



MAURITIUS RESEARCH COUNCIL
INNOVATION FOR TECHNOLOGY

**THE IMPLICATIONS OF THE INFORMAL
SECTOR ON THE MAURITIAN ECONOMY:
ANALYSIS AND EVALUATION**

Final Report

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RERERENCES

LIST OF ABBREVIATIONS

CSO	Central Statistical Office
DBM	Development Bank of Mauritius
EPZDA	Export Processing Zone Development Authority
GDP	Gross Domestic Product
GNP	Gross National Product
ICLS	International Conference of Labour Statisticians
ILO	International Labour Organisation
IMF	International Monetary Fund
MCCI	Mauritius Chamber of Commerce and Industry
MIDA	Mauritius Investment Development Authority
MEPZA	Mauritius Export Processing Association
OECD	Organisation for Economic Co-operation and Development
SMIDO	Small and Medium Industries Development Organisation

1. Executive Summary

Size and growth of the informal sector in Mauritius

- v Using the labour force estimates from the survey undertaken in 2001, and assuming that the average contribution to GDP (Gross Domestic Product) is similar in both formal and informal sectors, the size of the informal sector (that is, the amount generated by informal sector participants) is estimated at around Rs45 bn. This figure underestimates the size of the sector as worked out under the electricity consumption method. Assuming a unitary elasticity of electricity consumption to GDP, the size of the informal sector for the year 2001 has been estimated at Rs70.6 bn at current prices (accounting for 60% of the formal economy and 37.6% of the total economy). The underestimation can be explained by the exclusion of criminal activities in the definition of informal sector used for the purpose of the survey
- v The use of electricity consumption method indicates that the share of informal sector in overall GDP has more than doubled over the period 1990-2001, from 16.7% in 1990 to 37.6% in 2001 while the size of the informal economy experienced a more than 10-fold rise over the same period, from Rs6.4 bn in 1990 to Rs70.6 bn in 2001. On the other hand, the informal sector as a percentage of official GDP has increased by three-fold over the period 1990-2001, from 20% in 1990 to 60% in 2001. The share has increased systematically over the period 1990-2001
- v For the year 2001, the confidence bounds for the size of the informal sector were (29.6%, 40.6%) in terms of share in total output and (Rs 49.2 billion, Rs 80.0 billion) in terms of value added at current prices. The figures and trends implied by the confidence bounds confirm that the informal sector has grown into a sizeable phenomenon
- v The growth of the informal sector has fallen continuously over the period 1990-2001 (except for the years 1995 and 1996-1998) and has decreased significantly over the same period, from 53% in 1991 to 7% in 2001. The rate has however remained systematically above the growth rate of the formal sector, implying that official published growth rate statistics have underestimated the true growth rate of the economy. On the other hand, based on projections of growth rates, a tendency for convergence between growth rates of the formal and informal sectors can be expected

Employment in the informal sector

- v Three Mauritian households out of four have at least one member operating in the informal sector
- v Around 27% of individuals aged 15 years or more are engaged in the informal sector (if individuals not likely to form part of the active population are excluded - that is,

students, housewives, the unemployed and the retired - the rate of informalisation rises to 46%. The informal sector comprises of the following categories of workers: the self-employed (17%), employed workers (75%) and others (8%) respectively

- v Based on the survey findings, an estimated number of 227,800 are believed to operate in the informal economy in Mauritius (this figure comprises of around 37,800 self-employed individuals and 190,000 employees engaged in the hidden economy)
- v No significant difference can be observed between the profile of Mauritian households and that of households with at least one member involved in the informal sector. This implies that informalisation is comparable across categories of households, regardless of their socio-demographic characteristics
- v Compared to the Mauritian households, the profile of informal households displays an over-representation among the following sub-groups: income groups of less than Rs10,000, rural households and hindu and muslim households respectively
- v The profile of individuals operating in the informal sector display a slight over-representation among: (a) the hindus; (b) male; and (c) middle (Rs5,000-Rs14,999) and high (Rs20,000-Rs24,999) income groups respectively. On the other hand, there is no major discrepancy between the proportion of individuals in the informal economy and the sample proportion in both the rural and urban region
- v The use of logistic regression to assess the impact of specific socio-economic factors on informal sector participation indicates that:
 - 4 the incidence of informal sector participation among (a) people of different ethnic origins and (b) rural and urban residents are more or less equal
 - 4 age determines the probability of informal sector participation, whereby the probability peaks among middle-aged individuals (35-40 years)
 - 4 the probability of working in the informal sector decreases as household income increases
 - 4 the probability of participating in informal activities is higher among males than females
 - 4 the probability of informal sector participation is higher among individuals that are part of smaller households than those in larger ones
 - 4 the marital status of an individual has an influence, albeit a smaller one, on the probability of participating in informal activities, whereby non-married individuals have a higher such probability
- v The sectoral distribution of employment in the informal sector is different from formal sector employment distribution. There is a relatively larger concentration in Wholesale, Hotel & Restaurant in the former case (32%) while in the latter sector, the manufacturing sector ranks first, accounting for 39% of total formal employment
- v The survey results indicate a strong relationship between the sectoral belonging of the main job and the sectoral belonging of the secondary employment, whereby a large

proportion of individuals choose a secondary employment in the same sector as that of the primary sector

Characteristics of the informal sector

- v There is a strong degree of informality in the employment arrangements in the informal economy, whereby 21% of the self-employed are helped by family members in their business. 50% of family members are not paid at all while 32% receive a reward. In the case of non-family member employees, a large majority (86%) are remunerated per hour
- v With regards to remuneration frequency, around 38% of family members who are paid receive a daily remuneration and the same proportion are paid on a monthly basis while the rest are paid weekly. In the case of non-family members, around 42% are remunerated weekly while 36.1% are paid monthly; the remaining are paid on a fortnightly basis. The frequency of payment varies by type of individuals employed (that is, family and non-family members)
- v The absence of pension schemes and medical insurance facilities in the informal sector workplace is a serious cause for concern, especially considering that the large majority of those operating in the sector belong to low-income groups. In fact, 78% of all employees operating in the informal economy do not benefit from any form of fringe benefits compared to only 12% in the formal sector. Among those working for self-employed individuals, family member employees appear to be worse off, with only some 20% benefiting from such facilities compared to non-family member employees whereby more than half are beneficiaries. Moonlighters are in a far worse situation whereby around 89% do not receive any form of fringe benefits
- v The average value invested by the self-employed individuals is estimated at around Rs51,600. Savings appears to be the most common source of finance to fund investment, with more than half of those operating in the informal sector have recourse to savings for investment purposes. Borrowing is the second most popular source of funding, with around 35% resorting to this form of finance. Nearly half of the informal sector participants have recourse to informal means of borrowing, that is, from friends or relatives. The prevailing high interest rates are seen as a major inhibiting factor to borrow from banking/other financial institutions
- v Law compliance is very poor, with more than 50% of entrepreneurs who are not permit holders. The length and complexity of the procedures involved in acquiring a permit has been attributed as a major obstacle in their decision to obtain one
- v From the survey findings, we can deduce that the average monthly income of those engaged in informal activities is under Rs10,000. The large majority of entrepreneurs (more than 70%) perceive their revenue earned to be unstable – this appears to be more prevalent in the Construction and Manufacturing sectors

