that macro policies and total factor productivity are important factors that explain Guyana's growth process.

Constantine (2015) provides updated non-econometric evidence that illustrate the importance of Guyana's export sector to its overall growth process. Constantine makes two principal findings that are important to understand Guyana's growth process: 1. When non-services sectoral growth or profit rates are compared, the mining sector is an outlier — meaning that it is either above or below the average rate of the other sectors. It follows that Guyana's external sector is the key regulator of economic performance. 2. Growth in non-tradable services is only sustained in periods of export boom. Fundamentally, economic performance is externally driven. In recent work, Canterbury (2016) emphasizes the importance of Guyana's extractive sector (gold mining in particular) to its overall growth process. Grenade and Pasha (2012) also side with this strand of the literature. They argue that Guyana is heavily dependent on a limited range of primary commodities: gold, sugar, bauxite and rice but also dependent on the importation of the *majority* of its consumer and intermediate goods. Grenade and Pasha claim that Guyana's non-reliance on tourism is the primary reason why it fared much better than its Caribbean neighbours

since the Global Financial Crisis (GFC) — the primary mechanism being that gold prices escalated in the wake of the GFC and therefore, supported growth in Guyana.

On the historical front, Gafar (1996) notes that Guyana's economic boom between 1974 and 1976 can only be explained by the favourable commodity prices of its exports. Khemraj (2015a) and DaCosta (2007) both consider the colonial origins of Guyana's underdevelopment. Khemraj (2015a)'s key contention is that the Dutch settlement on the coastal plain locked Guyana into agriculture, which accompanied high drainage and irrigation costs and crucially, enslaved Guyana to the booms and busts of commodity prices in world markets. In addition to adverse geography, DaCosta (2007) underscores the legacy of Guyana's colonial institutions as an important determinant of its economic performance relative to Barbados.

There is another strand of the growth literature that emphasizes the role of Guyana's political economy. Grenade and Pasha (2012) and Grenade and Lewis-Bynoe (2011) both explain Guyana's economic boom since 2006 as the result of political stability and stronger institutions. But we remain unconvinced about this channel for two reasons: 1. Guyana's economy contracted in 2005 due to a massive flood that destroyed agricultural produce, it follows that in 2006 we expect an upsurge in economic growth as agricultural production recovers and 2. The GFC emerged in 2007 and accompanied booms in commodity prices such as gold, which supports growth. Further, any growth dividends from institutional strengthening are likely to be reaped in the longer term and therefore, are an insufficient explanation for any short run growth dynamics. Still, Staritz et al. (2007) posit that part of the growth slowdown between 1998-2005 can be explained by the political and institutional conditions that prevailed in Guyana. But we have already shown how this growth slowdown can be better explained by the dramatic decline in the export sector over the same period.

Singh (2013) studies Guyana's post-independence growth process and concludes that dictatorship and democracy can explain growth stagnation and acceleration respectively. Singh estimates a growth model and controls for a multitude of factors and find that institutions, political stability, capital stock, human capital and technology are the key sources of Guyana's long run growth process. Khemraj (2013) also considers political institutions and how these affect economic performance in Guyana. He explains that the present constitution supports a

winner takes all type of politics, which is especially detrimental in plural societies like Guyana. Khemraj (2013) explains that ethnic voting in Guyana inevitably leads to an elected Oligarchy that is highly corrupt and marginalizes ethnic minorities. The cumulative effect is sub-optimal economic growth.

Gafar (2004) studies the performance of the labour market in Guyana and arrives at a number of findings that are relevant for our empirical work. He empirically demonstrates that approximately 13,000 people migrated annually from Guyana during the 90s, which meant that the labour force declined. Further, Gafar notes that the labour force participation rate declined from 59.5% to 57% between 1992-1999. He offered three explanations for this: 1. Discouraged worker effect, 2. Increase in secondary school enrolment rates and 3. Inflow of remittances. It follows that while the Guyana economy grew in the 90s, the labour force and labour force participation rate declined, indicating that these are *inversely* related but also *insignificant* to Guyana's growth process.

In Singh (2013)'s empirical model, he finds that University graduates reduce economic growth in Guyana and this finding was robust to various specifications. Singh offers two explanations: 1. Poor quality education and 2. A mismatch between tertiary education and the skills and training that firms demand. The finding that University graduates are consistent with lower economic growth is likely to be robust since approximately 89% migrate to the UK, USA and Canada (Mishra (2006)). Building on Singh (2013), Constantine (2016a) offers a theoretical clarification. He contends that there is an inefficient allocation of human capital in Guyana as proxied by University graduates, the latter is highly skewed towards Social Science related programs — a useful proxy for rent seeking in the literature (Murphy et al. (1991)). As rent seeking increases at the expense of capital formation (entrepreneurship), the economy experiences lower economic growth. Constantine explains that Guyana's low technology economic structure skews the labour market reward structure in favour of rent seeking and only a growth enhancing structural transformation can improve the efficiency of the labour market.

