

The Construction Industry in the Economy of Barbados

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Construction is an important sector of any economy in terms of both output and employment. It tends to be even more important in developing countries, partly because the public sector is normally its major client and the government's expenditures can determine many of the characteristics of the industry. This is one of the reasons why studies have suggested that the characteristics of the industry are significantly different in a developing country from a developed country. In this light, the role of the construction industry in the economy of Barbados is examined to see how its characteristics match those suggested by the studies. Various economic statistics are examined for the economy as a whole and for the construction industry and the general characteristics discussed especially where there appear to be anomalies. The economic statistics and characteristics of the construction industry both suggest that Barbados is a developed country.

Keywords: Construction, Economy, Industry, Expenditure, GDP

1. Introduction

The statistics used in this study were obtained from the published national statistics from the Central Bank of Barbados (e.g., **CBoB 2001**), from the Caribbean Community Secretariat (e.g., **CARICOM, 2001**) and from the International Monetary Fund (e.g., **IMF, 1998**)¹. In the Figures that follow, the absolute values of some of the parameters have been scaled by factors of 10 so that the curves come together on a similar portion of the graph. The legend indicates where this has occurred. This has been done so that their *shapes* can be compared directly as the focus of interest here is not the absolute values so much as comparing the profiles of the curves and their trends.

The ways in which data have been presented in official publications of statistics have changed over time, so some figures that used to be differentiated are now aggregated or presented differently, some are new and some are no longer available. Similarly, some data streams are more up-to-date than others, so the identical time periods cannot always be examined directly. For these reasons, the data are not always complete or entirely consistent². Many of these same problems with data were reported by **Francis (1997)** in her study of

the construction industry in Trinidad and Tobago and **Lewis (1981)** in his attempt to construct an input-output table for Trinidad and Tobago.

2. Developing vs Industrialised Countries

One of the earliest and most influential studies of the economics of the construction industry in developing countries was that prepared by Duccio Turin for the United Nations Industrial Development Organization (UNIDO) in 1969 (**Turin, 1969**). In this monograph, Professor Turin concentrated initially on the place of construction in the national economy in the developing countries as compared with the industrialised countries and went on to relate the main aggregates of construction activity to the level of economic development.

One aspect that **Turin** focussed on was the relationship between the output of the construction industry and the Gross Domestic Product (GDP), and particularly the per capita measures of each. He found there to be a strong correlation between the per capita output of construction and GDP and that construction accounts to around half as much of the GDP in a

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¹ All values are presented in terms of the Barbados dollar, which has a fixed exchange rate of BDS\$2 = US\$1.

² Where values for the same period are unlike in different publications, the latest (most current) value has been used.

developing country as in a more developed one. **Turin** suggests that this may be because much of the construction work in the developing countries is carried out by the informal sector and does not get reported, as well as because the developing countries need to import construction materials and skills, and the money involved is lost to the local construction sector. By the same token, capital formation accounts for a significantly lower proportion of GDP in most developing countries as compared to the industrialised countries. This **Turin** suggests is because people and countries with higher incomes are more willing and able to invest in fixed capital formation.

As far as employment is concerned, **Turin's** analysis shows that the construction industry in a developed country employs around twice as many people as the industry in a developing country. He speculates that this may be due to under-reporting and the greater 'casualisation' of the labour force in the industry in the developing countries, particularly in the 'subsistence sector' of the economy.

3. Barbados

Barbados is a relatively small island (431 sq km) in the Caribbean region. Its population is around 275,000. The Gross Domestic Product (GDP) was just under US\$2,549 million (giving a GDP per capita of \$9,269) and its growth rate was around 1% per annum, in 2002. Barbados is described as having a 'small, open, developing' economy (**Archibald and Greenidge, 2003**) that is stable, though perhaps over-dependent on tourism. Slightly over 72% of its GDP derives from services, with 15% coming from tourism, as compared with a little over 7% from construction. Barbados has a typical unemployment rate of just less than 10% and its inflation rate is currently running at about 3% per annum. This is a brief introduction to the economy of the island which, according to the World Bank's Human Development Index, is ranked 27 in the High Human Development grouping with a GDP per capita of US\$15,560 PPP³ (**UNDP, 2003**).

The World Bank refers to low-income and middle-income economies as developing economies and the classifications for these are determined by Gross National Income⁴ (GNI) per capita. The groups are: low income (\$735 or less); lower middle income (\$736 - \$2,935); upper middle income (\$2,936 - \$9,075) and high income (\$9,076) or more. Barbados is one of the non-OECD countries that falls just into the 'high income' category. According to these classifications, Barbados is not a developing country.