- v Activities within the informal economy are strongly characterised by seasonality, with the month of December perceived by more than half of the informal participants as being the peak month whereby activities boom

Causes of informal sector participation

ECONOMIC REASONS

- v The increased emphasis on trade liberalisation over the past years has led to important job losses in the manufacturing sector. At the same time, the increased use of capital intensive methods of production has displaced unskilled labour in various sectors of the economy. In the absence of unemployment benefits in the country, displaced workers may have chosen to find a job in the informal sector
- v The perceived high level of taxation together with the prevalence of tax evasion among informal sector participants indicate that taxation acts as an incentive to operate in the informal sector. In fact, of the estimated 78% self employed individuals operating in the informal sector and who do not pay tax, around 28% earn a monthly income that is “taxable” - that is income earned at a level which is higher than the threshold below which no income tax is payable. In addition, if the self-employed were to operate in the formal economy, the high costs involved (both operational and labour costs) can be very discouraging to many to do so, especially those who do not have the required market size to benefit from economies of scale on capital investment
- v 87% of the moonlighters claim they operate in the informal economy to ‘make both ends meet’, indicating that they may be operating in the informal economy as a means to survive

NON-ECONOMIC REASONS

- v It is not only the excessive regulations (that is, the lengthy and complex procedures involved in acquiring a licence) which explain the proliferation of informal activities but also the lack of or weak enforcement of such regulations in the country. This is reflected by the significantly low request made by the relevant authorities (including banking institutions) for a licence from informal sector participants
- v The impetus to operate in the informal sector can also be linked to misallocation of public funds as perceived by informal sector participants. Public expenditure financed by tax revenue is seen as unjustified, which in turn impact on their decision not to contribute to the tax revenue of the country and hence on their resolution not to register for tax purposes

Consequences of informal sector

- v If we assume, for the sake of argument, that all activities in the informal sector should have given rise to the tax revenue but fall outside the tax net, then we can estimate the tax gap (that is, tax revenue foregone as a result of informalisation) for the calendar year

2001 at a maximum figure of Rs4.7 billion. However, the loss in tax revenue to the government may be significantly less than Rs4.7 billion since there may not be 100% tax evasion in the informal sector and also, a number of informal sector products and services would be tax exempted due to low investment level by informal operators

- v Informal operators lack social protection. From the survey results, it is estimated that there is a poor coverage of social protection programmes among some 177,700 individuals. This in turn may imply increased exposure of informal workers to the normal risks of work and also, an increased probability for such workers to work beyond their retirement age due to absence of a pension system protection

Possible suggestions

In line with the findings of the survey, the following suggestions have been made in this paper as possible solutions to control informalisation in the country. These relate to (a) the regulatory framework; (b) macroeconomic policy; (c) design of appropriate social programmes; and (d) the statistical system.

- v Regulatory changes can be brought to the following three important facets: registration of entrants, law enforcement and simplification of procedures. The registration of entrants has already been taken care of under the Business Registration Act 2002. As an added incentive, institutions like banks and SMIDO can engage in promotional activities to induce small entrepreneurs to register. With regard to law enforcement, it is suggested that regulations on public areas, urban land use, garbage disposal and pollution be enforced. Finally, it is desirable to have an easy, fast and inexpensive procedure for registering new entrants and in the acquisition of permits and licenses
- v Macroeconomic policies, as well as being geared towards educating and training individuals to increase their employability in the new emerging sectors like Information, Communication and Technology (ICT), should also target vulnerable groups such that higher levels of value added employment (and thus towards higher incomes at the individual and aggregate levels) are made available to wider segments of the population
- v The authorities may consider giving priority to schemes specially designed to meet the needs of informal sector workers, for instance, by (a) extending existing programmes and (b) creating new programmes which target informal sector workers. The scope of existing schemes can be extended to cater for non-covered employees in regular employment as well as employees in casual or intermittent employment. Since it may prove difficult to integrate self-employed workers into such schemes, 'self-financed' social protection schemes ('micro-insurance' schemes) for workers outside the formal sector can be developed, set up by various groups of workers, with the support of outside organisations such as non-governmental organisation, trade unions as well as the government

- v A comprehensive system of statistics on employment in the informal sector be developed to provide an adequate statistical base for the various users of the statistics, with data on the size of the sector, the number of participants by socio-demographic profile, production and income generated from the sector and other pertinent characteristics of the sector, as encountered in this research paper. Most importantly, to monitor changes in the size and characteristics of the informal sector over time, it is recommended that these statistics be compiled at regular intervals

2. Introduction

2.1 Background and objective

Informal sector activities are a fact of life and today, they are pervasive in the developing world and are seen in some parts of the developed world as well. To control these activities, statistics on who operates in the informal economy, and the magnitude of these activities are crucial. These data are also critical when trying to understand the national income and production of a country and when making effective and efficient decisions regarding the allocation of resources.

Yet, in many instances, the unofficial segment of the economy has been neglected due to the inherent difficulties in measuring unofficial activities. On the other hand, individuals engaged in such activities wish to remain unidentified and on the other, many governments may be reluctant to acknowledge their importance. Besides, there are disagreements about the definition of shadow economy activities, the estimation procedures and the use of estimates in economic analysis and policy making.

In spite of the above, there is growing concern over the informal sector phenomenon for the following reasons:

- 4 If a rise in the informal economy is the result of a rise in the overall tax burden, this may lead to the erosion of the tax base and subsequently to a decrease in tax receipts and thus to a further increase in the budget deficit or a further increase in tax rates with the consequence of an additional rise in the informal economy
- 4 With a growing informal economy, policy is based on erroneous 'official' macroeconomic indicators (for instance, unemployment, income, consumption, etc) and the direction of intended policy measures may be questionable

To address these growing concerns, a number of theoretical and empirical studies have been undertaken over the past decades to explain the characteristics, causes and consequences of the phenomenon of informal sector. The phenomenon is specific to each country, since the importance, scope and impact vary significantly from country to country. In Mauritius, there is a growing recognition that the informal sector has increased in significance over the past years. However, so far, no official attempt has been made to quantify the informal sector and produce data on its nature and characteristics in Mauritius. The lack of systematic data on the size, nature and importance of informal activities in the country has in turn made it difficult for policy makers to design appropriate policies to reduce their significance.

This research study, undertaken by De Chazal Du Mée, makes a contribution in this direction by providing important insights into the informal economy, more specifically, on the following:

- 4 overall size of the informal economy
- 4 contribution of the informal sector in terms of both output and employment
- 4 nature and composition of the sector
- 4 reasons for engaging in the informal economy
- 4 implications of the informal sector
- 4 possible policy measures to reduce the 'informalisation' of the economy

The hypotheses put forth as well as the empirical findings in this research paper have wide-ranging ramifications for economic analysis and policy making in the country. The sheer magnitude of the unofficial economy point to the need to recognise these activities in the policy-making process of the government.

