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### Announcement and Call for Papers – SALISES 11th

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Editor’s Note

The previous Special Issue on Universal Secondary Education (Vol. 34, No. 2, June 2009) featured a number of essays addressing this theme and its impact on Caribbean education systems. The Guest Editor, Joel Warrican, referred to two other contributions - one by Coreen Leacock and the other by Benita Thompson in his introduction that did not appear in the last issue.

We present the articles in this issue and ask that the reader treat these as part of that collection that appeared in the Special Issue.
How Important are Cash Flows for Firm Growth in Barbados?

Winston Moore, Tracey Broome and Justin Robinson

University of the West Indies, Cave Hill Campus, BARBADOS

Abstract

Firm liquidity can be particularly important for firms that are not able to access capital from traditional financial market institutions. The current study estimates a dynamic model of firm growth in Barbados, using data on companies listed on the Barbados Stock Exchange between 1997 and 2007, to evaluate the impact of firm liquidity. The estimated results suggest that a one percent rise in cash flow ratios leads to an increase in firm growth of between 0.3 and 0.6 percent. This relationship was robust to the addition of control variables, non-linearity and lagged effects as well as the addition of governance indicators. Given the importance of cash for firm growth in Barbados, the results suggest that policymakers should consider providing greater liquidity support for start-ups.

Keywords: liquidity, firm size, growth, Caribbean, Barbados Stock Exchange

Introduction

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Firm liquidity relates to the ability of a company to convert assets to cash. Liquidity is essential in periods of low earnings where the firm is unable to access capital markets and therefore serves as an important buffer to continue normal business operations (Anderson, 2002). Without sufficient liquidity, firms may also not be able to take advantage of potentially profitable investment opportunities that in the long-run could impact on firm growth and survival (Bond et al., 2003; Fazzari et al., 1988). This paper therefore provides an assessment of the relationship between firm liquidity and growth using a database of Barbadian companies.

In bank-based financial systems, such as those in the Caribbean, the management of liquid resources plays a significant role in firm development. Liquidity constraints could be even more important for more vulnerable firms. Oliveira and Fortunato (2006) note that larger companies tend to have easier access to cash flows from internal resources, debt or issuance of equity. Indeed, empirical results provided in the paper suggested that the sensitivity of firm growth to cash flow is greater for smaller and younger firms, implying greater financing constraints for these firms.

It is possible that the relationship between firm growth and liquidity could be influenced by firm size. Many authors have examined the relationship between firm size and growth (see Simon and Bonini, 1958; Ijiri and Simon, 1964; Lucas, 1967) in an attempt to assess the validity of Gibrat’s Law. Mansfield (1962) provides a relatively simple statement of Gibrat’s Law:

‘the probability of a given proportionate change in size (growth) during a specified period is the same for all firms in a given industry regardless of their size at the beginning of the period’.

The law therefore implies that the growth rate of any firm should be independent of its size at the beginning of the period examined. The evidence to date in support of this law has been mixed. Singh and Whittington (1975) find a weak positive relationship between size and growth, while Kumar (1985) reports a mild negative association between these two variables; both examined UK data from different periods. Similarly, Evans (1987) obtains a strong negative association between firm growth and firm size for all relevant samples including the entire size distribution of firms; rejecting Gibrat’s law for US data. More recent studies including Fagiolo and Luzzi (2006), Oliveira and Fortunato (2006), Macas Nunes and Serrasqueiro (2009) have
all rejected Gibrat’s Law.

There has been relatively little research, however, concerning financing constraints and firm growth in the Caribbean. The closest is a working paper by Craigwell and Moore (2004), which examines three types of financing constraints: internal finance, debt ceiling and exponential interest costs. The findings suggest that initially young, liquidity constrained firms tend to over-invest in capital, exhausting it over future periods and resulting in slower growth rates. In addition, firms with a debt ceiling experience a fluctuating growth pattern.

The present study contributes to literature on firm growth dynamics in the Caribbean by exploring the importance of liquidity. To account for the potential endogeneity between liquidity and firm growth, the system GMM estimator is employed. In this paper the authors utilise a database comprising information on seventeen (17) publicly-listed companies on the Barbados Stock Exchange over the period 1997 to 2007. The findings of this study could be useful for potential investors on the Barbados Stock Exchange, and Caribbean exchanges in general. In addition, if liquidity constraints are found to be important it could suggest that policymakers should pay greater attention to the liquidity of vulnerable firms.

The remainder of the article is structured as follows. Following this introduction, Section 2 of the article provides a brief overview of the literature. Section 3 describes the econometric approach and the data used in the study to assess the impact that firm liquidity has had on the growth dynamics of companies in Barbados. Section 4 summaries the empirical results, while Section 5 highlights the main findings and provides some policy recommendations.

**Brief Overview of Related Literature**

Firm liquidity is particularly important due to information asymmetry. Informational problems, particularly in relation to the capital market, can impact on a firm’s financial structure and therefore have important effects on its investment decisions and by extension its future growth prospects (Hoshi *et al*, 1991). The authors evaluate this hypothesis by dividing the firms into two groups: (1) those affiliated with financial institutions and therefore less
likely to experience information problems, and; (2) those not affiliated with financial institutions and therefore likely to experience greater problems raising capital. Hoshi et al (1991) find that investment tends to be more sensitive to liquidity for the second set of firms than for the first and could suggest that firms that are subject to liquidity constraints may experience problems in terms of financing their investment, resulting in lower output and growth.

Hundley et al (1996) note that many firms rely on internally generated funds to finance their research and development programmes. As a result, firms that are liquidity constrained should engage in a relative smaller amount of research and development and therefore experience slower rates of growth. To evaluate this hypothesis the authors evaluate the relationship between research and development intensity, profits and liquidity for US and Japanese firms. While US firms primarily rely on internally generated funds to finance research and development, due to arm’s-length relationships between firms and investors, Japanese firms tend to have close relations with a main bank or a key equity holder. As a result, problems in terms of raising external financing are likely to be less severe. The results suggest that while research and development activity among US companies tends to be related to firm profits and liquidity, the relationship between the three variables was much weaker among Japanese companies.

Liquidity can also influence the survival of new or relatively young firms. Holtz-Eakin et al (1994) assess the empirical relationship between liquidity constraints (access to capital) and the survival of enterprises. To evaluate the hypothesis, the authors compare the survival rates of individuals with/without substantial personal financial resources under the assumption that relatively high net worth individuals would be able to offset any potential capital constraints. Using inheritances as a proxy for net worth, Holtz-Eakin et al (1994) report that a $150,000 inheritance raises the probability of survival by around 1.3 percentage points and a 20-percentage points rise in sales receipts. Similar results are obtained by Fazzari, Hubbard and Petersen (1988). Carpenter and Petersen (2002) also show, using a database of 1600 small firms, that this situation is particularly greater for smaller firms. Most of the research on financing constraints and firm growth tends to provide evidence on a particular country, particularly the US. It is possible that the growth dynamics of firms can vary across countries due to differences in the
legal system, corruption, as well as financial and institutional development. To evaluate this issue, Beck et al (2005) utilise a database consisting of 4000 firms from 54 countries to examine the relationship between firm growth and financing constraints. Similar to earlier studies however, the article finds that small firms tend to be most affected by constraints stemming from financial and legal underdevelopment as well as corruption. The main financial constraints to growth turned out to be difficulties in dealing with banks, collateral requirements, high interest rates as well as liquidity constraints in the banking system.

Most of the recent growth in firms across the world has occurred in the so-called ‘new economy’. These firms are important sources of scientific innovation and employment. As a result, Elston (2002) investigates whether the relationships discussed above hold for firms primarily involved in the development and/or application of information or knowledge. The results suggest that while for old economy, firm growth is likely to be higher amongst larger firms, for the new economy firms growth tended to be higher for smaller firms. In relation to firm age, liquidity has a tendency to moderate the relationship between age and growth: without controlling for liquidity constraints older firms tended to grow faster than their less mature counterparts. However, once the effects of liquidity are controlled for in the model, younger firms are more likely to grow faster than more mature enterprises.

**Empirical Approach**

The article uses data on 17 companies listed on the Barbados stock exchange. All data are gathered from the company’s annual reports for 1997 to 2007. To evaluate the relationship between firm growth and liquidity a dynamic panel data model is estimated that utilises both the time- and cross-sectional dimensions of the database. The dynamic model is chosen since it accounts for any short-run disequilibrium that may exist in a given year. Growth, for example, is likely to be fairly persistent particularly during periods of economic expansion.

The dynamic regression model estimated is therefore of the following form:

\[
growth_{it} = \alpha_i + \gamma growth_{it-1} + \beta liquidity_{it} + \varepsilon_{it}
\]

(1)
where $\alpha_t$ are the firm-specific effects and $\epsilon_{tt}$ is an error term that is assumed to have normal properties. The inclusion of a lagged dependent variable in the model implies that $\beta$ provides a short-run estimate of the relationship between firm growth and liquidity. The long run coefficient can be obtained by dividing $\beta$ by $1 - \gamma$. The coefficient, $\gamma$, also provides an indication of whether or not there is convergence in firm growth rates over the sample period. If there is convergence, then $\gamma$ should be expected to be negative and statistically significant.

The dynamic panel data model outlined above is obtained using the generalised method of moments estimator suggested by Arellano and Bond (1991). The estimator attempts to explicitly account for the correlation between the lagged regressor and the error term. The Arellano-Bond GMM approach estimates the model in first differences in order to eliminate the country-specific effects (see Baltagi, 2005 for further details).

Firm cash flow, as a percentage of sales, is also included in the regression equation to capture the effects of liquidity constraints on firm growth. The variable is anticipated to be positively related to firm growth as low cash flow ratios may limit access to external financing as well as hinder the ability of the firm to exploit profitable investment opportunities. Jensen and Ruback (1983) and Fama and Jensen (1983) argue that managers also utilise cash to support short-term sales growth. Given there exists a managerial bias toward sales growth, it is also likely that managers could use cash flows to stimulate short-term sales growth (Brush et al 2000). This effect can be moderated by the governance structure the firm has in place: closely monitored managers are less likely to pursue short-term sales objectives over the long-term growth of the company.

To capture the modifying effect of the company’s governance structure on growth, governance controls are also added to the regression equation. The governance variables included as instruments in the regressions are: (1) board size; (2) board independence, and; (3) board leadership. Board size ($\text{boardfirmsize}$) is defined as the number of directors on the Board, Board independence ($\text{peroutsid}$) the percentage of the Board composed of outside (non-executive) directors and Board leadership ($\text{ceochair}$) as whether the positions of CEO and Chairman are held by the same individual (dummy variable; 1 in the case of CEO duality and 0 otherwise). As indicated in Section 2 of the study, it is possible that other factors may
impact on the growth dynamics of firms. Consequently, the study augments the model of firm growth dynamics in Barbados with proxies for firm size, age, and debt. Following Nelson and Winter (1982), the matrix of potential explanatory factors contains firm age and size. A priori, the relationship between firm size and growth is ambiguous: large firms may benefit from financial economies of scale (that is greater access to external finance), however, smaller firms may have more flexibility in their production and therefore can capitalise on opportunities for growth as they arise. Firm age is assumed to have a non-linear impact on firm growth. As a result, a squared age term variable is included in the regression equation. This allows younger firms to experience faster rates of growth than their older counterparts, up to some given threshold. The relationship between debt and growth is ambiguous, as some minimum level of debt is required to engage in growth-oriented investments. However, when debt reaches too high a level, it could act as a constraint to growth as resources would need to be transferred from investment activities towards debt repayment.

The dependent variable, firm growth (growth) is computed as:

\[ \text{Growth}_{it} = \ln(Sales_{it}) - \ln(Sales_{i,t-1}) \]

where sales is defined as gross firm sales. Other measures of firm growth such as the change in assets and employment were also employed, however, the main results present did not change appreciably.

Four cash flow ratios serve as proxies for liquidity. The first two cash flow ratios are obtained by dividing each company’s opening cash balance by total sales (ocash_sales) and total assets (ocash_assets), respectively. Opening cash, obtained from the previous year’s balance sheet, provides an indication of the liquid resources available to carry out business activities for that current year. The other ratios being evaluated include free cash flow (fcf) which is scaled by total sales (fcf_sales) and total assets (fcf_assets) as well. fcf was calculated by adding depreciation to net income after interest and taxes minus preferred dividends and dividends on common stock. fcf differs from opcf as it represents the cash that a company is able to generate after expenditures are made that are required to maintain and expand the asset base.
The gearing ratio measured by the ratio between the firm’s total debt and total assets \( \frac{\text{debt}}{\text{assets}} \) is also calculated for each listed company. Firm size \( \frac{\text{firm size}}{\text{assets}} \) is measured by level of sales in the current period, while firm age \( \text{age} \) is the number of years since incorporation.

Table 1 reports summary statistics for the firm-specific characteristics for firms listed on the BSE. The mean (median) firm age is 49 years (36 years) and the mean (median) firm size, which is proxied by sales, is $212 million (US$67.55 million). On average, firm sales of listed companies tend to rise by 5 percent per annum. The growth dynamics of these firms was not however normal as the measure of kurtosis (17.11) and skewness (-1.34) were significantly different from those expected from a normally distributed series of growth rates. In terms of indebtedness, for the average company, 40 cents in every dollar of assets is owed to creditors. With regards to the variable of interest, liquidity, most companies held about 13 cents per dollar of sales and about 7 cents per dollar of assets. Descriptive statistics for the Board Structure variables are also presented in Table 1. The mean (median) board size for the firms under investigation is 8.63(9). In addition, the mean proportion of non-executive officers is 75.87% and only 13% of the companies on the BSE had a dual relationship between the CEO and Chairman over that period.

If firm growth and size are unrelated to the previous year’s value, then the variables should be normally distributed. To evaluate whether or not this is the case, Figure 1 provides the Kernel density graphs (non-parametric estimates of the probability density function) for both firm growth and size. The density functions for both growth and size do not have the shapes expected of normally distributed variables.
How Important are Cash Flows for Firm Growth in Barbados?

Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>Mean</th>
<th>Median</th>
<th>St. Dev.</th>
<th>Kurtosis</th>
<th>Skewness</th>
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</thead>
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<tr>
<td><strong>Firm Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>187</td>
<td>48.76</td>
<td>36.00</td>
<td>38.53</td>
<td>1.46</td>
<td>0.19</td>
</tr>
<tr>
<td>Firm Size ($ millions)</td>
<td>162</td>
<td>212.000</td>
<td>67.546</td>
<td>304.000</td>
<td>8.49</td>
<td>2.27</td>
</tr>
<tr>
<td>Growth</td>
<td>157</td>
<td>0.05</td>
<td>0.04</td>
<td>0.16</td>
<td>17.11</td>
<td>-1.34</td>
</tr>
<tr>
<td>Debt</td>
<td>154</td>
<td>0.42</td>
<td>0.38</td>
<td>0.23</td>
<td>2.68</td>
<td>0.78</td>
</tr>
<tr>
<td>fcf_sales</td>
<td>146</td>
<td>0.13</td>
<td>0.11</td>
<td>0.14</td>
<td>16.95</td>
<td>2.99</td>
</tr>
<tr>
<td>fcf_assets</td>
<td>146</td>
<td>0.07</td>
<td>0.07</td>
<td>0.05</td>
<td>3.26</td>
<td>0.13</td>
</tr>
<tr>
<td>opcfc_assets</td>
<td>154</td>
<td>0.35</td>
<td>0.02</td>
<td>1.19</td>
<td>38.33</td>
<td>5.40</td>
</tr>
<tr>
<td>opcfc_sales</td>
<td>155</td>
<td>0.03</td>
<td>0.01</td>
<td>0.09</td>
<td>5.41</td>
<td>1.09</td>
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<tr>
<td><strong>Board Structure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bsize</td>
<td>139</td>
<td>8.63</td>
<td>9.00</td>
<td>2.29</td>
<td>1.80</td>
<td>0.02</td>
</tr>
<tr>
<td>Peroutsid</td>
<td>127</td>
<td>0.76</td>
<td>0.82</td>
<td>0.15</td>
<td>3.89</td>
<td>-1.22</td>
</tr>
<tr>
<td>Ceochair</td>
<td>140</td>
<td>0.13</td>
<td>0.00</td>
<td>0.34</td>
<td>5.93</td>
<td>2.22</td>
</tr>
</tbody>
</table>

In the case of firm growth, the growth rates seem to follow a tent-shaped distribution (similar results are reported by Fagiolo and Luzzi, 2006; Bottazzi and Secchi, 2004). These results therefore offer preliminary evidence against a Gibrat-type process for firm growth in Barbados. Indeed, when the quantiles of firm growth are plotted against that for firm size (Figure 2), there seems to be positive relationship between the two variables: larger firms tend to have relatively faster rates of growth.

