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TRADE & INDUSTRIAL POLICY STRATEGIES



## Services Sector Development and Impact on Poverty Thematic Working Group

### Services Sector Development: A Key to Poverty Alleviation in Mauritius

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indigenous growth

## **Services Sector Development: A Key to Poverty Alleviation in Mauritius**

**Final Report Submitted by**

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## **1. Introduction**

The services sector is increasingly seen as a means to promote economic development and reduce poverty. It is becoming the largest sector, in terms of share of GDP and employment, in most developing countries. The services sector is highly diverse, ranging, from infrastructure services such as telecommunications, construction, transportation, financial services to tourism to business services that directly affect firm competitiveness, to social services such as health or education. Infrastructure services support all types of enterprises. Education, health, and recreational services influence the quality of labour available to enterprises. Business and professional services provide specialized expertise to increase enterprise competitiveness.

As an economy develops, certain service industries or sub-sectors become more critical and drive development. Typically, utilities and construction are of initial importance in creating an economic base. Then transportation and communication services provide the economic infrastructure. Subsequently, financial and business services become more sophisticated and support ongoing growth and specialization. In parallel, there is usually a shift from low skill industries and consumer services (for instance retail services) to high skill industries supported by intermediate services (for example business services). The availability of high quality service inputs contributes both to increasing the value-added of industrial goods and to generating higher skills jobs.

In Mauritius, the services sector, contributes on average 68.5% of GDP, compared to 27.4% for the secondary sector and 4.1% by the primary sector which consists mainly of agricultural activities. The tertiary sector grew by 5.7% in 2008. All the services industries recorded increases in activities during the year. For instance, financial intermediation grew by 10.1%, transport, storage and communications rose by 6.2%, whilst real estates, renting and business grew by 7.1%. Education, which includes services provided by both public and private operators, rose by 3.4% in 2008, and other community, social and personal service activities increased by 8.3% in 2008, slightly higher than the 8.0% growth registered in 2007.

The service industry continues to be a major engine of growth in Mauritius which is driven in part by the rapid changes in information technology and telecommunications that support service delivery. In keeping with the growth in services output, service firms have also been the primary creators of new jobs, accounting for more than 80% of employment level. Service industries provide opportunities for persons with minimal resources, particularly women, to become self-employed and economically productive. The vast majority of service enterprises include very small or micro enterprises. Further, in many countries, the fastest growing component of international trade continues to be services. In Mauritius, exports of services registered a low growth of 2.6% in 2008 compared to 23.1% in 2007, mainly due to a low growth in tourist earnings in 2008.

Besides its contribution to GDP growth, employment creation and rising share of trade and foreign direct investment, the services sector needs also be of a very good quality. The main challenge that the Mauritian economy now faces is how to strengthen domestic supply capacity in services and reconcile trade, development, social, and equity considerations. Due to the difficulties in measuring services output and trade, and the resulting knowledge gaps, policy decisions are often made on the basis of very inadequate information and unsubstantiated assumptions.

Thus the aim of the study is to analyse the contribution of the services sector on economic growth and on poverty reduction in the Mauritian economy. The services sector is a booming sector but the extent to which it reduces poverty and income inequality is an empirical issue. Our first objective is to analyse the link between services sector development and economic growth. Using time series data for the Mauritian economy from 1970 to 2008, we model the rather complex relationship between the services sector and economic development. As income increases, the structure of the economy changes and there is a gradual movement from the traditional sectors namely agriculture and manufacturing to more upstream sectors like services. In this case, income drives the development of the services sector. On the other hand, the expansion of the services sector contributes to higher economic growth. In this case, it is economic growth that drives the services sector development. Causality almost surely runs in both directions. The existence of

bidirectional causality between the two variables will be tested for the Mauritian economy. Second, we examine the relative significance and contribution of the services sector on economic growth and poverty. Lastly, this study outlines several policy implications that draw upon the analysis. It provides a comprehensive assessment and analytical inputs to policy-makers on the policy options available to enhance the supply capacities and to maximize the contribution of trade, investment and growth in services to economic development, and poverty alleviation in Mauritius.

The structure of the study is as follows. Section 2 reviews the literature on the contribution of the services sector to GDP growth and poverty reduction. Section 3 analyses the data and section 4 sets out the methodology used. Section 5 presents the findings and we finally conclude in section 6.

## **2. Literature Survey**

The main difference between services and other goods depend on the nature of market transactions as well as intrinsic characteristics of services in relation to other goods (Singh, 2006). Singh (2006) further posits that nature of the market and the intrinsic characteristics of services are both subject to change as economies and technologies evolve. Hill (1977) raises the feature of non-storability of services, which requires that services must be consumed as they are produced and in a similar way. Griliches (1992) in turn defines services as anything that is the result of labour that does not produce a tangible commodity. It is precisely this absence of tangibility that leads to non-storability, and to non-transferability.

Development economists' doubts on services as a viable engine of growth and employment generation has been expressed both through theoretical and empirical analysis. This scepticism emanates from evidence of the relatively jobless nature of service sector growth, in particular in the developing countries. Economic history postulates that growth and employment in developing countries has normally been led by an open manufacturing sector, both in the traded and non-traded sectors of the economy. Growth theory accords no special role to service activities, with the

possible exception of financial and transport and telecommunication services. A second stylized fact in development economics is that the share of services in employment increases only with the rise in per capita incomes. However, given that services have become the main source of growth in both developed as well as developing countries, new empirical evaluation of this hypothesis has become crucial. Many service industries are not stagnant and have experienced significant labour and total factor productivity growth.

The economic literature has demonstrated the importance of the services sector in the process of economic growth and social development. The process of economic development is connected with systematic structural change in most countries: As per capita income rises, the primary sector loses in importance, while the manufacturing industry initially gains momentum but is eventually surpassed by the constantly growing service sector. The dual economy model attempts to explain economic growth by examining the role and relationship between the traditional agricultural sector and modern manufacturing sector. As Glasmeier and Howland (1993) point out, there exist two opposing schools of thought on the relationship between the service producing sector and economic growth. On the one hand is the view that the service producing sector can aid economic growth while on the other hand is the view that the service producing sector should not be seen as independent of, nor is it a replacement for, the traditional goods producing sector such as agriculture, mining, and manufacturing.

Empirical studies on sector growth and performance have largely been an extension of the dual economy model of Lewis (1954) and Hirschmann (1958). Fisher (1939) and Clark (1940), emphasized the shift from agriculture to industry in the course of economic growth; they in fact said little about the share of services. Kuznets (1953) concluded that the share of services in national product did not vary significantly with per capita income. Chenery (1960), when regressing the share of services on per capita income, found an insignificant coefficient on the latter, concluding that the relationship between services and per capita income is not uniform across countries. Chenery and Syrquin (1975) regressed the service-sector share of output on per capita income and per capita income squared, concluding that the relationship was concave

to the origin – that it rose with per capita incomes but at a decelerating rate. Kongsamut, Rebelo and Xie (1999) found, in contrast, the share of services in output to be linear in per capita income. Dutt and Lee (1993) use cross-section country-level data from three decades (1960s, 1970s and 1980s) to examine the relationship between the service producing sector and economic growth. They found that the effect is negative or positive depending on how the role of the service sector is measured, but argues that there is a strong case that effect is, in fact, usually negative.

Miles and Boden (2000) describe services as the ‘Cinderella sector’ which is largely ignored. They argue, however, that as the share of services in national economies continues to grow, and the linkages between services and other sectors of the economy are extended, the tendency to overlook services becomes less tenable. In a study of productivity accounts for 54 U.S. industries divided up into 25 goods producing industries and 29 services producing industries within the U.S. private nonfarm business sector for the years 1987-2001, Triplett and Bosworth (2004) argue that the bulk of the post-1995 acceleration of productivity growth was within the services producing industries. In the period after 1995, labour productivity in the goods producing industries improved, but not nearly so much as it did in the services producing industries. Multifactor productivity, moreover, accelerated strongly in services producing industries but hardly at all in the goods producing sector.

Wu (2005) examines and compares service sector developments in two Asian giant economies namely China and India. It investigates the determinants of demand for services and sheds light on the outlook for service sector growth in the two countries. The study reveals that growth in the services sector has mainly been driven by increasing specialization of production, rising standard of living and accelerated urbanization in both societies. There are also some non-economic factors which are difficult to be quantified in empirical analysis but have played important roles in service development in the two countries. These include biased development strategies in China, India’s early linkage with the West and recent boom in Indian IT exports. India’s service sector is seen as a dominant contributor to GDP growth but employment absorption is not very high whilst the service sector has been the main provider of new jobs in China where there still exists a sizable pool of rural surplus

labour to be shifted out of farming. In comparison with India, China's service sector is lagging behind. Even in international perspective, China's service sector is below the average.