3.1 Gross Domestic Product per Capita

One of the key statistics for looking at the performance of an industry is its output per individual employed in that industry - i.e., the output of the industry per capita of its employed labour force. **Turin** indicated that there is a "strong correlation between the *per capita* value added by construction and the *per capita* GDP". This correlation is demonstrated visually in **Figure 1**, which shows curves for the GDP per capita for Barbados and the output of construction per capita for those employed in the construction industry⁵ over the same period. It will be seen that the curves track one another reasonably well, but that the output per capita in construction is significantly lower than the national average.

This means that the construction industry is less efficient or productive than industry generally as the output per employee is significantly less than in other industries. The trend appears to be that this gap is widening. In theory, what should happen under these circumstances (in a reasonably efficient market) is that labour should migrate from construction into more productive industries, unless there is some factor that prevents this movement. It is likely that the reason why this has not happened is that the unemployed construction labour is relatively unskilled or at least that the skills of the individuals involved are not easily transferable to other industries. It is also possible that the other industries are working at or close to their capacity (or, at least, their short-term desired capacity),

³ PPP means Purchasing Power Parity and is the rate of currency conversion that equalises purchasing power of different currencies (**Anand and Sen, 1994**). It will be noted that the PPP GDP per capita is considerably higher than the nominal GDP per capita in current dollar terms.

⁴ This is calculated using the World Bank Atlas method.

⁵ Output and GDP are both measured at factor cost in current prices.

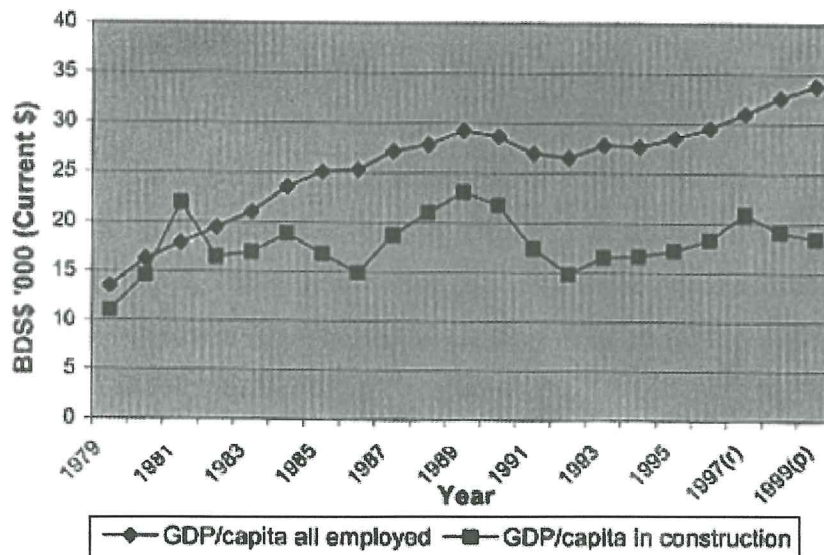


FIGURE 1: GDP Per Capita

and so there are no other jobs available for the construction industry workers who would otherwise transfer, and, given that the economy has unemployment levels running at around 9% (BGIS, 2003), this does seem likely to be the case.

It will also be seen in **Figure 1**⁶ that the variability of the GDP per capita in construction is significantly greater than in industry generally. This would be as expected from a Keynesian perspective, where the variations in the output of the engineering/construction industry would reflect the variations in the economy as a whole, but in an exaggerated manner. In other words, the industry exhibits business cycles that have more violent booms and busts than the economy in general. Except for the early 1980s, the curves in **Figure 1** have a similar sort of shape, with both curves peaking around 1989, followed by troughs that bottom out around 1992, and fairly consistent growth thereafter. There was a significant peak in construction around 1981 that is not reflected in the economy as a whole, so extraordinary circumstances must have been responsible. It is not coincidental that Barbados was hit in 1980 by Hurricane Allen⁷, which necessitated significant construction work to repair and

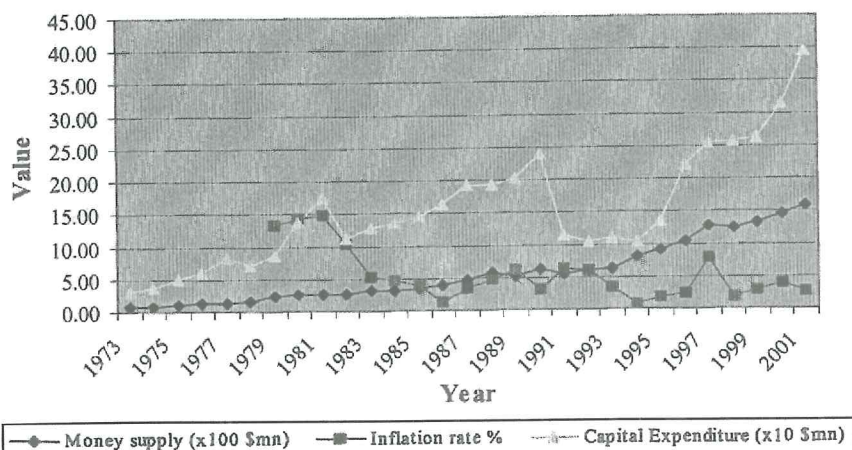
replace damaged structures. This in itself was a significant boost for construction, but setback for the rest of the economy. In light of this, it is surprising that, as will be seen later, there was a dip of around 25% in employment in construction between 1980 and 1981⁸, and a significant recovery afterwards in 1982. A reduction of this magnitude in the labour force while keeping output levels more or less constant would cause a peak in the output per employee (as shown in **Figure 1**), and this is reinforced by the fact that inflation held steady at around 14% in 1981, before falling by around 25% (to 10%) in 1982. In other words, in 1981, there was strong price inflation and a major dip in employment that together could explain the peak in output per worker in the industry.