### 3 Conceptual Framework

In the domestic foreign exchange (FX) market there is a *finite* quantity of a specific foreign currency (US dollar for instance) or group of foreign currencies at any moment in time. This finite quantity is traded by commercial banks, cambios and other participants, and a proportion is held by the central bank as official international reserves (Khemraj et al. (2015) and Khemraj (2015b)). Foreign currency is the lifeblood of small and highly open economies like Guyana — foreign currencies are needed to repay external debt, to import intermediate inputs and goods for final consumption and for foreign investment. The *stylized fact* of highly open economies is that import penetration is extremely high, which makes foreign currency a key input for investment and consumption purposes, hence the life blood metaphor.

Inflows of foreign currency depend on export receipts, capital inflows and remittances, while outflows are determined by imports and various forms of capital flight. In a freely floating exchange rate regime, these inflows and outflows alter the foreign exchange rate, while in the conventional case; a central bank intervenes to defend a given rate in a fixed exchange rate regime. Khemraj and Pasha (2012) notes that since 2004, the exchange rate regime in Guyana moved from a relatively flexible to a virtually fixed rate. But this is not akin to a fixed exchange rate regime established by monetary authorities as in the conventional case. They argue that the FX market is concentrated by few commercial banks that dominant the trade in foreign currencies. Khemraj and Pasha (2012) contend that their market power and high concentration help in the stabilization of the rate, the latter is important since commercial banks posses a large portfolio of assets in domestic currency, thus, a rapid depreciation is not within their financial interest.

To formally illustrate the importance of foreign currency to the growth process in a small and open economy, we employ Khemraj (2015b)'s modelling approach — consider the following Cobb-Douglas production function (equation 1), where  $\alpha + \beta = 1$ . Equations (2) and (3) depict the growth of technology ( $a$ ) and capital ( $k$ ) as functions of the difference between total foreign currency traded ( $F_t$ ) and a central bank's desired level of reserves ( $F^*$ ). Note that ( $a_0$ ) and ( $k_0$ ) are sources of growth that are not foreign currency intensive. Equation (4) explains that as

remittance inflows (  $F$  ) increase labour supply decreases, where  $\alpha$  is the share of ( $F$ ) accounted for by remittances and ( $l_0$ ) is the non-foreign currency intensive source of growth for labour.

$$Y = A(K)^a (L)^b \quad (1)$$

$$a = a_0 + j_1(F_t - F^*) \quad (2)$$

$$k = k_0 + j_2(F_t - F^*) \quad (3)$$

$$l = l_0 + j_3 F_t^2 \quad (4)$$

To focus exclusively on foreign currency and the growth process, we can assume that  $a_0 = k_0 = l_0 = 0$ . Collectively, equations (2)-(3) explain that growth in technology and capital is only possible if the total foreign currency in the economy exceeds the central bank's target level of reserves. The latter is not immediately available for the importation of intermediate inputs, technology and goods for final consumption since they are obtained from local market participants (Khemraj (2015b)). It follows that growth is only possible if ( $F_t > F^*$ ) holds, in other words, sustained inflow of foreign currency is the key source of economic growth in small and open economies. Crucially, the inflow of remittances reduces the supply of labour (via disincentive work effects) and our parabolic modelling is consistent with empirical estimates for small and open economies (Kim (2007) and Jadotte (2009)).

It is important to emphasize that our use of the Cobb-Douglas production is only illustrative and not intended to model Guyana's actual growth process. On consideration of policy and modelling the actual growth process in Guyana, it imperative to understand what factors increase and decrease ( $F$ ). For instance, to what extent does government spending or the structure of

private investment in Guyana increase or decrease ( $F$ ) and by extension, affect the growth process?

## 4 Empirical Analysis

Our conceptual framework motivates our empirical model: we control for the key factors that increase and decrease ( $F$ ). Consider the role of government in Guyana — its current expenditures on wages and salaries in the public sector are likely to reduce ( $F$ ) given Guyana's high import penetration of consumer durables. On the other hand, government capital expenditures on roads, airstrips and other key public infrastructure are important inputs for export-oriented sectors, which earn ( $F$ ). We estimate the growth implications of government spending but this poses an important problem for estimation by Ordinary Least Squares (OLS).

Consider equation 5, which regresses economic growth ( $g$ ) on total government spending as a ratio of GDP ( $G$ ), while controlling for other co-variates ( $Z$ ). If we estimate equation (5) by OLS, the results are likely to be biased since Wagner (1883) explains that economic growth is a key determinant of government spending. In other words, equation (5) suffers from endogeneity bias.

$$g_t = a_0 + a_1 G_t + a_2 Z_t + e_t \quad (5)$$

The first study to test Wagner's thesis in Guyana is Gafar (1975). Gafar estimates a simple OLS regression covering the period between 1955-1969 and concludes that Wagner's thesis holds. Alleyne (1999) tests for Wagner's law in selected Caribbean countries (including Guyana) but uses a bigger dataset — 1950-1990. Alleyne finds no support for Wagner's law and concludes that no long run relationship exists between economic growth and government spending in Guyana. However, Iyare and Lorde (2004) expand Alleyne's dataset (1950-1999) and find support for Wagner's law in Guyana. To control for the potential endogeneity problem, we estimate equation (5) using Two Stage Least Squares (2SLS).

