THE PRODUCTIVITY-WAGE GAP AND THE CURRENT ACCOUNT BALANCE: EXAMINING CAUSALITY

Abstract

Economic theory suggests the existence of a causal relationship between the wage-productivity gap and the current account balance. However, the theory has not received any empirical support to date, as studies investigating the determinants of the current account have generally focused on other variables. In this paper, the authors use an unbalanced annual panel data for three Caribbean countries namely: Barbados 1985-2001; Jamaica 1972-2005; and Trinidad 1985-2001; to determine whether there indeed exists a causal relationship between the wage-productivity gap and the current account. The conclusions of this paper should spark interest in the topic and instigate further empirical research.

Introduction

The interconnectedness of global markets makes the current and capital account balances of many economies sensitive to external shocks, as evidenced by the global recession and financial meltdown that originated with the US subprime crisis, 2007. This means that small open economies must seek to improve their international competitiveness[1] in order to hedge the risk of accumulating large current account deficits and/or debt. Productivity and wages are two important variables that can impact international competitiveness; however, there is limited empirical literature on how the gap between the two impacts the economy and particularly the current account.

Productivity may be defined as the derived output per unit of input for a period of time. Therefore, for a small open economy to be internationally competitive it must be able to produce more output per unit of input relative to another economy. Wages are formally defined as compensation for work for a period of time. Institutions such as trade unions play an important role in determining wages and ensuring that the labour force is paid its fair share of the benefits of its productivity. On the other hand, wage negotiations are time consuming and can affect the level of labour productivity in an economy, to the

[1] In this context international competitiveness refers specifically to trade competitiveness.

extent that many firms have opted to adopt a wage model that is explicitly a function of labour productivity.

However, this does not apply to the economy as a whole and the realities of labour market rigidities, including the multi-year fixed-term nature of most collective bargaining agreements, the downward rigidity of wages and cost-push inflationary pressures, allow for wage-productivity gap at the country level, at least in the short run. In the long run, however, wages and productivity should trend together and should, as such, be cointegrated.

The theoretical literature posits that a wage-productivity gap, i.e. wages trending above productivity (or vice versa), causes supply and demand imbalances domestically, which means there are expansionary and inflationary pressures (or contractionary and deflationary pressures) in the domestic economy. In a small open economy, however, the external market serves as an outlet for these pressures through changes in exports and imports, hence changes in the current account position. Thus, the theory hypothesises a negative relationship between the wage-productivity gap and the current account balance such that an increase in the former is reflected in a decrease in the latter.

It is against this background that this paper seeks to examine if there exists a causal relationship between the wage-productivity gap and the current account, with a view to later empirically verifying the posited theory.

This paper is organized as follows: Section 1 gives a detailed review of the literature on the wage-productivity gap, the current account and the impact of productivity and wages on the current account; Section 2 outlines the theoretical framework of the paper; Section 3 expounds on the methodology and data employed; and Section 4 exhibits the findings and conclusions of this study.

Section 1: Review of the Literature

The Wage-Productivity Gap

Empirical evidence supports the wage efficient theory that in the long-run wages and productivity are aligned, that is, they exhibit a co-integrating relationship. Several literatures support this. Although dated, Hall and Jenkinson (1970) shows that wages, prices, hours worked and productivity are cointegrated. Wages and prices were found to be I(2) and co-integrated of order I(1). This relationship was then examined in relation to productivity and cointegration found. Upender and Sujan (2008) also found cointegration between labor productivity and money wage rates in the Indian economy for the period 1980 to 2005. On the contrary, in many economies cointegration between the two is never found. Sachdev (2007) attributed the disparity between the two to factors such as measurement errors, definitional error, technological change and changes in the power of unions. The paper further concludes that in the US productivity outstrips wages and this gap might be explained by the fact that firms have been reaping the benefits of increased productivity by keeping the cost of labour low and maximizing corporate profits.

The definition of the wage-productivity gap is subject to debate. Firstly, does a gap really exist and, secondly, if it does exist, how do we measure or define such a gap. Zavodny (1999) defines the wage-productivity gap as the difference between percentage change in productivity and wages. This is primarily the definition that is used by many researchers. However, others have posited that the gap can be measured as short-run deviations away from the long-run relationship.