2.2 Methodology

The methodology adopted for the purpose of this research study consists of:

- (a) desk research, and
- (b) quantitative survey and statistical analysis.

(a) Desk Research

The desk research comprised of an extensive review of available articles and journals on the informal sector. Research on the following key areas was performed:

- 4 Existing theories on the informal sector
- 4 Comparison of informal sector across countries with different level of development
- 4 Existing information and data on the Mauritian informal sector
- 4 Econometric modelling techniques used in estimating the size of the sector

Subsequent to the desk research, an Inception Report was prepared and submitted to the Client, detailing the main findings of the research and the proposed approach for the study. A copy of the report is attached in Appendix A. The main highlights thereof are as follows:

- 4 There are a broad range of methods for estimating the size of the informal sector. These may be classified into the micro (survey) approach and the macro approach
- 4 The main deficiency of the survey approach is the subjective nature of its responses, which, while useful for analysing behavioural aspects, are less reliable for quantitative measurements
- 4 The macro approach involves econometric modelling which uses more objective indicators for estimating the size of the informal sector, and may also be used to construct time series and to perform statistical tests. However, they are less useful in analysing causal relationships and are usually based on implicit assumptions

It was thus recommended, in line with the findings of the inception report, to adopt a methodological approach that optimises both the use of quantitative surveys and of econometric modelling. The modelling approach was advocated to measure the size of the informal sector, while the survey was used to validate assumptions made in the model and

to analyse behavioural and other qualitative aspects pertaining to the informal sector. These methods are discussed in the next sub-sections.

(b) Quantitative survey and statistical analysis

The quantitative survey was conducted among 595 households and the mode of questionnaire administration adopted was via face-to-face interviews. The quota-based sampling technique was used for the selection of the households with a view to ensure that the sample was representative in terms of ethnic origin, household size, monthly household revenue and region respectively.

The details of sampling design, fieldwork organisation and monitoring are explained in Appendix B, whereby the fieldwork report is appended.

For the purpose of the survey, three questionnaires were designed to address the issues pertaining to the study. The three questionnaires were intended to capture the different profiles of respondents operating in the informal sector as follows:

	Screening questionnaire	Questionnaire 1 For the self-employed	Questionnaire 2 For those having a secondary employment
All households	4 (595 households)		
Households with at least one individual operating as an informal sector entrepreneur	4	4 (260 households)	
Households with at least one individual having a part time job in the informal sector	4		4 (203 households)

A screening questionnaire was administered to all households to identify the number of individuals participating in the informal sector by category of employment. The classification for informal sector participation for the purpose of the screening questionnaire has been largely based on that proposed by the International Labour Organisation (see Appendix C for a detailed description). The results of the screening questionnaire give a measure of the participation rate of the informal sector.

For each household with at least one member participating in the informal sector, one of two other questionnaires was administered according to whether the individual was employed solely in the informal sector, or whether s/he had a secondary employment in the informal sector. Both questionnaires addressed the same issues, in particular:

- Legislative issues, such as permits and taxation

- Labour arrangements
- Reasons for informal sector participation
- Characteristics of operations in the informal sector

A pilot test of the questionnaires was conducted over a targeted sample of 15 households. The results were analysed and relevant revisions were made to the questionnaires. The final version was submitted to the MRC for approval and a copy thereof is attached in Appendix D.

After approval from the MRC, fieldwork started on 27 May 2001 and lasted for three weeks, ending on 11 June 2001. Two briefing sessions were held: one on the 25th and the other on the 26th May 2001. A representative sample of 600 households were surveyed and only those above 15 years of age were considered. This amounted to 1814 respondents for the survey. Among those, 40% were employees, around 25% were housewives/without a job and responsible for house works and 16% were self-employed.

In line with the findings of the screening questionnaire, 260 households were retained for Questionnaire 1 and 203 were retained for Questionnaire 2 respectively.

2.3 Structure of the report

This report is organised as follows:

Chapter 3 provides a theoretical overview of the various concepts/definitions related to the informal sector as well as the commonly used methods for estimating the size of the sector. The definition retained for the purpose of this study as well as the method of estimation adopted are presented thereafter.

Chapter 4 undertakes a macro-economic analysis of the informal sector and examines the magnitude of informal activities in the country, trend and evolution of the sector as well as its correlation with key macroeconomic indicators

Chapter 5 examines the labour force participation in the informal sector and also, the profile of informal sector participants

Chapter 6 makes an assessment of the key features of the informal economy in terms of labour arrangements, fringe benefits, investment and funding, law enforcement and revenue stability respectively

Chapter 7 analyses the possible factors promulgating informal sector participation on the island from an economic and non-economic perspective

Chapter 8 examines the fiscal implications of the informal sector for the country

Chapter 9 highlights the key findings of the report and concludes by making a series of proposals on how to reduce the significance of informal activities in Mauritius

3. Theoretical overview

3.1 Definition of informal sector

3.1.1 Commonly used definitions

The informal sector has also been referred to in the literature as black, underground, cash, covert, hidden, grey, shadow, irregular, marginal, parallel, unobserved, and unofficial sector among others. Similarly, several definitions of the informal sector can be encountered. For instance,

- 4 from the statistician point of view, informal sector refers to economic activities belonging to, but not captured in the official GDP (Gross Domestic Product), that is, unregistered economic activities which contribute to the officially observed GDP
- 4 from a public authority's viewpoint, underground economy refers not only to unregistered activities but also to the sales or income not reported by the formal sector for tax or regulatory purposes

The table below summarises some of the commonly-held definition of informal sector by various authors.

AUTHORS	DEFINITION
<i>James H. Anderson (1998)</i>	Defined Mongolia's informal sector as that which 'consists of small-scale, usually family-based, economic activities that may be undercounted by official statistics, and may not be subject to the same set of regulations and taxation as formal enterprises'. In this case, micro enterprises are taken to be representative of the informal sector
<i>De Soto (1989)</i>	The informal economy comprises all extra legal activities, inclusive of market production, trade and direct subsistence production. Depending on the level of development of a country, different definitions of the informal sector can be found. For instance, for developed economies, informal sector is taken as a means of lowering production and sales cost. In the case of developing countries, informal sector is considered as a survival mechanism for individuals, where lesser-educated workers find it difficult to break into the formal economy.
<i>Enrique Gherzi</i>	The informal activities do not basically have a criminal content, but they must be carried out illicitly. In short, the informal sector is defined as those activities that have legal ends but

	employ illicit means.
	They defined informal sector based on political and economic criteria. From a political perspective, the criteria used for defining the underground economy were (a) government regulation of illegal activities, and (b) national statistics respectively. On the other hand, the economic criteria used were the following:
<i>Harding and Jenkins (1989).</i>	<ul style="list-style-type: none"> 4 labour market or status of labour: the informal sector is the sum total of all income-earning activities with the exclusion of those that involve contractual and legally regulated employment 4 Unreported tax evasion 4 size of activity: small enterprises 4 professional status, for example, self-employment¹ 4 regulation or registration of the activity, for example, unregistered establishments 4 national statistics or GNP accounts, for example, non-reporting or under-reporting