Linden and Mahmood (2007) analyse the long run dynamic relationship between sector shares (agriculture, manufacturing and services) and economic growth for 15 Schengen countries in period 1970-2004. Using panel co integration techniques, there is evidence of a unidirectional causality from the growth rate of GDP per capita to agriculture share growth, but a two-way causality runs between industry share growth and growth rate of GDP per capita. The relationship between services share growth and growth rate of GDP per capita is also bi-directional. Their study confirms that feedback impacts exist between services sector and the growth rate of GDP per capita.

Busari (2007) investigates the process behind the declining contribution of the service sector to GDP using a sample of 15 countries from the ECOWA sub region over the period 1985 to 2006. Using a panel data regression analysis, the study analyses the fundamentals driving the output of the service sector as a proportion of total national output. The study observed that factors such as external debt service, domestic capital formation, and household consumption are positively related to the transformation process of the service producing sector while this process is negatively related to net inflow of foreign direct investment.

Eichengreen and Gupta (2009) identify two waves of service sector growth, a first wave in countries with relatively low levels of per capita GDP and a second wave in countries with higher per capita incomes. The first wave is made of traditional services whilst the second wave of modern (financial, communication, computer, technical, legal, advertising and business) services that are receptive to the application of information technologies and increasingly tradable across borders. They observe an increase in the share of services in GDP at all levels of income after 1970 and, in addition, of a further increase in the share of services in countries with relatively high per capita incomes. The change in the second wave is not equally evident in all countries: it is most apparent in countries that are open to trade, that are democratic, and that are relatively close to the major global financial centres.

Evidently, the stylized fact is less than clear. Despite the huge number of studies on service sector productivity and economic growth in the developed economies, there exist little studies for Sub Saharan Africa. The underdeveloped nature of the sector and the dominance of the informal sector which is largely a service producing sector accounts for the dearth of studies on the sector in Sub Saharan Africa. To the best of our knowledge there is no study assessing the impact of services sector development on economic growth and poverty alleviation in Mauritius.

### **3. Situational Analysis of the Mauritian Economy**

#### ***Trend in GDP Growth and GDP Per Capita***

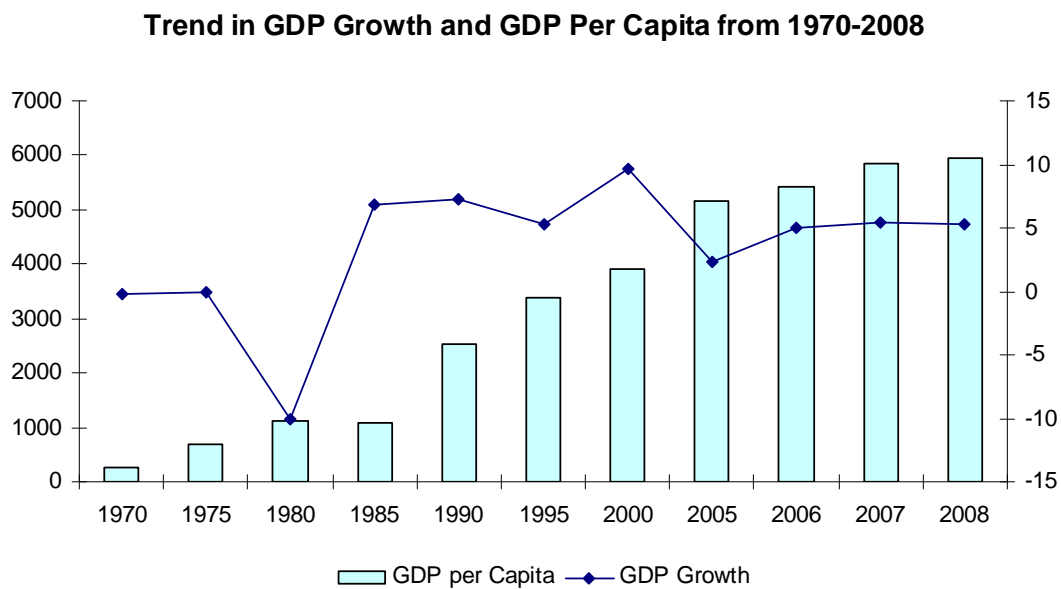
The Mauritian economy has come a long way since independence. Despite the inherent constraints of a small island state, the country has achieved remarkable economic success over the years. Back in 1968, the economy was entirely dependent on sugar exports and showed little scope for sustained economic progress and improvement in living standards. Mauritius has since evolved into an upper middle income economy. Much of this impressive economic record can be traced back to the economic diversification and development strategies adopted at distinct phases of the country's economic history.

Substantive reforms were, therefore, undertaken between 1980 and 1986 with the help of the IMF and World Bank as part of the stabilisation and structural adjustment programmes. The reform process set out to restructure and consolidate the agricultural sector as well as accelerate the development of the export-oriented Clothing and Textiles industry and the promotion of Mauritius as a select tourist destination. The average annual growth rate was 5.9 % during the 1980-90 period. The sustained period of high growth in the mid 1980s allowed a three fold increase in per capita income and a significant improvement in living standards.

From the late 1980s to the mid 1990s, the economy underwent further diversification. The development of the services sector was earmarked as an avenue for higher

growth. The establishment of a stock exchange in 1989, the liberalisation of the financial sector and abolition of exchange control, the promotion of offshore business activities and creation of a Freeport were geared toward positioning Mauritius as regional financial, business and trading hub. The three major sectors of the economy namely, Sugar, EPZ and Tourism as well as the new growth areas in Financial and Business services provided the main engines for a solid and stable growth performance. The economy grew at an average rate of 5.7 % between 1990 and 2000. However, the economic outlook turned gloomier at the start of the new century. Mauritius was faced with the challenge of adjusting to the phasing out of trade preferences in Textiles and Sugar that had underpinned much of the country's earlier economic and social progress. Increased global competition and a less favourable international economy were compounded by rising oil prices. As a result, economic growth slowed down to 4.7% per annum on average from 2000 to 2005. In 2008, GDP growth rate stands at 5.3% but growth rate is expected to fall to 2.5% in 2009 as a result of the world economic downturn. The trend in GDP growth rate and per capita GDP over the last three decades can be seen in Figure 1 below:

**Figure 1:**



## *Poverty Situation*

In Mauritius, less than 1% of the population fall below the \$1 a day poverty line. It is to be noted that \$1 a day poverty line is usually used for less developed countries where there is extreme poverty. Mauritius is an outlier in the Sub Saharan African region and by the \$2 a day poverty line, around 1.5% of the population lives in extreme poverty. In fact, Mauritius has one of the strongest economies in Africa with per capita income rising from US\$216 in 1968 to US\$5410 in 2006 and US\$6000 in 2008 (as shown in Figure 1 above). Mauritius' rapid economic progress has helped to reduce the proportion of the population living below the relative poverty line that is half the household median income (Rs 2,168 per household per month) from 28.4% in 1981 to 10.6% in 1992 and around 8% in 2008.

Since the international poverty line does not give a clear indication of the level of poverty in Mauritius, the government has adopted an income-based poverty line, which is the relative poverty line and is set at half the median monthly household income. From the latest household budget survey, the proportion of poor households living below the relative poverty line has increased from 7.7% in 2001/02 to 8% in 2006/07. By the same measure, the proportion of poor persons below the relative poverty line rose from 7.8% in 2001/02 to 8.7% in 2006/07. This can be shown by Table 1 below:

Table 1: Selected summary indicators on poverty, 1996/97, 2001/02 and 2006/07

Relative poverty	1996/97	2001/02	2006/07
Poverty line:- Half median monthly income <sup>2</sup> per adult equivalent (Rs)	2,004	2,804	3,818
Estimated number of poor households	23,800	23,700	26,900
Proportion of poor households (%)	8.7	7.7	8.0
Estimated number of poor persons	92,700	93,200	106,100
Proportion of poor persons (%)	8.2	7.8	8.7

*Source: Household Budget Survey 2006/2007, CSO, Mauritius*

<sup>2</sup> Income refers to employment income, property income, transfer income, income from own produced goods and imputed rent for non-renting households

The Mauritian government is presently implementing the ‘Eradication of Absolute Poverty’ programme. This programme covers a range of actions to give greater protection to the vulnerable groups and aims at empowering people and fighting unemployment. A total sum of US\$47 million has been recently targeted to these social programmes. The ‘Eradication of Absolute Poverty’ programme provides support to 5,000 children not attending pre-school and marginalized populations which represent some 7,000 families living in absolute poverty. It is expected there will be provision for medical screening for around 600 children of pre-primary schools in selected areas. Spectacles, hearing aids, food supplements and other facilities will be provided free to needy children.