Current Account

Generally, the current account is defined as savings less domestic investment. This leads to the generalization that a country running a current account deficit is a net borrower, while a surplus is synonymous with being a net lender. When a country runs an external current account deficit, it simply means that the country spends and consumes more than it produces during a given period (Grenade and Riley, 2007). Running a current account deficit is not a bad thing so as long as the debt incurred is sustainable.

The literature identifies some conventional indicators of the current account (Skeete, 2004). These include:

- Investment and savings - this ratio signals the credit worthiness of an economy to international investors
- Economic growth - continuous growth in factors such as productivity and human and physical capital pronounces economic growth which signals a country's ability to sustain its international competitiveness and current account deficit/surplus
- Openness - which is the ratio of exports to GDP that shows a country's ability to generate foreign exchange to service its external debt
- Foreign exchange adequacy indicators;
- Real exchange rate
- Composites of external liability;
- Political instability
- Fiscal - public and private sector savings-investment imbalance affects the current account balance

The modelling and implications of the current account deficit have evolved since the post-World War II era through the 1990s (Edwards, 2000). The post-World War II period saw discussions and policies regarding current account balances based on the Elasticity Approach, which focused on the behaviour of flows (in and out). This approach is based on the level of domestic activities, foreign activities and the real exchange rate. By the mid-1970s, assessments of the current account changed to examine whether the devaluation of a country's currency would result in an improvement in the country's external position. During the second part of the 1970s, oil price shocks caused many countries to experience huge swings in their current account balances. Edwards (2000) noted that the most important current account analytical development during this period was a renewed interest in, and a formal emphasis on, the inter-temporal dimensions of the current account. This approach is synonymous with the Absorptions Approach and offers a broader perspective of the current account than the Elasticity Approach. It recognizes the current account as an outcome of economic agents' inter-temporal utility maximization. These new developments in current account specification sparked debates among economists in the early 80s and into the 90s. Some, endorsing the elasticity

approach, emphasize the role of the exchange rate in the adjustment of the current account, while others cling to the second identity, the absorption approach, which emphasizes that the exchange rate is unimportant in current-account adjustment (Hung, 2002).

Genberg et al (1992) identified four commonly used current account identities.

$$CA = EX - IM + i * NFA \quad (1)$$

$$CA = Y - A \quad (2)$$

$$CA = S - I + GB \quad (3)$$

$$CA = \dot{F} \quad (4)$$

Where: EX is exports; IM is imports; i*NFA is earnings on net foreign assets; Y is GNP; A is domestic aggregate absorption; S is Private saving; I is private sector investment; GB is government budget; and $\dot{F}$ is accumulation of foreign assets.

Equation (1) is the elasticity approach; (2) the income-absorption approach; (3) the saving-investment approach, which is another absorption approach and (4) is sometimes called the monetary approach as it models the external balance as a function of the accumulation of foreign assets/liabilities (Genberg et al, 1992).

Despite the arguments for and against the use of a certain current account identity, they have all proven helpful to economists. For example, shocks to exports will influence the current account balance and this may be captured in equation (1); on the other hand, changes in investments shape the current account, hence equation (3) would capture this direct effect.

Productivity, Wages and the Current Account

Productivity refers to measures of output from processes, per unit of input. Therefore, growth in productivity is measured by the changes in output relative to changes in one or more inputs of production. It is concerned with the use of resources (inputs or factors of production) to obtain the output of goods and services given the state of technical knowledge, level of demand and socio-economic framework (Downes, 1994). Studies

have examined the effects of productivity shocks on the current account deficit, the majority employing intertemporal models and establishing a predominantly negative relationship, e.g. Glick and Rogoff (1995), Marquez (2002), Morel (2004), Bussiere et al (2005).

Glick and Rogoff (1995) used an intertemporal model that shows changes in the current account as a function of: lagged investment; changes in country-specific productivity; global productivity; government balance and lagged current account. They found that the current account responds negatively and generally significantly to country-specific productivity shocks; however, there is little or no response to global productivity shocks. They showed empirically that when the assumptions hold, productivity is exogenous and follows a random walk process but that when they are relaxed it is exogenous and does not follow a random walk. Their results were both highly significant and robust. The justification for the negative coefficient on productivity was that the demand side productivity impact is greater than the supply side impact.