On consideration of policy it is important to understand the *differential* impact government current and capital expenditures have on economic growth. Therefore, we re-specify equation (5) and disaggregate ( $G$ ) into current ( $CEXP$ ) and capital ( $CAEXP$ ) expenditures measured as ratios

of GDP. This new model is depicted in equation (6) and is estimated by 2SLS. We expect the following relationships to hold: (  $g/CEXP < 0$ ), (  $g/CAEXP > 0$ ) with the net effect being ambiguous (  $g/G < or > 0$ ) in equation (5) — (see Figure 1 Panels A, B and C for partial correlations).

$$g_t = b_0 + b_1CEXP_t + b_2CAEXP_t + b_3Z_t + u_t \quad (6)$$

#### 4.1 Data and Choice of Control Variables

Our dataset covers the period 1990-2015 and the World Bank’s World Development Indicators, Thomas et al. (2011) and the Bank of Guyana Annual Reports are our data sources. We focus on the (1990-2015) period for the following reasons: 1. Prior to 1990, Guyana was a socialist oriented economy with a marginal private sector and this structural difference is bound to affect the stability of our estimates and 2. On consideration of policy, it is better to focus exclusively on the modern and short run growth process.

Our primary control variables are secondary school enrolment rates (*SSER*), University of Guyana graduates (*UOGG*), exports of goods/services as a ratio of GDP (*EX*), private investment as a ratio of GDP (*I*) and foreign direct investment as a ratio of GDP (*FDI*). Basic competency (as proxied by *SSER*) is key to ensure that loanable funds and scarce foreign currencies are employed in a meaningful and efficient manner. Over the period under consideration, Guyana has made tremendous progress in this area and thus, (*SSER*) is likely to be an important determinant of economic performance. We expect (  $g/SSER > 0$ ) to hold and the partial correlation is illustrated in Figure 1 Panel D. Based on Singh (2013), Mishra (2006) and Constantine (2016a) we expect (  $g/UOGG < 0$ ) and the partial correlation is depicted in Figure 1 Panel E. We have already demonstrated the great importance of exports to Guyana’s economy, therefore, we expect (  $g/EX > 0$ ) to hold and this relationship is shown in Figure 1 Panel F.

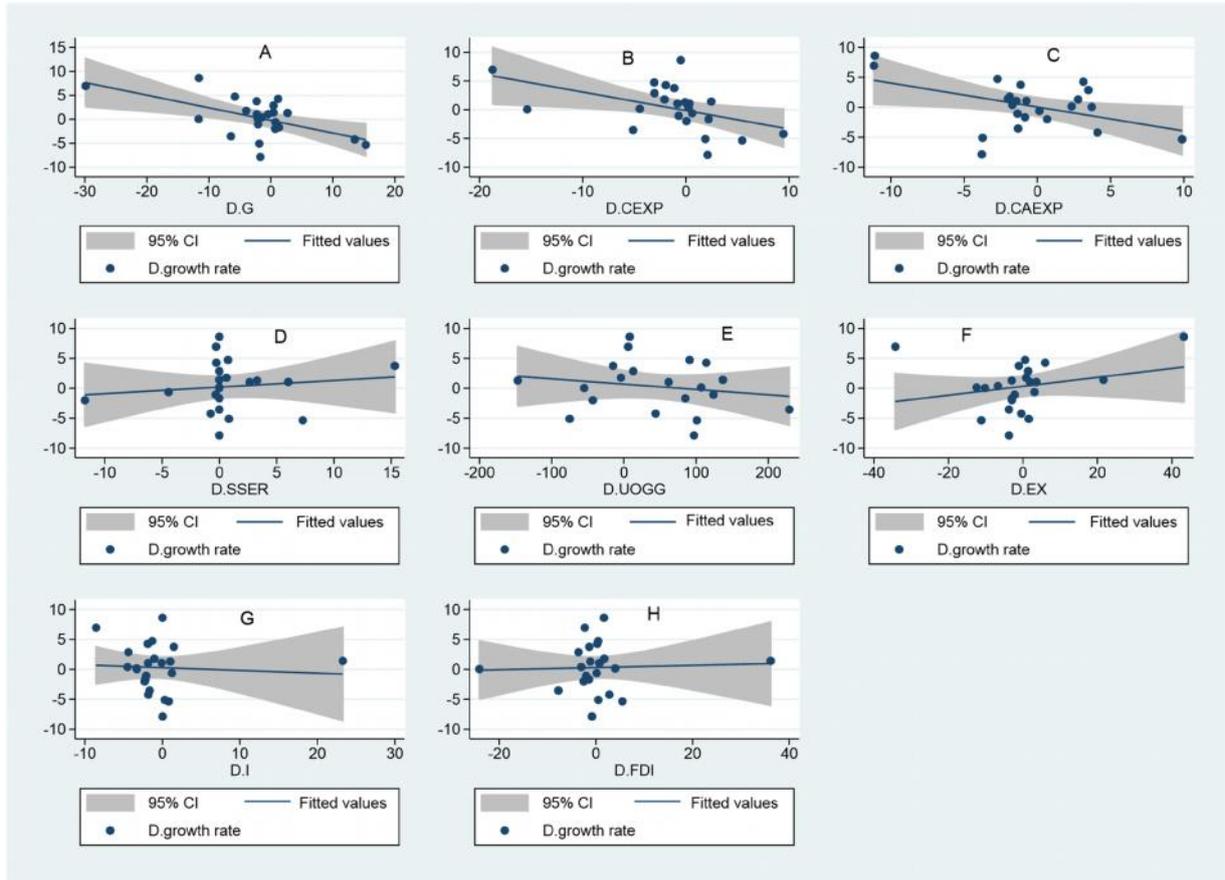
In a *closed* economy one can expect an unambiguously positive relationship between (*I*) and (*g*). However, in the context of Guyana, if the great majority of (*I*) are in non-tradable economic activities that utilize rather than earn (*F*), (*I*) can decrease economic growth. The partial correlation in Figure 1 Panel G suggests a negative relationship but we leave the expected result