In an attempt to harmonise research work on the informal sector, the 15th International Conference of Labour Statisticians (ICLS) recommended in 1993 the use of one or more of the following:

- 4 non-registration of the enterprise
- 4 small size in terms of employment
- 4 non-registration of the employees of the enterprise

Moreover, the criteria that need to be considered for defining the informal economy have been specified as follows:

<i>Criteria</i>	<i>Sub - criteria</i>
<i>Legal ownership</i>	Unincorporated enterprises
<i>Ownership of enterprise</i>	Households
<i>Type of accounts</i>	No complete set of accounts
<i>Product destination</i>	At least some market output
<i>Number of persons engaged</i>	To be specified according to national circumstances

The informal economy is considered as a group of production units, which forms part of household sector and for which no complete sets of accounts are available. However the activities excluded from the informal sector are not necessarily formal, for example, the non-market production of goods not accounted for in National Accounts. In this case, the ICLS recommends that such activities be identified as separate categories outside the informal/formal sector classification.

¹ Note however that not all the self-employed individuals operate in the informal sector

3.1.2 Working definition retained for the study

For the purpose of this study and given the Mauritian context, the definition of the ILO (International Labour Organisation) regarding informal employment has been retained. Appendix C details out the components of informal employment as defined by the ILO.

Informal activities are taken to refer to unregistered and small enterprises, those enterprises consisting of unregistered personnel, and secondary employment. Value added from home-based activities such as the exclusive production of goods and services for own final consumption are excluded from informal activities, for example, activities like child rearing and food preparation are not taken into account in the informal sector. Furthermore, the activities from the criminal economy are not considered as part of the unofficial economy. In other words, the definition retained for the informal sector is market-based activities with legal ends but with illicit means.

3.2 Methods to estimate the size of the informal sector

Various attempts have been made to quantify the informal sector, thus yielding a variety of estimation techniques. Over the years, the different techniques have resulted in an increase in the precision of the results. The different techniques used have different assumptions and a particular technique is selected based on how realistic are the assumptions for the country in question. The different methods used have been found to yield wide variations in the result on the estimated size of the informal sector across studies.

The methods devised by a large array of authors can be classified into two approaches, namely the micro approach and macro approach respectively. The micro approach includes sample surveys that are used in a wide number of countries to measure the informal economy. These surveys are based on voluntary replies. On the other hand, the macro method, also known as the "indicator" approach, attempts to quantify the size of informal sector through the use of appropriately chosen indicators containing information about the development of the informal economy. These estimates are based on the analysis of high-level aggregates and the results are given in percentage of GDP. Macro methods include the following: -

- 4 Discrepancy between national expenditure and income statistics
- 4 Transactions method
- 4 The currency demand method
- 4 The discrepancy between the official and actual labour force
- 4 The physical input method
- 4 The model method

Appendix E summarises the size of the informal economy as a percentage of official GDP for developing countries, Central and South America, transition countries and OECD countries respectively based on three methods of estimation, namely the physical input, currency demand and the model method respectively.

3.2.1 Method retained for the study

There is no single best method to estimate the size of the informal sector, each one having its usefulness depending on the context and scope of the study in which they have been estimated. Appendix A assesses the suitability and adaptability of the approach to be used to estimate the size of the informal sector for Mauritius based on the following criteria:

- 4 Reliability of results
- 4 Usefulness of results for analysis purposes
- 4 Data availability
- 4 Plausibility of model assumptions

In line with the above criteria, this study warrants the use of a macro approach over a micro approach. The choice of macro method to be adopted for the study has been made after assessing the assumptions and limitations of each macro model respectively (see Appendix A). Subsequently, the currency demand model and the physical input method have been found to be better suited for the study on the following grounds:

- 4 the methodology for both these methods is based on correlation analysis, which can be tested using standard statistical techniques. Moreover, the data requirements for these two models are less extensive and more reliable than the other methods
- 4 they are the only two methods that have been applied to developing and developed countries alike
- 4 the use of these two methods enables cross-country comparisons with informal sectors in developing, transition and developed economies

The main problem with the above-mentioned two indicator models is that they do not, in themselves, explore causes and consequences of the informal sector. This can be addressed, however, by using side models and mini surveys.

In line with the assessment of the various methods, we used the physical input (electricity) method complemented with a quantitative survey to estimate the size of the informal sector in Mauritius (the physical input method has been retained over the currency method due to availability of data for modelling purpose and also, for simplicity of modelling). This approach has proved useful in exploring causes and consequences of the informal sector as well as in validating the assumptions made in the physical input model.

4. Macroeconomic analysis of the informal sector

4.1 Value added in the informal sector

The size of the informal sector, in terms of value added to output has been estimated in this study using the electricity consumption model (the rationale behind this simple yet powerful model and how it is used to compute the size of the informal sector are detailed out in Appendix A). However, this section should be read with a note of caution. The figures pertaining to the size of the informal sector should not be considered as actual figures but rather, as an indication of the order of magnitude of the sector. In brief, the model works as follows:

The model uses growth in domestic electricity consumption to establish a time series evolution of the overall economy (i.e. both formal and informal sectors) based on the elasticity of electricity on GDP consumption. The time series is calibrated into nominal values using a previously known value, and the values of formal GDP. The size of the informal sector is derived by taking the difference between the overall economy and the formal component

Published figures are used for domestic electricity consumption in kWh (CEB Annual Reports) and official GDP (CSO). Following the literature, the elasticity of consumption of electricity is taken to be equal to one. The model is calibrated using the results from Lacko (1996) who used a cross-country version of the electricity model to compute the size of the informal sector in various economies. Lacko estimated the share of the hidden economy for Mauritius at 20% of official GDP in 1990. Since the method used was based on electricity consumption and the result is the only econometric quantification of the informal sector in Mauritius in the literature, we have used this result in our model to compute the size of the informal sector as follows (under unitary elasticity of electricity consumption to GDP):