Further, the government has strengthened the National Empowerment Foundation (NEF), which is given a key coordinating role in fighting the remnants of poverty. US\$ 17.5 million have been allotted to the NEF for the funding of its sponsored programmes namely, the functional literacy and numeracy programme and life-skills training programme. For the last decade, a number of poverty schemes namely the Trust Fund for the Social Integration of Vulnerable Groups, EU-funded Micro Project Programme for Poverty Alleviation ‘*A Nou Diboute Ensam*’<sup>3</sup> and IFAD Rural Diversification Programme among others were established. All the existing poverty alleviation programmes have been re-oriented on the basis of the participatory approach where the poor are empowered with the necessary skills to move out of the poverty trap. The main objectives of these schemes were the financing of community development programmes, micro credit schemes, social infrastructural development, and loans to needy students.

Though we may argue that poverty affects few households in Mauritius compared to other African economies, it is however important to note that those affected remains in poverty for a remarkable portion of their lifetime. It is vital to capture the dynamics of poverty by differentiating between a poverty level where there is a high-risk of becoming poor combined with a relatively high chance of leaving poverty, or

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<sup>3</sup> English Translation: ‘Let’s Stand Together’.

if the poverty level instead is due to a low risk of becoming poor combined with a low chance of leaving poverty. In the former case poverty is a relatively brief and temporary condition, while it is more persistent and chronic in the latter case. Gaining insights about the flows into and out of poverty is essential from a policy perspective; the effectiveness of different poverty reduction measures depends crucially on the nature of poverty. If poverty is more temporary, programs that aim at stabilization of short term income fluctuations are appropriate. If poverty is more persistent, there seems to be a stronger need for measures improving the long-term labour market outcomes or for social assistance.

### ***Sectoral Contribution to GDP***

The transformation of the Mauritian economic structure over time is reflected by changes in the relative contribution of the main sectors<sup>4</sup> to GDP. The primary sector has been in decline since independence. Its contribution to GDP has fallen from 23.1% in 1968 to 4.4% in 2008. This is mainly explained by the contraction of the sugar industry in GDP. Heavily dependent on climatic conditions, the sugar sector faces even more uncertainty and difficult challenges ahead as the EU Sugar Protocol becomes redundant. The drastic cut in sugar prices and the opening up of the EU market to non-African Caribbean Pacific (ACP) developing countries has been a huge set back to the Mauritian sugar industry. Its very survival will depend on the swift implementation of important reforms to reduce costs, enhance competitiveness and diversify into high value added activities such as the production of special sugars, electricity generation from bagasse and production of ethanol and spirits.

The share of secondary sector output rose from 24.1% in 1968 to 31.7% in 1996 but by 2008 it had fallen to 27.4%. The performance of the secondary sector is closely linked to the growth of EPZ manufacturing. Despite falling slightly, the contribution

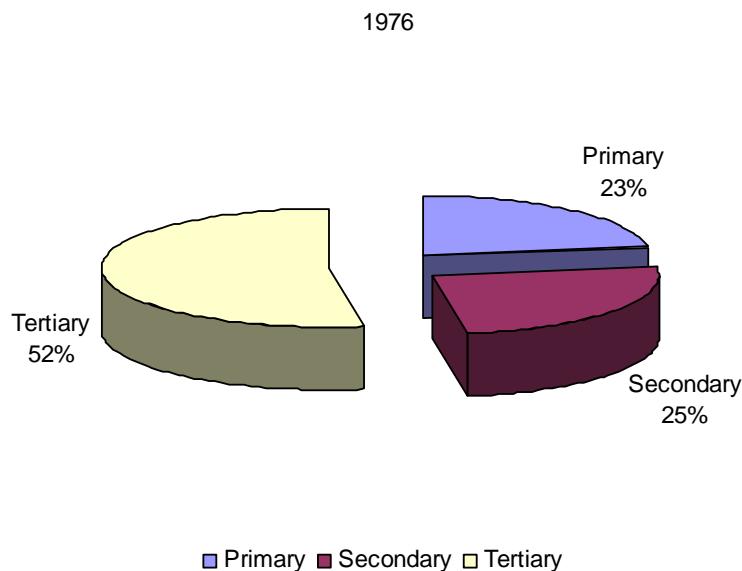
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<sup>4</sup> The primary sector includes Agriculture, Forestry and fishing and Mining and quarrying. The secondary sector comprises Manufacturing, Electricity, Gas and water and Construction. The tertiary sector covers Wholesale and retail trade, Hotels and restaurants, Transport, storage and communications, Financing insurance, real estate, and business services, Community, social and personal services including Public administration.

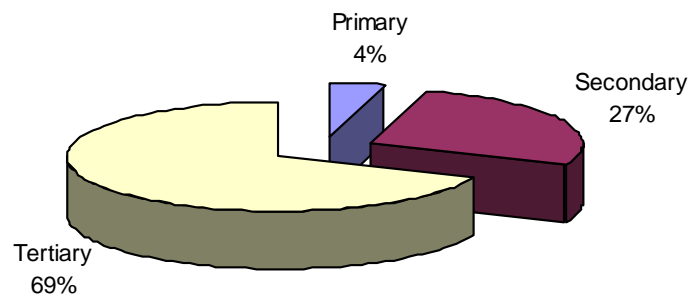
of the EPZ sector to GDP remained quite stable throughout the 1990s. However, with the phasing out of the Multi-Fibre Agreement (MFA) and the removal of restraints on the exports of low cost producers like China to the EU and US markets, the EPZ sector is facing an ever-increasing global competitive threat.

The tertiary sector has maintained a constant expansion path since independence. Its share in GDP has risen from 52.8% in 1968 to 68.5% in 2008. The increased prominence of the service sector is mainly accounted for by the growth of Tourism and Financial and Business Services. Tourism represented 8.6% of GDP in 2008 compared to a mere 1.8% in 1976. The growth rate of Financial and Business Services has averaged 3.6%, 6.3% and 7.6% over the periods 1977-1986, 1987-1996 and 1997-2006 respectively. As a result, the sector's share in GDP has increased from 15.9% in 1976 to 22.4% in 2008. The main drivers of the sector are banking, especially the offshore segment, and business activities such as accounting, management consultancy and legal services. The sectoral transformation of the Mauritian economy can be shown by Figure 2 below:

Figure 2: Shares of Primary, Secondary and Tertiary Sectors in GDP in 1976 and 2008



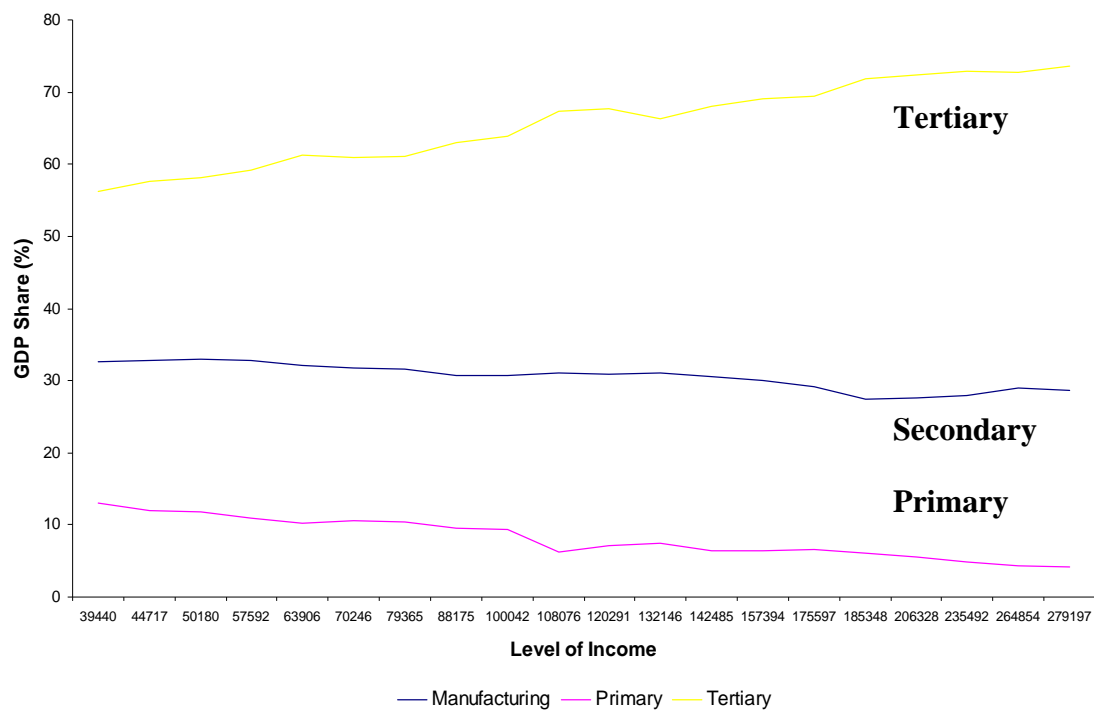
2008



■ Primary ■ Secondary □ Tertiary

From the above, we note a significant decline in the contribution of the primary sector to GDP while the tertiary sector has shown a constant improvement over the years. From Figure 3 below, it can be further observed that as the economy moved to higher income levels, the share of the tertiary sector has increased while the contribution of the primary sector has declined. The government strategy centred on further diversifying the economic base in order to propel the economy onto higher levels of sustainable development alongside the consolidation, modernisation and expansion of the existing sectors has proved beneficial over the years.