open — (  $g/ I > or < 0$ ). The view that (*FDI*) increases economic growth is uncontroversial, we expect (  $g/ FDI > 0$ ) to hold for at least two reasons: 1. (*FDI*) inflows increase ( $F_t > F$  ) and 2. The greater share of *FDI* inflows are into Guyana's export oriented sectors: gold, bauxite etc. The partial relationship is illustrated in Figure 1 Panel H.

As a form of robustness check of our primary control variables, we include secondary control variables: remittances as a ratio of GDP (*REMIT*), external debt as a ratio of gross national income (*EXDEBT*), underground economy as a ratio of GDP (*UNDE*), lagged GDP (*LGDP*) and labour force (*L*). We do not expect a statistically significant relationship between (*g*) and (*REMIT*), further, we expect (  $g/ REMIT < 0$ ) to hold for the following reasons: 1. *REMIT* reduces the supply of labour through disincentive effects and by extension economic growth and 2. There is an inverse relationship between (*REMIT*) and (*g*) owing to the lack of synchronization of business cycles between Guyana and North American countries.

However, this inverse relationship is *not causal*. Growth in (*REMIT*) suggests secured employment and growth in developed countries, which means that the prices for Guyana's key exports are relatively low as a result of their low-income elasticity of demand in world markets. Therefore, Guyana experiences a growth slowdown as (*REMIT*) increases. Now consider the reverse — when developed countries face economic crises, unemployment increases and (*REMIT*) tend to decline. However, gold prices tend to rise reflecting the lack of confidence and uncertainty in rich countries and this supports economic growth in Guyana. The partial correlation is illustrated in Figure 2 Panel A. Finally, for comparative purposes and to be consistent with the literature, we also include a parabolic modelling of (*REMIT*), where we expect (  $g/ REMIT^2 < 0$  and  $g/ REMIT > 0$ ).

**Figure 1: Primary Control Variables**



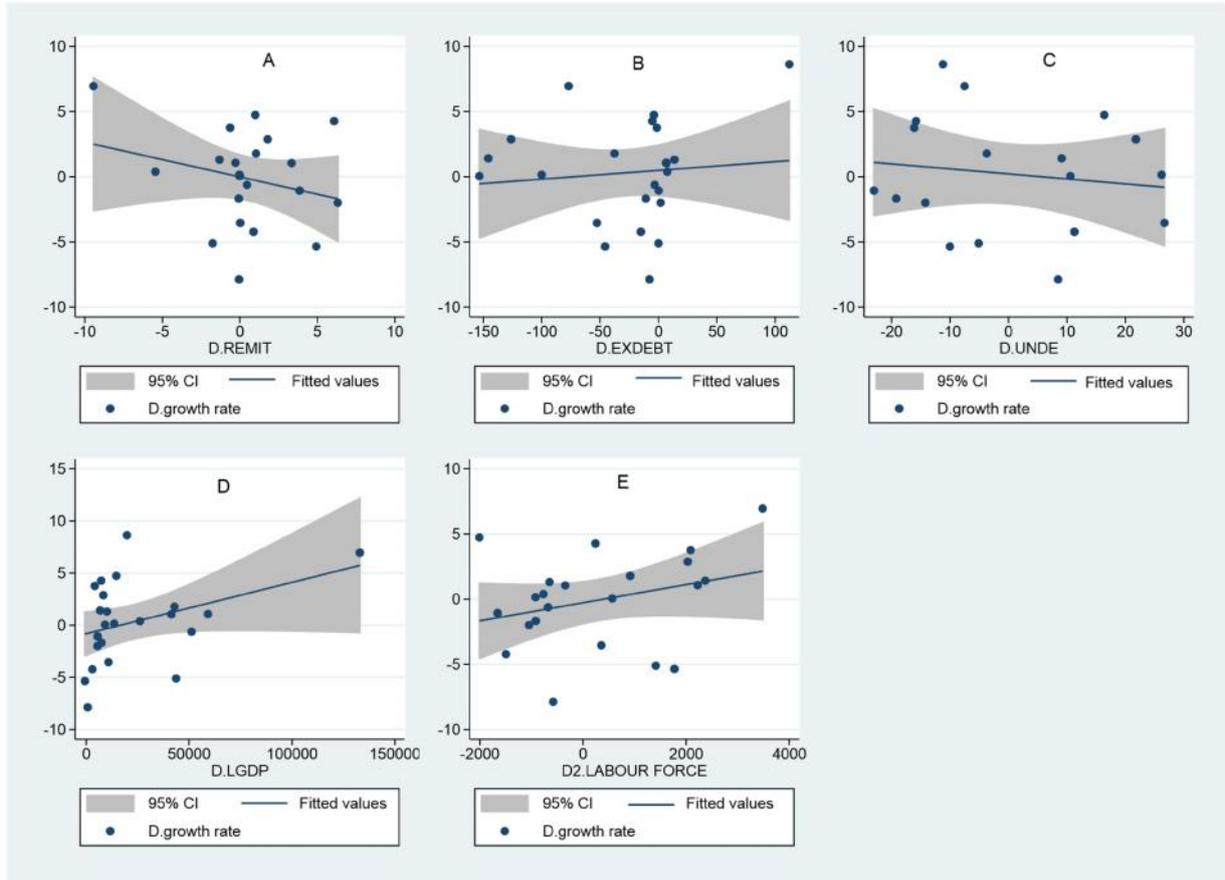
Notes: All series are  $I(1)$  integrated and thus, expressed in first differences. The shaded area covers the 95% Confidence Interval (CI).