In terms of the variable of interest, liquidity, Figure 3 plots the four measures of liquidity alluded to above against firm growth for various quantiles of firm growth. In agreement with a priori expectations, there was a strong positive association between firm growth and liquidity: firms with larger reserves of cash tend to have faster rates of growth.
**Figure 1: Kernel Density Graph of Firm Size and Growth**

![Kernel Density Graph of Firm Size and Growth](image1)

**Figure 2: Mean Firm Growth as a Function of Firm Size**

![Mean Firm Growth as a Function of Firm Size](image2)
ECONOMIC RESULTS

The results provided in the previous section suggest that there is a high degree of correlation between firm growth and liquidity. However, the graphical approach employed in this section could not provide a quantitative estimate of this relationship. This section presents and interprets the results from estimating the model of firm growth. Table 2 gives the initial growth regression results: growth is assumed to be a function of lagged firm growth
and liquidity. The empirical model is estimated using the two-step system GMM approach with white robust standard errors.¹

The four liquidity models presented are able to explain between 60 – 70% of the variation in firm growth.² The calculated j-statistic, which tests for instrument independence from the unobserved error process, is insignificant at the 5 percent level of testing, but significant at the 10 percent level of testing. The Ljung-Box Q-statistic, which evaluates the null hypothesis that there is no autocorrelation in the residuals up to the $k$-th lag, along with the related p-values are also provided. The insignificance of the Q-statistic in all four regressions implies that the null hypothesis of no residual serial correlation could not be rejected at normal levels of testing.

Given that the estimated model provides a relatively robust representation of growth dynamics in Barbados, the coefficient estimates are evaluated. In regressions (1)-(4) the lagged growth term is negative and statistically significant indicating that there was some convergence in the growth dynamics for the companies under investigation. In relation to the variable of interest, all the measures of liquidity are positive and statistically significant, suggesting that liquidity is a significant determinant of growth of Barbadian firms. The estimated liquidity coefficient ranged between 0.3 and 0.9: a one percent rise in cash flow ratios leads to a 0.3 to 0.9 percent increase in firm growth. Note, however, that three out of the four cash flow ratios had a liquidity coefficient above 0.8. Only in the case of $(opcf/sales)$ does the liquidity coefficient fall below 0.8.

The results obtained above could have been due to the exclusion of other determinants of firm growth. As a result, the basic regressions estimated are augmented with various indicators of firm characteristics. The results are given in Table 3. age was only statistically significant in regression (5). In this instance, the coefficient was positive and statistically significant, that is older firms tend to grow faster than younger firms. This result could be associated to the relationships that older firms may develop in relation to banking and supplier networks. The squared age term was also statistically significant in regression (5), with the negative coefficient estimating indicating that
Table 2: Estimated Relationship between Firm Growth and Liquidity without Control Variables

<table>
<thead>
<tr>
<th>Dependent variable: $growth_{it}$</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$growth_{it-1}$</td>
<td>-0.157 (0.006)***</td>
<td>-0.185 (0.004)***</td>
<td>-0.140 (0.007)***</td>
<td>-0.132 (0.025)***</td>
</tr>
<tr>
<td>$\left(\frac{fcf}{assets}\right)_{it}$</td>
<td>0.876 (0.026)***</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$\left(\frac{fcf}{sales}\right)_{it}$</td>
<td>-</td>
<td>0.814 (0.005)***</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$\left(\frac{opcf}{assets}\right)_{it}$</td>
<td>-</td>
<td>-</td>
<td>0.812 (0.019)***</td>
<td>-</td>
</tr>
<tr>
<td>$\left(\frac{opcf}{sales}\right)_{it}$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.304 (0.025)***</td>
</tr>
<tr>
<td>pseudo r-squared</td>
<td>0.643</td>
<td>0.702</td>
<td>0.652</td>
<td>0.684</td>
</tr>
<tr>
<td>s.e. of regression</td>
<td>0.167</td>
<td>0.157</td>
<td>0.162</td>
<td>0.163</td>
</tr>
<tr>
<td>J-statistic</td>
<td>15.694 [0.072]</td>
<td>15.689 [0.072]</td>
<td>15.819 [0.071]</td>
<td>14.375 [0.072]</td>
</tr>
<tr>
<td>Q-statistic</td>
<td>0.201 [0.654]</td>
<td>1.300 [0.254]</td>
<td>0.069 [0.793]</td>
<td>0.060 [0.806]</td>
</tr>
<tr>
<td>Observations</td>
<td>109</td>
<td>109</td>
<td>114</td>
<td>114</td>
</tr>
</tbody>
</table>

Notes:  
(1) All equations are estimated via system GMM techniques.  
(2) White standard errors are given in parentheses below coefficient estimates.  
(3) ***, ** and * indicates significance at the 1, 5 and 10 percent level of testing.

there is some threshold in relation to age-growth relationship. The debt ratio was not statistically significant in any of the estimated regressions. This finding might be related to the type of firms included in the database. Listed firms could be limited in terms of debt accumulation by shareholders. It is possible that if a wider cross-section of Barbadian firms was employed this result could have differed. However, such a database was not available. The final control variable included in the regression, \textit{firmsize}, was positive and statistically significant in all four regressions under consideration. This suggests that larger firms listed on the Barbados Stock Exchange tend to
have relatively faster rates of growth. This result might reflect the benefits associated with size in bank-based financial systems, such as relationship lending and other financial economies of scale (see Craigwell and Moore, 2003). The coefficient was about 0.4 for regressions (5) and (6) and around 0.7 in regressions (7) and (8).

In terms of the variables of interest, the findings in relation to the liquidity indicators were similar to those obtained in Table 2. All four liquidity measures still had positive coefficient estimates, however, the coefficient on $\frac{opcf}{assets}$ was statistically insignificant at normal levels of testing. For the equations where the liquidity proxy was statistically significant, the coefficient estimate ranged from 0.3 to 0.6: a one percent increase in liquidity could lead to rise in firm growth of between 0.3 to 0.6 percent.

In relation to non-linear effects, the model was estimated with a squared size term as well as an interaction between size and liquidity term. However, the coefficient on all four liquidity-size interaction terms was insignificant at normal levels of testing. In relation to the lagged liquidity effects, the model was augmented with lagged liquidity terms up to the third lagged, however, the Wald coefficient restriction test suggested that these terms could be restricted to zero at normal levels of testing. Similar to previous results, the three corporate governance indicators were all insignificant at normal levels of testing.

The insignificance of these variables might be due to the long-term nature of the effects of corporate governance. While in the short-run corporate governance might have little or no effect on firm growth, in the long-run firms with good corporate governance structures should be expected to have faster rates of economic expansion.
Table 3: Estimated Relationship between Firm Growth and Liquidity with Control Variables

<table>
<thead>
<tr>
<th>Dependent variable: $growth_{it}$</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$growth_{it-1}$</td>
<td>-0.166</td>
<td>-0.187</td>
<td>-0.218</td>
<td>-0.212</td>
</tr>
<tr>
<td></td>
<td>(0.027)***</td>
<td>(0.030)***</td>
<td>(0.010)**</td>
<td>(0.029)***</td>
</tr>
<tr>
<td>$\left( \frac{fcf}{assets} \right)_{it}$</td>
<td>0.328</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(0.142)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\left( \frac{fcf}{sales} \right)_{it}$</td>
<td>-</td>
<td>0.552</td>
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<td>(0.108)***</td>
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<td>$\left( \frac{opcf}{assets} \right)_{it}$</td>
<td>-</td>
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<td>(1.697)</td>
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<td>-</td>
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<td>$\alpha_{it}$</td>
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<td>(0.000)***</td>
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<td>(0.182)</td>
<td>(0.832)</td>
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<td>(0.045)***</td>
<td>(0.199)***</td>
<td>(0.072)***</td>
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<tr>
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<td>107</td>
<td>112</td>
<td>112</td>
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</table>

Notes:  
(1) All equations are estimated via system GMM techniques.  
(2) White standard errors are given in parentheses below coefficient estimates.  
(3) ***, ** and * indicates significance at the 1, 5 and 10 percent level of testing.

Conclusions

Firm liquidity can be particularly important for firms that are unable to access capital from traditional financial market institutions. It also serves as an important buffer during economic downturns. Despite the importance of this subject area, there has been little research concerning financing constraints...
and firm growth in the Caribbean. To fill this gap in the literature, the current study estimates a dynamic model of firm growth in Barbados using data on companies listed on the Barbados Stock Exchange between 1997 and 2007. A preliminary analysis of firm growth, suggested that firm growth rates tend to follow a tent-shaped distribution, that is growth rates tend be clustered around the middle of the probability density function. When the quantiles of firm growth are plotted against that for liquidity, there was a positive relationship between the two variables: firms with larger reserves of cash tend to have faster rates of growth.

This basic graphical analysis of firm growth-liquidity relationship was augmented with the results from a dynamic panel growth model that provides point estimates of the relationship between firm growth and liquidity. The results from this estimated growth model suggest that a one percent rise in cash flow ratios leads to a 0.3 to 0.6 percent increase in firm growth. This relationship was robust to the addition of control variables, non-linear and lagged effects as well as the addition of governance indicators.

Given the importance of cash for firm growth in Barbados, the results suggest that policymakers should consider providing greater liquidity support for small firms and start-ups in order to encourage growth. The obtained relationship between cash and firm growth also implies that macroeconomic policymakers should consider monitoring firm cash on an ongoing basis as an important leading indicator of firm growth in Barbados. Future research could attempt to undertake a larger region-wide study. This will not only permit the creation of a dynamic firm growth model of regional companies but additionally would allow the scrutiny of a wider cross-section of firms across various industries.

1 Controls for industry effects were included in the regression, however, these were statistically insignificant.

2 A pseudo r-squared for the GMM estimation equation is obtained by regressing fitted growth on actual growth. The r-squared for this regression is then employed as the pseudo r-squared.
How Important are Cash Flows for Firm Growth in Barbados?

References


Quality Education for All in the Eastern Caribbean: \(^1\)
Rethinking the Curriculum in the Face of Universal Secondary Education

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Abstract

This article explores the issue of quality education as it relates to universal secondary education (USE) in the Eastern Caribbean (EC). It discusses the historical context of secondary education in the region, and its influence on areas such as the purpose of secondary education, the content of the secondary education programmes, and the manner in which students are transferred from primary education to secondary. The article also discusses challenges faced by EC countries where USE is already in place, citing the example of Barbados, and identifying issues that must be addressed if quality is to be a priority for secondary education for all in the region.

**Keywords:** universal secondary education, quality education, Caribbean, curriculum

\(^1\) In this article, Eastern Caribbean includes the members of the Organisation of Eastern Caribbean States (OECS) and Barbados.

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Introduction

For many decades, it has been acknowledged in the Eastern Caribbean (EC) that education is an avenue by which citizens of the region can improve their standard of living. As a result, children have been constantly encouraged to go to school and do well. Several highly acclaimed writers from the region have produced literature that chronicles the journey of many Caribbean sons and daughters who, through education, have risen above their circumstances, and ventured into the various fields to earn the respect of their peers worldwide.

As with life in general, over the years, the face of certain aspects of education has changed, while some things have remained constant. For example, one change that is becoming very evident in the region is the number of students leaving primary education who now have access to secondary school. On the other hand, the manner in which these children are assigned to schools has, for the most part, remained constant. While change for the sake of changing is not recommended (if it ain’t broke, don’t fix it!), there comes a time when, even in the face of great resistance, change becomes imperative, indeed necessary for growth and survival.

This article explores an area that has been discussed in many fora in the past, and continues to provoke lively debates: the question of what constitutes ‘quality education’ for Caribbean citizens, that is, what type of education does the region need to produce citizens who will not only survive in the current global climate, but who would make valuable contributions to the shaping of that global environment in the future. This question is particularly relevant to the region at this time when education is in the forefront and educational provisions are being examined, reformed and/or expanded. One aspect of education that has taken centre-stage in several of the EC countries is the provision of universal secondary education (USE).

With the adoption of the UN’s Millennium Development Goals (MDGs), attention is being paid worldwide to the pursuit of universal primary education. However, the countries in the EC have not only already achieved that goal, they have put in place the structures that allowed them to move to the next level: USE. Over the past five years, the media and government agencies across the region have been reporting activities associated with this
pursuit. For example, in 2005, the Permanent Secretary in the Ministry of Education in Dominica was quoted as saying that ‘for the first time, all the students who wrote the common entrance [examination] have gained access to secondary education all over the island’ (Charles, 2005, para. 4). In that same year, St. Vincent and the Grenadines also reported that ‘every student who wrote the Common Entrance Examination (CEE) [had] been officially placed in a secondary school’ (Chance, 2005, para. 4).

Similarly, in his speech delivered to Parliament in St. Lucia on August 29, 2006, the Minister of Education, Human Resource Development, Youth and Sport reported that the start of the 2006 – 2007 academic year marked ‘the formal inauguration of Universal Secondary Education in St. Lucia, with all of the 4301 children who wrote the Common Entrance Exam this year being offered places at secondary schools’ (Michel, 2006, para. 10). The examples noted above are of countries recently embarking on USE. However, other EC countries have been providing USE for several decades. For example, countries such as Anguilla, Barbados, the British Virgin Islands, Montserrat and St. Kitts/Nevis were offering USE by the start of the new millennium (Miller, 2000).

The quest for USE is usually accompanied by the cry of ‘education for all.’ As with the MDGs, countries of the EC have committed to the goals of Education for All (EFA) adopted by the World Education Forum in Dakar in 2000 (Harvey, 2000; Miller, 2000; Wood, 2007). Six EFA goals have been identified for achievement by the year 2015 (World Education Forum, 2000). Two of these goals are particularly relevant to the notion of USE. Goal 5 speaks of the need to eliminate gender disparities in primary and secondary education, while Goal 6 addresses the issue of quality. With regards to removing gender disparities, the Dakar Framework for Action advocates better educational opportunities for girls worldwide. This could be achieved through USE. However, in the Eastern Caribbean, education concerns seem more related to the boys. In this region, it appears that the boys are the ones who are more likely to underachieve in secondary school or worse, to drop out before completing the course (Parry, 2000). To stem this trend, a closer look needs to be taken at what is mentioned in Goal 6: the quality of education that is being offered.
This matter of quality cannot be taken lightly. Agencies responsible for providing education for the region’s young people must concern themselves with identifying what constitutes quality education, especially in the current climate in which USE is being introduced. In this article, the concept of ‘quality education’ is explored in terms of the purpose of education and the content of educational programmes at the secondary level. This is all considered in light of USE. Thus, after a brief historical look at the curriculum traditionally followed by secondary schools in the region, the article discusses the possible challenges of providing quality education for all students under USE. Finally, there are suggestions about what must be considered in relation to the curriculum if quality education is to be provided for all students entering secondary schools in the region.

**Traditions of Secondary Education**

Traditionally, secondary education in the Eastern Caribbean reflects the legacy of the region’s colonial past. It was not free nor was it universal. Secondary education in the region was implemented initially for the white and the wealthy in the colonial society. Places were limited and, though government-supported, students were required to pay fees. Referring to secondary schools in the Leeward Islands in the early to mid-twentieth century, Fergus (2003) stated that these were primarily established to serve the elite in the society, providing a classical education much the same as what was offered in British Grammar schools. This pattern would have been true for most of the English-speaking territories in the region. Traditionally, a very small proportion of the students leaving primary education had access to this form of secondary education (Gordon, 1963, p. 266). With time, places in secondary schools in the region were increased with the introduction of secondary modern schools and later, comprehensive schools that again, reflected the British influence (Dent, 1982). While the traditional grammar school prepared its students for academia, the secondary modern and comprehensive schools tended to be more employment-oriented (Dent, 1982; Fergus, 2003; Gordon, 1963).

As was mentioned previously, the traditional grammar schools provided a ‘classical’ education that, as was the case in Britain, was highly academic in nature, preparing students to write the Cambridge examinations and for university entry. According to Dent (1982), the typical grammar school
curriculum for the first three years included subjects such as English Language, Literature, Classical and Modern Languages, History, Geography, Mathematics, Chemistry, Physics (often not for the girls), Biology (especially for the girls), Art, Music, Woodwork/Metalwork (for the boys), Home Economics (for the girls), Religious Education and Physical Education. Students pursuing this academic education in the EC often did so with the hope of obtaining one of the few Island Scholarships. Thus, education was very competitive and narrowly focused on the areas that would lead to such a scholarship. Indeed, as early as 1915, the influence of the Island Scholarship process on the composition and organisation of the curriculum in Caribbean secondary schools was cause for concern. For example, Gordon (1963) cites a memo to the Education Commission, in which the Headmaster of an existing grammar school in the region wrote:

The curriculum is drawn up mainly to meet the needs of a small number of clever boys, and not those of the great majority of the pupils, and every boy, whatever his individual tastes may be, is taught on almost exactly the same lines (p. 269).

This situation persisted in the grammar-like schools in the Eastern Caribbean for many years.