One would normally expect the output per capita curves to follow much the same shape, as indicated by **Turin**, as they respond to much the same sort of changes in the technological and economic environments. The extra 'bumpiness' of the construction output per capita curve may be explained by a number of factors such as, among other things, differential changes in technology, changes in employment patterns or 'stickiness' of employment

⁶ Note on all Charts where it is relevant, (r) = revised and (p) = provisional figures.

⁷ Allen was a Category 3 hurricane that passed close to Barbados in August 1980, with 125 mph winds which caused heavy damage, including destroying about 35 houses and damaging 200 more (Barbados, 2003). In 1995, Hurricane Marilyn also passed just to the north of Barbados with 75 mph winds, but it only caused minor damage.

⁸ This dip in employment at a time of increased work for the industry can perhaps be explained by the local tendency for self-help type construction. Construction workers whose homes were damaged would tend to try to fix their own homes first, even if this meant leaving their jobs.



Note: Capital expenditure is by central government.

FIGURE 2: Money Supply, Inflation and Public Capital Expenditure

(the tendency for people not to be laid off when economic conditions may suggest it would be appropriate) rather than by inherent dissimilarities in the response of the construction industry and the economy in general. The reference period was one of intense technological change fired by the dramatic growth in the use of microelectronics and various forms of information technology (IT). Anecdotal evidence suggests that the construction sector was relatively slow to respond to the full range of opportunities offered and this may have either delayed or affected the way the industry responded. In other words, the output per capita of the construction sector may have reacted differently than other sectors to the technological changes induced by microelectronics and IT.

By the same token, the economy of Barbados is heavily dependent on tourism which typically contributes about 15% of GDP, compared with around 7% from construction (BGIS, 2003). The factors that drive tourism are generally different from those that drive construction so the sectoral responses to the same stimulus will be different. For example, the effect of a hurricane hitting Barbados⁹ will be to cause a major downturn in tourist arrivals, but it would be likely to lead to a surge in construction spending.

There is a very active 'informal' sector in Barbados that may represent between a quarter and one-third of the economy¹⁰. The construction sector will certainly account for a proportional share of this, with people doing a significant amount of building for themselves and in self-help groupings. It is not clear how much this activity is reflected in any of the national statistics, except that the physical inputs will be purchased in the normal way and should show up in the figures for the expenditure on the GDP.

As shown in Figure 2, there were peaks in capital expenditure by the central government in 1982, 1991 and 1997 and in inflation around 1982, 1989, 1992 and 1997. This seems to suggest that there is a link between high levels of public sector capital spending and inflation, which does seem reasonable. Because construction is 'materials-intensive', one would expect its output value to be sensitive to changes in the cost of material inputs, and hence to the inflation rate. Thus, the patterns of peaking in construction output and the inflation rate should be linked and in this case, although not entirely aligned, they are similar. The peaks in inflation around the early 1980s and 1990s match peaks in construction output at the same times, as can be seen in Figure 2.

⁹ The historical record shows that Barbados was affected by hurricanes or tropical storms that came closer than 60 miles from the coast 43 times in 133 years to the end of 2003. The precise years in which Barbados was affected since 1970 are: 1970 tsbr, 1974 tsbr, 1979 br, 1980, 1986 tsbr, 1987 tsbr, 1988 tsbr, 1995 br, 2001 ts, 2001 tsbr, 2002 tsbr (where 'br' indicates a brush with the storm and 'ts' indicates a tropical storm rather than a hurricane). Only Allen in 1980 caused significant damage.

¹⁰ There are significant variations in the estimates of the size of the informal sector in the countries of the Caribbean region, much of which is accounted for by differences in the definition of the sector. Some estimate that the sector accounts for half of recorded income. More conservative estimates have put the size of the sector in Jamaica, for example, at approximately 35% of GDP in recent years (Atchoarena and McArdle, 1999).