Marquez (2002) replicated and enhanced the work of Glick and Rogoff (1995) by updating the data set and accounting for two main measurement errors. Firstly, the model was replicated using an updated data set. Secondly, different formulations were used which included incorporating a measurement for relative prices and fiscal shocks as well as the examination of the exogenous and the random walk assumptions imposed on productivity. In both instances the results were not consistent with Glick and Rogoff's (1995) findings. However, upon closer scrutiny he found two developments[2] after 1990 that led to the anomaly, (i) measurement errors of manufacturing productivity as proxy for the whole economy and (ii) measurement errors of the exclusion of capital when measuring productivity. Correction of these measurement errors restored Glick and Rogoff's (1995) conclusion.

[2] Development in information and technology and the identity for investments in the national account has been re-defined to include firms.

In a panel analysis of 21 OECD countries spanning 1960 to 2003, Bussiere et al (2005) found that there was a "prominent role for productivity in the determination of the current account." The research set out to examine the level of significance of government fiscal balance and productivity on the current account balance. A current account model was derived, specified as a function of: change in domestic public saving, change in global public saving, change in country-specific productivity, change in global productivity and lagged investment. Both the government fiscal balance and productivity were significant. Country-specific productivity was found to be the most important explanatory variable, entering with a negative coefficient, which was highly statistically significant. As in Glick and Rogoff (1995), the negative coefficient on productivity is attributable to the fact that the demand-side impact is greater than the supply side of the current account (exports), which generally exhibits a positive relationship with productivity.

Indeed, productivity is seen as one of the driving forces behind a country's ability to export. Yasar (2000), using a VECM panel data analysis, found that permanent productivity shocks in the short-run and the long-run induce larger export levels. In an industry cross-country analysis for the US and Canada productivity was found to be a significant and a positive determinant of international competitiveness (Lee and Tang, 2000). Ogunleye (2008), utilizing granger causality testing and a VECM to examine the short-run and long-run relationships, found that there was a dual-causal relationship between exports and total factor productivity. The co-efficient on productivity was positive.

Despite wages being a microeconomic variable, on aggregate it also has implications for the current account. New Zealand in 1984 realized the importance of wages, prices and production to its international competitiveness, so much so that wages were frozen to help curb their spiralling current account deficits (Kohsaka, 2004). Rodseth (2000) examined wages and their impact on the current account. He highlighted that in the short run:

- If wages are rigid and too high, output and income will be low, which implies low saving and a current account deficit.

- High private wealth implies low saving and a current account deficit.
- Contrary to the first point, high wages mean low returns on capital and low real investments which are associated with increases in the current.

The long-run effect of wages on the current account, he suggested, would be the correction of the points above, which would return the economy to its steady state.

The above-examined literature showed that productivity and wages are significant determinants of the current account but there is limited work on the wage-productivity gap as a determinant of the current account. However, theoretical work by primarily Caribbean economists examining the issue posited that wages and productivity must be aligned so as to avoid demand and supply imbalances and their impact on the current account. Downes et al (1990) indicated that competitiveness can be achieved through policies aimed at increasing labour productivity but there must be wage policies that reflect the interrelationship between productivity gains, real wage increases and inflation. In 2003, Downes developed a model that examined two countries, labelled A and B, and found that the growth in relative real wages, that is, a decrease in real wages in A relative to B, enhances export competitiveness. Conversely, growth in relative labour productivity, that is, an increase in labour productivity in A relative to B, enhances export competitiveness (Downes, 2003). Downes (2006) further reiterated in the case of Barbados that with a fixed-exchange-rate and the USA as its main trading partner, increases in real wages should not outstrip increases in (labour) productivity as it has implications for the current account balance.

A lower/higher growth rate in wages reduces/increases the burden on fiscal and monetary policy by restraining/boosting disposable incomes. This curbs/exacerbates demand/inflationary pressures in the country and restricts/boosts imports. Additionally, if wage growth is in excess of productivity growth, or vice versa, this will ultimately cause exports to become less/more competitive (Blackman, 1989). These import and export (supply and demand) impacts eventually translate into a deterioration or improvement on the current account.