External debt can affect economic growth through two channels: 1. External debt repayment reduces ( $F$ ), which can adversely affect economic performance and 2. The growth of ( $EXDEBT$ ) can fund capital expenditure and increase the efficiency of private investment, in particular, export oriented investment and this can increase economic growth. We leave the expected sign open: ( $g/ EXDEBT > or < 0$ ) and its partial correlation is shown in Figure 2 Panel B. The underground economy can be an important determinant of economic growth since it affects crime and serve as a key source of unfair competition etc. There is some speculation that a great share of Guyana's underground economy is related to Narco-Trade and money laundering. If the

latter are confined to export oriented sectors this can be growth intensive but if the greater share of money laundering are within non-tradable economic activities, this tend to reduce ( $F$ ) and by extension economic growth. Though the partial correlation (Figure 2 Panel C) suggests an inverse relationship, the expected sign is left open: ( $g/ UNDE > or < 0$ ).

It is standard in the growth literature to include ( $LGDP$ ) in growth regressions but in the Guyana case the interpretation can be very different. As ( $LGDP$ ) increases in Guyana, imports rise and ( $F$ ) declines, which can potentially reduce economic growth. The standard literature contends that poor economies well within their production possibility frontiers; experience rapid growth as ( $LGDP$ ) increases, but this story is not necessarily plausible in small and open economies. We expect ( $g/ LGDP < 0$ ) to hold and the partial correlation is depicted in Figure 2 Panel D. We have already discussed labour and growth in some detail and based on the literature, we expect a negative ( $g/ L < 0$ ) and insignificant relationship — see Figure 2 Panel E for its partial correlation.

**Figure 2: Secondary Control Variables**



*Notes:* All series are  $I(1)$  integrated and thus, expressed in first differences (with the exception of Labour Force, which is  $I(2)$  integrated and expressed in second differences). The shaded area covers the 95% Confidence Interval (CI).

#### 4.1.1 Policy Variables, Institutions and Finance?

Policy variables are omitted from our specification for two principal reasons: 1. Lubker et al. (2002) explain that policy proxies such as inflation, openness index etc., are policy outcomes and *not* policy instruments and 2. Rodrik (2012) argues that researchers learn nothing from regressing economic growth on government policies. He explains that it is difficult to isolate the exogenous component of government interventions — if the latter are endogenous responses, government policies in regression models tell us very little about actual government policies. Also, we omit

institutional proxies because institutions are likely to have very long run effects on economic growth and our model focuses only on short run dynamics and secondly, the present proxy measures are woefully inadequate, the indicators confuse institutional forms and functions (Chang (2011)). Finally, we do not control for conventional notions of financial development (credit to the private sector and stock market turnover rate etc.) because in a small open economy such as Guyana, it is well established that relatively poor economic performance increases non-performing loans (Khemraj and Pasha (2016)). It follows that conventional notions of financial development is a consequence rather than a cause of economic growth.

## 4.2 Results

Our baseline results are presented in Table 1 and all variables are stationary in first differences with unit root tests illustrated in Table 3. The findings in Model 1 confirm that ( $G$ ) is endogenous based on the Wu-Hausman Test and the Sargan Test indicates that the instruments used are valid, ergo, our 2SLS estimation method is appropriate. Our expected signs for ( $SSER$ ), ( $UOGG$ ), ( $EX$ ) and ( $FDI$ ) are all confirmed and are statistically significant determinants of growth with the exception of ( $UOGG$ ). Model 1 shows that ( $G$ ) and ( $I$ ) both reduce economic growth and are statistically significant. The finding for ( $G$ ) is not surprising, the net effect is determined by the differential effects of ( $CEXP$ ) and ( $CAEXP$ ). Further, we argue that the negative finding for ( $I$ ) does not indicate that private investment unambiguously reduces economic performance. Much of exports in Guyana (which is positive in Model 1) are private sector investments, therefore, we contend that ( $I$ ) is capturing non-tradable private investment. The latter reduces ( $F$ ), tightens Guyana's foreign currency constraint and reduces economic growth. Fundamentally, the negative finding for ( $I$ ) indicates a problem with the structure of private investment in Guyana — an over reliance on non-tradable at the expense of tradable investment ventures.