When the need for greater access became apparent, more secondary schools were opened in the various territories, especially from the 1950s. These secondary modern schools as they were called, included in their programmes subjects that were expected to make up for the perceived impractical nature of the elite secondary schools (Gordon, 1963). Rather than merely preparing students for university education, the secondary modern schools prepared them for the world of work. These later gave way to the comprehensive school which offered a cross section of academics and practical subjects. The curriculum offered in these non-grammar schools was somewhat broader, including what were described as ‘more practical’ subjects (Gordon, 1968). Though these schools were identified mainly for the less academically oriented students, they eventually focussed on the more academic areas of the curriculum. This is a reflection of what took place in Britain, where, according to Dent (1982), some of the secondary modern and comprehensive schools ended up offering very academic programmes that prepared students for the external examinations. Indeed, Dent pointed out that in some cases, some comprehensive schools did as well as, or better than the grammar schools in the external examinations.
Perhaps the urge of the other types of schools to compete with the grammar schools was predicated on the need to be valued in the society. This need no doubt stemmed from the manner in which, in the latter half of the twentieth century, students were admitted into secondary schools. This was done by means of a selection process applied when students reached the end of the primary education stage. This process involved the use of an examination, which over the years has been known by various names throughout the region: the screening test, the 11+ examination, the common entrance examination. Perhaps the most telling of these monikers is the screening test, for essentially that is what the test did, and continues to do. Traditionally, it screened the students to identify those who qualified to be offered one of the limited places in a secondary school, facilitating the selection of the most academically-inclined boys and girls for access to secondary education. Later, as the number of secondary schools increased, students were ranked based on the results of the test and those for whom places were available were deemed to have passed while the others were deemed to have failed. With the introduction of USE, the results from the common entrance test are used to determine the school or stream to which students are assigned. These practices, steeped in tradition, can contribute to the challenges that EC countries may face with the introduction of compulsory secondary education.

Quality Education for All: the Challenges of USE

In the Dakar Framework for Action, quality education is defined as ‘one that satisfies the basic learning needs, and enriches the lives of learners and their overall experience of living’ (World Education Forum, 2000, p. 17). Embedded in this definition is the notion that the needs of individual learners should be taken into account. This notion, though not always put into practice, is not revolutionary to the Caribbean. For example, in its White Paper on Education Reform, the Barbados Ministry of Education, Youth Affairs and Culture (1995) adopted the theme ‘each one matters: quality education for all’ (p. 6). This suggests that this agency is aware that education should meet the individual needs of learners in such a way as to assure all students that they are important and worthwhile. Fostering such feelings in students could, as embodied in the above definition of quality education, enrich the lives of the students as well as their overall experience of living.
With the advent of USE across the region, the challenges of providing such quality education can be envisioned. For example, there is the basic concept of identifying physical space in which all students can pursue secondary education comfortably. While it is commendable to offer a place at a secondary school to all students who complete the course of primary education, the value of the place is cheapened if the physical space is cramped, unattractive and generally unpleasant. The quality of education is greatly enhanced if the physical environment is pleasant and conducive, not only to learning, but also to fostering positive relationships within the school and the community that it serves. Students, teachers, administrators and even parents are all likely to be more productive and cooperative in pleasant surroundings. The type of physical environment that secondary school students enter can have an impact on their self-esteem and sense of worth. Thus, a major challenge of providing quality education under USE, is not only to offer a place, but also to offer adequate space for the students to learn and grow.

Another challenge of providing quality education for all secondary students is linked to content of the programmes or the curriculum offered. In identifying components of a quality education for all, the Dakar Framework for Action lists ‘a relevant curriculum that can be taught and learned in a local language and builds upon the knowledge and experience of the teachers and learners’ (p. 17). The need for a relevant curriculum in this the twenty-first century is recognised across the region. For example, in their work *Pillars for Partnership and Progress*, Miller, Jules and Thomas (2000) several times allude to the need for relevant programmes and materials for the OECS countries. Also, in their curriculum reform document, the Barbados Ministry of Education (2000) listed the meaning/relevance of curriculum and school practices as issues to be addressed in curriculum reform (p. 8).

This will be particularly difficult in light of the education history of the region. In the region, traditionally, the education that is valued is the highly academic one associated with the grammar school setting. Thus, the challenge of designing a relevant curriculum for all may arise from trying to strike a balance between what is valued by the society and meeting the learning needs of all students who pass through the secondary school system. With USE in place, the needs of the learners being served are likely to be more diverse than they were prior to its implementation. Prior to USE, because
of the selection process, students entering secondary schools tended to be those who had high academic aptitude (and gained a place in the grammar-like schools) or average aptitude (admitted to the comprehensive schools). These students were able to pursue the highly academic offerings of the schools with some degree of competence and success. However, with USE students who would have done poorly on the selection examinations are being admitted to secondary schools and, if their needs are not taken into account, will be expected to pursue either this highly academic programme, or at least a watered down version. This is not the meaning of quality education for all, and if allowed to happen, will lead to apathy among some students.

Perhaps a lesson can be learned from the Barbados case. This country has had USE since the 1970s. Students wrote a secondary school entrance examination and were offered places in secondary schools based on their performance, among other factors. The students who performed best on the examination tended to be offered a place in the schools with grammar school origins where they pursued a highly academic programme. The students with the middling performance tended to be assigned to the schools with the traditional comprehensive origin. The students who performed poorly on the examination were often assigned to a select set of schools. Generally, all students pursued the traditional curriculum that led to certification examinations in 5 or 6 years.

Over the years, the Barbados education authorities noticed trends in the secondary schools that prompted curriculum reform. They recognised that it was necessary to design a more relevant programme if quality education was to be provided. Indeed, in their White Paper on Education Reform, the Ministry of Education (1995), acknowledging the achievement of universal secondary education, noted that ‘the challenge for Barbadian education is therefore one of quality rather than access’ (p. 6). In relation to the quality of the education that was being offered, Carter (1995) reported findings of a study that explored the views of students in the secondary schools across the island. He reported that of the 531 students who completed the research instrument, 36% expressed dissatisfaction with their subject options. He also reported that when the students were asked about subjects that they would like to see removed from the curriculum, 16% and 26% noted the ‘traditional “academic” areas’ of Science and languages respectively (p. 6). Carter surmised that this was probably reflective of the difficulty that
students who were less academically-able might have had with these subject areas. Out of these concerns about the quality of education came the Education Sector Enhancement Programme (ESEP) with its theme of ‘each one matters: quality education for all’.

While this effort to provide quality education for all the students who enter secondary school is commendable and indeed very necessary, it is evident that this country still faces challenges in providing quality education for all. Consider for example, the findings of Leacock, Thompson, Burnett and Obidah (2007). These researchers compiled a report on each of the secondary schools in Barbados for the 1999 to 2005 period: their intake of students and their performance on the regional Caribbean Secondary Education Certificate (CSEC) General Proficiency examinations administered by the Caribbean Examinations Council (CXC).

Based on the data presented by Leacock et al (2007), students with the best scores on the secondary school entrance examination during this period were assigned primarily to the schools with the grammar school history, with the majority being assigned to the four schools that historically have been the most prestigious. The students who scored at the lower end of the scale were assigned to schools that were least prestigious. An examination of the results of the four most prestigious and the four least prestigious schools for 2005, five years after the introduction of the reformed curriculum might be instructive. These data are presented in Table 1 below.

What is evident here is that five years after the introduction of the reformed curriculum that is based on the theme that each one matters and that all deserved quality education, the less academically-able students still are not achieving highly in the secondary schools. Fewer of these students are writing examinations and among the few who do, the pass rate is less than encouraging. Without having studied this phenomenon in depth, one can speculate about what might contribute to this situation. But if the curriculum that is being offered is considered, then that speculation can look more solid.
Bearing in mind that students of diverse abilities enter secondary school each year, the Barbados curriculum planners devised a programme that they believed would provide quality education for all of them. One of the main features of this programme is the introduction of different levels of entry. The curriculum for secondary schools is divided into six levels, where Level VI is the final stage of the programme and leads to the writing of external certification examinations (Barbados, Ministry of Education, 2000). The provision to facilitate diversity comes on the entry to secondary school. At this point, students who have mastered the primary education programme begin their secondary education at Level II. Those who do not demonstrate mastery of the primary school curriculum begin at Level I. Thus, according to the education authorities, Level I is designed to help academically weak students to bridge the gap between primary and secondary education (Barbados, Ministry of Education, 2000, p. 33). However, there is evidence to suggest that these students are still not coping, are becoming very frustrated and may be engaging in undesirable behaviours that are designed to mask their inability to cope with the curriculum (Thompson, 2008). The indications are that these students who are being admitted into secondary school because USE is in place, are not having their needs met and hence, the quality of the provisions made for them can be called into question.
The case of Barbados highlights the fact that, though the notion of making provisions for students of all abilities is important and highly commendable, attention must be paid to the *quality* of those provisions if the students are to obtain the intended benefits. These provisions cannot merely be a repetition of what was done in the last year at primary school or worse, a watered version of what the more academically-able students are offered. Quality education for struggling students at secondary school calls for much thought. It also calls for knowledge and understanding of the difficulties that these students face on a daily basis as they try to cope with the rigours of education at this level.

Another lesson from the Barbadian context relates to the means of assessing and certifying students under USE. It is evident that, even when the curriculum is designed to address the needs of the students, the means of assessment play a vital role in the way in which the students are taught. Despite the fact that the reformed curriculum advocates assessment procedures other than the sole reliance on paper and pen tests, teachers continue to use this approach primarily. This is done despite the fact that it is acknowledged that many of the weaker students at secondary schools have reading and writing difficulties that would make paper and pen tests disadvantageous for them. However, one reason for this dogged persistence was reported by Leacock (2006). In a study of the implementation of the reformed Mathematics curriculum in secondary schools, teachers were asked about their assessment practices in light of the programme’s recommendations. Leacock reports that one Head of Department explained that the school prepared students for certification examinations which were primarily paper and pencil tests and hence, this was the preferred means of assessing students in the classroom.

Unfortunately, this seems to extend to the struggling students as well. Thus, they too are prepared to write the often highly academic certification examinations. The problem is, because secondary education usually spans five to six years, the weaker students are often expected to write these examinations in approximately the same time period as their more able peers. More often than not, the weaker students are not ready to write these certification examinations. As a result, many of them may feel as if they are working in vain and hence give up on schooling, either dropping out or becoming apathetic while biding their time until they can leave school legally. Others may go on to write the examinations, but may fail dismally,
which can be devastating to their self esteem. This cannot be considered quality education since by definition, quality suggests that the students’ lives and their overall experience of living should be enriched (World Education Forum, 2000). It is encouraging though, that the CXC has introduced an alternative approach of certifying that students have completed at least basic secondary education in the Caribbean Certificate of Secondary Level Competence (CCSLC). It is hoped that this innovation would add to the quality of the education offered to all students in secondary schools throughout the region. But there may be challenges ahead.

Designing such a programme that is acceptable to the society will by no means be an easy task. As mentioned earlier, the Eastern Caribbean societies tend to value highly academic programmes and students who are not following such a programme are often considered to be somehow inferior to those who are. This perhaps contributes to the obsession of parents to ensure that their children gain a place in a ‘top’ secondary school, where it is perceived that they can go on to be a doctor or a lawyer or some other profession of perceived worth. These are usually the schools with grammar school backgrounds, and generally are out of bounds for the less academically inclined students who are served by USE. On the other hand, programmes that would allow all students to develop not only academically but also personally, may have little currency, and, no matter what prospects for lifelong learning they may present, may still be considered inferior to the wholly academic route. Thus, for USE to be successful and for the slogans that advocate quality education for all to have any worth, there is a need for careful reflection by the education authorities in the region and possibly, some hard decisions that must be made.

Towards Quality Education for All: Reflections and Decisions (on Curriculum)

The above discussion focussed on the challenges that EC territories are likely to face as they seek to ensure that all students completing the course of primary education have the opportunity to pursue secondary education. In this 21st century, this opportunity can no longer be considered a mere privilege, but indeed, a right. The case of Barbados was highlighted to illustrate how these challenges can manifest themselves and how education authorities may endeavour to meet them. The case of Barbados also illustrates how the
history of secondary education and the traditions associated with the various schools and the manner in which students are assigned to them can have an impact on what students are offered when they enter this level of learning. One important lesson coming out of the Barbados context was highlighted by the Barbadian education authorities that acknowledged that when access is no longer a prohibitive obstacle, attention must be paid to quality. It is being suggested in this article that those EC countries that have recently introduced USE or that are moving in that direction, need not wait until some three or four decades after its implementation to think about quality.

When USE is introduced, it is known that children who traditionally would not have qualified to enter secondary school will have access, and they will bring with them all the challenges that would have limited them in the past. If they are to benefit from their secondary education experience, then education authorities must think carefully about the provisions that are made for these children, indeed for all the children. Even for those students who traditionally would have gained a place in secondary school by ‘passing’ the entrance examination, thought must be given to nature of what they are being offered if the criterion of quality is to be met. What might have been quality education fifty years ago is not necessarily so in this era. Challenges and issues that today’s world citizens face were perhaps unheard of at the time of the conception of the traditional curriculum associated with the prestigious schools with grammar schools history. The introduction of USE seems to merit some changes to the way educational programmes are conceptualised and implemented. If USE is to be more than just offering a place merely to record numbers of children in classrooms, then some hard decisions must be made about what constitutes quality education across the region. The following is a set of issues on which education planners should reflect and decisions that should be made in their attempt to ensure that all students, no matter what their background, have access not just to secondary education, but to quality secondary education.

The Purpose of Education

Before deciding on the content of a programme for secondary education, planners should first reflect on the purpose of education. This reflection should go beyond the socially expected clichés that are often bandied about. The fact is that in the EC, governments allocate large proportions of their
annual budgets to education. The question that needs serious consideration is what are they expecting to get back from this investment in their people? This can lead them into philosophical as well as practical considerations. It is acknowledged that if education planners have a clear vision about the purpose of education, then they would be in a better position to identify means of accomplishing their goals. However, if the purpose is diffused, then the programmes planned are likely to be unfocussed and weak. Thus for example, governments and their agents responsible for education should ask themselves questions such as: Is the purpose of education solely economic? Are we merely training a workforce? Is the purpose mostly to develop the minds of the students? In essence then, there needs to be reflection on and development of a philosophy on education that can then be translated into policy on secondary education. This should then be applied to guide the development of a programme for all secondary school students.

The Composition of the Curriculum

With the introduction of USE, the composition of the curriculum must come under greater scrutiny. Decisions have to be made about what subject matter is to be included, how it should be organised, what instructional approaches to advocate, and how students are to be assessed. As mentioned earlier, this could be a daunting task for educational authorities and it should be given much thought, as well as be the subject of much consultation if a quality programme is to be devised for secondary education in the region. It is evident that the heavily academic programme that is offered in the countries of the EC might be linked to the perceived apathy and high failure rates among secondary school students. Hence, thought should be given to developing a programme that is of high quality without the heavy emphasis on the academic areas. Some relevant issues to be considered when planning for USE are presented below.

First, consideration should be given to what ought to be the focus of the curriculum: transmission of subject knowledge to students or helping them to develop skills that they can use to access knowledge. This is an extremely important consideration in the twenty-first century. For one thing, with advancements in technology, ‘knowledge’ is generated at a phenomenal rate and it is not possible for students to be given all the knowledge they will need in any one subject area. Further, with availability of facilities such as the
Internet and the World Wide Web becoming so prevalent in the Caribbean, students have access to myriad sources of information that may sometimes present ‘knowledge’ that conflicts with what they might be exposed to in the classroom. Third, because of the rapid technological changes in the global environment, the concept of ‘lifelong learning’ is being heralded in the Caribbean as it is elsewhere in the world.

Education authorities must ask themselves some serious questions. These include: should a curriculum for secondary schools, where diversity in the classroom is increasing, place emphasis on the transmission of subject matter knowledge? And should the emphasis be shifted to ensure that all students develop the confidence as learners, to pursue knowledge on their own, to suit their needs and contexts? This is not to say that subject knowledge is not important or that no thought should be given to what and how much of it should be included in the curriculum. The reality is though that not all students have the capacity to absorb subject knowledge at the same rate, and indeed, may have no need for certain subject matter knowledge during their secondary school careers. Thus, trying to force it down their throats may be counterproductive. Any programme offered in a system with USE should be designed to increase the chances that all students (regardless of sex, academic acuity, socio-economic or cultural background) who pass through secondary school leave with the confidence and sense that they have the knowledge, skills and strategies required to pursue additional education to suit their specific needs. This is what the concept of lifelong learning is about and this is what should be an essential feature of the curriculum for USE in the EC. This does not mean that those who can, should not be allowed to aim to write and pass CSEC examinations as they exit the system. What it means though is that those who do not reach this point by the time they exit the system, should feel a sense of accomplishment and feel that with the appropriate opportunities (for example through continuing and adult education programmes), they can go on not only to achieve academically, but also to be valuable contributing members of the community.

Quality of Instruction

All would agree that having a quality curriculum is a very important part of providing quality education for all students. However, a quality curriculum would be useless if the teachers could not deliver it effectively. Thus, in
making preparations for quality education for all, the countries of the EC must pay attention to teacher development. Prior to USE, secondary school teachers would have been prepared to work with students whose academic abilities fell within a particular range. They were sufficiently able to ‘pass’ the screening test. Many of these students might have experienced a measure of success in the secondary level, even if their teachers were not trained. However, with USE, training for teachers is essential. Among other things, teachers must be prepared to (1) deal with greater social, economic and academic diversity among their students; (2) think of teaching, not just the subject content for their particular area, but also helping their charges to develop skills such as literacy and numeracy; (3) diagnose students weaknesses and strengths and plan instruction accordingly and (4) use technology appropriately in instruction.