Year	Household electricity consumption (Gwh)	Growth rate in household electricity consumption (%)	Size of total economy (Rs mn - 1990 prices)	Real Formal GDP (Rs million - 1990 prices)	Informal economy (Rs million - 1990 prices)	Size of total economy (Rs million - current prices)	Informal economy (Rs million - current prices)	Informal to formal (%)
1990	198.9	9.2	38,148	31,790	6,358	38,148	6,358	20.0
1991	223.81	12.5	42,926	33,152	9,773	46,376	10,559	29.5
1992	253.28	13.2	48,578	35,375	13,203	55,384	15,052	37.3
1993	278.82	10.1	53,476	37,738	15,738	65,908	19,397	41.7
1994	300.81	7.9	57,694	41,069	16,625	76,631	22,082	40.5
1995	339.95	13.0	65,201	43,635	21,566	90,690	29,996	49.4
1996	364.47	7.2	69,903	46,078	23,825	103,129	35,149	51.7
1997	394.93	8.4	75,746	48,635	27,110	117,275	41,974	55.7
1998	431.2	9.2	82,702	53,285	29,417	136,881	48,688	55.2
1999	449.6	4.3	86,231	54,063	32,168	148,859	55,531	59.5
2000	491.93	9.4	94,350	59,126	35,224	166,783	62,266	59.6
2001	522.8	6.3	100,270	62,567	37,703	187,884	70,647	60.3

Source: National Accounts (Central Statistical Office), DCDM calculations

Implications of the informal sector on the 16

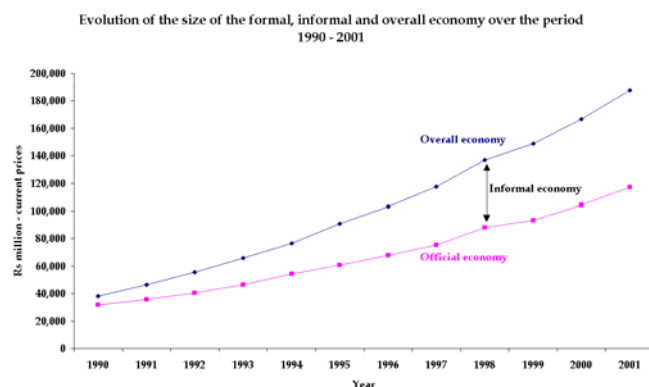
DCDM

Mauritian economy: Analysis and Evaluation

From the above table, we note that the informal sector in Mauritius has grown both in terms of size and importance over the 1990-2001 period:

- 4 The share of informal sector in overall GDP has more than doubled, from 16.7% in 1990 to 37.6% in 2001

- 4 the size of the informal economy experienced a more than 6-fold rise over the period and amounted to approximately Rs70 bn in year 2001 (at current prices). The sizeable increase in the unofficial economy over the past decade can be more easily observed from the graph. The gap between the overall and official economy reflects the size of the hidden economy. As can be noted, the gap has augmented significantly over the period considered



- 4 The informal sector as a percentage of official GDP has increased by three-fold over the period 1990-2001, from 20% in 1990 to 60% in year 2001 (under unitary elasticity of electricity consumption to GDP). The share has increased systematically over the period 1990-2001, as illustrated in the diagram



4.1.1 Alternative elasticity scenarios

The results in this section derive from models that have been constructed on the basis of assumptions. Fitted values predicted by the models thus contain some degree of uncertainty. This sub-section attempts, on the one hand, to characterise this uncertainty by establishing confidence bounds for the model results, and, on the other, to cross-validate these results by analysing alternative estimations.

Confidence bounds or confidence intervals represent comfort zones round predicted values. In other words, one is expected, with a reasonably high degree of certainty, to find actual value of a parameter lying within the confidence bounds for its predicted value.

Standard statistical techniques use t-statistics to construct confidence intervals for values predicted by regression equations. These can unfortunately not be used in the case of the informal sector since the latter is a latent variable, that is, a variable which is known to exist but whose value is unknown. Although sophisticated econometric techniques can be devised for latent variables, data limitations do not allow us to construct such regressions for the size of the informal sector.

A less conventional approach has thus been used to estimate the confidence intervals for the size of the informal sector. This approach builds on the work from De Soto et al and the World Bank group around predicted values. In their paper, De Soto and Hernando report that countries differ in their efficiency of utilising energy for output production such that the elasticity of electricity to GDP consumption is different in each case. They established absolute bounds characterising energy-efficient and energy-inefficient countries of electricity consumption to GDP to lie between 0.9 and 1.15 respectively² (Appendix F details out the workings for the size and share of the informal sector, based on the 0.9 and 1.15 elasticity scenarios).

The following table summarises the confidence limits for selected years.

Year	Size of the informal sector as a % of total economy	
	1995	2001
Upper bound	34.8	40.6
Lower bound	28.5	29.6

As one moves further from the base year, confidence intervals become larger, since there is a greater degree of uncertainty. For the year 2001, the confidence bounds for the size of the informal sector were (29.6%,40.6%) in terms of share in total output and (Rs 49.2 billion, Rs 80.0 billion) in terms of value added at current prices (see Appendix F). The figures and trends implied by the confidence bounds do not significantly modify the analyses in the above sub-sections and confirm that the informal sector has grown into a sizeable phenomenon.

4.1.2 Validation of results through survey results

The size of the informal sector can be further cross-verified through the results obtained in the quantitative survey. Direct surveys are known to produce unreliable results, namely under-declarations of income generated and taxes contributed. We will instead use labour force participation estimations in the survey, which are likely to be more realistic, to extrapolate the size of the informal sector.

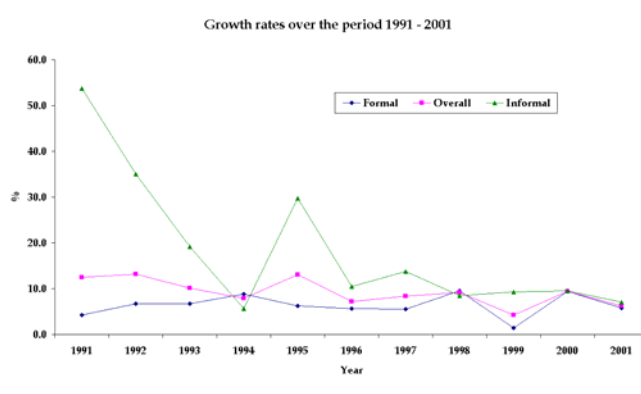
² These elasticity limits have also been used by Lacko to give confidence intervals for his estimates of the informal sector of transition economies using the electricity model

Assuming that the average contribution to GDP per worker is similar in both formal and informal sectors, that is Rs 197,062, the 227,822 informal sector participants in the country (see Section 5.1) are expected to generate an output of about Rs 45 billion. This figure underestimates the size of the informal sector estimated using the econometric method (Rs 58.5 billion) but such underestimation is consistent with the informal sector literature and also, the estimation falls within the confidence bounds established in the previous sub-section. In addition, is important to point out that, as per the definition of informal sector retained for this study, the figure of Rs45 billion excludes criminal activities, while the latter may be incorporated in the figure reached through econometric modelling, hence the underestimation of the informal sector using the survey results.

There is, hence, a sensible degree of consistency between the above extrapolations from the survey results and the econometric estimations, thus reinforcing the conclusions from the macroeconomic analysis.