The industry is also labour-intensive, so it is also sensitive to wage increases. However, wages were constrained for most of the 1990s as a result of a 'structural adjustment programme' introduced in 1990 in response to the serious balance of payments problems experienced by Barbados in the late 1980s and early 1990s. As a result, there were no 'wage-push' effects causing the output value to increase.

The other curve on **Figure 2** shows the growth of the money supply. Normally, one would expect the inflation rate to directly reflect changes in the money supply, but the inflationary peak around 1980 seems to have no relation to changes in the money supply. It is possible that the minor peaks in money supply around 1988, 1990 and 1997 show up in the inflationary peaks in 1989 and 1991 and 1997. **Tse and Raftery (2001)** investigated the relationship between the money supply and construction output and determined that there is a specific and strong causal relationship between the construction activity and the broadly defined money supply M3, and that positive money-supply shocks have a larger effect on construction output than negative money-supply shocks. The lead up to the minor peaks in money supply in 1989, 1991 and 1997 do seem to have prompted surges in construction activity leading up to the peaks in 1989 and 1997. In 1991, there was a foreign currency crisis and severe cutback in government capital expenditure that prevented the construction sector from responding to the increased money supply.

The role of public sector expenditure on construction projects was examined by **Akintoye and Sommerville (1995)**, who suggested that government could use such capital investments to fine-tune the economy in times of 'overheating' by adjusting project start dates or by changing their durations. **Figure 3** shows the central government's capital expenditure, which is an indicator of public sector expenditure on construction, as well as the total GDP (at factor cost) and the output of the construction sector. It can be seen that the shape of the two curves is similar, but that the industry output curve appears to lag behind the capital expenditure by two to three years. This may be explained by public sector spending being budgeted for at the initiation of new projects, but that the expenditure is not immediate, or that the initial project provokes follow-on expenditures in the private sector. For example, a major public sector infrastructural improvement project may cause private sector development that would not otherwise have been economically viable. This developmental work would naturally lag some two to three years behind the public sector improvement work.

In **Figure 3**, it can also be seen that the construction industry reflects the booms and busts of the business cycles seen in the economy as a whole. It can also be seen that the output of the construction sector has gradually been falling behind that of the rest of the economy. It is not clear whether this relative decline of the construction sector is an indication of a

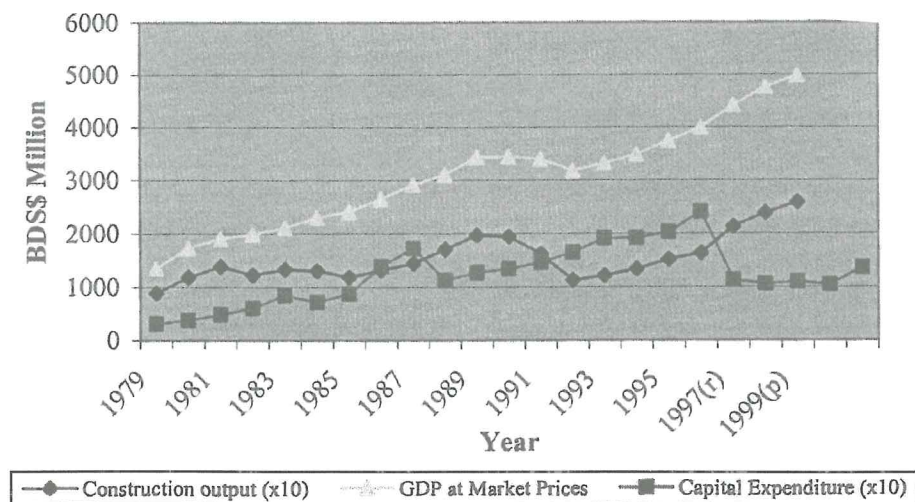


FIGURE 3: Construction Output, GDP and Capital Expenditure

relative deterioration in construction productivity or to the comparative advance of other sectors. Those in the industry suggest that the industry has not declined relative to other industries, but that the structure of its output has changed. It is producing less in volume terms, but it is a higher quality of output (personal communication). Limitations on the availability of suitable land and delays in approvals are restricting the ability of the industry to grow as fast as other sectors and thus the total output of the industry is being restricted.

It is also notable that there is no apparent lag between the peaks and troughs in construction output and those of the GDP for the economy at large. The same is true for Trinidad and Tobago where there is also no apparent lag in response (Lewis, 2003), although in other parts of the world, it is quite common for there to be a lag, as, for example, in Turkey where construction lags behind the rest of the economy by around nine months (Birgonul and Ozdogan, 1999) and in Australia where it is 'between two and three quarters' (De Valence, 1999).