For many teachers such training represents a radical change in perspective and practice. They would require not just training, but also supervision and support along with adequate time in order to successfully make the adjustment. The acute need for appropriate training was brought to the fore recently in St. Lucia where teachers who were set to work with the students who prior to USE would not have entered secondary school, reported feeling unprepared to help their charges (Warrican & Leacock, 2007). Education authorities must not assume that teachers will automatically change their practices simply because a different calibre of student is entering the classroom. The fact is that traditionally, the secondary school systems across the region have been catering to the so-called average or above average student. Not only have curricula targeted this type of student, but teacher training programmes have also done so. The introduction of USE now necessitates that all teachers, no matter where they are assigned, be exposed to areas such as special needs education, educational technology, social and emotional learning issues, as well as a variety of assessment techniques and how to use the outcomes of assessment appropriately. If instruction for all students is to be of high quality, then this type of exposure is imperative.

Transfer Procedures

No conversation of quality education for all students can be had without consideration of the approaches used to transfer students from primary education to the secondary level. Currently, the countries in the Eastern
Caribbean use the scores obtained on the common entrance examination as a major contributor to the transfer process, whether USE is in place or not. Prior to USE, these scores determined if a student would be offered one of the limited places in secondary schools. This is understandable since whenever a product or service is limited, a system of choosing beneficiaries must be devised. However, with USE, this system of selections would (or should) become obsolete. This is not to say that there should be no assessment at the end of the primary education phase. However, the use to which the results are put should be reconsidered.

For example, not only are the results of the transfer examinations used to select students for limited places, but in countries where USE is already in place, the results are used to determine which school students will attend or in some cases, the stream into which they are placed. The result is that the more academically able students are placed in the more prestigious schools (those with the traditional grammar school history) and the less academically able are placed in other schools. As mentioned earlier, these schools are often considered inferior to the more prestigious ones. Teachers and students in the least prestigious schools are often subjected to taunts, and in some cases, not provided with the resources appropriate for their needs.

The fact is though that, if quality education is to be provided for all, then no students should be in a situation in which they feel worthless, helpless or frustrated; and neither should their teachers! Such situations tend to lead to teacher burnout and high dropout and absentee rates among students. These are conditions that quality education should eliminate or at least, minimise.

**Conclusion**

This article explored issues relating to quality education for all in the EC, in the face of the expansion of universal secondary education in the region. One issue that was discussed is the historical context of secondary education in the region, and its influence on current practices. This influence spread across areas such as the purpose of secondary education, the content of the secondary education programmes, and the manner in which students are transferred from primary to secondary education level. The article also discussed challenges faced by EC countries where USE is already in place,
citing the example of Barbados, and identifying issues that must be addressed if quality is to be a priority for secondary education for all in the region.

Indications are that the governments in the region are committed to the goals of the various international initiatives to which they subscribe. The provision of universal secondary education has the potential to contribute to the alleviation of poverty, to reverse the negative trends of crime and violence in the society, to promote greater participation in the social, political and economic arenas. Whether or not it lives up to this potential in the EC is very much related to the quality of what is being provided. The fact is that countries in the Caribbean region invest large proportions of the annual budgets to education, but the returns will only be maximised if these funds are spent on a quality service. Thus, if governments are to pay more than lip service to the call for universal primary and secondary education, then they must take the time and the effort to ensure that not only the criterion of quantity is met by providing more places, but also that the element of quality is kept to the fore. This means that education authorities must ask the question: when we create places for all students in secondary schools, what do we do once we have filled them? They must then work towards finding an answer that reflects the slogan ‘quality education for all’.

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Disruptive Behaviours in Barbadian Classrooms: Implications for Universal Secondary Education in the Caribbean

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Abstract

This article examines how classroom disruptive behaviours can derail the benefits to be derived from Universal Secondary Education (USE). Specific attention is paid to disruptive behaviour as it relates to the nature and level of occurrence in older and newer secondary schools in Barbados and the perceived causes. Implications from the findings suggest that Caribbean territories yet to implement USE should consider issues relating to more equitable student allocation, appropriate and relevant curriculum, the training of teachers in classroom management and more parent inclusion in the education system. Consideration of these issues should certainly enhance the quality of education provided by USE.

Keywords: classroom disruptive behaviour, universal secondary education, disruptive behaviour, Barbados
Introduction

In an effort to provide quality education based on access and equity, Caribbean governments have placed significant emphasis on universal secondary education (USE). The Caribbean governments have realised the tremendous benefits to be derived from USE and have embraced relevant policies and strategies to achieve the goal of providing adequate secondary school places. To date, all Caribbean territories with the exception of Antigua and Barbuda, Jamaica, Guyana and Grenada have adequate places for their primary school leavers.

Given the fact that the Caribbean territories participate in a global economy it is imperative that they, like the developed countries, provide their citizens with equal opportunities to benefit from an extended education. According to Glewwe, Zhao and Binder (2006, p. 36), USE can play a key role in assisting countries with the alleviation of poverty and the promotion of economic growth. Moreover, Villanueva (2007, p.5) highlights the many advantages which developing countries can derive from USE. These include:

- Secondary education results in a country with a qualified labour force which can absorb modern production technology, provide higher value products, and increase wages.
- People with secondary education contribute to their households’ continuing social and economic development, creating a virtual cycle of social well-being.
- Populations with the highest average levels of secondary education contribute more to strengthening political systems and democracies, as they are informed, critical constituents who demand better public management.

The advantages of USE are not restricted to individual nations, but also to the individual citizen as well. A secondary education equips students with the necessary skills, knowledge and attitudes to better compete within the global market. Furthermore, the students’ personal development is also enhanced. Former Prime Minister of St. Lucia, Dr. Kenny Anthony also highlighted the benefits of USE and noted, “the attainment of universal secondary education is a milestone that signals that a country has reached a particular threshold in its human resource development and its capacity to develop itself”. (St. Lucia Government Information Service Press Release, April 10, 2003).
Of significance also is the positive impact of USE on students’ employment opportunities as well as the expansion and diversification of tertiary level education. Without the implementation of USE, the Caribbean secondary school systems will have limited access and inequitable distribution of learning opportunities which previously characterised the majority of secondary school systems.

Caribbean territories have had similar backgrounds prior to the introduction of USE, but the Barbadian experience is highlighted since it is one of the territories with the longest history of universal secondary education. In Barbados, prior to 1952, primary students who benefited from a secondary education did so based on the criteria of merit or their parents’ financial ability to pay school fees at privately owned secondary schools. Students who were intellectually gifted were awarded scholarships to attend the few grammar schools which existed. Other primary students who did not fit either of the two aforementioned criteria, usually remained in the primary schools, joined the workforce or were apprenticed to various trades. This situation warranted the need for additional secondary school places in order to afford equitable secondary education for all.

To ensure that there were adequate secondary school places for all students the government of Barbados embarked on the construction of several new secondary schools. Based on the research of the Planning and Research Unit of the Ministry of Education, Youth Affairs and Sports (Barbados, 2004), fourteen newer secondary schools were built in Barbados over the period 1952 to 1997. In 1952, the first two secondary modern schools were opened and throughout the 1950s and early 1960s the government of Barbados continued to build a number of secondary schools. By the time of Barbados’ independence in 1966, five more secondary schools were opened. In 1997, the last of the fourteen newer secondary schools was built. To date, there are twenty-two public secondary schools in Barbados guaranteeing a secondary school place for all students who leave the primary system. These twenty-two secondary schools comprise the ‘older grammar’ schools and the ‘newer comprehensive’ schools, now collectively referred to as government secondary schools.
With the Common Entrance Examination (CEE) in place, the allocation of students to the secondary schools is primarily based on the students’ CEE marks, their choice of schools and available space in the schools of choice. However, given that students with higher CEE scores are allocated to the former grammar schools, the students assigned to the newer secondary schools are usually those with the lower CEE marks. Based on this system of allocation there is a general perception that some secondary schools are better than others and invariably the newer secondary schools are less favoured.

The building of these fourteen secondary schools to achieve USE has not been without sacrifice. Present and past administrations of government of Barbados have injected a significant amount of revenue to sustain the education system, spending as much as 20% of the Gross Domestic Product (GDP) on education. This was recently verified in the 2007 Budgetary Estimates where approximately 480 million Barbados dollars (US $1 = BDS $2) was allocated to education. Bearing this in mind, it is imperative that the vast revenue spent on education should be cost-effective with students gaining maximum benefits from their schooling. This can only be achieved however, if the schools’ teaching-learning environments are conducive to the promotion of quality education. Increasingly, however, a number of threats have been identified which have the potential to derail students’ opportunities to benefit from USE.

In the literature, a number of threats and challenges including the drug culture, popular music, religion, and the media among others, have been identified. The focus of this article however, is the impact and causes of classroom disruptive behaviours as perceived by students and school personnel. This article presents an analysis of such behaviours in Barbadian public secondary school within the context of USE. Classroom disruptive behaviours are examined with particular emphasis on the nature and frequency of such behaviours. This investigation is relevant and timely and will benefit Barbados’ education system, as well as those territories which have recently introduced USE or are in the process of doing so. To fully understand the nature and impact of classroom disruptive behaviours it is necessary to contextualise the term since there are myriad definitions of the term ‘disruptive behaviour’.
**Classroom Disruptive Behaviours**

A number of classroom behaviours can be described as disruptive, but for the purpose of the research conducted, classroom disruptive behaviours referred to the myriad activities which disrupt and impede the teaching-learning process. This description is in concert with Arbuckle and Little (2004), who define disruptive behaviour as, “an activity that causes distress for teachers, interrupts the learning process and that leads teachers to make continual comments to the student” (p.67).

Disruptive behaviour in the classroom has many labels, including terms such as deviant, anti-social, undesirable, problem behaviour and misconduct, to name a few. Such labels describe a host of activities deemed to be disruptive. For example, Alhassan (2002) identified nine types of disruptive behaviours. These are aggression, fighting, self-failure, interfering with the work of other children, damaging own property, bullying, vandalism, running about the class and damaging class furniture. Corrie (2001), also identifying classroom disruptive behaviours, included the constant need for supervision, not listening to directions, often playing with pens, pencils, and other items, slow getting started - needing to be pushed to begin work, talking out of turn, being unmotivated, getting distracted from work easily, often seeking attention and preventing others from learning by talking to them, touching them, or interfering with their books, materials and equipment.

These types of behaviours are of great concern to teachers and adversely affect the standard of education impinging on the quantity and quality of education delivered and received. Corrie (2001) states that, “at times, children’s behaviours disrupt teaching and learning and fill classrooms with tension. Teachers find it hard to stay enthusiastic when they spend precious time managing children’s behaviour. They feel frustrated when, despite their best efforts, nothing seems to change” (p.4).

Although the behaviours identified are largely mild and non-aggressive, they are nonetheless very disturbing. Corrie (2001) asserts that, “too many days were filled with repeating instructions, giving warnings, sorting out skirmishes, and managing incompliant behaviour” (p.7). He further explained that often teachers feel “more like police officers engaged in crowd control rather than helping children to learn” (p.7).
The effects of such behaviours have created school climates where some teachers have become quite apathetic to school in general and more specifically to the value and impact of their teaching, especially when students have lost respect for, and interest in the value of education. It is not that the majority of students do not show interest in their school work but it is the few who are bent on disrupting the schools and causing undue stress and frustration for students who want to learn and teachers who want to teach.

Managing disruptive behaviour on a daily basis means less teaching time; teachers who are stressed from the inordinate amount of time averting classroom chaos, and teachers who generally feel annoyed, exhausted, frustrated and dissatisfied. The comments of some teachers in relation to their teaching experiences verify how negatively students’ disruptive behaviours have influenced their career decisions and have impacted their lives. Some speak of early retirement or even changing their careers. The impact of disruptive behaviour on the lives of teachers and students is significant and should be examined more comprehensively.

Across the region, when people think of adolescent deviance, activities such as drug use, gambling, sexual misconduct, fights and stabbings might easily come to mind. However, such behaviours, though disturbing, are perpetrated by only a small proportion of the school population. However, as suggested by Corrie (2001), it is the everyday, and often considered less serious, acts of misconduct that may have a greater negative effect on the teaching and learning in Caribbean secondary school classrooms. For example, behaviours such as talking out of turn, not paying attention and refusing to complete homework may be more disruptive to classroom transactions than the serious ones mentioned earlier, simply because they may occur more frequently and directly in the teaching and learning environment: the classroom.

Given that the focus of USE is the delivery of equitable and quality education, then such behaviours can inevitably prevent students from deriving maximum benefits from their secondary school experience. Classrooms environments that are frequently interrupted by minor infractions interfere with the students’ concentration and contribute to teacher stress and apathy. This article examines classroom disruptive behaviour in the Barbadian context with a view to providing some lessons for other Caribbean territories that have recently embarked on USE or that are moving in that direction. It
Disruptive Behaviours in Barbadian Classrooms

In order to explore disruptive behaviour in Barbadian secondary school classrooms, data were collected from students, teachers, guidance counsellors and principals in a sample of twelve schools. Four of these schools have a traditional grammar school history (older secondary schools) and the other eight have a comprehensive school background (newer secondary schools). The data were collected in two phases. In the first phase, questionnaires were administered to 328 fourth form students and 95 teachers. These instruments were designed to gather information on the participants’ perceptions of the nature and frequency of disruptive behaviour in the classroom, as well as its impact on the teaching-learning process. In the second phase, data were collected from 60 students (5 from each of the 12 schools) deemed deviant by school administration. These students were asked about their own activities in relation to disruptive behaviour. Data about their activities were also collected from the guidance counsellors at the schools and in some cases, school principals. Because of their perceived impact on the quality of education offered in secondary schools, the behaviours outlined by Alhassan (2002) and Corrie (2001) were incorporated into the data collection instruments.

When the data were analysed, a number of interesting and instructive features emerged. For example, in relation to the nature and frequency of disruptive behaviour in the classroom, it was found that disruptive behaviours were perceived by students and teachers of the newer secondary schools (3 of these in particular) to occur more often than in the older secondary schools. As indicated in Table 1, the most prevalent disruptive behaviour in the newer secondary schools was task avoidance. This was followed by defiance of authority, verbal and physical hostility towards peers and classroom non-conformity. In the older secondary schools only two categories occurred frequently. These were task avoidance and verbal/physical hostility towards peers.
Further evidence to substantiate the claim of a higher occurrence of Classroom Disruptive Behaviours (CDB) in newer secondary schools was provided by the schools’ guidance counsellors. At the newer secondary schools, guidance counsellors reported that each week, they saw about 8 to 12 students in connection to disruptive behaviour, while counsellors at the older secondary schools reported seeing 1 to 3 students weekly. In fact the counsellor at one of these latter schools reported seeing only about 2 cases per term.

Interestingly enough, in both categories of schools ‘task avoidance’ was the category of behaviour which occurred most frequently followed by ‘verbal and physical hostility towards peers.’ The subscales of ‘task avoidance’ included student behaviours such as:

- Sleeping during lessons;
- Refusing to complete homework set by the teacher;
- Being distracted easily by other classmates;
- Refusing to correct work when asked;
- Refusing to complete tasks in given time.

In terms of ‘verbal and physical hostility towards peers’, this comprised behaviours such as:

- Cursing classmates;
- Fighting with classmates;

### Table 1

<table>
<thead>
<tr>
<th>Categories of Classroom Disruptive Behaviours</th>
<th>Mean (Newer Secondary)</th>
<th>Mean (Older Secondary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Conformity</td>
<td>3.6</td>
<td>3.1</td>
</tr>
<tr>
<td>Verbal/physical hostility towards teachers</td>
<td>2.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Verbal/physical hostility towards peers</td>
<td>3.6</td>
<td>3.5</td>
</tr>
<tr>
<td>Defiance of Authority</td>
<td>3.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Task Avoidance</td>
<td>3.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Inappropriate Use of School Property</td>
<td>3.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Inconsiderate Interpersonal Relationships</td>
<td>3.3</td>
<td>2.7</td>
</tr>
<tr>
<td>Over-reactions to Normal Situations</td>
<td>3.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Technological related factors</td>
<td>2.2</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Overall Average Mean</strong></td>
<td><strong>3.3</strong></td>
<td><strong>2.9</strong></td>
</tr>
</tbody>
</table>
• Shouting at classmates;
• Teasing classmates;
• Poking at classmates.

Of these latter behaviours, students perceived that the cursing of classmates occurred most frequently. On the other hand, teachers were of the opinion that the most frequently occurring behaviour was students talking while the teacher is talking. Regardless of which behaviour is perceived as most prevalent, they appear to have a negative impact on the teaching-learning process.