Figure 3: Economic Structure and Level of Development



The current economic set up of Mauritius is characterised by structural changes as evidenced by a lower contribution of the traditional sectors, namely sugar and textile to GDP and a corresponding larger contribution of the tertiary sector, which includes the services industries. Table 2 below presents the contribution to GDP of the main sectors from 1976 to 2009.

Table 2: Percentage distribution of GDP by industry group (main sectors), 1976-2009

	1976	1980	1985	1990	1995	2000	2005	2009
Agriculture, hunting, forestry and fishing	22.5	12.4	15.3	12.9	10.4	7.0	6.0	4.2
Sugarcane	17.8	8.1	11.1	8.0	5.7	3.6	3.2	1.7
Other	4.7	4.3	4.2	4.8	4.6	3.4	2.8	2.5
Manufacturing	15.2	15.2	20.6	24.4	23.0	23.5	19.8	19.7
Sugar	5.5	2.4	3.2	3.4	1.6	0.8	1.0	0.5
Food excluding sugar	-	-	-	-	-	4.1	5.1	7.1
Textiles and Clothing	2.6	4.3	9.5	-	-	12.0	6.7	5.0
Other	7.1	8.5	7.9	-	-	6.6	7.0	7.1
Construction	8.0	7.6	5.6	6.7	6.4	5.6	5.6	6.9
Hotels and restaurants	1.8	2.3	2.4	3.9	5.1	6.5	7.7	7.6
Transport, storage and communications	8.5	11.3	10.9	10.4	11.4	13.0	12.6	11.0
Financial intermediation <sup>1</sup>	5.7	5.0	4.7	4.9	6.5	9.7	10.3	11.5
Insurance	4.2	3.3	2.9	1.5	2.1	2.3	2.9	2.8
Banks	1.5	1.7	1.8	0.0	4.4	6.6	6.2	7.4
Other				0.0	-	0.8	1.2	1.3
Real estate, renting and business activities	10.2	12.7	11.1	8.9	8.5	8.9	10.2	11.9

Source: CSO, Mauritius

<sup>1</sup> For the years 1976, 1980 and 1985, financial intermediation includes other business activities whilst real estate involved only ownership of dwellings.

' Forecast

The significant structural change comes from the agricultural sector with a tremendous fall in the contribution of the sugar sector from 17.8% in 1976 to an expected 1.7% in 2009. This large decline is attributed essentially to the EU sugar reforms. With the EU price reduction of 5% in 2006 and a total of 36% in 2009, the overall economic weight of the sector has fallen, albeit mitigated by the emerging cane-related sector. The sugar sector's contribution to GDP is now very small.

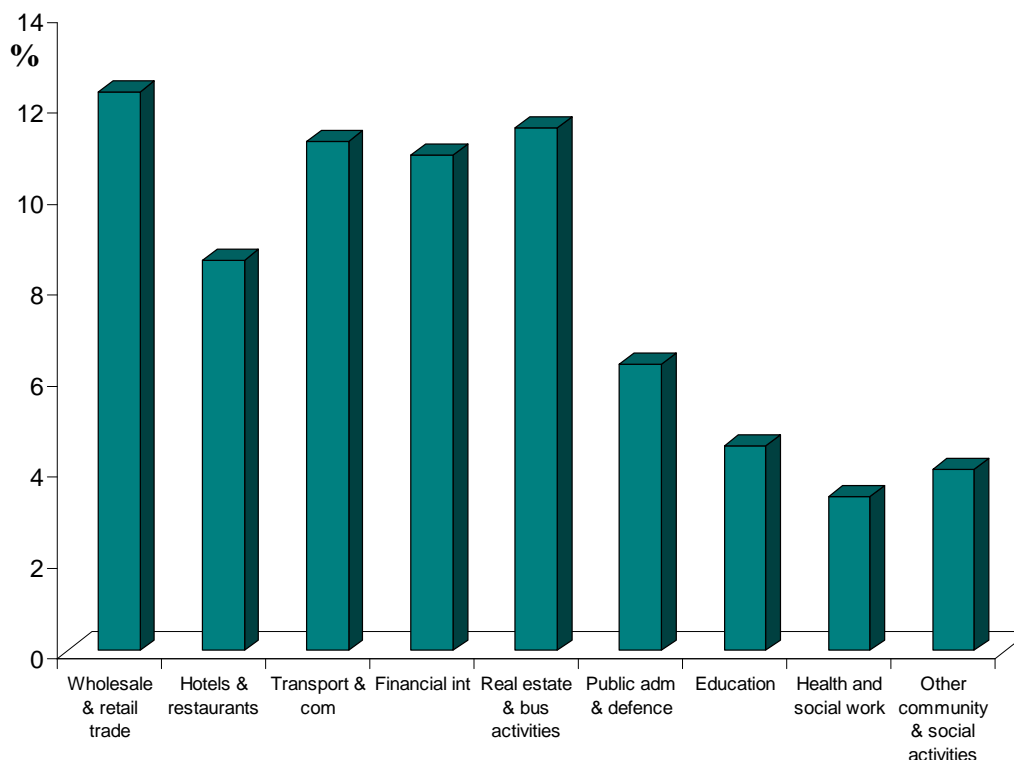
The textiles sector in particular witnessed negative sectoral growth rates over the period 2003-05, including a record 14.7% drop in 2005. This is mainly attributed to the impact of the dismantling of the Multi Fibre Arrangement. Though modest positive growth was recorded in the subsequent years, the sector is yet to recover gradually. The Construction sector contributed 5.6% to GDP in 2000 as compared to an estimated figure of 6.9% for the year 2009. It should be noted that the GDP sectoral real growth rate of the construction sector surged from 5.2% in 2006 to 15% in 2007, mainly due to the construction of projects under the Integrated Resort Scheme.<sup>5</sup>

The economy seems to be driven by the services sectors, especially activities in "Hotels and Restaurants", "Transport storage and communications", "Real estate, renting and business activities" and "Financial intermediation". As shown in table 2, the financial intermediation sector's contribution to GDP is likely to increase from 6.5% in 1995 to an expected 11.5% in 2009. The contribution of this sector to GDP has revolved around 10% since the year 2005. It has been estimated that the sector will grow further in 2009 following growths of 2.8% and 7.4% in insurance and banks respectively. Figure 4 below shows the main activities of the services sector in 2008.

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<sup>5</sup> The IRS was first enacted in August 2002. As of date, the Investment Promotion (Real Estate Development Scheme) Regulations 2007 comprises two schemes: the Integrated Resort Scheme (IRS) for large landowners (more than 10 hectares) and the Real Estates Scheme (RES) for small landowners (at least 1 arpent but less than 10 hectares). Both the IRS and the RES are targeted at non-citizens. However, the IRS involves the construction and sale of luxury residential units to foreigners and technical specifications state that it should be on freehold land of more than 10 hectares to be sold at a price exceeding USD 500,000. The RES allows small landowners to develop and sell residential property to non-citizens. The RES should be built on freehold land of not more than 10 hectares.

Figure 4: The Main Activities of the Services Sector in 2008



***Investment in the Services Sector***

From table 3 below, we observe that total domestic investment in the services sector has been rising over the years with a greater share in the tourism sector and in real estates and business activities. In 2008, local investment in real estates and tourism sector amounts to 36.7% and 22.6% respectively. The Integrated Resort Scheme (IRS) has in effect attracted huge investments both from locals and foreigners. Together with investment in the constructions of new hotels, investment in IRS has contributed positively to the development of the tourism sector. Further domestic investment in the transport sector has also been on the rise with a growth rate of 50.8% between 2007 and 2008. Wholesale, retail trade and repairs has also attracted major local investment in 2008.

Table 3: Domestic Investment in the Services Sector (1995-2008)

Domestic Investment in the Services Sector (Rs M)	1995	2000	2005	2008
Education	345	487	1,326	1,678
Financial intermediation	551	535	1,336	1,258
Health and social work	136	343	543	1,293
Hotels and Restaurants	1,172	2,791	4,193	11,920
Real estate , renting and business activities	4,843	7,244	9,509	19,357
Public administration and defence; compulsory social security	888	1,278	1,975	2,680
Transport , storage and communications	2,561	4,327	4,542	6,594
Wholesale & retail trade and repairs	1,211	2,193	2,736	5,499
Other community, social and personal service activities and private households with employed persons	440	1,065	2,349	2,508

*Source: CSO, Mauritius*

Moreover, Mauritius has also been able to attract considerable foreign investment in recent years, particularly in financial services and the tourism sector (as shown by Table 4 and Figure 5 below). The financial system in Mauritius, as in most developing economies, is still dominated by banks. For the year 2007, banks held 73% of total financial sector assets – the insurance sector accounted for 13%, non-bank deposit taking institutions for 8%. Leasing, credit finance, investment funds and other financial institutions accounted for the remaining 6%. One of the major attractions of Mauritius as a base for inward investment in several countries, especially India, China and Pakistan is its network of double taxation treaties. Mauritius has a growing network of double Tax Treaties with 33 countries<sup>6</sup>. The health sector has recently attracted FDI essentially from India with the setting up of Bramwell Apollo Hospital.