The results for equation (6) are presented in Model 2 and based on the Wu-Hausman Test, both ( $CEXP$ ) and ( $CAEXP$ ) are endogenous and the Sargan Test suggests that the instruments used are valid. Firstly, our expected results for ( $SSER$ ), ( $UOGG$ ), ( $EX$ ) and ( $FDI$ ) are all realized and statistically significant determinants of growth — ( $I$ ) remains negative and statistically significant. Model 2 suggests that ( $G$ ) reduces economic growth because of the adverse effects of

(*CEXP*) on economic performance. This relationship overshadows the positive effects of (*CAEXP*) since the latter is insignificant. Why should this be the case? There are at least two plausible explanations: 1. Poor quality public works and 2. Public works not biased in favour of export-oriented sectors. Model 2 is re-estimated by OLS and the results are presented in Model 3, where all expected signs and statistical significance are the same as in Model 2. However, there are some changes in the size of the estimated coefficients, which indicates the biases associated with OLS estimation of endogenous variables.

As a form of robustness check of our primary control variables, we add the secondary control variables to Model 2 and these results are shown in Table 2. In addition to the secondary control variables, Model 4 includes a parabolic modelling of our variable (*REMIT*) to capture both the positive and disincentive effects associated with remittance inflow. The first notable feature of Model 4 is that all primary control variables have their expected signs, secondly, they are all significant determinants of growth; including (*CAEXP*) and finally, (*I*) becomes implausibly large: (-1.648). As it relates to our secondary control variables, (*EXDEBT*) is positive and significant, (*LGDP*) is negative (consistent with our expectation) and significant and (*REMIT*) is insignificant, both in linear and non-linear form. Finally, (*L*) and (*UNDE*) are insignificant determinants of growth. Though Model 4 suggests that our baseline results are robust, we are unconvinced about the plausibility of this model since (*I*) is implausibly large.

The greater share of (*REMIT*) goes into consumption, which are non-tradable economic activities on the investment side of the economy, therefore, it is likely that the inclusion of (*REMIT*) inflates (*I*). Model 5 re-estimates Model 4 but omits (*REMIT*) and the findings for our primary control variables are not appreciably different from Model 2 — all variables have their expected signs, plausible coefficients and are statistically significant with the exception of (*CAEXP*). Unlike Model 4, all secondary control variables in Model 5 are statistically insignificant and have their expected signs with the exception of (*UNDE*), which now become negative as compared to Model 4. To ensure that our implausibly large coefficient for (*I*) is not caused by our parabolic modelling of (*REMIT*), we re-estimate Model 5 but only include a linear form of (*REMIT*) in Model 6. Though the expected signs and statistical significance of our primary control variables remain robust, (*I*) is still implausibly large: (-1.791). Also, consistent

with our expectation, (*REMIT*) in its linear form is negatively associated with growth in Guyana and insignificant. Based on the overall findings we make three conclusions: 1. Our baseline results are robust, 2. Model 2 is our preferred specification and 3. (*REMIT*) should not be included in growth models in Guyana, primarily because there is no *causal* relationship as explained in section 4.1.

Table 1: Baseline Results (1990-2015)

Dep. Var: $\Delta$ Growth Rate	Model 1: 2SLS		Model 2: 2SLS		Model 3: OLS	
	Coefficient	Std. Err.	Coefficient	Std. Err.	Coefficient	Std. Err.
$\Delta$ G	-0.244*	0.072				
$\Delta$ CEXP			-0.703*	0.098	-0.749*	0.124
$\Delta$ CAEXP			0.139	0.110	0.191	0.138
$\Delta$ SSER	0.212***	0.129	0.242*	0.083	0.243**	0.107
$\Delta$ UOGG	-0.008	0.007	-0.010**	0.004	-0.010***	0.006
$\Delta$ EX	0.138*	0.049	0.254*	0.040	0.268*	0.051
$\Delta$ I	-0.402**	0.188	-0.659*	0.136	-0.690*	0.173
$\Delta$ FDI	0.212**	0.104	0.420*	0.080	0.444*	0.103
Observations	20		20		20	
R-squared	0.60		0.83		0.83	
<b>Endogeneity Test</b>						

Wu-Hausman Test	11.367*		2.855**			
<b>Test of Over-Identification</b>						
Sargan Test	3.330		3.223			

*Notes:* \*, \*\* and \*\*\* indicate statistical significance at the 1%, 5% and 10% levels respectively. Endogeneity Test — Null hypothesis: exogenous variables. Test for Overidentification Restrictions — Null hypothesis: instruments are valid. Instruments for G: EX, I, SSER, UOGG, FDI, EXDEBT, CAEXP and LGDP. Instruments for CEXP and CAEXP: EX, I, SSER, UOGG, FDI, EXDEBT, CAEXP<sup>2</sup>, CEXP<sup>2</sup>, Growth rate<sup>2</sup> and LGDP.