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**Table 2**

<table>
<thead>
<tr>
<th>School Codes</th>
<th>% of Disruptive Students</th>
<th>No. of Disruptive Student Referrals per week</th>
<th>Ratios M/F</th>
<th>Disruptive Behaviours Resulting in Suspensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1</td>
<td>20</td>
<td>2</td>
<td>3:1</td>
<td>Abusive language, fighting</td>
</tr>
<tr>
<td>O2</td>
<td>10</td>
<td>1</td>
<td>2:1</td>
<td>Fighting, physical aggression towards teachers</td>
</tr>
<tr>
<td>O3</td>
<td>2</td>
<td>2 (per term)</td>
<td>1:2</td>
<td>Fighting</td>
</tr>
<tr>
<td>O4</td>
<td>30</td>
<td>3</td>
<td>5:1</td>
<td>Abusive language, fighting, physical aggression towards teachers, making rude comments to teachers, disobedience of school rules</td>
</tr>
<tr>
<td>O5</td>
<td>30</td>
<td>3</td>
<td>5:1</td>
<td>Fighting, physical aggression towards teachers, obscene gestures to teachers, rude comments to teachers</td>
</tr>
<tr>
<td>N1</td>
<td>70</td>
<td>10</td>
<td>2:1</td>
<td>Rude comments to teachers, stealing, premeditated damage to school property</td>
</tr>
<tr>
<td>N2</td>
<td>3</td>
<td>5</td>
<td>1:1</td>
<td>Abusive language, damage to property, fighting, physical aggression towards teachers, rude comments to teachers</td>
</tr>
<tr>
<td>N3</td>
<td>15</td>
<td>10</td>
<td>1:1</td>
<td>All except- encouraged classmates to clown around in school</td>
</tr>
<tr>
<td>N4</td>
<td>70</td>
<td>10</td>
<td>8:1</td>
<td>Use of abusive language, argued when corrected by teacher, talk back to the teachers, refused to complete work set by the teacher</td>
</tr>
<tr>
<td>N5</td>
<td>3</td>
<td>5</td>
<td>N/A</td>
<td>Fighting, physical aggression towards teachers</td>
</tr>
<tr>
<td>N6</td>
<td>80</td>
<td>12</td>
<td>2:1</td>
<td>Fighting, physical aggression towards teachers, rude comments to teachers</td>
</tr>
<tr>
<td>N7</td>
<td>40</td>
<td>8</td>
<td>3:1</td>
<td>Abusive language, damage to property, fighting, physical aggression towards teachers, obscene gestures to teachers, rude comments to teachers</td>
</tr>
<tr>
<td>N8</td>
<td>70</td>
<td>10</td>
<td>N/A</td>
<td>Fighting, physical aggression towards teachers, obscene gestures to teachers, rude comments to teachers</td>
</tr>
</tbody>
</table>

*The letter ‘N’ denotes counsellors from newer secondary schools.
*The letter ‘O’ denotes counsellors from the older secondary schools.
Students’ frequent verbal abuse can possibly create negative school climates characterised by disrespect, fear, retaliation, resentment and anger. Such school environments are not very conducive to student learning and can, therefore, be considered a threat to achievement. The comments of school personnel highlight the negative impact such behaviours can have on the teaching learning process:

“It creates an atmosphere of confusion and discord. After an incident, it is quite difficult to help the students refocus on work which many of them consider boring; unlike the “exciting” disruptive behaviour” (Guidance Counsellor);

“Class time is often interrupted to deal with disciplinary issues. Hence, valuable time is wasted. The attitudes of both student and teacher after disruptive behaviour are not conducive to continuation of assigned lesson” (Principal);

“Students exposed to such behaviour are at risk of poor educational progress. Furthermore, such behaviour in the classroom diminishes learning opportunities for the other students” (Guidance Counsellor).

Research indicates that students thrive best in a positive school climate. The White Paper presented by the National School Climate Centre states that, “positive school climates promote student learning, academic success and healthy development, as well as effective risk prevention, positive youth development and increased teacher retention” (2008, p.7). These are all factors which will promote a high-quality secondary education which in itself is the goal of universal secondary education (Cohen et al, 2006).

It is also interesting to note that although verbal abuse of peers occurs more frequently in the newer secondary schools, it is also quite prevalent in the older secondary schools. This shows that it is a negative behaviour which is quite pervasive across the secondary school system and which can have a negative impact on student achievement. It is, therefore, necessary for school officials to address this issue as this will counteract the positive outcomes expected from the implementation of USE.

These findings are indeed significant when one considers how students are allocated to secondary schools in Barbados. In this country, children write the Common Entrance Examination (CEE) typically at 11 years old (though
it may be written by students as young as 9 years old and as old as 12 years), having completed the prescribed number of years in the primary education system. Generally, students are ranked according to their obtained score, and allocated to schools based on this score, parental choice and available places in the various schools. This approach is highly contentious, with many debates on the pros and cons of the examination raging on. One argument contends that it is the fairest method of transferring students to secondary schools, while another views it as promoting elitism in the society. Whatever the arguments, the fact is that the vast majority of students allocated to newer secondary schools score in the 0 to 50 range on the CEE, while the majority of students allocated to the older secondary schools tend to be those who scored at the upper end of the 51-100 range (Leacock, Thompson, Burnett and Obidah, 2007).

It is noteworthy that the three newer secondary schools that reported the most occurrences of disruptive behaviours, are among those that take in the students who are at the lower end of the CEE rankings. Thus, it appears that the schools that take in the majority of students who perform poorly on the CEE are the ones likely to have a prevalence of disruptive behaviours such as task avoidance, defiance of authority, verbal and physical hostility towards peers. Indeed, teachers who participated in the study were of the opinion that the allocation policy contributed to the high occurrences of disruptive behaviours in the newer secondary schools. This was indicated by comments such as:

“Too many of the same type of students with below average academic abilities are placed or allocated to one school and hence there are no role models to boost or motivate them”.

Another teacher suggested that disruptive behaviours are caused by “the lumping together of students with generally weak behavioural patterns”. This situation has some implications for other territories that are embarking on universal secondary education.

**The Perceived Causes of Classroom Disruptive Behaviours**

The study also explored the perceptions of the students and teachers in relation to the causes of disruptive behaviour in the classroom. The comments from the respondents indicated that issues related to students and the home were
the most significant contributors to displays of disruptive behaviours in the Barbadian classrooms. These two factors were mentioned most often by both students and teaching personnel. In fact, one-third of the students referred to home related issues, while about half of the teachers indicated that student issues were the primary causes of disruptive behaviours in the classroom. Also mentioned but to a lesser extent were factors related to school, peers and society.

In respect to home issues, the students were very critical of parenting skills and the home environment in general. Students’ comments mainly focussed on the lack of love, care and attention in the home, as well as poor parenting skills. These sentiments are exemplified in the following student comments:

“In my opinion I believe that the main cause of students behaving badly comes back from the home as some parents don’t give their children the correct amount of love and affection and they don’t spend time to sit down and talk to them so the children feel left out and so do deviant things to get attention”.

“Children behave badly because they have no home training and if someone tells them about it they get vex and want to fight”.

Generally, students and teachers commented similarly with regards to a number of home related issues. Both groups were of the opinion that there is a breakdown in the home as far as it relates to instilling acceptable standards of behaviour. Comments referred to declining morals standards and values as well as to a general disrespect for parents.

Student issues were also identified as one of the main causes of students’ disruptive behaviour. In fact, 33 of the 68 teacher responses specified that issues related to students were mainly responsible for disruptive behaviours. A number of student issues were identified, but the two most prevalent referred to the students’ lack of interest in academic education and their attention seeking behaviours. Comments also referred to general indiscipline, learning deficiencies, as well as mental and psychological problems. The following comments best express the perceptions of teachers as they relate to student issues as the causes of disruptive behaviours:
Disruptive Behaviours in Barbadian Classrooms

[Students are] “not interested in learning; priorities need to be readjusted so that academic achievement is their goal”; [Students] “lack interest in school work and are distracted by relationships and personal problems”; [Students’] “attention seeking behaviours mask their inability to complete the specific tasks”; “Students seek attention which they may not be receiving at home. This is not only from peers, but from the teacher who is seen as a role model or mother/father figure”.

Teachers also gave other reasons, one of which was the students’ learning deficiencies. At least seven such comments were made by teachers and mainly emphasised the students’ inability to read, their short attention span and restlessness. The comments focused on poor reading skills which were linked to student frustration and ultimately misbehaviour. One of the teachers stressed that, “many students are unable to read and when asked to complete class assignments this proves to be a very difficult task. The alternative is to be disruptive”. Similarly, another teacher was of the view that “students are frustrated that they can’t get the work done, so misbehave to avoid trying”.

These comments suggest that Barbadian students who are struggling with the curriculum may resort to disruptive behaviour to avoid tasks that they find too difficult or uninteresting. The issue of the curriculum is one which is widely debated within the education fraternity and beyond. Traditionally, the Barbadian education system has been largely academic and has favoured the more academically-able students. However, when one considers the academic achievement of a large number of students entering the newer secondary schools, it is not difficult to envision this as their reaction to a highly academic programme. This is indicated by one of the comments made by a newer secondary teacher who reported that “some students are unable to cope with the level of instruction being taught at school. This, as a result, makes the students very frustrated”. Another teacher simply stated that “students are unable to cope with the new curriculum”.

In light of these comments, it is evident that the perception is that the curriculum is not a good match for the abilities and interests of some students, especially those at some of the newer secondary schools. As a result, these students are engaging in behaviours that reflect their inability to cope and
release their frustration. It is interesting to note that students did not refer to the curriculum per se but commented on the boredom of some classes. This speaks indirectly to the curriculum as well as the teachers’ instructional style. Students of the newer secondary schools noted that “most classes are boring and there is nothing to look forward to” and “sometimes when the class is dull and boring to make it livelier you would make noise or do lawlessness”. From these comments, one may infer that what is taught is not interesting or the way it is taught is not appropriate or both. The comments made by both teachers and students seem to suggest that poor classroom management by some teachers contribute to students being disruptive in the classroom. As one teacher stated, there is “bad or inappropriate classroom management, lack of class rules to govern conduct in class and attention to task”.

Lack of classroom management competencies seems to contribute to a cycle that seriously interferes with the teaching learning. Thus, because of poor management skills, disruptive behaviour is encouraged and this behaviour, in turn, causes teachers to become frustrated. The perceived dilemma of teachers is captured in this comment by one of the guidance counsellors in the newer secondary schools:

“It can lead to frustration. Teachers come to teach and students can’t settle down; this can result in teacher anxiety and burnout. Hence teachers say and do things that they shouldn’t such as insulting students because of having to deal with persistent bad behaviour”.

Comments made by some students suggest that the teachers’ stress levels result in incidences where the teachers’ behaviours and attitudes can be somewhat questionable:

“Teachers curse students, do not correct their books, accuse students of gambling, talk about students in the staffroom, call students names and tell students that they don’t care about the students’ parents and unfair students for ‘stupidness’”; “Some teachers are cruel and sometimes curse the students or tell them they will get pay at the end of the month”; “The teachers are also to blame because they tend to be very rude at times and provoke the students with their ‘holier than you’ attitudes. Give respect and you get it in return”.
The comments also suggest that the teacher-student relationships may be somewhat strained, resulting in students’ mistrust and disrespect for teachers.

Apart from the above mentioned perceived contributors to disruptive behaviour, some teachers suggested that mental and psychological problems may also contribute to students’ misbehaviour in the classroom. Teachers’ comments primarily referred to undiagnosed psychological conditions, mental illnesses and attention disorders such as Attention Deficit Hyperactivity Disorder (ADHD). One of the teachers commented that “there are a number of students who have attention disorders or learning difficulties which cause them to act out because they do not know any better or they cannot express themselves”.

As with the perceived nature and frequency of disruptive behaviours in Barbadian classrooms, the perceived causes of these behaviours may also have implications for USE across the region. Factors such as students’ attitudes, their home backgrounds, the curriculum, teachers’ practices, as well as mental and psychological problems have all been identified as contributors to students’ misbehaviour in the classroom. These findings from Barbados can provide some food for thought for the territories that have recently introduced USE as well as those that are moving in that direction. Lessons to be learned and implications for other Caribbean territories are discussed in the next section.

Lessons from Barbados: Implications for Neighbouring Countries

The findings of the study conducted in Barbados as mentioned earlier can be instructive for other Caribbean countries in relation to USE. Barbados has had compulsory education at this level for several decades and has seen and endeavoured to cope with many changes during that period. If others can learn from the experiences of this country then perhaps pitfalls can be avoided and successes imitated. The links between disruptive behaviour in the classroom and certain practices have emerged from the study reported. For example, it is evident that the method of allocating students to secondary schools may have an impact on the nature and frequency of disruptive behaviour in the schools. The Barbados example suggests that primarily allocating large
proportions of academically weak students to specific schools provides an environment that fosters disruptive behaviour.

This finding has tremendous implications for USE as it alerts administrators and policy makers of the possible pitfalls which may arise as a result of allocating students to schools in the manner used by Barbados. It is common when USE is introduced to build or establish new schools. These schools however usually do not have the same prestige as many of the older schools and are usually the recipients of the students who formerly would not qualify for one of the limited places in secondary school. If the Barbadian case is taken into consideration then it is evident that this approach can contribute to reduced teaching time due to disruptive behaviour. The implication here is that education officials need to pay close attention to allocation policies and to put structures in place very early to reduce the chances of creating schools that encourage a prevalence of disruptive behaviours as experienced in the some of the newer secondary schools in Barbados.

Another implication for USE based on the Barbados case relates to the curriculum being offered. Again, prior to USE, students pursuing education at this level were usually the most academically able and hence competent enough to experience some success on a heavily academic programme. However, with the introduction of compulsory education, not all students entering these schools will be able to or indeed interested in following such a programme. Curriculum planners should take this into account and offer suitable programmes. Of great importance is the fact that the curriculum followed by the less academically able students should not be a diluted version of that used by the more academically able students. The Barbados case illustrates the notion that students who are dissatisfied with the curriculum being offered (either it does not meet their needs or it is too challenging), will find ways and means of avoiding interaction with it. Such avoidance may translate into disruptive behaviour. Under USE, secondary schools must be prepared to help students acquire skills that perhaps traditionally are associated with primary education. For example, there must be provisions for students who are struggling with basic literacy and numeracy to acquire such skills. Teachers in all subject areas must be committed to helping their students in these areas. Students who are competent in these areas are less likely to resort to task avoidance tactics.
The findings of the Barbados study also have implications for teacher training. A good quality curriculum is fundamental, but for students to realise their full potential, teachers must be capable of delivering the curriculum effectively. Teacher training should therefore be analysed within the context of quality education for students. The fact that poor classroom management skills can have an impact on the frequency and type of disruptive behaviour suggests that teachers in all schools should be helped to acquire such skills. Under USE, students entering secondary schools are more diverse in terms of their knowledge, socio-cultural backgrounds, values and attitudes. Teachers must, therefore, be able to deal with this variation of characteristics if they are to be successful at meeting their needs, as well as reducing the levels of stress that they themselves experience. They must be equipped with a wide range of instructional techniques that they can creatively apply to the classroom setting; they must be equipped to deal empathetically with adolescents who may be struggling with knowledge and skills that other students handle with ease; they must be equipped to build up rather than tear down the self-worth and self-esteem of these struggling students. Indeed, the admonition of Seeman (2005) should be heeded when teachers are being prepared for the task they are to carry out. Seeman entreats that:

We need to help teachers not with just how to handle discipline problems, but also to how to prevent these problems. The best time to fix a problem is before it becomes one. We need to help teachers diagnose and locate the causes of disruptive behaviour (p. 4).

Doing these things requires skills that teachers can acquire through training; training that should not be left to chance if universal secondary education is to have the desired effect for all students.

Finally, a very important implication relates to the home backgrounds of the students entering secondary schools. The fact is that schools must recognise that the students are coming to them with the values acquired from the homes and communities in which they live. The evidence suggests that these environments do not always provide examples of acceptable behaviour nor do they always provide the students with environments in which they can feel safe to grow and develop. In light of this, schools must try to foster collaborative partnerships with parents in an effort to combat the disruptive behaviours of their children. Parents and other family members need to
get more involved in the education system with a view to improving the standard of education which their children receive. Additionally, schools must provide a loving and caring environment for their students. Often students are disruptive because they feel threatened and uncared for in an antagonist school environment. Therefore, schools should at all cost avoid perpetuating the sense of danger these children may feel, and develop relationships built on trust and mutual respect. Schools also need to cultivate climates that have a positive influence on all students, no matter what their abilities or backgrounds. This would go a long way to reduce the instances of disruptive behaviour that can have a negative impact on the quality of education that students are exposed to in secondary schools.

Conclusions

Often when access to secondary education is restricted, those who are afforded the opportunity are highly motivated to succeed. When there is universal secondary education, the reality is that not all students may have the capabilities or the motivation to take full advantage of the opportunity. However, the Barbados case indicates that there are situations that can make it difficult for some students to take full advantage. Disruptive behaviour in the classroom creates such a situation. Classroom disruptive behaviours can be a real threat to effective schooling and must be nipped in the bud wherever possible. But it must be recognised that disruptive behaviour in the classroom is not only a hindrance to quality education, it may also be a symptom of students’ inability to cope with education that, for them, lacks quality because it does not address their needs.