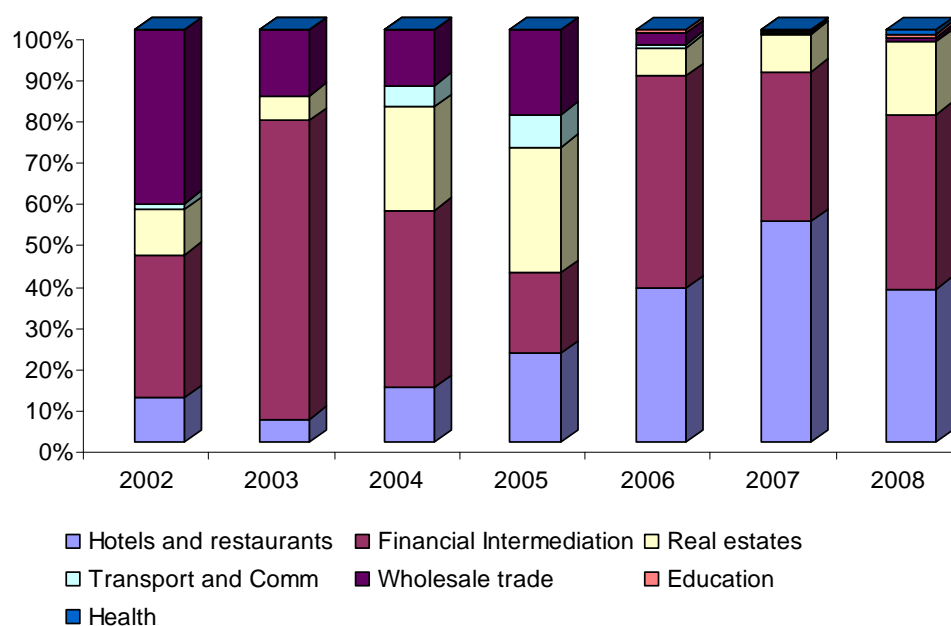
<sup>6</sup> These countries are Barbados, Belgium, Botswana, China, Croatia, Cyprus, France, Germany, India, Indonesia, Italy, Kuwait, Lesotho, Luxembourg, Madagascar, Malaysia, Mozambique, Namibia, Nepal, Oman, Pakistan, Russian Federation, Rwanda, Senegal, Singapore, Sri Lanka, South Africa, Swaziland, Sweden, Thailand, Uganda, United Kingdom and Zimbabwe.

Table 4: Foreign Direct Investment in the Services Sector (2002-2008)

Foreign Direct Investment in the Services Sector (Rs M)	2002	2003	2004	2005	2006	2007	2008
Education	-	-	-	2	55	30	74
Financial Intermediation	316	1,311	392	481	3,593	4,056	4,564
Health	-	-	-	-	2	29	120
Hotels and Restaurants	99	103	121	536	2,610	5,979	3,985
Real estates	100	109	228	759	473	1,030	1,888
Transport and Communication	13	1	47	191	56	18	22
Wholesale trade	386	288	123	510	198	38	103

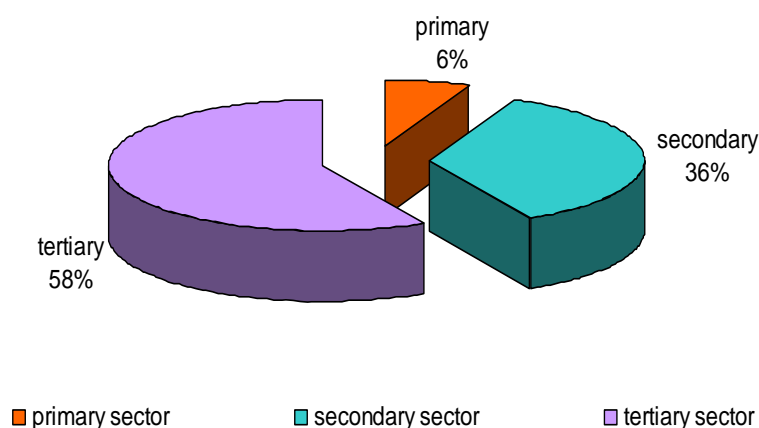
Source: CSO, Mauritius

Figure 5: FDI across the Different Activities in the Services Sector (2002-2008)



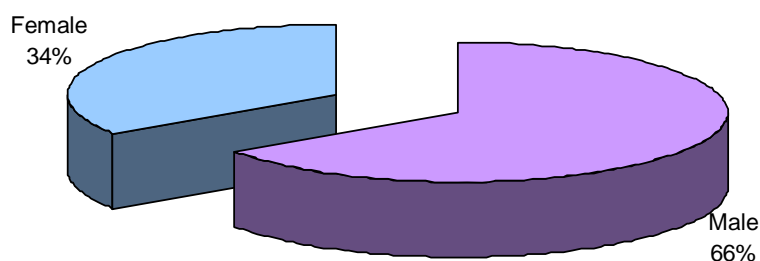
### *Employment in the Services Sector*

Figure 6: Employment across Sectors in 2008



In 2008, employment in the tertiary amounts to 58% of total employment in Mauritius. This share has been increasing over the years essentially with the development of the financial and tourism sectors. From Figure 7, female employment amounts to 34% whilst 66% are male workers.

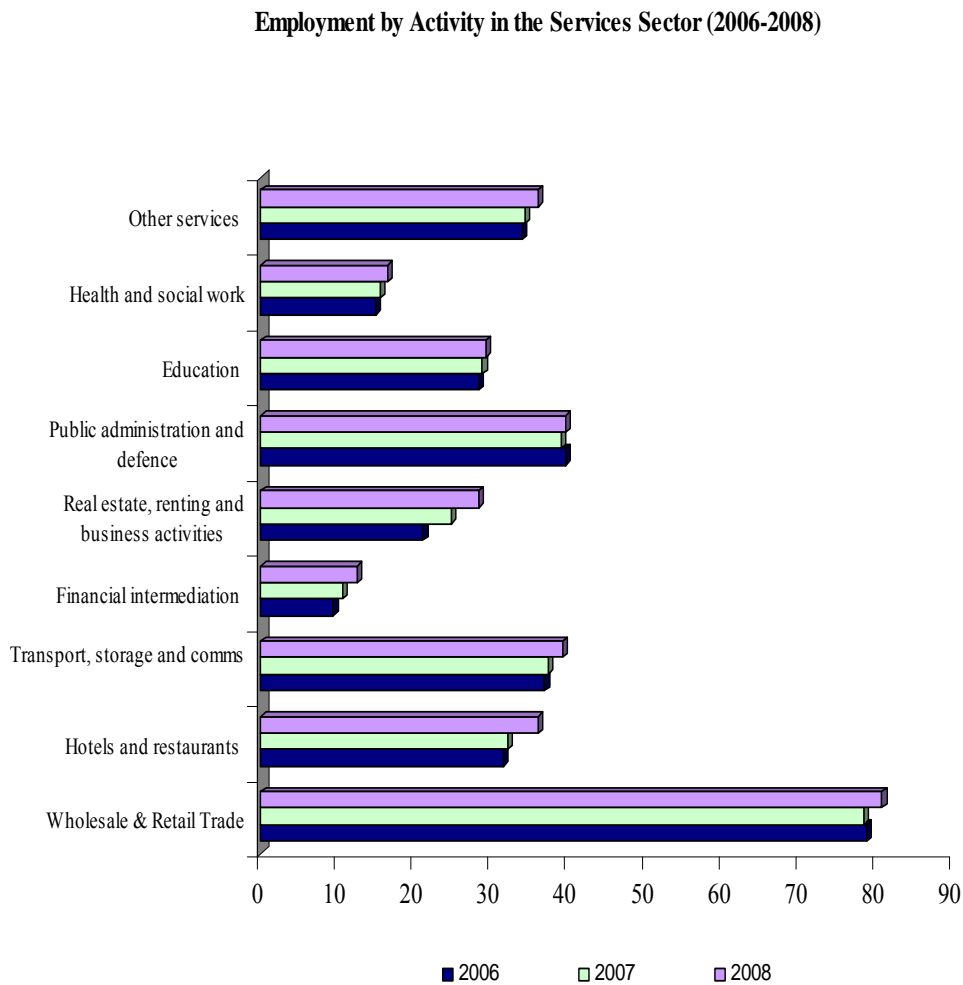
**Figure 7:** Employment by Sex in Services Sector in 2008



Employment in the financial sector for instance, has increased by about 25% since the beginning of the present decade. Further from Figure 7 below, we note that a large

percentage of the labour force in the services sector in 2008 is concentrated in wholesale and retail trade (14.8%), transport and communication (7%) as well as the tourism sector (6.7%). Public administration and defence employs around 7.3% of workers within the service sector in 2008.