As Figure 4 shows, public building represents around 20% of all building activity, but it has fluctuated between just over 10% and just below 30% of all activity. There was a general decline in the Barbadian economy following a currency crisis in 1991 resulting in a reduction in public spending that persisted until 1995. This is reflected in the reduced share of public building as a percentage of all building. The anomalous increase shown in 1994 is more a result of a proportionately larger fall in private sector building in that year than an indication of increased public expenditures.

Turin (1969) indicated that 'in most countries, construction represents between 45 and 60% of all fixed capital formation' and as Figure 5 shows, in Barbados, this value is consistently about 60%. Thus, given that public building is around 20% of all building and that this represents some 60% of GCF and as can be seen in Figure 6, GCF currently represents around 20% of GDP, it can be seen that changes in the public sector's levels of investment impact significantly on the construction industry and both of these are highly responsive to the state of the economy as measured by the GDP.

The recession in 1991 and the resultant cut back on capital expenditure impacted immediately on

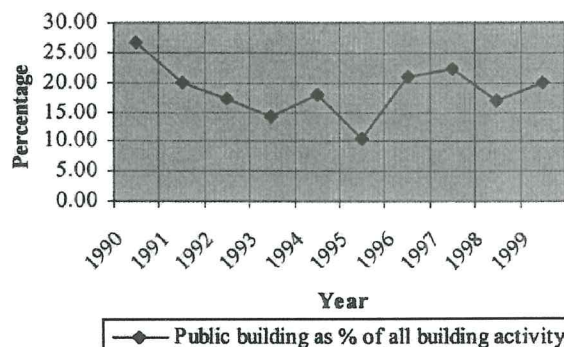


FIGURE 4: Public Building as Percentage of All Building Activity

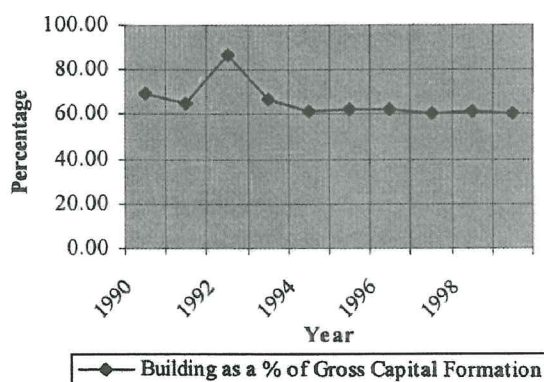


FIGURE 5: Building as Percentage of GCF

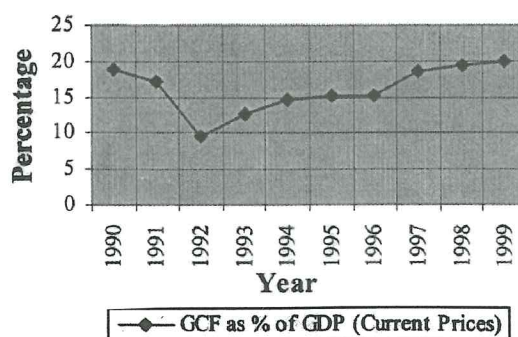


FIGURE 6: GCF as Percentage of GDP

the national levels of fixed capital formation, however, a number of public building projects had already been initiated and would have been problematic to stop, so the share of building in GCF continued to rise until it peaked in 1992 as other forms of capital expenditure were halted. The public sector was slow to start new projects in the next few years and the effect of this can

be seen in **Figure 4** where the public sector's share of building activity declined until around 1995 before it began to pick up again. As **Figure 7** shows, this is reflected in the share of construction output in GDP, which also declined until 1992 and stayed at a relatively low level (below 5%) until around 1996 when it began to climb back towards the 6% level. **Turin (1969)** indicated that this value was between 7 and 13% in most developing countries as compared with 10 - 16% in the industrialised countries.

Since the early 1980s, the economy of Barbados has been relatively healthy. The dip experienced by the economy in the early 1990s 'due to an expansionary fiscal policy and adverse exogenous factors' (**IMF, 1998**) was soon recovered and there were eight years of steady growth until 2001, when GDP contracted by 2 3/4% due largely to the terrorist attacks of September 11 and the consequent decline in tourism. The government is attempting in part to use the construction industry to help 'kickstart' the economy, as was done some years earlier by Trinidad and Tobago under similar circumstances (**Construction Industry Committee, 1992**). Between 1998 and 2002, the government progressively increased the share of expenditure on capital formation from 3.8% to 5.0% of GDP. Part of this increase in expenditure on construction was absorbed by the wage increases that occurred in 2001 and 2002.

3.2 Employment

The construction industry is often promoted in the developing countries as being an engine for growth and employment creation (**World Bank, 1984**). As a country's economic development takes place, the role of the industry tends to become more important (**Bon, 2001**), for example, it is reported that "... construction labour averaged 7.4% of the total labour force of 16 developed countries, contrasting with the average of 3.2% in 12 lower-income countries" (**World Bank, 1984**). These figures are in line with **Turin's (1969)** figures of between 6 and 10% in industrialised countries and between 2 and 6% in developing countries. Thus, the levels of employment in construction may be an indicator of the developmental status of a country and these are shown in **Figure 8**.