By way of a caveat, it must be noted that Downes and Blackman's insightful pieces were written within the context of developing countries such as those of the Caribbean.

Section 2: Theoretical Framework

Consider the following specification for changes in real wages.

$$\Delta W_t = \beta \Delta A_t + \delta Y_t + \varepsilon_t \qquad (2.1)$$

where W_t is real wages and A_t is productivity, Y_t is vector a of other variables that influences the wage rate and ε_t is the random component. Equation (2.1) shows that changes in real wages are a proportion of changes in productivity. Here the assumption is that changes in real wages and productivity are not one-to-one, as other factors of production such as investment capital must be paid their marginal returns. All things being equal, changes in real wages and productivity present the following scenarios:

Scenario 1

$\frac{\Delta W_t}{\Delta A_t} > \beta$ leads to demand being greater than supply (excess demand) which could lead to:

- *Increase in imports if the economy does not have the economic footing to expand its domestic production to meet demand.*
- Increase in prices (inflationary pressures) or increase in imports inflation
- Wage freeze
- Increasing productivity through investment in capital goods and new technologies

Scenario 2

$\frac{\Delta W_t}{\Delta A_t} < \beta$ then supply is greater that demand (excess supply) which could lead to:

- *Increase in exports so long as there is a market for the goods produced, especially to open economies that are unable to compete on the international market (comparative advantage).*
- Expansion of demand by increasing the wage rate and/or decreasing interest rates to promote consumer borrowing.

- Expansion in government spending through borrowing domestically and internationally.
- Reduction in firms' marginal cost by cutting production and/or employment.

Scenario 3

$\frac{\Delta W_t}{\Delta A_t} = \beta$ the market clears, that is, supply is equal to demand.

Section 3: Methodology and Data

Methodology

The investigation of the causal relationship of the wage-productivity gap and the current account were done using OLS models in levels and difference. Unit root tests were conducted to ascertain the order integration of wages and productivity, followed by the test for co-integration. The test for co-integration was important in adopting a definition of the wage-productivity gap. The renowned Granger-causality methodology was then used to investigate the existence of a causal relationship between the wage-productivity gap and the current account.

Unit Root Tests

To complement our intuitive identification of unit roots with concrete evidence, unit root tests were administered. The literature identifies several unit root tests in panel data: Levin, Lin and Chu (2002), Bretung (2000), Im, Pesaran and Shim (2003), Maddala and Wu (1999) and Choi (2001). However, the Levin, Lin and Chu (2002) and Im, Pesaran and Shim (2003) were employed, while the others were used to substantiate their findings. All unit root tests were conducted with a constant and a trend component where appropriate.

Levin, Lin and Chu (2002) employ the assumption that the persistence parameters are common across cross-sections. Consider an AR(1) process for the panel data.

$$y_{it} = \rho_i y_{it-1} + x_{it}\delta_i + \varepsilon_{it} \qquad (4.1)$$

where i = 1,2,…,N cross-section units or series, that are observed over period t = 1,2,….,T. x_{it} is any exogenous variable, which could be a trend, a fixed or/and individual

effects, ρ_i is the auto-regressive coefficient for the i[th] cross section and ε_{it} the mutually independent idiosyncratic disturbance. If $|\rho_i| = 1$ the series has a unit root; however, if $|\rho_i| < 1$ the series is stationary. The LLC test assumes a common unit root across cross-sections, that is $\rho_i = \rho$ across all cross sections. Therefore using the general specification of an Augmented Dickey-Fuller function (ADF):

$$\Delta y_{i,t} = \alpha y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{i,j} \Delta y_{i,t-j} + x_{it}^{'} \delta + \varepsilon_{it} \qquad (4.2)$$

where $\alpha = \rho - 1$ and the lag length across cross-section may differ, the null is specified, there is a unit root, and the alternative, there no unit root. i.e.

$H_o : \alpha = 0$
$H_1 : \alpha < 0$

Im, Pesaran and Shim assume that the individual unit root varies across cross-sections. The resulting test is a combination of individual unit roots test across cross-section. It takes the average of the t-statistics for each unit test to derive the appropriate test statistics. Using the ADF (equation (4.2)) the null hypothesis is specified as:

$H_o : \alpha_i = 0, \quad for\ all\ i$

and the alternative:

$$H_1 : \begin{cases} \alpha_i = 0 & for\ i = 1, 2, ..., N_1 \\ \alpha_i < 0 & for\ i = N+1, N+2, ..., N \end{cases}$$

The lag length is fixed across cross-sections. Like LLC, the IPS test is said to have an asymptotically normal distribution.