Figure 8: Employment across Different Activities in the Services Sector (2006 -2008)



Looking ahead, the emphasis in years to come must be on the adoption of a new economic framework that fosters more skills intensive and diversified service-oriented economic activities so as to ensure sustainable growth in the absence of the safety net of trade preferences.

#### **4. Data and Model Specification**

The study uses data for Mauritius from 1975 to 2008 to estimate the models specified below. The key data sources are the World Development Indicators (2008) and different publications of the Central Statistical Office in Mauritius. Attention has been given to the conversions and calculations for each specific variable in the relevant form. Detailed information on the contribution of the services sector to GDP, GDP per capita, GDP growth, investment, trade among others was collected. One major limitation of the data is the unavailability of a poverty index for Mauritius over this period of analysis. The headcount poverty index from the World Bank is available only in the last few years and cannot be included in our analysis. We are constrained to use income per capita as an indicator of poverty.

##### ***Variables Used***

GDPPC is nominal gross domestic product per capita. GDPPC is used as a monetary proxy for poverty. Though it may not be a proper proxy, we are constrained to use this measure as data on head count poverty index or human poverty index are not available for Mauritius over this time frame.

HotelGDP represents the contribution of the hotels and restaurants to GDP. It measures the share of the tourism sector in the total domestic output of the Mauritian economy.

WRTGDP denotes the wholesale and retail trade share of GDP. It measures the contribution of whole sale and retail trade in the total domestic output of the Mauritian economy.

FinanceGDP is financing, insurance, real estate and business services as a share of GDP. The sector covers the financial sector and real estate.

TransGDP is the contribution of the transport sector to GDP. It covers transport, storage and communications.

Inflation is the inflation rate for the Mauritian economy. Since the dependent and the explanatory variables in the model are in nominal terms, inflation is included to account for the change in prices and subsequently in the cost of living over the years. This is likely to impact negatively GDPPC and thus standard of living.

Ser is the secondary enrolment ratio which is a measure of human capital. Higher education is likely to contribute positively to growth and per capita GDP. Education can help in obtaining a better job and subsequently leads to a rise in the standard of living.

ExpsGDP represents exports as a share of GDP which is used as a measure of openness. Higher exports to GDP leads to higher economic growth, but a more open trade regime may initially have a negative impact on a small island economy and essentially on local firms in terms of higher degree of competition.

Tel is number of telephone mainline per 1000 of inhabitants. This measure is used to assess the level of development of the country. It has been rising over the years and a good communication system will contribute positively to growth and GDP per capita.

### ***Model Specification***

The model used in this study is as follows:

$$\ln GDPPC_t = \alpha_0 + \nu_1 \ln HotelGDP_t + \nu_2 \ln WTRGDP_t + \nu_3 \ln FinanceGDP_t + \nu_4 Inflation_t + \nu_5 \ln Ser_t + \nu_6 \ln ExpsGDP_t + \nu_7 \ln Tel_t + \nu_8 \ln TransGDP_{t-1} + \varepsilon_t$$

## **5. Methodology**

### **5.1 Autoregressive Distributed Lag (ARDL) Approach**

The methodology adopted for our analysis will be in two parts. The first part of the methodology employs the autoregressive distributed lag (ARDL) approach to cointegration proposed by Pesaran et al. (2001) using the Microfit econometric package. The ARDL bounds cointegration technique has been selected to determine

the long run and short run relationships between services sector and GDP per capita. The choice of this methodology is based on several considerations. Firstly, as shown by Pesaran et al. (2001), the ARDL models yield consistent estimates of the long run coefficients that are asymptotically normal irrespective of whether the underlying regressors are I(1) or I(0). Secondly, this technique generally provides unbiased estimates of the long run model and valid t-statistics even when some of the regressors are endogenous (Harris, 2003). Inder (1993) and Pesaran (1997) have shown that the inclusion of the dynamics may help correct the endogeneity bias. Thirdly, given the size of the sample used in this study and the number parameters to be estimated the bound approach appears more appealing than the Johansen cointegration technique, which would have required the estimation of a system of equations and thus a considerable loss in degree of freedom.

Gujarati (1988) notes that a distributed lag model includes present and historical values of the explanatory variables (the Xs) and an autoregressive model is one that includes one or more lagged values of the predicted variable (Y) among its regressors. In deriving the ARDL estimates Persaran and Shin (1995) include lagged values of both the dependent and explanatory variables on the right hand side of the equation as the regressors to illustrate the long run and short run relationship with the dependent variable. The procedures to carry out the ARDL approach to cointegration technique includes (i) the determination of the long run relationships among the variables used in the models; and (ii) the estimation of the coefficients of the long and short run relationships. A description of each of the above steps will be discussed below.

To estimate the ARDL model is to test for the presence of long run relationships among the variables by using the Bounds F-Test. To implement the bound test procedure, equation (1) is modeled as a conditional ARDL error correction model (ECM) as follows:

$$\begin{aligned}
\Delta \ln GDPPC_t = & \alpha_0 + \sum_{i=1}^n \alpha_i \Delta \ln HotelGDP_{t-i} + \sum_{i=1}^n \delta_i \Delta \ln WTRGDP_{t-i} + \\
& \sum_{i=1}^n \beta_i \Delta \ln FinanceGDP_{t-i} + \sum_{i=1}^n \sigma_i \Delta Inflation_{t-i} + \sum_{i=1}^n \lambda_i \Delta \ln Ser_{t-i} \\
& + \sum_{i=1}^n \omega_i \Delta \ln ExpsGDP_{t-i} + \sum_{i=1}^n \nu_i \Delta Tel_{t-i} + \sum_{i=1}^n \varphi_i \Delta TransGDP_{t-1-i} \\
& + \eta_1 \ln GDPPC_{t-1} + \eta_2 \ln HotelGDP_{t-1} + \eta_3 \ln WTRGDP_{t-1} \\
& + \eta_4 \ln FinanceGDP_{t-1} + \eta_5 \ln Inflation_{t-1} + \eta_6 \ln Ser_{t-1} + \eta_7 \ln ExpsGDP_{t-1} \\
& + \eta_8 \ln Tel_{t-1} + \eta_9 \ln TransGDP_{t-2} + \varepsilon_t
\end{aligned} \tag{2}$$

where  $\alpha_0$  is a drift component and  $\varepsilon_t$  is the white noise error. The long run multipliers are represented by the coefficients of the lagged level variables while  $\alpha_i$ ,  $\delta_i$ ,  $\beta_i$ ,  $\sigma_i$ ,  $\lambda_i$ ,  $\omega_i$ ,  $\nu_i$  and  $\varphi_i$  represent the short run impacts on GDP per capita. The equation is estimated using OLS. The next step is to test the presence of cointegration by restricting all estimated coefficients of lagged level variables equal to zero. That is the null hypothesis of no cointegration

$(H_0 : \eta_1 = \eta_2 = \eta_3 = \eta_4 = \eta_5 = \eta_6 = \eta_7 = \eta_8 = \eta_9 = 0)$  is tested against the alternative hypothesis

$(H_0 : \eta_1 \neq 0, \eta_2 \neq 0, \eta_3 \neq 0, \eta_4 \neq 0, \eta_5 \neq 0, \eta_6 \neq 0, \eta_7 \neq 0, \eta_8 \neq 0, \eta_9 \neq 0)$  by the mean of a F-test with an asymptotic non-standard distribution. Two asymptotic critical value bounds provide a test for cointegration when the independent variables are  $I(d)$  with  $0 \leq d \leq 1$ . The lower bound assumes that all the regressors are  $I(0)$ , and the upper bound assumes that they are  $I(1)$ . If the computed F-statistics lies above the upper level of the band, the null is rejected, indicating cointegration (Pesaran and Pesaran, 1997). If the computed F-statistics lies below the lower level band, the null cannot be rejected, supporting the absence of cointegration. If the statistics fall within the band, inference would be inconclusive.