It must be borne in mind that disruptive behaviour or deviance in schools is multifaceted and, therefore, requires a comprehensive approach to solve the problem. Schools although important, cannot solve the problem of disruptive behaviour alone. Ideally it calls for collaboration among stakeholders of education such as schools’ administration, parents, teaching staff, auxiliary staff, and the organisations of health care, social work and even the police force. But when access to secondary education becomes universal, the schools take on an even more critical role if the young people that they serve are to truly benefit. As Walker (2003-2004) pointed out:

Schools are not the source of children’s behaviour problems, and they cannot completely solve them on their own …
Schools can do a lot to minimise bad behaviour – and in doing so, they help not only the antisocial children, they greatly advance their central goal of educating children (p.1).

Caribbean territories that are embarking on universal secondary education can learn from neighbouring countries such as Barbados and put policies and practices in place to ensure that disruptive behaviour is kept to a minimum and that all students, no matter what their abilities or backgrounds, have the opportunity to take full advantage of this provision.

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COMMENTARY

A Tale of Constitutive Capacities for Civil Society Organisations (CSOs) in Natural Resources Management (NRM): Between India and the Caribbean Basin

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Introduction

The debates over land degradation and desertification have gathered momentum over the last couple of years as we have witnessed a shift in terrain pointing toward more holistic and forward-thinking approaches to the issue. (Mikhalev and Reimov, 2008; Webbe, 2009; Bai and Dent, 2006).

As series of meetings and summits have unfolded to assure continuity in dialogues, the aims have been to flag, in a comprehensive fashion, meanings of participation and consensus-building on policies, practices or advocacy strategies. The perspectives seek to raise issues of global significance and therefore, strive to adapt responses in parallel to local contexts, that is, their outcomes on technical projects, service provisions, capacity development and accountability on public options (Ahmad, 2008; Brown and Jagadananda, 2007).

So, rather than to subscribe to mere interpretations about mechanisms of institutional transformations, it is a progressive trend set to achieve quasi optimal results on the minimum functions of law and institutions and bring convergence for economic development and sustainable livelihoods. The
United Nations Convention to Combat Desertification (UNCCD) proposes that civil society can no longer be seen as an inert factor. Instead, civil society provides a systematic approach for understanding the complex dynamics between environment (drought, climate change, desertification, etc) and human development in terms of people-led change. In other words, it affords a vision (non-static) that seeks to streamline conceptual linkages that favours the ecology of inclusive participation, thus resulting in the implementation of policies, monitoring systems and empowerment of local groups. Howell and Pearce (2001) note that it is the translation of a paradigm in development thinking taken from a standpoint where separateness and ambivalences in organisational and institutional arrangements are no longer the order of the day. Nowadays prevalence is given to mainstreaming in sustainability by building up communities of practice with adaptive languages for localised interventions, self-regulation and organisational capacity for non-state actors.

**Bringing Up the Evidence**

By falling into the realms of constitutive capacities, we are increasingly seeing the integration of dialogic engagements. Constantinos (2008) suggests that these are transformational measures that can untie integrated alternatives in change management, organisational learning, or participatory policy processes. This is noteworthy as it serves to broaden analyses of the situational aspects of livelihood choices, as well the resources and institutional support needed to address local policies, capacity development and governance. And the implications and opening of opportunities for dialogue, between observers, policy and research advocates, coalition-builders, and intergovernmental policy advisors have stretched the formation of more comprehensive networks and also raised political capital for civil society organisations. From these diverse stories a striking note has emerged out of past experiences. It is the redefinitions of pre-requisites for participatory and consensus-building approaches by positioning the right interfaces or access to information, that allows civil society to seize the best options out of viable institutional processes in the form of good governance systems (to guarantee oversight or compliance) and accreditations inter alia. These initiatives are all in an effort to strengthen development results (which in our case refer to the socio-economic needs and rights of local communities, their livelihoods when facing some recurring effects of droughts or increasing...
With evidence taken from India and the Caribbean region, this commentary draws on different dimensions and complementarities as they unfold to engage sustainable Natural Resources Management (NRM). There is a common thread, which is the expansion of synergies between the state and the citizens to steer community planning, policy implementation and organisational learning as effective mechanisms for change and good governance. Anheier (2004) sums up these perspectives where the current evolution of civil society has taken policy development by storm. He argues that due to the evolving nature of development effectiveness, the more than experimental relevance of performance factors for governments to level results on democratic governance and accountability has urged the creation of “face-to-face relationships” between governments and the third-sector. The aim is to engage negotiations and build-up legitimacy on both sides of the spectrum. What’s more is this bottom-up approach for institutional change where partnership-building has been engaged to build up capacities through training or workshops in order to manage results and bring remedies on the forefront of environmental or ecological issues, and social equity. In considering constitutive capacity, it is important to examine how sequencing within activities and objectives can lead up to integrated outputs in terms of institutional strengthening and project deliveries.

For example, in some rural districts in India, the use of citizen report cards has proven to be an instrumental tool for consultations to level ad hoc engagements between governments and citizens, and bring stories of transparency in civic engagement. This process has allowed significant achievements to occur in multilateral stakeholder dialogues, and helped steer improvements on standards, compliance and legislations on environmental conservation and community-control of forest assets for marginalised groups (Box 1).
In the state of Jharkhand, the introduction of the Joint Forest Management Policy in 2001 has been an overture to reconcile reforms in public sector and bring about change to tribal people (local forest- dependent people). It’s been done by harnessing the full effects of usufruct rights and shared benefits accrued on natural resources and forest management for designated self-help groups or communities. In the midst of grinding poverty levels, politicians, civil servants, donors and tribal leaders have embraced a decentralised approach in planning and decision-making that has put the onus on the implementation of consultations. Programmatic support is undertaken through the enforcement of Village Forest Management and Protection committees to seek solutions in conflict management and provisions in access to resources to sustain livelihoods and improvements in biodiversity. These adaptations have taken place through open meetings to identify needs and problems, build consensus and mold legislations to promote working spaces between national level coordination/allocation bodies, public service providers, donors, and tribal institutions/local panchayats and citizens groups (NGOs). They have revolved around participatory feedback loops (citizen report cards) to mainstream performance monitoring and evaluation of activities.

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In terms of results, this framework has opened up an adaptive environment, that is, demand-led to feed organisational capacity (skills development, trainings and workshops) on conflict and natural resources management; redefine tenurial rights (on terms of acts and responsibilities); and boost up productivity levels impacting upon the rural livelihoods of tribal people.

**Source: Public Affairs Foundation (2004)**

The above mentioned case is not an isolated narrative. It reveals, for observers, an ongoing process of emergence of a civil society not limited in scope or actions. In fact, as the stories move on, we can find numerous examples that bring diverse blends for participation or civic engagement with government. Some of them capture components in market-led and sustainable environmental strategies and reconfigure local governance by putting the stress on citizens’ preferences and accountability (rights-based approach).

For instance, by interpreting the directions toward empowerment and conservation, series in institutional and capacity development sequences can be unearthed. McConney et al (2003) point to a continuity or distinctive dynamic underlying the introduction and progress of co-management for coastal resources and the increasing role of CSOs to map pro-poor policies on natural resources management in the Caribbean. Taking stock from context-bound stories from St Lucia, Barbados and Belize, we have a multi-sectoral approach that has brought, over the years, functional and quasi-integrated convergences on management and institutional relations (regulations, legislations and jurisdictions). The intention is to upgrade the role and responsibilities of CSOs (private sector, Fisheries Advisory Committees, Fishing Cooperatives, village councils, NGOs, research centres) and stimulate engagement with government agencies (coastal management and fisheries management authorities, Fisheries Advisory Boards). Against these backgrounds, for CARICOM and OECS governments, a rising sense of urgencies vis-à-vis the impacts of exogenous shocks on their small economies coupled with the need to counter-balance the excessive escalation of tourism-based development models, an outgrowth that has resulted in

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1 Caribbean Community and Common Market
2 The Organisation of Eastern Caribbean States
significant damage to their ecosystems and local livelihoods) has brought to the open the concept of Island System Management.

This is a framework that pushes for integrated roles and responsibilities between jurisdictions and administrative decisions. It clears the path for greater participation on Fisheries Management Plans (FMP) and curtails the process of network strengthening for CSOs to obtain legitimacy and credibility, moves across jurisdictional fields to exert power on decision-making tables, revamps consultations (meetings, workshops, group processes) on co-management, and explores viable options for decentralised capacities or delegations.

In retrospect, a strategic planning framework which has been highly participatory in nature, for some countries (for example, Belize) co-management agreements sealed between all stakeholders have sketched interesting lines and returns. In some of these settings, CSOs have been able to take on co-management responsibilities, input local and traditional knowledge, assess under which areas training, mentoring or leadership development are needed (Barbados with Women as fisher-folk leaders), flatten organisational blocks and legal hurdles for participating stakeholders and their constituencies, and bring equity in program developments by taking on the reach of community-based organisations (CBOs) in poor coastal communities to assure fairness and compliance on the integration of pro-poor strategies to sustain livelihoods. It has been a work in progress; experimental, with an inclination towards learning by doing.

**What’s moving the conventional wisdom?**

By being a bridge between citizens and governments, CSOs have now opened up more visible forms to interpret change and bring complementarities in interventions to sustain interconnectivities. And parts of these wide perspectives cut across trans-boundary dialogues to conceive systems-dynamics, articulate progressive and incremental approaches to build up political spaces, and offer down-stream communities pragmatic responses.

As a matter of fact, nowadays these inquiries have become multi-dimensional as they touch matters of local governance and partnership-building, accountability on public options, as well as collective decision-making
and suitable focus on monitoring and evaluation of development projects (activities/outcomes). And the constant challenges associated with the degradation of natural resources, which translate themselves negatively on access to and sustainability of livelihoods for vulnerable groups, have pushed forward combination of innovative participatory approaches in development planning. Whether or not these are seen as organising principles in community development, such frameworks have opened up predispositions in terms of policy and research to tackle what components can drive the adoptions of shared values and mindsets to generate integrated solutions to productivity and NRM. They put the focus on systems-approaches and partnership-building to enhance the capacity of institutions and individuals.

With so much going on at the forefront of environmental protection and human development, the options of high level activism have garnered a pro-development stance that has radically changed the landscape of state-citizenry relations. These are equations that bring new outlooks about the nature of change and alternative adaptation proposals of cross structural and systemic processes of reforms and institution-building (see Capener, 2009). In short, for some societies, the growth of CSOs has turned out to be a vital lever that can help to rescale the contracts between the State and public institutions. If given the right attention, this is an organisational trend that can promote significant alternatives on development thinking as to how we might for harmonise policy instruments toward more comprehensive evaluation exercises to pinpoint agency goals, the consequent functionings of communities across their socio-economic and environmental aspirations and their impacts on indicators of health, education, employment and security (see Wheeler, 2007 and Viana, 2009).

Conclusion

As much as the examples cited in this Commentary provide us with insights about the formation or interactions between civil society and government, a cautious reminder is necessary. It is good to keep in mind that within these diverse settings, the process of good governance can be a challenging domain with, at times, quite a few no-trespassing symbols found along the roads. However, as parts of trials and errors, the configurations of CSOs re-color the debates about the open functions of institutions and arrangements to balance government or market failures.
Whether under the forms of forums, workshops, conferences or working groups, dialogues with CSOs are positive steps forward to engineer negotiations, assess the validity of some policy instruments to bring up comprehensive visions when targeting functioning levels across communities. These are pluralistic ways to take sharp views about the valuations of integrated strategic development interventions, blending capacity development techniques (facilitation, mentoring on alternative practices, etc). The purpose is to bridge institutional mechanisms through harmonised legislations and regulations to bring about change in an effort to re-position the ‘role’ of law and cement guarantees on rights. This will serve to mainstream compliance or equal capabilities among CSOs, in order to alleviate stock-piling inequalities and move away from generalised visualisations.

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COMMENTARY

Is Money Endogenous in the Pacific Island Countries?

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Introduction

Successful conduct of monetary policy and its implementation depends on a stable relationship between money supply and monetary base. The assumption behind this relationship is that monetary base, also known as reserve money, is exogenous. In other words, the causal relationship is assumed to run from monetary base to money. This assumption was investigated by Goodhart (1984, 1994) and Howells and Hussein (1998) in the advanced countries and by McClean (1981, 1985, 1997, 1998) and Greenidge et al 2001) in the developing countries including Caribbean island countries. The empirical studies on the G-7 countries (Howells and Hussein 1998), which have flexible exchange rate regimes, established that money was endogenous. On the other hand, the results obtained from studies in the Caribbean region were mixed (Greenidge et al 2001).

In open economies with fixed exchange rate regimes, the central bank ends up in times of balance of payments surplus purchasing foreign exchange from exporters at the fixed exchange rate, which increases international reserves and also the monetary base by the same amount. When there is a deficit in the balance of payments, the central bank sells foreign exchange at a fixed exchange rate and in the process reduces its international reserves and monetary base by the same amount. Thus, monetary authorities have
no discretion to change the monetary base at will, thus rendering it as an endogenous variable. The implication is that with fixed exchange rates, domestic monetary authorities cannot control their own money supplies (Pierce and Tysome 1985, 36).

McClean (1998, 1985) concluded that narrow money in Barbados had a causal predominance over reserve money and therefore, monetary base in an open economy could be endogenous. Greenidge et al. (2001), however cautioned that such a conclusion could not be generalised for all the open island economies in the Caribbean region. Jayaraman and Ward (2003) in their study on Fiji, a Pacific Island country (PIC) with an open economy under a fixed exchange rate regime, observed that there was a two-way causal relationship between Fiji’s monetary aggregate and monetary base.

The objective of this commentary is to examine whether any generalisation could be made in respect of all six Pacific island countries, which have their own independent currencies. The countries chosen are Fiji, Samoa, Solomon Islands, Tonga and Vanuatu, all of which have fixed exchange rate regimes; and Papua New Guinea (PNG), which has adopted a flexible exchange regime since 1994. There are no studies on Pacific islands on the lines of a regional study similar to Greenidge et al (2001). The only study available is on Fiji (Jayaraman and Ward 2003), which is related to an earlier period 1980-2001. In the present study, a more recent period for all the relevant countries, including Fiji is covered. The remainder of the article is organised as follows: the second section outlines the methodology adopted for the empirical analysis, the third section reports the results and the third and last section presents a summary and conclusions.

**Data and Methodology**

The variables for the econometric analysis include narrow money (M1) representing currency and checking deposits; broad money (M2) representing M1 plus savings and time deposits and reserve money (RM) consisting of currency held outside the banks and reserves kept by commercial banks with the monetary authority.

The period of analysis varies in respect of each country as dictated by availability of data, which are drawn from IMF (2008). For Fiji, PNG,
Samoa and Solomon Islands the period covered is 1980 to 2007; for Tonga the period covered is 1983 to 2007 and for Vanuatu 1981 to 2007. The number of quarterly observations for the data series of Fiji, PNG, Samoa and Solomon Islands is 112; the number of quarterly observations for data series for Tonga is 74; and Vanuatu is 106. The variables were transformed into logs for the empirical analysis for checking unit roots and testing the presence of a long-term relationship or cointegration between the monetary aggregates and reserve money.

The equation reflecting the long-term relationship to be estimated is:

\[
LM_t = \beta_0 + \beta_1 LRM_t + e_t
\]

where

\[
LM = \log M1 \text{ or } \log M2, \text{ as the case may be;}
\]

\[
LRM = \log \text{ of reserve money;}
\]

\[
e \text{ is the Gaussian error term; and}
\]

\[
t = \text{ time period}
\]

In order to examine the endogeneity of money in six PICs, the study uses a few econometric techniques, namely Augmented Dickey-Fuller (ADF) and Ng-Perron unit root tests, the Johansen and Juselius (JJ) cointegration procedure, and Granger’s causality test within vector error correction model (VECM). ADF and Ng-Perron tests are used to examine the order of integration of each time series. The cointegration test is applied to examine the long-run relationships between monetary aggregates and reserve money, while the Granger causality test is aimed to investigate the short-run dynamic causal relationship between them.

**Cointegration Test**

When monetary aggregates and reserve money become stationary after first differencing (that is, integrated of order one), they may have linear combinations and cointegrated in the long-run (Granger, 1981). The next step is to apply cointegration techniques to examine whether there appears a long-run stable relationship between monetary aggregates and reserve money. In this analysis, we use the JJ (Johansen and Juselius 1990) framework of testing...
for the existence of cointegrating vector. The JJ cointegration procedure applies a system approach to cointegration that enables determination of up to \( r \) linearly independent cointegrating vectors \((r \leq m-1)\), where \( m \) is the set of variables used for cointegration. The cointegration equation is constructed as follows:

\[
\Delta Z_t = \Pi Z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Z_{t-i} + BX_t + \varepsilon_t
\]

(2)

where \( \Pi = \sum_{i=1}^{p} A_i - I \), \( \Gamma_i = \sum_{j=i+1}^{p} A_j \), \( Z_t \)

is a \( k \)-vector of \( I(1) \) variables, \( X_t \) is a \( d \)-vector of deterministic variables, and \( \varepsilon_t \) is vector of white noises with zero mean and finite variance. The cointegrating equations are reflected by the rank of the coefficient matrix \( \Pi \). This cointegration technique is to estimate the \( \Pi \) matrix in an unrestricted model, then test the restrictions implied by the reduced rank of \( \Pi \).