Cointegration Test

If two or more variables are integrated of the same order, say I(d), and the linear combination of the two yields stationary errors then the variables are said to be co-integrated. This suggests that there is a long-run relationship between the two, although there are short-run deviations away from the long-run equilibrium. The Engle-Granger two-step approach, developed by Robert Engle and Clive Granger in 1987, involves identifying and confirming that the orders of integration are the same, then estimating the

long-run relationship (equation 4.5). That is, if wages and productivity are integrated of the same order then equation 4.5 should capture the long-run relationship.

$$X_t = \mu + \Omega Y_t + \varepsilon_t \tag{4.5}$$

The residual (ε_t) from the long-run estimation, which in the case of this study defines the wage-productivity gap, is tested for the desired orthogonal properties to derive a conclusion about the null hypothesis of no cointegration. If the null is rejected, i.e. co-integration is found, then the model can be specified in an ECM form (equation 4.6).

$$\Delta X_t = \sum_{i=0}^{T} \theta \Delta X_{t-i} + \sum_{i=0}^{T} \beta \Delta Y_{t-i} + \delta \ (X - \mu - \Omega Y)_{t-1} + \nu_t \tag{4.6}$$

where θ and β are short-run multipliers and δ is the speed of adjustment towards that long-run equilibrium; ν is white noise. Pedroni (2004) and Kao (1999) modified the Granger's work to suit the test for cointegration in panel data; therefore the two were employed in this research.

Causality Tests

In general terms, a variable can be said to Granger-cause another variable if past and present values of the latter can be used to forecast the former. It measures the extent to which past values of a variable explain variations in another. This does not concretely suggest that one causes another.

Hurlin (2008) identifies four different causality hypotheses. Firstly, the Non Causality (HNC) hypothesis, which implies that there do not exist any individual causality relationships. Secondly, the Homogenous Causality (HC) hypothesis, which occurs when there exist N causality relationships and the individual predictors obtained, conditionally on past values of the regressors, are identical. Thirdly, the Heterogeneous Causality (HEC) hypothesis assumes the existence of N causality relationships as in the HC case, but the dynamics of the dependent variable are heterogeneous. This characteristic of the dependent variable does not affect the causality result. And finally, there is the Heterogeneous Non Causality (HENC) hypothesis, which assumes that there exists a subgroup of individuals for which there is a causal relationship.

This study examines two of the above-mentioned hypotheses, HC and HENC, to investigate causality between the current account and the wage-productivity gap, firstly, to identify if there is a common consensus of causality among countries and, secondly, to identify countries for which a causal relationship exists.

To this end, the following two specifications are taken into consideration:

$$CA_{i,t} = \theta_i + \sum_{p=1}^{T} \eta_p CA_{i,t-p} + \sum_{p=0}^{T} \mu_p WPGAP_{i,t-p} + \varepsilon_{i,t} \quad (4.3)$$

$$WPGAP_{i,t} = \lambda_i + \sum_{p=1}^{T} \alpha_p WPGAP_{i,t-p} + \sum_{p=0}^{T} \beta_p CA_{i,t-p} + \nu_{i,t} \quad (4.4)$$

where $\varepsilon_{i,t}$ and $\nu_{i,t}$ are the disturbance terms, which are supposed to be independently and normally distributed. After selecting the appropriate lag length, informed by the Schwartz-Bayesian Criteria (SBC) and Akaike's Information Criteria (AIC), equations (4.3) and (4.4) are estimated in levels using Ordinary Least Squares (OLS) and the null of no HC Granger causality examined.

For equation (4.3):

$$H_o : \eta_p = 0 \; and \; \mu_p = 0$$
$$H_1 : \eta_p \neq 0 \; and \; \mu_p \neq 0$$

and for equation (4.4)

$$H_o : \alpha_p = 0 \; and \; \beta_p = 0$$
$$H_1 : \alpha_p \neq 0 \; and \; \beta_p \neq 0$$

Additionally, restrictions were placed on η_p and α_p through the introduction of fixed effects, in order to test the null of no HENC Granger causality.