Once the long run relationship has been established the final step of the ARDL analysis involves estimating the coefficients of the long run relations and making inferences about their values (Pesaran and Pesaran, 1997). This stage involves two further steps. The first stage involves selecting the orders of the lags based on Schwarz Bayesian Information Criteria (SBIC) or the Akaike Information Criteria

(AIC). In the second step, the selected optimal ARDL model restricted to the lag structure defined in the first stage of the final ARDL process is then estimated including the short run and error correction model. We construct a lagged error correction term to substitute the whole set of lagged level variables. It is therefore possible to estimate the short run coefficients as an error correcting model while allowing for the long run estimates as follows:

$$\begin{aligned}
\Delta \ln GDPPC_t = & \alpha_0 + \sum_{i=1}^n \alpha_i \Delta \ln HotelGDP_{t-i} + \sum_{i=1}^n \delta_i \Delta \ln WTRGDP_{t-i} + \\
& \sum_{i=1}^n \beta_i \Delta \ln FinanceGDP_{t-i} + \sum_{i=1}^n \sigma_i \Delta Inflation_{t-i} + \sum_{i=1}^n \lambda_i \Delta \ln Ser_{t-i} \quad (3) \\
& + \sum_{i=1}^n \omega_i \Delta \ln ExpsGDP_{t-i} + \sum_{i=1}^n \nu_i \Delta Tel_{t-i} + \sum_{i=1}^n \varphi_i \Delta TransGDP_{t-1-i} \\
& + \psi_t ECM_{t-1} + \gamma_t
\end{aligned}$$

$ECM_{t-1}$  is the error correction term and its coefficient  $\psi_t$  is the speed of adjustment. The other coefficients in the model are the short run dynamics that cause the model to converge to equilibrium. These methodologies will be applied to avoid spurious results.

The second stage includes conducting standard Granger causality tests augmented with a lagged error-correction term. The Granger representation theorem suggests that there will be Granger causality in at least one direction if there exists co-integration relationship among the variables provided the variables are integrated order of one. Engle-Granger (1987) cautioned that if the Granger causality test is conducted at first difference through vector auto regression (VAR) method than it will be misleading in the presence of co-integration. Therefore, an inclusion of an additional variable to the VAR method such as the error-correction term would help us to capture the long-run relationship. To this end, an augmented form of Granger causality test is involved to the error-correction term and it is formulated in a bi-variate  $p$ th order vector error-correction model (VECM) which is as follows:

$$\begin{bmatrix} \Delta GDPPC_t \\ \Delta SERGDP_t \end{bmatrix} = \begin{bmatrix} K_1 \\ K_2 \end{bmatrix} + \sum_{i=1}^p \begin{bmatrix} d_{11}(L) & d_{12}(L) \\ d_{21}(L) & d_{22}(L) \end{bmatrix} \begin{bmatrix} \Delta GDPPC_{t-1} \\ \Delta SERGDP_{t-1} \end{bmatrix} + \begin{bmatrix} \lambda_1 ECM_{t-1} \\ \lambda_2 ECM_{t-1} \end{bmatrix} + \begin{bmatrix} C_1 \\ C_2 \end{bmatrix} + \begin{bmatrix} \eta_1 \\ \eta_2 \end{bmatrix} \quad (4)$$

where  $\Delta$  is a difference operator, ECM representing the error-correction term derived from long-run co-integrating relationship via ARDL model, C ( $i = 1, 2$ ) is constant and ( $i = 1, 2$ ) are serially uncorrelated random disturbance term with zero mean. SERGDP is the services sector as a share of GDP. Through the ECM, the VECM provide new directions for Granger causality to appear. Long-run causality can be revealed through the significance of the lagged *ECMs* by t test, while F-statistic or Wald test investigate short-run causality through the significance of joint test with an application of sum of lags of explanatory variables in the model.

The Granger causality test is applied to equation (4) by firstly checking the statistical significance of the lagged differences of the variables for each vector, which is a measure of short run causality and second by examining the statistical significance of the error-correction term for the vector that there exists a long run relationship.

To ascertain the goodness of fit of the ARDL model, the diagnostic test and the stability test are conducted. The diagnostic test examines the serial correlation, functional form, normality and heteroscedasticity associated with the model. The stability test is conducted by employing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMsq). Examining the prediction error of the model is another way of ascertaining the reliability of the ARDL model. If the error or the difference between the real observation and the forecast is infinitesimal, then the model can be regarded as best fitting.

## 5.2 Unit Root Hypothesis

Prior to the application of the ARDL approach, the first step is to test for the stationarity of each variable used in the model for unit roots. The use of non-stationary variables in the time series analysis leads to misleading inferences (Libanio,

2005). The unit root test is applied to check the order of integration and it is a crucial requirement for the existence of cointegration links (John, Nelson and Reetu, 2005). The study uses the traditional Augmented Dicker Fuller (ADF) test to check for the unit root in each variable and thereby determine the order of integration.

## 6. Findings

### 6.1 Results for Unit Root

Before applying the ARDL procedure, all variables are tested for stationarity. The ADF test for stationarity analyses whether the mean and variance of the variables are constant over time. It determines whether the variables in the model are stationary in their levels or first difference forms. This enables us to assign the order of integration for each variable i.e. I(0) or I(1) before identifying the possible long run linkages. Table 5 below

Table 5: ADF Test Results

Variable	Levels		First Difference	
	Intercept	Order of Integration	Intercept	Order of Integration
$\ln\text{GDPPC}_t$	-4.01	I(0)		
$\ln\text{HotelGDP}_t$			-5.14	I(1)
$\ln\text{WRTGDP}_t$			-5.79	I(1)
$\ln\text{FinanceGDP}_t$			-6.42	I(1)
$\ln\text{TransGDP}_{t-1}$	-29.38	I(0)		
$\text{Inflation}_t$	-3.41	I(0)		
$\ln\text{Ser}_t$			-8.01	I(1)
$\ln\text{ExpsGDP}_t$			-3.80	I(1)
$\text{Tel}_t$	12.13	I(0)		

Note: Critical value at 5% level is 2.95% for intercept but no trend

For the model to be valid, the variables must be either I(0) or I(1). Therefore the test for stationarity confirmed this as seen by Table 5 above. GDP per capita, inflation, telephone mainlines and the share of the transport sector to GDP; are stationary while the other variables become stationary after differencing once.

## 6.2 Results for Bounds F test

The Bounds F test result in Table 6 below shows the results of the first stage with the estimated F-test value indicative of the presence of the long run relationships among the variables. As the calculated F-statistic of 4.11 exceeds the upper bound critical value, then the null of no cointegration is rejected. As cointegration is confirmed, we move to the second stage where the ARDL model can be established to determine long run and short run relationships. We further estimate the long-run coefficients of the GDP per capita equation and the associated ARDL error correction models.

Table 6: Bound F Test Results

<b>Model</b>	<b>Critical Values Band</b>		<b>Estimated F test value</b>	<b>Pass/Fail</b>
Equation (2)	I(0)	I(1)		
	2.850	3.805	4.11	Pass

## 6.3 ARDL Model and Long Run Dynamics

In the second stage, the ARDL, long run and the short run ECM coefficients are estimated by using Schwartz Bayesian Criteria to select the appropriate lags. Given the time series period from 1976 to 2009, the lag length has been set to maximum order of 1. The model's diagnostic tests for serial correlation, functional form, normality of residuals and heteroscedasticity do not indicate any concern. The results are reported in Table 7 below.

Table 7: ARDL (1, 0, 1, 1, 0, 0, 0, 0) selected based on Schwarz Bayesian Criterion.

Dependent Variable is  $\ln\text{GDPPC}_t$

Variable	Coefficient	Standard Error	T-ratio
$\ln\text{GDPPC}_{t-1}$	0.799***	0.037	21.629
$\ln\text{HotelGDP}_t$	0.102*	0.057	1.810
$\ln\text{WRTGDP}_t$	0.212**	0.094	2.244
$\ln\text{WRTGDP}_{t-1}$	0.229**	0.090	2.547
$\ln\text{FinanceGDP}_t$	0.126***	0.038	3.292
$\ln\text{FinanceGDP}_{t-1}$	0.178***	0.055	3.226
$\ln\text{TransGDP}_{t-1}$	0.355***	0.078	4.576
$\text{Inflation}_t$	-0.002**	0.0008	-2.525
$\ln\text{ExpGDP}_t$	0.185**	0.078	2.375
$\ln\text{Ser}_t$	0.354**	0.163	2.170
$\text{Tel}_t$	0.003***	0.0007	4.917
Constant	1.387*	0.716	1.931
R-squared	0.999	No of Obs.	33

Once we established that a long-run cointegration relationship existed, equation (2) was estimated using the following ARDL (1, 0, 1, 1, 0, 0, 0, 0) specification. The long run estimates of the model are presented in Table 8 below.