4.2 Growth trends and evolution

The growth of the informal sector has fallen continuously over the period 1990-2001 (except for the years 1995 and 1996-1998) and has decreased significantly over the same period, from 53% in 1991 to 7% in 2001 (these figures correspond to the unitary elasticity scenario). The rate has however remained systematically above the growth rate of the formal sector, as illustrated in the graph. This implies that official published growth rate statistics have underestimated the true growth rate of the economy.



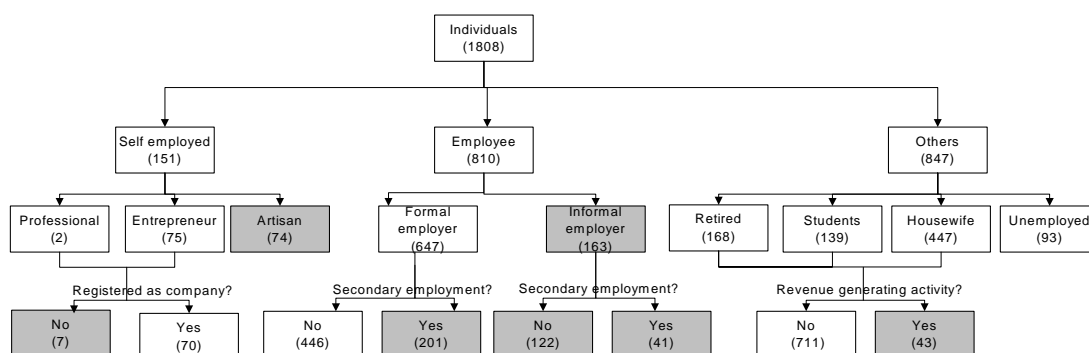
Two periods can be distinguished from the graph: the early half of the decade (1990-1995) where growth of the informal sector averaged about 29% per year, and the latter half (1996-2001) with more moderate growth rates of 10% per year. However, the high growth rates of the informal sector during the first half of the decade may be misleading to the extent that the informal base was relatively small over that period. In fact, it can be seen that the growth of the overall economy followed more closely that of the formal rather than the informal sector. As the share of the informal sector in the economy grew in importance in the latter half of the decade, growth rates slowed down to more reasonable, albeit high still, figures.

The graph also shows a tendency for convergence between growth rates of the formal and informal sectors. As a result of this convergence, the informal sector is expected to stabilise at 60% of the formal economy.

5. Employment in the informal sector

5.1 Aggregate labour force in the informal sector

The chart below gives a breakdown of informal sector labour participation by category of workers in the country, as per data obtained from the survey results.



Based on the survey results, the following observations can be made:

- v Three Mauritian households out of four have at least one member operating in the informal sector
- v Around 27% of individuals aged 15 years or more are engaged in the informal sector. If individuals not likely to form part of the active population are excluded (that is, students, housewives, the unemployed and the retired), the rate of informalisation rises to 46%
- v The informal sector comprises of the following categories of workers: the self-employed – professionals, small entrepreneurs, hawkers, fishermen, etc. who work for themselves - (17%), employed workers (75%) and others (8%) respectively.
- v The majority of self-employed operating in the informal economy comprises of artisans (91%) while the remaining constitutes of professionals/entrepreneurs (9%). More than half of the employed workers in the informal sector constitutes of employees with primary job in the formal sector and with secondary employment, referred to as the moonlighters (55%) while the rest are employees with primary job in the informal sector. The category 'others' comprises of housewives, students, retired individuals and the unemployed. Their low participation in the informal economy is not surprising since they do not form part of the economically active population

In line with the above survey findings, total informal employment has been estimated for Mauritius. The table below provides a breakdown of the population in Mauritius aged 15 years and above, categorised in terms of self-employed, employees and others respectively.

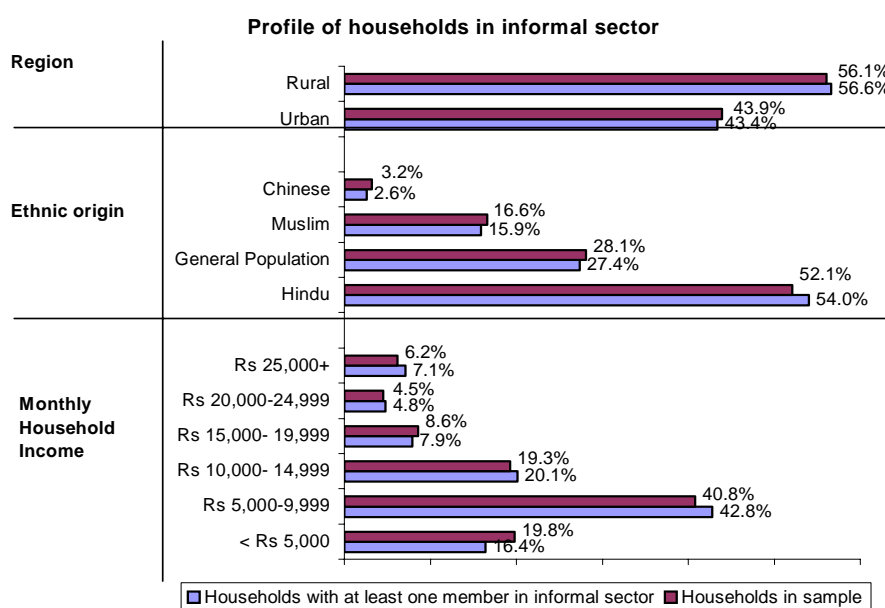
Employment estimates in the informal sector by category of workers				
Category of workers	Self-employed (excluding 'others')	Employees		Others
		Secondary employment with formal primary job	Primary job informal	
Informal sector employment	37,800	93,800	76,100	20,100
Total informal sector employment	227,800			

In Mauritius, there are 844,060 individuals aged 15 years and above (excluding the disabled). Based on the survey findings, an estimated number of 227,800 individuals are believed to operate in the informal economy in Mauritius. The number of self-employed individuals and employees engaged in the hidden economy amounts to 37,800 and 190,000 respectively.