Data and Issues

The data for this paper is compiled as an unbalanced panel with annual data from 1972 to 2005 for Jamaica and 1985-2001 for Barbados and Trinidad. The composed data set came from the International Monetary Fund's (IMF) International Financial Statistics (IFS), the International Labour Organization's (ILO) Key Indicators of the Labour Market (KILM), the World Bank's World Development Indicators 2007 (WDI 2007) and Alleyne 2000.

From KILM, the GDP per person employed was used as the proxy for labour productivity (country-specific). This definition is just one of the two measures adopted by researchers. The other is output per hour worked but due to the limited data available the much simpler definition was adopted. The real wage and productivity index was produced using 2000 as the base year (see appendix 1a: Figures1.1-1.3). Nominal wages is defined as compensation of employees, from the national accounts, divided by total employment. The Jamaican series follows from that which Dr. Dillon Alleyne, 2000, used in his paper "Employment, Growth and Reforms in Jamaica". The series was updated and a nominal wage index created. The Barbados and Trinidad series were taken from KILM data compilation and a wage index created. The paper adopts the definition of Zavodny 1999, where the wage-productivity gap is calculated as the difference between the percentage change in productivity and compensation per employee, wage estimate. The balance for the current account and GDP in US dollars and Consumer price index were retrieved from the IFS and WDI, and was taken as defined.

The unavailability of data on productivity and wages measures for developing countries was the greatest limitation as the researcher had hoped to empirically add value to the posited using more Caribbean/small open economies.

Section 5: Empirical Findings and Discussion

For the 3 countries examined, wages and productivity were both found to be I(1), however, the use of the Engle-Granger based approaches to test for co-integration in panel data, Pedroni (2004) and Kao (1999), showed no significant cointegrating relationship between wages and productivity. The wage-productivity gap was therefore measured by difference between the percentage change in productivity and compensation per employed.

The wage-productivity gap was found to be I(0) (stationary), as the unit root tests unanimously rejected the null of a unit root. The current account balance shows mixed results of stationarity. Under the assumption of a common unit root the current account

was found to be I(0), however, under the assumption of an individual unit root the current account balance was found to be non-stationary [3].

With respect to the OLS Granger causality tests[4], the Wald statistics presented evidence of a one-way causal relationship, that is, the gap Granger-cause the current account at the 5% level of significance. Thus, the HC hypothesis holds, in that there is a common consensus of causality among the 3 Caribbean states that 'The Gap' Granger-cause the current account balances. The HENC hypothesis was examined by controlling for individual effects (fixed-effects) and the same one-way causal relationship found. This led to the scrutiny of individual countries. Barbados showed evidence of a dual causal relationship; Trinidad and Tobago exhibited a one-way causal relationship, which suggested that the current account granger cause the wage-productivity gap. In the case of Jamaica no causality was found[5]. The difference in these results could be as result of the differences in exchange rate regime as well as the length of the sample for each country. The appropriate number lags used in the causality tests were informed by AIC and SBC.

Conclusion

The theoretical literature posits that while various factors allow for the gap between wages and productivity in the short run, in the long run the two should trend together. It is also posited that the observed short-run deviations from this long-run relationship (the wage-productivity gap) cause supply and demand imbalances in the domestic economy, which in turn are reflected in changes in the current account balance.

There were two key motivations for this study:

(1) To examine the hypothesis of a long-run (cointegrating) relationship between wages and productivity in the Caribbean states, thereby defining the gap accordingly, and

(2) To verify the existence of a causal relationship between the wage-productivity gap and the current account balance.

[3] See Appendix 2a: Table 2.1 for the results of the unit root tests.
[4] See appendix 2b: Table 2.2 for causality results.

Contrary to the hypothesis of a long run co-integrating relationship, this study's findings are that there is no evidence of a co-integrating relationship, which suggest that the gap is sustained in both the short and long-run for these Caribbean countries. Given the short-run definition of the gap as the difference between the percentage change in productivity and compensation per employed, the Granger-causality tests confirmed a one-way homogenous causality and heterogeneous non-causality between the wage-productivity gap and the current account balance, that is the wage-productivity granger cause the current account.