Table 8: Estimated long run coefficients using the ARDL approach selected based on Schwarz Bayesian Criterion. Dependent Variable is  $\ln\text{GDPPC}_t$

Variable	Coefficient	Standard Error	T-ratio
$\ln\text{HotelGDP}_t$	0.509**	0.233	2.188
$\ln\text{WRTGDP}_t$	2.192***	0.507	4.327
$\ln\text{FinanceGDP}_t$	1.514***	0.201	7.528
$\ln\text{TransGDP}_{t-1}$	1.767***	0.348	5.079
$\text{Inflation}_t$	-0.010***	0.003	-2.895
$\ln\text{ExpGDP}_t$	0.918**	0.395	2.327
$\ln\text{Ser}_t$	1.760**	0.731	2.408
$\text{Tel}_t$	0.017***	0.002	6.743
Constant	6.873*	3.337	2.060
No of Obs.			33

The estimated coefficients of the long-run relationship show that the services sector in terms of the tourism sector, whole sale retail trade, financial sector and transport and communication have a very high significant positive impact on GDP per capita. A 1% expansion in the tourism sector for instance leads to approximately 0.10% increase in GDP per capita. Similarly a 1% growth in transport and communications leads to 1.77% increase in GDP per capita. Among the different service activities, whole sale and retail trade seems to contribute more to per capita GDP. In fact growth in this activity has been increasing substantially over the last decade. Other variables like inflation for instance has a significant negative impact on standard of living as high prices reduce purchasing power of individuals. Education captured by secondary enrolment ratio has a positive effect on GDP per capita, showing that education is an essential means to get people out of poverty. Higher education implies better jobs and higher income levels. Telephone mainlines which is included as a measure of development has a positive effect on GDP per capita. Good communication services are crucial in the promotion of economic development. Foreign investors are often attracted to location where the basic infrastructural development and services are available. Good communication facilities among other services thus contribute positively to economic performance and prospects of Mauritius.

### 6.3 ARDL-ECM– Short Run Dynamics

In addition to the ARDL results, our next set of findings report the short run estimates. The fact that the variables in the model are cointegrated provides support for the use of an ECM representation in order to investigate the short run dynamics. Estimation results still based on Schwartz Bayesian Criteria are presented in Table 8 below. the R<sup>2</sup> value of 0.814 suggests that the ECM fits the data reasonably well. In terms of the short run relationships we observe a positive and significant impact of the different services activities on per capita GDP. Higher positive short term effects are noted from the transport and communication sector as well as wholesale retail trade activities. The signs of the short run dynamics are maintained to the long run. The other variables are as per prior expectations.

Table 8: Error Correction representation for the selected ARDL model

Dependent Variable is  $\Delta \ln \text{GDPPC}_t$

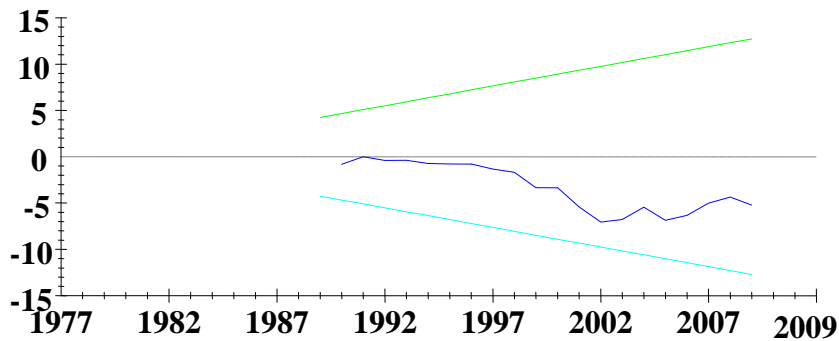
Variable	Coefficient	Standard Error	T-ratio
$\Delta \ln \text{HotelGDP}_t$	0.102*	0.057	1.810
$\Delta \ln \text{WRTGDP}_t$	0.212**	0.094	2.244
$\Delta \ln \text{FinanceGDP}_t$	0.126***	0.038	3.292
$\Delta \ln \text{TransGDP}_{t-1}$	0.355***	0.078	4.576
$\Delta \text{Inflation}_t$	-0.002**	0.0008	-2.525
$\Delta \ln \text{ExpGDP}_t$	0.185**	0.078	2.375
$\Delta \ln \text{Ser}_t$	0.354**	0.163	2.170
$\Delta \text{Tel}_t$	0.003***	0.0007	4.917
Constant	1.387*	0.716	1.931
$\text{ECM}_{t-1}$	-0.201***	0.0369	-5.447
R-squared	0.814	No of Obs.	33

#### 6.4 Stability of the Model

Finally, we examine the stability of the long-run coefficients together with the short-run dynamics. In doing so we follow Pesaran and Pesaran (1997) and apply the CUSUM and CUSUMSQ (Brown, Durbin, and Evans, 1975). The tests are applied to the residuals of the model. Specifically, the CUSUM test makes use of the cumulative sum of recursive residuals based on the first set of  $n$  observations and is updated recursively and plotted against break points. If the plot of CUSUM statistics stays within the critical bounds of 5% significance level [represented by a pair of straight lines drawn at the 5% level of significance whose equations are given in Brown, Durbin, and Evans (1975)], the null hypothesis that all coefficients in the error correction model are stable cannot be rejected. If either of the lines is crossed, the null hypothesis of coefficient constancy can be rejected at the 5% level of significance. A similar procedure is used to carry out the CUSUMSQ test, which is based on the squared recursive residuals. Figure 9 shows a graphical representation of the CUSUM and CUSUMSQ plots. Neither CUSUM nor CUSUMSQ plots cross the critical bounds, indicating no evidence of any significant structural instability.

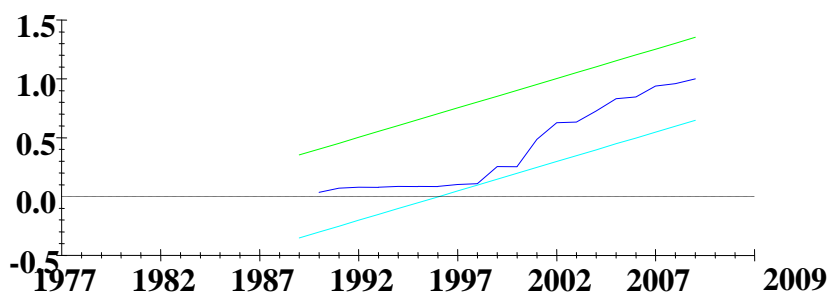
**Figure 9**

**Plot of Cumulative Sum of Recursive Residuals**



The straight lines represent critical bounds at 5% significance level

**Plot of Cumulative Sum of Squares of Recursive Residuals**



The straight lines represent critical bounds at 5% significance level

### 6.5 Granger Causality Test

The Granger causality test indicates that the services sector has a positive and significant long run effect on GDP per capita. Causality is established from the services sector to GDP per capita in the long run while causality is observed from GDP per capita and the services sector in the short run only. The services sector is viewed as a long terms growth strategy which is seen to play a significant role for a

small island economy like Mauritius. Though the level of economic development may also help to foster the services sector, we observe that it is important in the short run only.

## 7. Conclusion and Policy Implications

The paper investigated the dynamic relationship between services sector development and GDP per capita for Mauritius by using annual time series data from 1976-2009, using the bounds testing (ARDL) approach to co integration. We examine the long run and short run relationships between services sector development and GDP per capita. The bounds test suggested that the variables of interest are bound together in the long-run. The associated equilibrium correction was also significant confirming the existence of long-run relationships. The equilibrium correction is also fairly fast and is restored by less than three months of the year.

Our findings confirm that the services sector contribute positively to GDP per capita and wholesale retail trade has the strongest impact on the economy followed by the transport and communication sector and the financial sector. Tourism is also seen to contribute positively to the Mauritian economy. The results also confirm that secondary enrollment ratio, inflation, telephone mainlines and exports as a share of GDP are important elements in explaining GDP per capita. Further the empirical result shows that there is evidence of causality from the services sector to GDP per capita in the long run while causality is observed from GDP per capita and the services sector in the short run only.

The major limitation of our study rests on the measurement of poverty. We have used a monetary indicator which is GDP per capita. We also tried another measure which is the Human Development Index (HDI). The HDI is comprised of three sub-indices that measure health and lifespan, education and knowledge, and standard of living. It attempts to describe achievement of development goals related to quality of life. It is aggregated from four indicators: life expectancy, adult literacy, the gross school enrollment index, and GDP per capita. However, HDI data is available over a five year period and we do not have a continuous time series data for the variable.

Nonetheless, we attempt to apply linear interpolation methodology and thereafter apply the data for regression analysis using the same variables in the above analysis (results not reported). One major problem is that the HDI does not vary much over the years and may not be an appropriate index to use for time series analysis.

From the results, a policy suggestion for enhanced GDP per capita in Mauritius will be the promotion of the services sector and its various activities. The government may also focus on human resource development in an attempt to create the skilled labour force which is highly required by the services sector. We have also noted that trade openness has positive implication which implies that trade liberalisation of the economy and export promotion must be among the priorities of policy makers. Further a required level of development is also important to foster the development of the services sector. We have seen that in the event of the world economic downturn, the Mauritian government has attempted to mitigate the negative consequences of the global economic crisis through an appropriate policy mix. Mauritius has been considered as an outlier in the Sub Saharan African region and is further seen as an example in setting the right strategies in difficult times. Mauritius has so far been resilient to the crisis relative to other African countries or emerging economies. The two main reasons which underline the economy's resilience to such an unprecedented external shock is the effectiveness of the reforms which have been implemented during the past three years. The second is the robustness of the financial system as recognised by the IMF. The reforms have opened the economy and made it more versatile and have also given the country the fiscal space required to deal with such a crisis.

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