5.2 Profile of participants in the informal economy

5.2.1 Households with at least one member operating in the informal economy

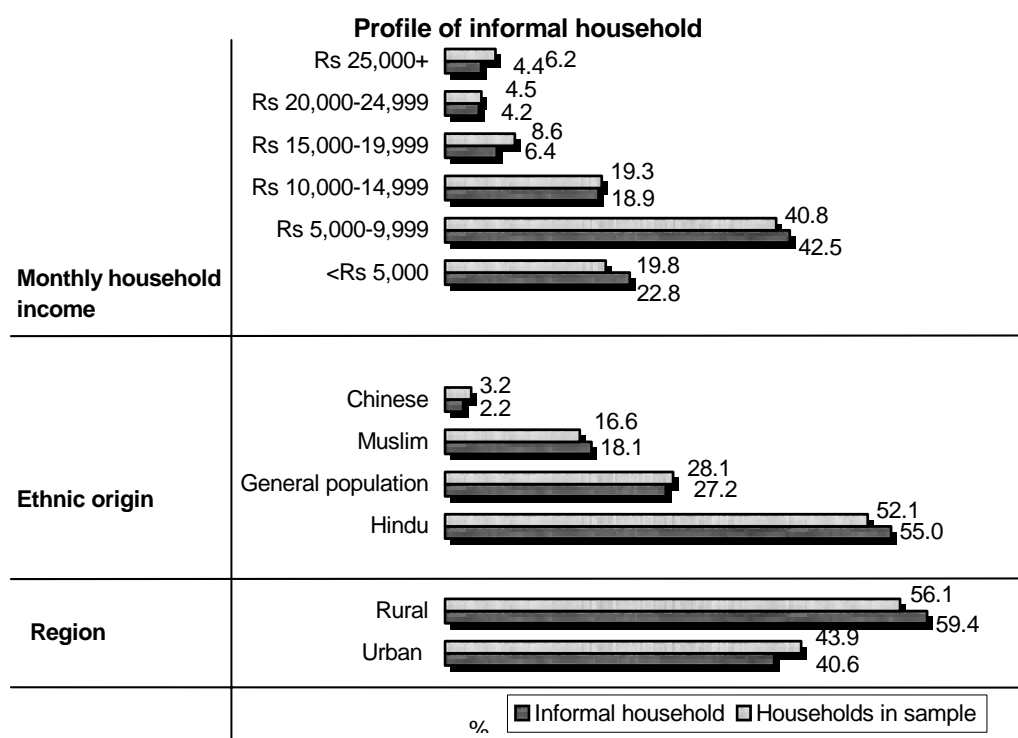
The survey results indicate that more than three-quarters (around 77.8%) of households have at least one member working in the informal sector. The profile of these households presented graphically below.



No significant difference can be observed between the profile of Mauritian households and that of households with at least one member involved in the informal sector. This implies that informalisation is comparable across categories of households, regardless of their socio-demographic characteristics.

5.2.2 Households with heads operating in the informal sector

Informal households (defined as households with heads operating in the informal economy) account for 60% of the total households interviewed during the survey. The socio-demographic profile of these households is presented graphically below:



Compared to the Mauritian households, the profile of informal households display an over-representation among the following sub-groups:

- ✓ Income groups of less than Rs10,000
- ✓ Rural households
- ✓ Hindu and muslim households

5.2.3 Profile of individuals in the informal economy

The table below presents the socio-demographic profile of individuals operating in the informal economy in Mauritius (both the self-employed and moonlighters).

		<i>Total informal (%)</i>	<i>Self- employed (%)</i>	<i>Moonlighters (%)</i>	<i>Sample (%)</i>
<i>Ethnic origin</i>	Hindu	54	51.2	57.6	52.1
	General population	27.4	28.5	26.1	28.1
	Muslim	16.0	16.2	15.8	16.6
	Chinese	2.6	4.2	0.5	3.2
<i>Region</i>	Urban	43.4	46.5	39.4	43.9
	Rural	56.6	53.5	60.6	56.1
<i>Monthly household income (Rs)</i>	<5,000	16.4	19.6	12.3	19.8
	5,000-9,999	42.8	43.8	41.4	40.8
	10,000-14,999	20.1	16.9	24.1	19.3
	15,000-19,999	8.0	6.2	10.3	8.6
	20,000-24,999	4.8	5.0	4.4	4.5
	25,000+	3.9	6.9	7.4	6.2
<i>Sex</i>	Male	85.7	82.7	89.7	83.2
	Female	14.3	17.3	10.3	16.8

The following observations can be made from the above table:

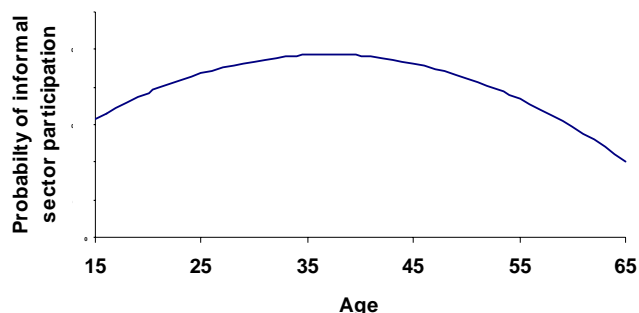
- ✓ The profile of individuals operating in the informal sector display a slight over-representation among: (a) the hindus; (b) male; and (c) middle (Rs5,000-Rs14,999) and high (Rs20,000-Rs24,999) income groups respectively
- ✓ There is no major discrepancy between the proportion of individuals in the informal economy and the sample proportion in both the rural and urban region

5.3 Factors which impact on informal sector participation

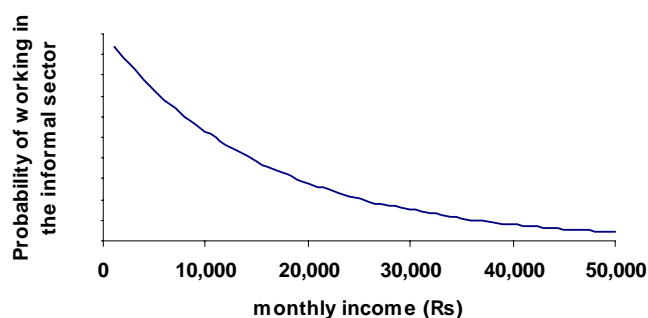
To assess the impact of specific socio-economic factors on informal sector participation, the logistic regression method has been used. This method gives a statistical measure of the incidence of these different parameters on informal sector participation through the computation of probabilities implied by their respective regression coefficients. The appropriateness of this methodology, together with the technical specifications and detailed results of the regression are discussed in more details in Appendix G. The main findings of the analysis are summarised below.

- v Ethnic origin and region are statistically insignificant. This implies that the incidence of informal sector participation among (a) people of different ethnic origins and (b) rural and urban residents are more or less equal. This corresponds to the findings in Section 5.2.3 whereby it was observed that the profiles of individuals operating in informal sector activities were rather similar to sample profiles relating to these parameters

- v Age determines the probability of informal sector participation, as illustrated in the diagram. Other things remaining the same, the probability of informal sector participation follows a smooth quadratic profile, peaking among middle-aged individuals (35-40 years). This is reminiscent of typical age-earning profiles and suggests a strong correlation between informal sector participation and earnings.

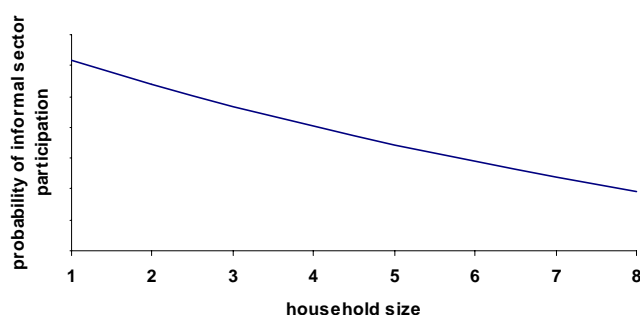


- v The probability of working in the informal sector decreases as household income increases. This is in line with the observation made in previous sections whereby it was noted that there is a higher incidence of informal sector participation among households belonging to the low-income group. At high income levels, however, the decrease in probability is less sharp than at lower incomes levels.