Table 2: Robustness Checks (1990-2015)

Dep. Var: Δ Growth Rate	Model 4: 2SLS		Model 5: 2SLS		Model 6: 2SLS	
	Coefficient	Std. Err.	Coefficient	Std. Err.	Coefficient	Std. Err.
Δ CEXP	-0.940*	0.122	-0.963*	0.131	-0.919*	0.118
Δ CAEXP	0.400**	0.208	0.093	0.148	0.337**	0.162
Δ SSER	0.405*	0.101	0.307*	0.086	0.418*	0.099
Δ UOGG	-0.013*	0.005	-0.013*	0.004	-0.015*	0.004
Δ EX	0.308*	0.066	0.311*	0.059	0.297*	0.063
Δ I	-1.648*	0.429	-0.825*	0.157	-1.791*	0.287
Δ FDI	0.431*	0.081	0.562*	0.088	0.424*	0.081
Δ EXDEBT	0.051*	0.015	0.004	0.014	0.053*	0.015

$\Delta$ LGDP	- 0.00004***	0.00002	-0.00003	0.00003	-0.00005**	0.00002
$\Delta$ REMIT	0.066	0.441			-0.092	0.226
$\Delta$ REMIT <sup>2</sup>	-0.006	0.441				
$\Delta_2$ L	-0.0001	0.0003	-0.0004	0.0004	-0.0001	0.0003
$\Delta$ UNDE	0.001	0.029	-0.038	0.028	0.004	0.028
Observations	18		19		18	
R-squared	0.93		0.87		0.93	

Notes: \*, \*\* and \*\*\* indicate statistical significance at the 1%, 5% and 10% levels respectively.

Table 3: ADF Unit Root Tests

Variable	Level		First Difference	
	Stat	p-val	Stat	p-val
Total Gov. Exp. as % of GDP	-2.472	0.133	-6.537	0.000
Growth Rate	-3.761	0.009	-7.744	0.000
Gov. Current Exp. as % of GDP	-2.153	0.227	-5.257816	0.000
Gov.	-3.044	0.044	-6.022	0.000

Capital Exp. as % of GDP				
Secondary School Enrollment Rate	-1.149	0.676	-5.601	0.000
University of Guyana Graduates	-1.872	0.337	-4.096	0.005
Exports of Goods & Services as % of GDP	-1.106	0.695	-5.030	0.000
Private Investment as % of GDP	-1.544	0.495	-5.265	0.000
Foreign Direct Investment (net inflows) as % of GDP	-3.997	0.005	-7.422	0.000
Remittance Inflow as % of GDP	-1.410	0.558	-3.969	0.006
External Debt % of GNI	-2.539	0.122	-4.085	0.004

Underground Economy as % of GDP	-2.125	0.237	-2.700	0.088
LGDP	1.361	0.998	-3.668	0.011
Labour Force*	-0.341	0.903	-1.328	0.598

*Notes:* The unit-root tests contain a constant and similar results are obtained but not presented here when a linear trend is included (with the exception of the Underground economy, which is stationary in second difference when a linear trend is included). \*: Labour Force is stationary in second differences when a constant and linear trend are included. The optimal lag length is determined by SIC, with maximum of 5 lags considered. Rejection of null hypothesis ( $p\text{-val} < \text{confidence level}$ ) provides evidence of stationary process at level or first difference.

## 5 Discussion

What do our findings imply for policy? At the most general level, our findings illustrate the growth limitations of the structure of the Guyana economy — its high import penetration of intermediate inputs and consumer durables. This structural feature makes for a low skill intensive economy, which explains why University graduates migrate — the latter is particularly devastating for two reasons: 1. The loss of skilled labour and 2. The loss of financial resources since much of tertiary education is subsidized through poor loan recovery. It follows that unless the skills intensity of the economy is upgraded, skilled human capital will migrate and the occupational structure of University graduates will be less than useful to the economy.

How does a Government upgrade the skills intensity of its economic structure? Public and private investment and FDI must be strategically integrated with two principal objectives: 1. Increase Guyana's export penetration to the Caribbean Common Market and wider world and 2. Reduce Guyana's import penetration of both intermediate inputs and consumer durables. The latter is particularly important to enhance the growth payoffs from (*CEXP*) and (*I*) — presently, these reduce economic growth due to high import penetration. Reducing the latter changes the growth dynamics to ensure economic performance becomes *domestic demand led* and therefore, ensures counter cyclical fiscal policy is growth enhancing. In the case of high import penetration,

austerity is necessary for fiscal and balance of payments sustainability. On the front of enhancing export penetration, this must be guided by a common sense approach of expanding the exports of raw materials to benefit from high commodity prices and strategic value added upgrading of raw materials. Nothing short of a coherent industrial policy regime that takes the Caribbean Common Market seriously is required to meaningful upgrade the skills intensity of the Guyana economy.

It is beyond the scope of this article to fully discuss what an industrial policy regime would look like for Guyana. But it includes sensible immigration reform as a short-term solution to the skills shortage and the use of Guyana's diaspora through ICT technology to fill key human resource gaps. Also, it is important to emphasize that Guyana cannot go it alone, successful technological upgrading requires a CARICOM FDI policy framework (among other common policy regimes) to prevent the *race to the bottom* among member states. Further, policymakers, civil society and private sector need to understand that in small and highly open economies like Guyana, with gross skill shortages, inadequate infrastructure (including ICT) etc., — high taxation is hardly the binding constraint to tradable investment. This is particularly important since industrial policies can become an excuse to unjustifiably give tax cuts to business elites, which worsens income inequality and deepens the import penetration ratio through consumption cascades. It is useful to remember that poor countries such as Guyana, suffer from inadequate tax administration, which necessarily means that taxpayers, particularly business elites, already benefit from indirect tax concessions.