These results confirm the posited theory that the wage-productivity gap has current account implications for the 3 Caribbean countries studied. The fact that these are developing economies, whose labour markets are less likely to minimise the potential for even short-term wage-productivity gaps, could be cause for concern. Additionally, for countries like Barbados with a fixed exchange rate the relationship between the gap and the current account could be more critical as is shown by the dual causality relationship. This would be interesting to highlight in this section. In any event, while this study has not fully established that the wage-productivity gaps is a significant determinant of the current account, Caribbean states and policy makers in these jurisdictions need to continue to ensure that growth in wages is aligned as far as possible with productivity gains.

The data shortage was a major limitation of this study. Going forward, we hypothesize that developing countries should generally have inflexible labour markets, which would potentially display significant wage-productivity gaps. Furthermore, since they tend to be dependent on international markets (trade and finance) for their economic survival, the current account implications are likely to be critical. On that note there are keys areas for further research, which include:

- An extension (or the replication) of the present study to cover more developing countries, provided that the associated obstacle of data unavailability could be surmounted.

- A study which examines the determinants of the wage-productivity gap itself, which would be of great interest and utility to policy makers as a guide to minimising the gap going forward.
- The development of an intertemporal model which models the relationship of the current account explicitly as a function of the wage-productivity gap.

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Appendices

Appendix 1a: Real wages and Labour Productivity for Barbados, Jamaica and Trinidad and Tobago.