In order to examine the number of cointegrating vectors, the JJ cointegration technique provides two types of likelihood ratio tests. The first test is based on the trace test and the second test is based on the maximum eigenvalue test. We use both test statistics to examine the long-run relationship between monetary aggregates and reserve money.

**Granger Causality Test**

Engle and Granger (1987) demonstrate that once variables are found to be cointegrated, there should be a corresponding error-correction representation in which the short-run dynamics of the variables in the system are influenced by deviations from equilibrium. Accordingly, it is implied that changes in the dependent variables are a function of the level of disequilibrium in the cointegrated relationship (captured by the error-correction term), as well as, changes in other explanatory variable(s).

Given that \( M1 \) and \( RM \) are cointegrated, the Granger representation theorem suggests that the dynamic relation between these variables should be
examined within the framework of vector error correction model (VECM), and the system of the short-run dynamics of M and RM is:

\[
\Delta LM_t = \gamma_1 ECT_{t-1} + \sum_{i=1}^{k} \theta_{1k} \Delta LM_{t-k} + \sum_{i=1}^{k} \theta_{2k} \Delta LRM_{t-k} + \mu_{1t} \tag{3}
\]

\[
\Delta LRM_t = \gamma_2 ECT_{t-1} + \sum_{i=1}^{k} \pi_{1k} \Delta LM_{t-k} + \sum_{i=1}^{k} \pi_{2k} \Delta LRM_{t-k} + \mu_{2t} \tag{4}
\]

where \( ECT_{t-1} \) is the error correction term obtained from the cointegration equation, \( \gamma_1, \theta \) and \( \pi \) are estimated parameters, and \( \mu \) is stationary random processes with zero mean and constant variance. Granger (1988) notes that ECM provides two channels through which Granger causality can be detected. In the cointegrated system above [Equation (3)], LRM does not Granger cause LM if all the \( \theta \)'s are jointly insignificant or \( \gamma_1 \) is statistically insignificant. Specifically, this hypothesis of no causality from LRM to LM can be formulated as \( H_0: \theta_{ji} = 0 \) and \( \sigma_1 = 0 \) Conversely, the hypothesis of no causality from LM to LRM can be expressed as \( H_0: \pi_{1i} = 0 \), for all \( i \).

Results and Interpretations

The first step is to examine the order of integration of each series. It is important to check the stationarity properties of each variable as both the cointegration and Granger causality tests require all series must be I(1). The results of the augmented Dickey-Fuller (ADF) and Ng-Perron tests are shown in Table 1. Both unit root tests give similar results. The null hypothesis of non-stationary cannot be rejected in levels at the 5% significance level. The null hypothesis, however, can be rejected for all variables in first difference at the 5% significance level. Moreover, the tests suggest a possible deterministic trend for all series. This indicates that monetary measures (M1 and M2) and reserve money (RM) are I(1).

These findings testify that the cointegration test is a good starting point for examining the existence of long-run relationship between these series. The results of cointegration test between narrow money (broad money) and reserve money are reported in Table 2. The test shows that there is a single cointegrating vector for each one of six PICs, at 10% significance level or better.
The sign of reserve money (RM) on monetary aggregates is shown in Table 3. For narrow money (M1), the sign is positive and statistically significant for all PICs, which would suggest that a rise in the reserve money would lead to a higher narrow money in the long-run. The long-run estimated coefficients of reserve money on M1 show that an increase in reserve money by 1%, other things being constant, leads to an increase in M1 ranging from 0.7089% (Vanuatu) to 2.8267% (Samoa). Similarly, we find that there exists a strong positive relationship between broad money (M2) and reserve money for all PICs, and the estimated coefficients are ranged from 0.6178% (Vanuatu) to 3.9541% (Samoa). These findings are consistent with a priori expectations, which suggest that reserve money has a significant and positive effect on monetary aggregates in the long run.

As regards four other PICs, namely PNG, Samoa, Solomon Islands and Tonga, the test results confirm the existence of causality linkage running from reserve money to monetary aggregates (both M1 and M2). In all the four PICs, the ECTs in the equations with monetary aggregates as dependent variables have not only the theoretically expected negative signs but they are also statistically significant. However, the coefficients of ECTs in the equations with reserve money as dependent variable, are found statistically not significant, ruling out any causality linkage running from monetary aggregate to reserve money. The results confirm that money supply is exogenous in PNG, Samoa, Solomon Islands and Tonga and the causality linkage runs only from reserve money to monetary aggregates.

The existence of a long run equilibrium relationship between monetary measures (M1 and M2) and reserve money indicates that causality relationship must appear in at least one direction (Engle and Granger, 1987). Hence, we proceed to estimate a Granger causality test in examining the dynamic linkages of the variables in the short-run. Granger causality test within VECM model is estimated for those countries with a long run equilibrium relationship. The results of VECM estimation are shown in Table 4.
Table 1: The Results of Unit Root Tests

<table>
<thead>
<tr>
<th>Variable / Country</th>
<th>ADF test</th>
<th>Ng-Perron test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>First Difference</td>
</tr>
<tr>
<td></td>
<td>Constant, without trend</td>
<td>Constant, with trend</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fij i</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>0.36 (0)</td>
<td>-3.06 (2)</td>
</tr>
<tr>
<td>M2</td>
<td>-0.36 (0)</td>
<td>-1.10 (0)</td>
</tr>
<tr>
<td>RM</td>
<td>0.57 (3)</td>
<td>-2.84 (6)</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>1.92 (0)</td>
<td>-2.51 (0)</td>
</tr>
<tr>
<td>M2</td>
<td>2.92 (0)</td>
<td>-0.67 (0)</td>
</tr>
<tr>
<td>RM</td>
<td>1.00 (3)</td>
<td>-2.87 (3)</td>
</tr>
<tr>
<td>Samoa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>-1.46 (3)</td>
<td>-2.98 (7)</td>
</tr>
<tr>
<td>M2</td>
<td>-2.33 (0)</td>
<td>-3.37 (6)</td>
</tr>
<tr>
<td>RM</td>
<td>-2.34 (2)</td>
<td>-2.05 (2)</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>-0.18 (1)</td>
<td>-2.06 (0)</td>
</tr>
<tr>
<td>M2</td>
<td>0.45 (0)</td>
<td>-1.21 (0)</td>
</tr>
<tr>
<td>RM</td>
<td>0.37 (0)</td>
<td>-3.14 (4)</td>
</tr>
<tr>
<td>Tong a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>1.02 (7)</td>
<td>-1.26 (7)</td>
</tr>
<tr>
<td>M2</td>
<td>1.38 (3)</td>
<td>-1.28 (4)</td>
</tr>
<tr>
<td>RM</td>
<td>-1.54 (0)</td>
<td>-2.18 (0)</td>
</tr>
<tr>
<td>Vanuatu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>-0.60 (1)</td>
<td>-3.41 (0)</td>
</tr>
<tr>
<td>M2</td>
<td>-2.57 (2)</td>
<td>-3.16 (2)</td>
</tr>
<tr>
<td>RM</td>
<td>-0.81 (3)</td>
<td>-3.02 (4)</td>
</tr>
</tbody>
</table>

Note: The ADF critical value at 5% level is –2.9640 and –3.5629 for constant without trend and constant with trend regressions, respectively. These critical values are based on McKinnon. The optimal lag is selected on the basis of Akaike Information Criterion (AIC). The Ng and Perron critical value is based on Ng and Perron (2001) critical value and the optimal lag is selected based on Spectral GLS-detrended AR based on SIC. The null hypothesis of the test is: a series has a unit root. The figures in brackets denote number of lags. The asterisk ** denotes the rejection of the null hypothesis at the 5% level of significance.
Table 2: Johansen Cointegration test

<table>
<thead>
<tr>
<th>Country</th>
<th>Null Hypothesis</th>
<th>Narrow Money (M1)</th>
<th></th>
<th>Broad Money (M2)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Trace Statistic</td>
<td></td>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Eigenvalue</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Statistic</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiji</td>
<td>r=0</td>
<td>26.5542***</td>
<td></td>
<td>13.5559*</td>
<td>12.9435*</td>
</tr>
<tr>
<td></td>
<td>r≤1</td>
<td>0.3319</td>
<td></td>
<td>0.6123</td>
<td>0.6123</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>r=0</td>
<td>17.1633**</td>
<td></td>
<td>15.2034*</td>
<td>13.7595*</td>
</tr>
<tr>
<td></td>
<td>r≤1</td>
<td>1.0443</td>
<td></td>
<td>1.4438</td>
<td>1.4438</td>
</tr>
<tr>
<td>Samoa</td>
<td>r=0</td>
<td>15.4577*</td>
<td></td>
<td>13.4351*</td>
<td>13.4233*</td>
</tr>
<tr>
<td></td>
<td>r≤1</td>
<td>0.4620</td>
<td></td>
<td>0.0117</td>
<td>0.0117</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>r=0</td>
<td>14.6579*</td>
<td></td>
<td>16.3996**</td>
<td>13.6889*</td>
</tr>
<tr>
<td></td>
<td>r≤1</td>
<td>0.0957</td>
<td></td>
<td>2.7107</td>
<td>2.7107</td>
</tr>
<tr>
<td>Tonga</td>
<td>r=0</td>
<td>20.0533***</td>
<td></td>
<td>30.7949***</td>
<td>28.1522***</td>
</tr>
<tr>
<td></td>
<td>r≤1</td>
<td>0.2423</td>
<td></td>
<td>2.6426</td>
<td>2.6426</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>r=0</td>
<td>19.3858***</td>
<td></td>
<td>14.7637*</td>
<td>14.3190**</td>
</tr>
<tr>
<td></td>
<td>r≤1</td>
<td>0.7674</td>
<td></td>
<td>0.4447</td>
<td>0.4447</td>
</tr>
</tbody>
</table>

Notes: \( r \) is the number of cointegrating vectors. *, ** and *** denote rejection of the null hypothesis at the 0.10, 0.05 and 0.01 significance levels, respectively.

Table 3: Normalised Coefficient between Monetary Aggregates and Reserve Money

<table>
<thead>
<tr>
<th>Country</th>
<th>M1</th>
<th>RM</th>
<th>M2</th>
<th>RM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>-1.0000</td>
<td>1.1291*** [47.4913]</td>
<td>-1.0000</td>
<td>0.8951*** [15.7519]</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>-1.0000</td>
<td>1.0578*** [20.2283]</td>
<td>-1.0000</td>
<td>0.8521*** [14.7299]</td>
</tr>
<tr>
<td>Samoa</td>
<td>-1.0000</td>
<td>2.8267*** [4.17947]</td>
<td>-1.0000</td>
<td>3.9541*** [3.82573]</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>-1.0000</td>
<td>1.0473*** [13.0516]</td>
<td>-1.0000</td>
<td>0.9337*** [8.59100]</td>
</tr>
<tr>
<td>Tonga</td>
<td>-1.0000</td>
<td>1.1544*** [6.25521]</td>
<td>-1.0000</td>
<td>0.8242*** [4.37768]</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>-1.0000</td>
<td>0.7089*** [22.6164]</td>
<td>-1.0000</td>
<td>0.6178*** [8.75974]</td>
</tr>
</tbody>
</table>

Notes: The vectors are normalised for monetary aggregates (M1 and M2). *, ** and *** indicate significance at 10%, 5% and 1% levels, respectively. Figures in square parentheses [ ] refer to t-test statistics.

Granger causality tests show that there exists a bi-directional causality between monetary aggregates and reserve money for Fiji and Vanuatu (Table 4). The coefficients of error correction terms (ECTs) for these two countries are significant at the 10% level or better, and have a negative sign. This suggests that in Fiji and Vanuatu, money supply, (narrow and broad money) is endogenous. For these reasons, money multiplier in Fiji and Vanuatu would not be relevant, as was argued by Jayaraman and Ward (2003).
Table 4: Granger causality results based on vector error correction model for Selected PICs

<table>
<thead>
<tr>
<th>Country</th>
<th>RM-led M1 ECT</th>
<th>M1-led RM ECT</th>
<th>RM-led M2 ECT</th>
<th>M2-led RM ECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>42.5956***</td>
<td>-0.3231***</td>
<td>2.6333**</td>
<td>17.9031***</td>
</tr>
<tr>
<td>PNG</td>
<td>9.5825***</td>
<td>-0.0631*</td>
<td>1.5218</td>
<td>-0.0083</td>
</tr>
<tr>
<td>Samoa</td>
<td>2.6398***</td>
<td>0.0151*</td>
<td>0.9308</td>
<td>-0.0056</td>
</tr>
<tr>
<td>Solomon</td>
<td>6.8638***</td>
<td>-0.0522***</td>
<td>1.3578</td>
<td>-0.0143</td>
</tr>
<tr>
<td>Tonga</td>
<td>5.8885***</td>
<td>-0.3125***</td>
<td>1.1076</td>
<td>-0.0913</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>4.5342***</td>
<td>-0.2107***</td>
<td>1.9991**</td>
<td>-0.4195*</td>
</tr>
</tbody>
</table>

Note: The Wald statistic which tests the joint significance of the lagged values of the independent variables is reported. This statistic is to be compared with F-statistics. *, ** and *** denote rejection of the null hypothesis at the 0.10, 0.05 and 0.01 significance levels, respectively.

Conclusions with Policy Implications

This commentary undertook an empirical investigation asking whether there was any long-run, stable relationship between monetary aggregates (narrow and broad money) and reserve money in six PICs, namely Fiji, PNG, Samoa, Solomon Islands, Tonga and Vanuatu, which have independent currencies of their own, with specific focus on the direction of relationship between reserve money and monetary aggregate, both in the short-and long-runs.

The empirical findings are summarised as follows: (i) there is a long run, cointegrating relationship between monetary aggregates and reserve money in all PICs; (ii) the long-run coefficient of reserve money in the equation with monetary aggregate, narrow money or broad money, is significant; and (iii) it has a positive relationship with monetary aggregate for all PICs.

Resorting to Granger causality tests, we note that there is bi-directional causality between monetary aggregates and reserve money for Fiji and Vanuatu and hence the conclusion is money supply is endogenous in Fiji and Vanuatu.

On the contrary, the empirical results confirm that reserve money Granger causes monetary aggregates for PNG, Samoa, Solomon Islands and Tonga and there is no bi-directional causality relationship. Thus, money supply is exogenous in these four PICs, confirming reserve money has great predictive
power over monetary aggregates. Therefore, the four PICs can successfully aim at changes in reserves to influence changes in money supply. On the other hand, Fiji and Vanuatu cannot exclusively rely on manipulating reserve money. Indirect instruments in these two countries with a view to effecting changes in central bank balance sheets for altering money supply will not be as effective as direct instruments. The latter will work better, as they alter commercial bank balance sheets, such as credit ceilings and other restrictions.

It is worth recalling that from early 2007, following the December 2006 coup, Fiji’s central bank suspended its regular open market operations in its Reserve Bank of Fiji (RBF) Notes, which were primarily intended at influencing short-term interest rates. Instead, RBF switched on to direct measures for discouraging credit growth. This was in keeping with study findings on G7 countries by Howells and Hussein (1998) that, if endogeneity existed, policy instruments should be aimed directly at the credit counterparts of the money stock.

References


COMMENTARY

Science, Technology and Innovation and Inequality

Richard Kelly
Planning Institute of Jamaica, JAMAICA

Introduction

The results of change are often unpredictable and the very scientific and technological progress that made it possible for the human species to prosper has also exposed us to new kinds of risks. Advances in Science, Technology and Innovation (STI) have led to most of the growth and wealth gains in developed economies, but developing countries such as those in the Caribbean with a dearth of technological expertise and development continue to lag behind. Despite this, many developing countries are reaping the fruits of STI in the form of growth and welfare improvement but there is still a widening gap between industrialised and non-industrialised nations. Hence, while advancement in STI has brought tremendous benefits to developing countries, it has also led to inequalities not just between developed and developing countries, but among and within the developing countries themselves. This commentary discusses inequalities related to the use (or unavailability) of STI from the perspective of Jamaica. The main focus of the paper is on education and Information and Communications Technology (ICT). It also looks briefly at health, employment and security.

Profile of Jamaica

Jamaica is situated in the north-western Caribbean and is the largest Anglophone Caribbean island. The island boasts a tropical climate. The country’s population now stands at approximately 2.7 million persons and is a melting pot of races, with the majority of the citizens being of African descent.
The economy is heavily dependent on services, which now account for 73 per cent of GDP (Economic and Social Survey (ESSJ), 2007). Remittances, tourism, and bauxite/alumina are major foreign exchange earners. Among the current problems experienced by the economy are high interest rates, increased foreign competition, a sizable merchandise trade deficit, and high debt to GDP ratio. The average growth of GDP for the period 2002-2007 was 1.5 per cent. Just over 10 per cent of Jamaican households are below the poverty threshold (Survey of Living Conditions, 2006)

**Brief History of Inequality in STI in Jamaica**

Jamaica and other Caribbean countries have emerged from a history of colonisation and European domination. Relatedly, the use and development of science and technology (S&T) was guided by the general economic philosophy, policies and needs of the colonising European countries (the ‘mother’ countries). S&T application was thus focused almost exclusively towards pro-European socio-economic development, with little or no thought given to the local development needs of the colonies. Being stratified societies then, the use of S&T was confined to the wealthy colonial masters. Scientific knowledge was not diffused throughout the populace and therefore did not evolve as a mainstream component of Caribbean culture (Lowe, Brown & Magnus, 2000). The emphasis changed somewhat in the period of self government. It could be said that the pattern of access and use of STI is directly linked to the political evolution of the colonies. The use was limited during the period of colonisation, directed mostly towards the imperatives of the colonial masters and the dictates of the European economies. Access and use widened, though incrementally, with the “democratisation” of the colonies during and after the independence movement as the new states sought to redefine themselves. However, the roots of inequalities in S&T had already been germinated with the richer and more educated class having access to S&T and the majority of the population remaining ignorant to such knowledge and applications.