It will be seen that employment in construction over the past 20 years or so has varied from around 7% to over 11% of total employment. This is a

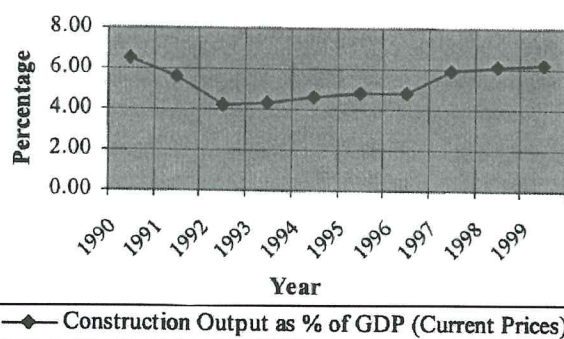


FIGURE 7: Construction Output as Percentage of GDP

relatively high range of values and would put Barbados at the upper end of the range for the more developed countries based on this criterion. The variability of construction employment is largely explained by the tendency for construction workers to be temporary. They are taken on or laid off as demand dictates. In recessionary times, government capital budgets tend to be the first to be cut and this has a direct and dramatic effect on the construction industry that, in countries like Barbados, is heavily dependent on public sector expenditures.

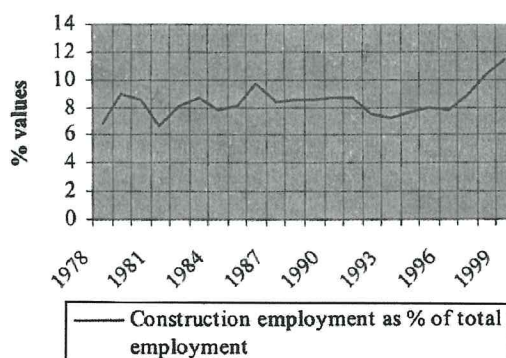


FIGURE 8: Construction Employment as Percentage of Total Employment

There is a tendency for the size of the construction labour force (both employed and unemployed) as well as the rate of employment in the sector to be much more variable than in other industries. This can partly be explained by the tendency for construction workers to be laid off or taken on as demand dictates - what has been described as a 'casualisation of the labour force' by **Wells (2001)** and **Standing and Tokman (1991)** for example. When demand falls, they are treated as if they are no longer part of the official 'construction labour force'

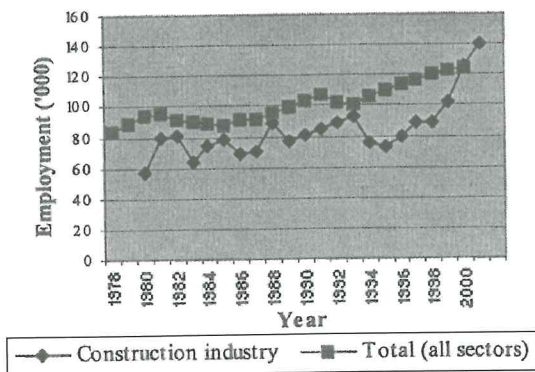


FIGURE 9: Construction Employment and Total Employment

which falls as a result, but these workers are almost immediately readily available for 'construction' work once demand returns.

The relatively rapid growth of employment, shown in Figure 9, in construction in the late 1990s took it to 11.4% of the labour force in 1999, before this levelled off at 11.0% in 2000 and 2001. This is very high according to Turin, whose studies suggested that typically, the "construction industry employs between 2% and 6% of the labour force in developing countries and between 6% and 10% in industrialised countries" (Turin, 1969). The reasons for the levels of employment in construction being such a high proportion of all employment may include the use of extra workers to offset an apparent fall in individual productivity, as well as a change in the output of the sector from new-build to renovation, repair and maintenance functions which tend to be more labour-intensive than new-build.

3.3 Index of Wages

One factor that can account for fluctuations in the output and employment levels in one industry compared with others is when there are significant changes in wage rates. Figure 10 shows an index of nominal wages in construction compared with industry in general in Barbados, using 1980 as the base year.

This shows wages increases in construction to have been running close to the national average over the period from the early 1970s, with construction wages generally less than the industry average. Recent figures for construction are not available, but there is little reason why the pattern should have changed. This Figure shows the way in which nominal wages have varied, with nominal values in 2001 being 2.4 times what they were in 1980 in real terms, the value of the wages in 2001 were still below those of 1980 (99%).