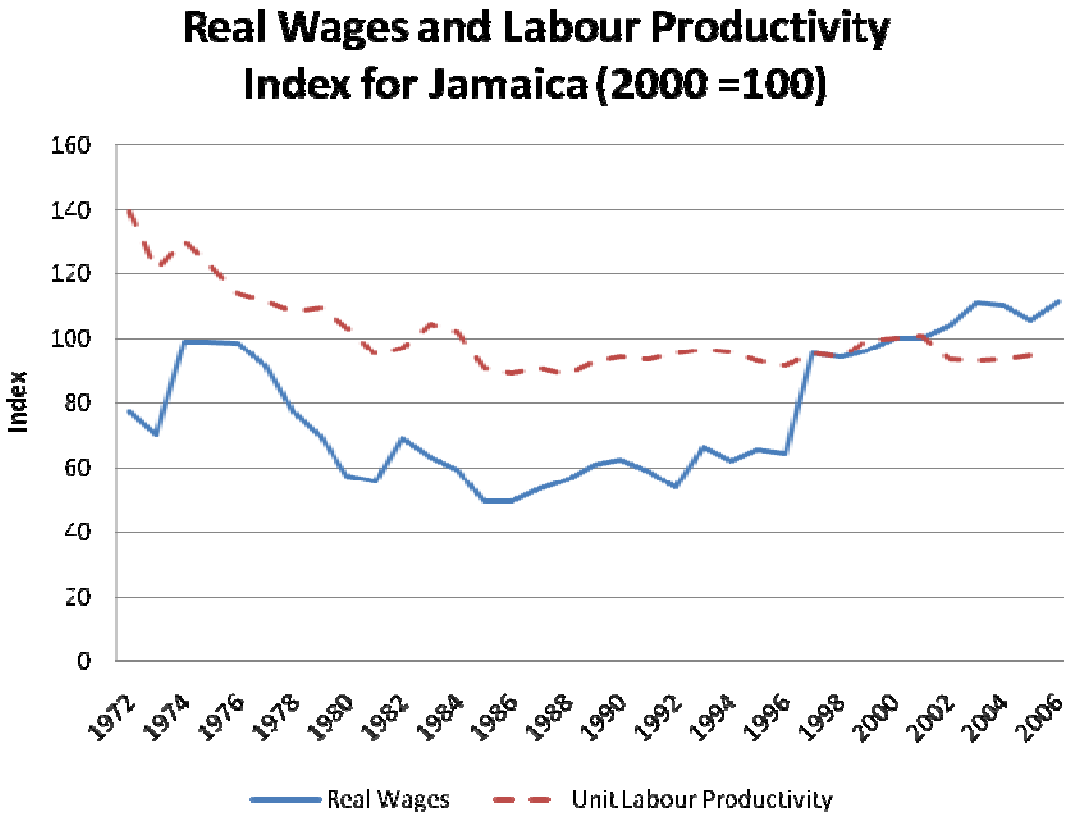

Figure 1.1

Figure 1.2

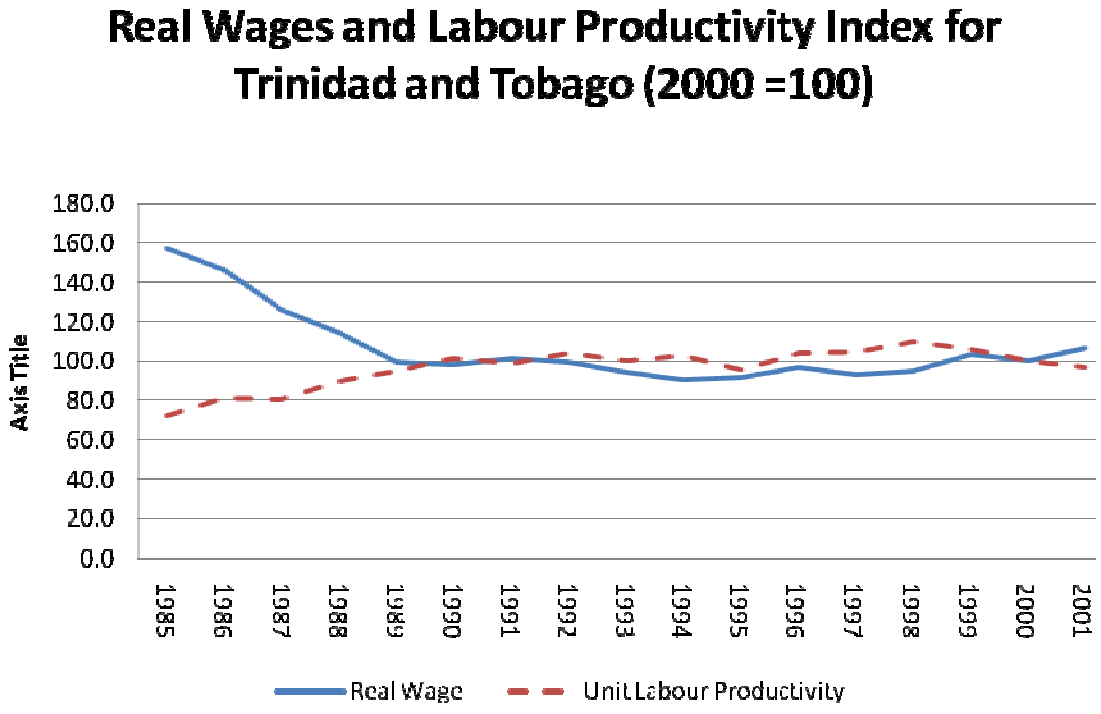

Figure 1.3

Appendix 2a: Panel Unit Root Test

Level Variables /Unit Root Test	Levin, Lin & Chu t*	Breitung t-stat	Im, Pesaran and Shin	ADF - Fisher Chi-sq.	PP - Fisher Chi-sq.
	Null: Unit root (assumes common unit root process)		Null: Unit root (assumes individual unit root process)		
Current Account	0.0400	0.0410	0.1475	0.1818	0.2628
Wage-Productivity Gap	0.0003	0.4374	0.0323	0.0205	0.0201
Wage	0.0204	0.9654	0.1983	0.1308	0.0023
Productivity	0.2534	0.3385	0.4076	0.3636	0.6796

Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.
Automatic selection of lags based on SIC

Exogenous variables in level: Individual effects, individual linear trends

Table 2.1

Appendix 2b: Granger Causality

GRANGER CAUSALITY Country	WPGAP does not Granger-Cause CA	CA does not Granger-Cause WPGAP
Barbados	0.0237**	0.0396**
Jamaica	0.5269	0.5993
Trinidad and Tobago	0.1877	0.0650***
Total Panel (OLS in levels)	0.0450**	0.9964
Total Panel (FIXED EFFECTS in levels)	0.0533***	0.8961

* Significant at 1% level

** significant at 5% level

*** significant at 10% level

N/A limited data points

Table 2.2