**STI in Jamaica**

Jamaica and other developing countries have been trying to use STI to boost economic competitiveness and improve the quality of life for their population. Initiatives in Jamaica in STI have included:
• Establishment of institutions for the promotion and use of STI
• Research and Development (R&D) in the agricultural sector to improve crop and livestock and production and enhance food quality.
• The use of nuclear technologies in the analysis of soil content to improve health and food quality.
• The use of ICTs to improve access to information, education and services.
• The use of Geography Information System (GIS) and Global Positioning System (GPS) technologies in identifying areas where poverty exists (for targeting resources) and mapping natural, social and economic assets.

The country consistently tries to use STI to reduce inequalities and create a better quality of life but this goal is hampered by low investments in R&D (less than 1.0 per cent of GDP), a weak research and innovation culture and inadequately developed STI infrastructure. Although access to technology is increasing, access and use is still affected by income, level of education (and training) and geographical location.

S&T Education – A Component of the Knowledge Economy

Access to knowledge and quality education is integral to creating indigenous technology, adopting and adapting foreign technologies and driving the knowledge economy. Evidence has shown that countries with high levels of education enjoy higher levels of innovation and economic growth than countries with lower levels of education. Due to access to more resources, access to technology and more individualised attention to students, the education systems in most developed countries are comparatively better than those of most developing countries. This creates disparities in the competence of developing countries to access and use technology and effectively deal with a wide range of global challenges. Inadequate resources, crowded classrooms and not enough use of an enquiry-based approach to teaching, especially in science, mathematics and related subjects, have resulted in a comparatively low performance of Jamaican students in these subjects. For example, the Economic and Social Survey Jamaica, 2008 shows that at the primary level the mean scores for mathematics and science have remained low in the Grade Six Achievement Test (GSAT) \(^1\), not having exceeded 55.0
per cent over the last five years (Figure 1).

Similarly, at the Caribbean Examination Council (CXC)/Caribbean Secondary Education Certificate (CSEC) level, performance in core science subjects\(^2\) and mathematics in CXC has remained flat or worsened over the period 2002-2007 (Figure 2).

**Figure 1. Performance of Jamaican Students in Mathematics and Science in the GSAT Examinations, 2004-2008.**

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1 Students sit 4 subjects in the GSAT exams: Mathematics, English Language, Social Studies and Science.
2 Biology, Physics and Chemistry
Disparities are also seen in performance in mathematics and science of students attending preparatory or primary schools. Students attending preparatory schools on average performed better in both subjects than those in primary schools (Figure 3). In the case of preparatory school students, the thesis is that the higher income status of their parents is an indicator of their access to and use of technology which can either aid or positively influence the learning process. Moreover, these schools might have access to technology and facilities that may be lacking in primary schools.

Disparities are also evident in the performance of students attending Upgraded 3; Technical; and Traditional High Schools where students in the latter two categories achieve higher passes in subjects such as mathematics, core science subjects and Information Technology (Figure 4). The socio-economic indicators are sharp here as Upgraded schools were initially established as part of an attempt to expand access to secondary education. The traditional high schools are of older vintage and heritage and many were established as Trust schools or by the church to educate the local gentry. They generally have better laboratory facilities, a history of teaching the

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3 Upgraded high schools, secondary schools established after the late 1960s to expand secondary education to the children of the poor.
sciences and draw their students mainly from the wealthier socio-economic groups. Examination of results by school highlights the strong relationship between socio-economic group and examination outcome.

Figure 3. Comparison of Performance of Preparatory and Primary School Students in Mathematics and Science in the Grade Six Achievement Test, 2008

![Bar chart showing comparison of performance in Mathematics and Science for Preparatory and Primary school students.]

This disparity in performance in the science subjects and mathematics dictates the level of competence in students leaving high schools in their ability for further education in the natural sciences and their ability to access and use technology.

At the tertiary level, the number of students pursuing undergraduate degrees in STI related disciplines has been on the increase. For instance, in academic year 2007/08 there was a 14.0 per cent increase in the number of students enrolled in the Faculty of Pure and Applied Science, University of the West Indies (UWI) and a 10.3 per cent increase in the Faculty of Health and Applied Science, University of Technology (UTech) compared to 2006/07. The number of students pursuing STI related higher degrees is also growing. However, the number of Jamaican students pursuing undergraduate and graduate studies in Engineering in the Caribbean region has remained comparatively low. In the 2007/08 academic year, for example, the number
of Jamaican students enrolled in Engineering at the undergraduate level fell to 55 which was 13 fewer than 2006/07.

**Figure 4. Comparison of Performance of Jamaican Students in selected science subjects in the CXC/CSEC May-June Examinations, 2007**

Recognising that STI is pivotal to economic development, the country has shown improvements in developing the STI infrastructure and improving the delivery of science education through a number of initiatives. Among these are:

- The move towards an enquiry-based approach to teaching science,
- The exposure of more students to science and related subjects and offering cross-faculty S&T courses at some tertiary institutions,
- Provision of more laboratory facilities and,
- Increasing use of Information and Communications Technology (ICT) for research and to aid teaching (E-learning).

In addition, the Government of Jamaica (GoJ) in partnership with the private sector has stepped up efforts in the popularisation of STI by introducing activities such as science competitions, exhibitions, internships, community outreach and awards for excellence in performance in science related subjects.
Notwithstanding these efforts, disparities still exist throughout the Jamaican education system, especially in mathematics and the science subjects which impair the country’s ability to harness STI for social and economic development and protection of its natural resources. Science is still seen as difficult and only for the brighter ‘geeks’ of the society. Unfortunately, the ‘geeks’ are disproportionately concentrated in traditional high schools. Due to the unavailability of adequate jobs within core science fields, the country has a further challenge in retaining trained S&T professionals.

The wide differential in mean annual expenditure on school and school related items points to some of the inequalities in education, some of which no doubt manifest themselves in STI outcomes shown above. The 2007 Jamaica Survey of Living Conditions (JSLC) showed, for example, that the average poor (quintile 1) household spent $40,786.80 on these expenses compared with $89,015.9 by the wealthiest quintile (quintile 5). Notably, households with students attending Secondary High Schools (most of which are Traditional) spent an average of $87,000 annually compared to mean expenditure of $72,678.5 for households with students in Technical High Schools. The regional disparity highlights this even more forcefully. Average expenditure for households in Rural Areas was $49,794.60 compared to $64,071.50 in other towns and $73,937.2 in the Kingston Metropolitan Area (KMA). In fact, rural expenditure was approximately 20 per cent less than the national average and closest to that spent by the poorest quintile.

**Information and Communications Technology**

There is now growing evidence that ICTs can play a significant role in enhancing development by reducing poverty; improving and providing access to education, healthcare and other basic services; increase business efficiency and competitiveness; and promote environmental protection. The impact of ICTs is especially being seen in developing countries where people are gaining better access to information. While there is still a wide gap in the use and access to ICTs between developing and developed countries, this gap is narrowing, especially in the area of mobile penetration. In 2007, for instance, 69.0 per cent of the world’s mobile subscribers came from developing countries (ITU, World Summit Report, 2008).
Over recent years, the GoJ has invested in expanding the ICT infrastructure in a bid to boost efficiency and production, improve telecommunications and increase access to global knowledge through the internet. Internet penetration within the country now stands at 55.3 per cent \(^4\) (Table 1). The increasing penetration rate is partly attributed to provision of services via multiple locations offering access (Planning Institute of Jamaica, 2008). Broadband penetration rate at 3.47 per cent in 2007, though comparatively, low has aided significantly in increasing access. In 2007 it was reported that 16.5 per cent \(^5\) of households have computers and of those having computers, 50.0 per cent reported having an internet connection. Households in urban areas have both a higher percentage of computer ownership and internet connection. Both ownership of computers and internet access are skewed towards the wealthier, and given the potential value of these indicators in knowledge creation, they can serve as re-enforcers of inequality. This potential impact can be counterbalanced by access to other facilities providing computer and internet facilities, including community access points.

### Table 1. Internet penetration in Jamaica for selected years

<table>
<thead>
<tr>
<th>Year</th>
<th>Users (mill.)</th>
<th>% Penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0.06</td>
<td>2.3</td>
</tr>
<tr>
<td>2002</td>
<td>0.6</td>
<td>22.4</td>
</tr>
<tr>
<td>2006</td>
<td>1.07</td>
<td>39.6</td>
</tr>
<tr>
<td>2007</td>
<td>1.23</td>
<td>45.5</td>
</tr>
<tr>
<td>2008</td>
<td>1.5</td>
<td>55.3</td>
</tr>
</tbody>
</table>

Source: International Telecommunication Union

Among the positives of the ICT expansion has been its use to enhance business efficiency and production and offer better services. For example, in a bid to provide more efficient services and information to a wider cross-section of people, the GoJ is providing online services at a number of government agencies through the E-Government Programme. In addition the financial services sector has upgraded its services through the use of ICTs to facilitate greater customer satisfaction, offer services in remote locations, reduce

\(^4\) Economic and Social Survey Jamaica 2007  
\(^5\) Survey of Living Conditions Jamaica, 2007
transaction times and boost efficiency and improve security. The rise in the number of Automated Banking Machines (ABMs) is a case in point. The number of ABMs has grown by 50 per cent since 2003 (Figure 5).

Table 2 Tele-density in Jamaica, 2000-2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Landlines</th>
<th>Mobile</th>
<th>Total</th>
<th>% Fixed line</th>
<th>% Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2 597 100</td>
<td>507 107</td>
<td>249 842</td>
<td>756 949</td>
<td>19.53</td>
<td>9.62</td>
</tr>
<tr>
<td>2001</td>
<td>2 612 500</td>
<td>511 302</td>
<td>640 449</td>
<td>1 151 75</td>
<td>19.57</td>
<td>24.51</td>
</tr>
<tr>
<td>2002</td>
<td>2 622 500</td>
<td>434 772</td>
<td>1 244 976</td>
<td>1 679 748</td>
<td>16.58</td>
<td>47.47</td>
</tr>
<tr>
<td>2003</td>
<td>2 638 300</td>
<td>450 859</td>
<td>1 576 360</td>
<td>2 027 219</td>
<td>17.09</td>
<td>59.75</td>
</tr>
<tr>
<td>2004</td>
<td>2 650 900</td>
<td>423 886</td>
<td>1 837 552</td>
<td>2 261 438</td>
<td>15.99</td>
<td>69.32</td>
</tr>
<tr>
<td>2005</td>
<td>2 660 700</td>
<td>319 000</td>
<td>1 981 464</td>
<td>2 300 464</td>
<td>11.99</td>
<td>74.47</td>
</tr>
<tr>
<td>2006</td>
<td>2 673 800</td>
<td>342 235</td>
<td>2 274 650</td>
<td>2 837 691</td>
<td>12.81</td>
<td>85.1</td>
</tr>
<tr>
<td>2007</td>
<td>2 682 100</td>
<td>370 989</td>
<td>2 691 104</td>
<td>3 062 093</td>
<td>13.88</td>
<td>100.3</td>
</tr>
</tbody>
</table>

Source: Office of Utilities Regulations and STATIN

Figure 5. Cumulative number of ABMs in Jamaica
Despite the positives, challenges still exist in providing adequate ICT infrastructure to benefit the population. The current internet platform supports mainly dial up connections which are slower and less efficient than broadband technology, and although Internet access has been rising, half of the population, especially in rural areas, are still without access. Universal access to the internet should be a priority policy goal given the ability of the Internet to diffuse knowledge throughout the population and to positively influence natural productivity and output. Both public and private sector efforts have had the effect of reducing knowledge inequality. The improved access to information that these developments have brought is perhaps the most empowering to the poor, as information can be converted to “assets” which can increase quality of life.

Health, Employment and Security

The GoJ has been taking a number of steps to improve access to health care for the Jamaican population. Examples include introduction of free health services at some public hospitals and providing better medical technologies. Medical technologies are often expensive and are usually located in selected hospitals and other healthcare facilities in urban areas which are usually better equipped than those in rural areas. This of necessity reduces access and provides a basis for inequity in the health sector. In addition, private facilities often have greater access to health related technologies because they operate as profit-making enterprises, attract different clientele and recover equipment costs through fees charged. The result is that people with higher incomes are better able to access better healthcare services.

A further problem relating to health is the insufficient capacity in the country to deal with technological risks. For instance, Jamaica has little or no capacity to identify and manage high risk technology. This problem has been made worse by access to a plethora of commodities through the globalisation process. Noteworthy is the growth in hazardous waste (including electronic waste) but the country still lacks an integrated policy and facilities to manage such waste. This has potential negative effects on the environment and on human health.

The greater use of technology in many areas that once employed manual work has put many unskilled and low skilled persons at risk of unemployment,
potentially exacerbating their poverty. Today’s economy is increasingly knowledge based so workers not only must have higher levels of education, but also the ability to adapt, learn and master new skills quickly and efficiently. This places a demand on the current education and training system to respond to the changing needs of the job market. However, while the country has seen more technology intensive production, some businesses and industries are still mired in old and inefficient technology such as seen in the country’s power generating plants. The inefficiencies in power generation, transmission and distribution partly attributed to old technology have resulted in high cost of electricity which has inhibited optimal economic development.

The GoJ also has formidable challenges in providing adequate security for the population. Inadequate resources and appropriate technology has exacerbated this situation, especially in the areas of evidence gathering and forensics. Increasing crime has not only impacted the country’s social fabric but has also had a significant effect on economic development. Digital security technology (mainly ICTs) is being used by some home and motor vehicle owners to improve safety and reduce car theft. However, affordability of these technologies is related to income and while motor vehicle security technology is more common, very few homes are equipped with security devices.

**Conclusion**

STI is fundamental in fostering economic development and global competitiveness and for advancing national development. While disparities exist between developed and developing countries, inequalities also exist within the developing countries themselves in the access and use of STI. The challenge for countries like Jamaica is to access types of technologies that are affordable and benefits can be readily transmitted throughout the society. In fact, this is a global challenge which calls for developed countries to play a greater role. The creation of national policies and mechanisms to distribute the benefits of STI throughout the populations of developing countries is needed.

**References**


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The Sir Arthur Lewis Institute of Social & Economic Studies (SALISES) is issuing a call for papers for its 11th Annual Conference to be held in Trinidad & Tobago over the period March 24-26, 2010 on the theme:

**Turmoil and Turbulence in Small Developing States: going beyond survival**

The small economies of the Caribbean and other areas are grappling with the consequences of a global financial and economic meltdown of unprecedented proportions. These consequences include falling demand for traditional products like tourism, dwindling remittances and the accompanying intensification of negative social ills like unemployment, rising criminality, overburdened health and educational facilities and the like. Many small developing economies, in the Caribbean and elsewhere, are also facing serious threats from climate change, the accompanying rising sea levels and the increase in number and ferocity of storm surges. What are the options, given the limited policy space now available to these small economies? It is to answer questions like these that the SALISES is hosting a conference on the theme indicated. Participation is open to scholars, policy makers, graduate students, professionals and all persons interested in the burning issues associated with this theme.

Papers and panels are invited on the following topics:

1. Constitutional reform, governance, democracy and development.
2. Migration and return migration in development and underdevelopment.
3. Development and maintenance of social capital as a survival strategy
4. Innovation and entrepreneurship as developmental platforms.
5. Disaster preparedness
6. The environment: coastlines, fisheries, sustainable development.
7. Climate change and small states
8. Finance, offshore banking and investment in the new international economic order
9. Fostering productivity, efficiency and international competitiveness
10. Crime, violence, repatriated criminals and regional security
11. The HIV/AIDS Pandemic, Well-being and Lifestyle Challenges
12. Issues in National and Regional Identity
13. Tourism and eco-tourism
14. Cultural industries in small states: copyright, piracy and technology
15. Caribbean Manufacturing
16. Vulnerable populations, social exclusion, poverty and inequality
17. Gender, Health, ageing and disability
18. Children and Youth
19. Sport and Culture in the developmental process.
20. Human Resources Development as a Survival Strategy
21. Macroeconomic Management in Small States

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Send abstracts of 200 words or less, or full papers (inclusive of abstracts), to:

Ms Francine Alleyne
SALISES
University of the West Indies
St. Augustine
Trinidad & Tobago
E-mail: the.salises@sta.uwi.edu

**Conference Fees**

<table>
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<tr>
<td>Academic</td>
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<tr>
<td>Students</td>
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<tr>
<td>Other (Corporate, Government etc.)</td>
<td>US$250.00</td>
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</tbody>
</table>

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