One reason why increases in construction wages should be slightly below the average for other industries could be because construction is used as a sort of 'buffer' employment for many people - as it is in other islands of the Caribbean. When there is other (better paying) employment available, the individuals will choose that first and will fall back on construction work when there is no alternative. Although there will always be a 'hard core' of construction workers who are skilled and valued by their employers and who are kept in the industry, there is also a large, basically unskilled group who are notionally in the construction industry, but whose employment depends directly on demand.

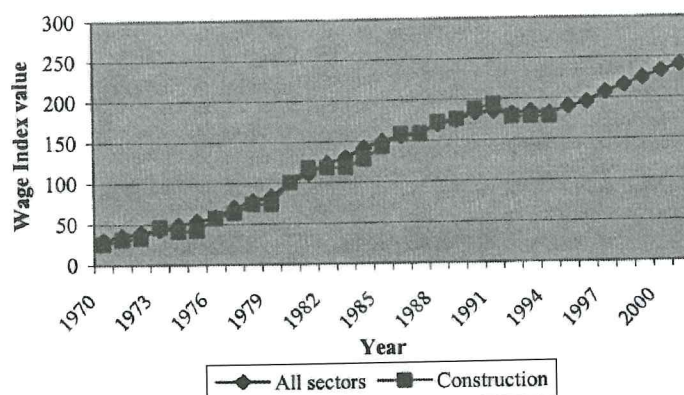
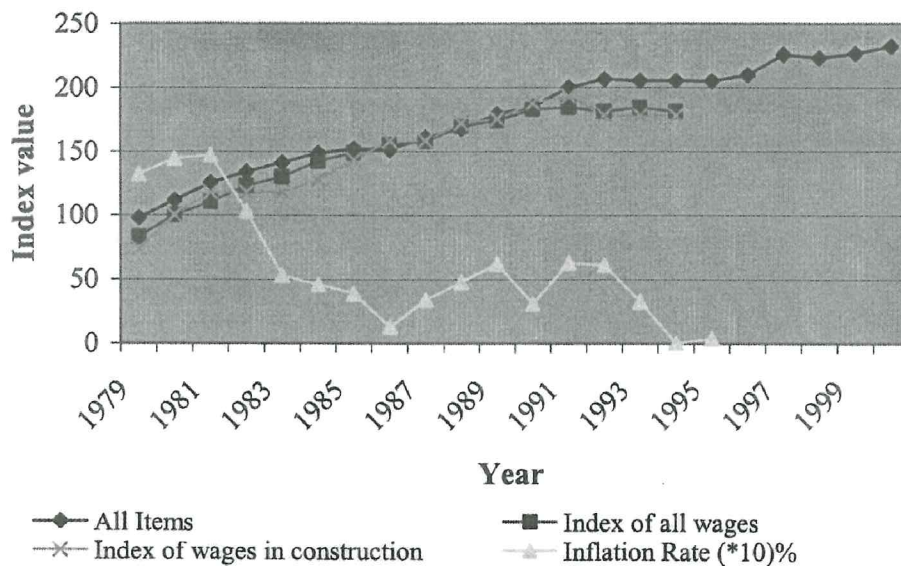


FIGURE 10: Indices of Wages

FIGURE 11: *Indices of Wages, Inflation and Retail Prices*

3.4 Index of Retail Prices

For this reason, it was of interest to examine the index of retail prices to see if it showed any significant upward or downward trend. This is shown as the 'All Items' curve in **Figure 11**. As will be seen, the all items retail price index follows much the same shape as the index of wages in the economy as a whole and as the index of wages in construction, this being a general upward trend over time, with a late levelling off in the mid-1990s. This suggests that wages and prices both react in the same way to changes in the general economy.

To see how inflation relates to these indices, the inflation rate (multiplied by a factor of 10 to better see its shape) was plotted on the same Figure. As can be seen, the inflation rate has trended downwards from around 14% in the early 1980s to around 5% in the early 1990s and to below 1% in the mid-1990s. It has since stabilised at around 2% per annum. Again, it can be seen that the variations in the all items price index bear little relation to the general inflation rate, with prices tending upwards as inflation goes down. This apparent paradox can perhaps be explained by the fact that the Barbados economy is very open¹¹ and that the variations owe more to external factors (like international inflation or the world market price for

oil), and the need to import so much, than to factors internal to the economy of Barbados.

4. Conclusions

The economy of Barbados seems to fit within most of the parameters that define a 'Developed Country'. This includes both the GDP per capita measure used by the World Bank and the Human Development Index used by the UNDP, as well as the various characteristics identified by **Turin** as being representative of a Developed Country. This suggests that the various measures are in agreement and that the relationships between the construction sector and other sectors of the economy will behave in ways typical of a developed country. This in turn should mean that construction work will change its focus from being on new construction that is typical of a developing country, to being on repair, maintenance and refurbishment that is characteristic of a more developed country. (**Bon, 2001**).