Opponents to industrial policy regimes claim that Guyana simply do not have the skills, marketing capabilities and quality control institutions to meet regional and international standards for higher value added goods and services. These are facts. But there are other illuminating facts to consider: 1. Guyana hardly meets its own domestic health and safety standards; yet, there is a consensus that Guyana must do all that is necessary to meet these standards, 2. The quality of Guyana's schooling is far below satisfactory; still, society demands that Guyana must enhance the quality of its public education and 3. There is major dissatisfaction with the quality of public service delivery but society spares no effort to demand better services. Our principal point here is that it is a given that Guyana is far below any conceivable international and regional standard but this is hardly a reason to forgo industrial policies — all

stakeholders in the economy must demand that the key industries, sectors, and firms meet these standards as they do with other domestic standards.

What about finance? Finance is but one ingredient in effective industrial policy regimes — the latter combines three sources of finance: FDI, public finance and private finance. In the case of Guyana, the banking institutions are flushed with excess liquidity, a strategic government would integrate these into its industrial policy regime. Further, the obsession with financing developmental projects suggests that the lack of investible funds is the binding constraint but this is not necessarily the case. Providing free consulting services, market research information, quality control assistance etc., can be just as effective as providing affordable finance. In fact, domestic banking institutions might be more inclined to lend at lower rates if they are convinced that private sector investment projects are supported by an institutional framework (industrial policy regime for instance) that supplies market data, assess risks, provide training and key infrastructure etc., that enhance the probability of realizing profitable investment ventures. It follows that industrial policy regimes in the 21st Century need not be preoccupied with development banks — government can use existing financial institutions and various incentive schemes to provide affordable finance. This is not an argument against development banks but it is one instance of how modern day industrial policy regimes can overcome the *political mal-incentives* associated with development banks.

What about WTO regulations? Firstly, the Caribbean Common Market creates the space for substantial trade diversion and therefore, explicit protection for trade within the Common Market. Secondly, CARICOM needs to spearhead a number of trade renegotiations for member states (including Guyana) with key trading partners. Many bilateral trade agreements were signed under adverse economic and social conditions — severely weakening the bargaining power of CARICOM member states. Finally, effective industrial policy regimes in the 21st Century are likely to be sufficiently different from the older models and thus, should create space for innovative industrial policies that are likely to be beyond the reach of current WTO regulations. Strategic partnership among private and public sectors and academia can be created to devise WTO friendly industrial policies and with the aid of the legal profession (in Guyana and CARICOM), Guyana can seek meaningful WTO exemptions.

In a plural society such as Guyana, clientelist politics and distributional conflicts are the two major obstacles to an effective industrial policy regime. It follows that policymakers, academics and other analysts must be explicit about the distributional implications of certain industrial policies and identify strategies to counter the tendency of rising inequality. Key political leaders and the wider society must find consensus on a *minimalist* industrial policy regime to insulate the latter from clientelist politics. This minimalist agenda can be updated over time after a transparent review of the growth payoffs and distributional consequences. A similar approach (transparency about growth and distribution implications) is needed to mitigate conflict over the windfall gains expected from Guyana's recent oil find. Given the latter, the urgency for an industrial policy regime increases to address concerns over the famous Dutch Disease.

## 6 Conclusion

We estimate a growth model using the Instrumental Variables approach and find supporting evidence that government current expenditure reduces economic growth. This relation is the consequence of Guyana's economic structure — high import penetration ratio and an export portfolio limited to a narrow range of primary commodities. Though government capital expenditure is growth intensive, it is not statistically significant at conventional levels. We recommend a growth enhancing structural transformation through the creation and implementation of an industrial policy regime. A transformation of Guyana's productive structure enhances the growth payoffs associated with government current and capital expenditures — this is imperative to increase the feasibility of Keynesian fiscal policies.

Consistent with our expectation and the stylized fact of small and open economies, exports remain a robust source of economic growth in Guyana. There is scope for government capital expenditure to be strategically tailored to export oriented sectors. Also, Guyana has made tremendous progress in terms of secondary school enrolment rates and our evidence suggests that this is growth intensive. However, University graduates are consistent with lower economic performance. An industrial policy regime that enhances the skill intensity of the economy can

reduce the migration of skilled labour and increase the returns to entrepreneurship as compared to rent seeking — making University graduates growth intensive.

We find supporting evidence that foreign direct investment increases growth, especially since these are directed towards Guyana's extractive sectors. However, this further concentrates Guyana into the production of primary commodities and reinforces its low-skill intensive productive structure and limits the growth payoffs of government current expenditures. An effective industrial policy regime will balance the inflow of foreign investment into extractive sectors and higher value added production. Additionally, the paper presents evidence that show how the present *structure* of domestic private investment reduces economic performance. There is an excess of private investment in non-tradable economic activities, which have a low employment premium and are low-skill and low-wage intensive. In the absence of an industrial policy regime (as in the present case) private investment seeks the highest returns that are associated with the lowest risks, hence, the excess of private investment in non-tradable economic activities.

A historically unique feature of the Guyana economy is the rapid inflow of remittances since the 90s but our theoretical and empirical model demonstrate that remittances have no statistically significant or causal relationship with economic performance in Guyana. This finding is robust to a linear and non-linear modelling of remittances on economic growth. Finally, further research is needed to explore the nuts and bolts of an industrial policy regime for Guyana and how this can be used to optimize the gains from oil production (which is expected in 2020) and be consistent with a green or low carbon economy.

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