As an endnote, perhaps it should be added that the general regional perception of Barbados is not that of it being a 'developed country', but a more advanced 'developing country'. This perception is based on two main issues, the first being the number of people who are poor and struggling (despite the high average GDP

¹¹ This is exemplified by the fact that in 2000, for example, Barbados imported goods to the value of BDS\$2,312.1 million, while it exported BDS\$545.7 million (BGIS, 2003).

per capita), and the second being the undiversified nature of the economy (with the offshore financial and other business services and tourism being disproportionately large).

References

- [1] Akintoye, A. and Sommerville, J. (1995). *Distributed Lag Relationships between UK Construction Orders and output*, Construction Management and Economics, 13, pp. 33-42.
- [2] Anand, S. and Sen, A.K. (1994). *Human Development Index: Methodology and Measurement*, Occasional Paper, Human Development Report Office, UNDP, New York, also at http://hdr.undp.org/docs/publications/ocational_papers/oc12.pdf
- [3] Archibald, X. and Greenidge, K. (2003). *Debt and Fiscal Sustainability in Barbados*, Central Bank of Barbados Working Paper.
- [4] Atchoarena, D. and McArdle, T. (1999). *Reforming Training Governance: The Jamaican Experience*, Paris: International Institute for Educational Planning.
- [5] Barbados (2003). *Always a Near Miss for Barbados*. <http://www.terryally.com/vob/barbadoshit.shtml>
- [6] BGIS (2003). *Economy*, Barbados Government Information Service, see web site at www.barbados.gov.bb/bgis/business/econ.htm
- [7] Birgonul, M.T. and Ozdogan, I. (1999). *Government Effects of the Turkish Construction Industry*, in Ruddock, L. (Ed.). *Macroeconomic Issues, Models and Methodologies for the Construction Sector*, CIB Publication No. 240, Rotterdam, The Netherlands.
- [8] Bon, R. (2001). *Whither Global Construction*, (June 1992, last updated 15th May, 2001 by Will Hughes) at <http://www.eceru.reading.ac.uk/whither.html>
- [9] CARICOM Secretariat (2001). *National Accounts Digest 1990-1999*, Information and Communication Programme, CARICOM Secretariat, Georgetown, Guyana.
- [10] Central Bank of Barbados (2001). *Economic and Financial Statistics, July 2001*, Research Department, P.O. Bod 1016, Bridgetown, Barbados.
- [11] Construction Industry Committee (1992). *Report on Projects Recommended for Implementation in the Construction Industry*, National Symposium on Employment and Job Creation, Chaguaramas Convention Centre, Trinidad and Tobago.
- [12] Francis, M. (1997). *Developments in the Construction Sector of Trinidad and Tobago: Outlook for the 1990s*, Quarterly Economic Bulletin Volume xxii, No. 3, Central Bank of Trinidad and Tobago, Port of Spain.
- [13] Lewis, T.M. (1981). *Input-Output Analysis of the Construction Industry in Trinidad and Tobago*, Proc. 3rd International Symposium, CIB W-65, Organisation and Management of Construction, Vol. 2, C2, Dublin, pp. 135-151.
- [14] Lewis, T.M. (2003). *The Construction Industry in the Economy of Trinidad and Tobago*, Construction Management and Economics, (submitted April 2004).
- [15] Lewis, T.M. and Imbert, C.A.C. (2002). *Caricom Construction and Installation Services Sector - Elements for Competitive Strategies*. Caricom Regional Negotiating Machinery (CRNM), Devon House, Kingston, Jamaica.
- [16] Standing, G and Tokman, V. (1991). *Towards Structural Adjustment - Labour Market Issues in Structural Adjustment*, International Labour Organization, Geneva.

- [17] Tse, R.Y.C. and Raftery, J. (2001). *The Effects of Money Supply on Construction Flows*, Construction Management and Economics, 19, pp. 9-17.
- [18] Turin, D.A. (1969). *Industrialization of Developing Countries: Problems and Prospects - Construction Industry*, Monograph No. 2, United Nations Industrial Development Organization (UNIDO), New York.
- [19] UNDP (2003). *Human Development Report 2003*, available at http://www.undp.org/hdr2003/pdf/presskit/HDR03_PKE_HDI.pdf
- [20] Valance, G. De (1999). *Recalculation of Australian Construction Productivity using Construction Industry Survey Data*, in Ruddock, L. (Ed.) *Macroeconomic Issues, Models and Methodologies for the Construction Sector*, CIB Publication No. 240, Rotterdam, The Netherlands.
- [21] Wells, J. (2001). *Construction and Capital Formation in Less Developed Economies: Unravelling the Informal Sector in an African City*, Construction Management and Economics, 19, pp. 267-274.
- [22] World Bank (1984). *The Construction Industry: Issues and Strategies in Developing Countries*, The World Bank, Washington, 1984. ■