- v The probability of participating in informal activities is higher among males than females. Other things remaining the same, males have a greater probability (+0.18) of being in the informal sector than females.

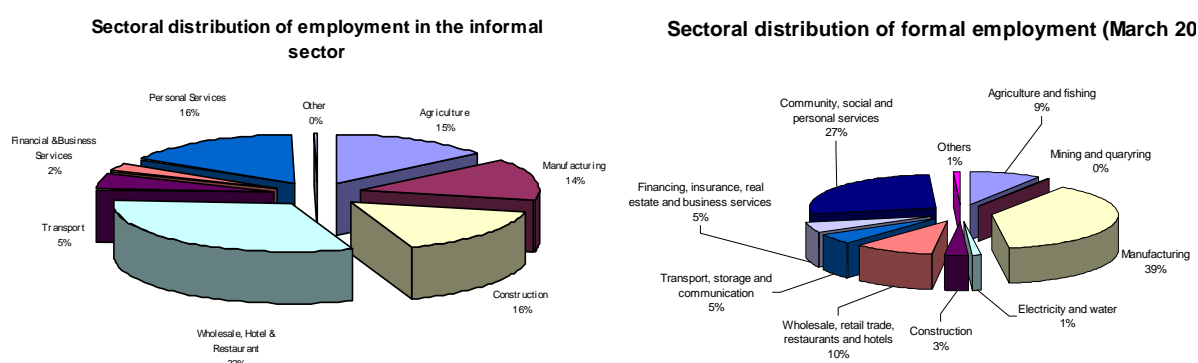
- v The probability of informal sector participation is higher among individuals that are part of smaller households than those in larger ones. However, the probability of working in the informal sector increases at a decreasing rate with household size, as shown in the diagram.



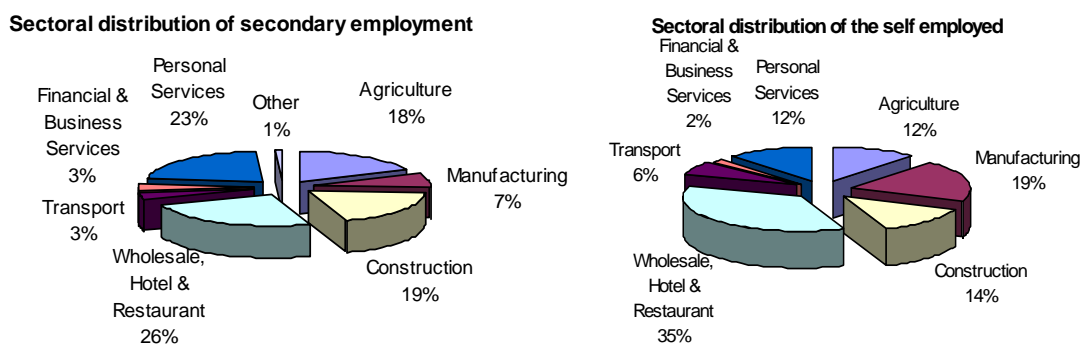
- v The marital status of an individual also has an influence, albeit a smaller one, on the probability of participating in informal activities. Non-married individuals have a higher probability (+0.07) of operating in the hidden economy compared to married individuals

5.4 Sectoral distribution

Data on the sectoral distribution of employment in the informal sector indicates a relatively larger concentration in Wholesale, Hotel & Restaurant (32%), followed by the Construction (16%) and Personal Services sector (16%) respectively. These three sectors together account for over 60% of total informal employment. The picture is different when data on sectoral distribution of employment in the formal sector is considered. The Manufacturing sector ranks first, accounting for 39% of total formal employment, followed by Community, Social and Personal Services (27%) and Wholesale, Retail trade, Restaurants and Hotels (10%) respectively. The sectoral distribution of employment in the informal and formal sector is illustrated in the charts below.



Those individuals with a secondary employment in the informal sector are largely under-represented in the manufacturing and wholesale, hotel and restaurant sectors respectively relative to total informal employment in the same sectors. On the other hand, the self-employed are slightly over-represented in the manufacturing sector. The sectoral distribution of the self-employed and moonlighters is presented in the charts below.



The following observations can be made from the above:

- ✓ The proportion of self-employed operating in the Transport and Manufacturing sectors is twice/more than twice the proportion of moonlighters engaged in the sectors. Also, the share of self-employed individuals engaged in the Wholesale, Hotel and Restaurant sector is considerably higher than the proportion of moonlighters in the same sector
- ✓ The proportion of moonlighters engaged in the personal services sector is nearly twice the proportion of self-employed

The survey results also indicate a strong relationship between the sectoral belonging of the main job and the sectoral belonging of the secondary employment. There is a tendency for moonlighters to choose a secondary employment in the same sector as the primary one. The relationship between the sectoral belonging of the primary employment and the secondary employment is illustrated in the following table.

		Secondary employment						
Primary employment		Agriculture	Manufacturing	Construction	Wholesale	Transport	Financial services	Personal services
	Agriculture	48.7%	2.6%	28.2%	12.8%	0.0%	0.0%	7.7%
	Manufacturing	7.1%	42.9%	0.0%	28.6%	14.3%	7.1%	0.0%
	Construction	0.0%	9.5%	61.9%	9.5%	4.8%	0.0%	14.3%
	Wholesale	3.6%	0.0%	7.1%	75.0%	3.6%	7.1%	3.6%
	Transport	18.8%	12.5%	25.0%	18.8%	12.5%	0.0%	12.5%
	Financial services	0.0%	0.0%	0.0%	33.3%	0.0%	33.3%	33.3%
	Personal services	16.0%	4.9%	11.1%	17.3%	1.2%	3.7%	43.2%

The table above indicates that a large proportion of individuals tend choose a secondary employment in the same sector as that of the primary job. This tendency is more apparent for Wholesale, Construction and Agriculture sectors, as opposed to Transport and Financial Services sectors.

6. Characteristics of the informal sector

6.1 Labour arrangements

- v 21% of the self-employed are helped by family members in their business. This reflects a strong degree of informality in the employment arrangements in the informal economy. Data on the sectoral distribution of the self-employed indicate that the Transport and the Wholesale sector are the two sectors with the highest proportion of self-employed helped by family members
- v 29% of the self-employed have employees other than family members and this practice is more prevalent in the Financial sector (75% of those operating in the financial sector employ non-family members). 79.2% of the self employed with non-family member employees employ less than four individuals and slightly more than half of these employees comprise of friends
- v 50% of family members are not paid at all while 32% receive a reward. In the case of non-family member employees, a large majority (86%) are remunerated per hour
- v With regards to remuneration frequency, around 38% of family members who are paid receive a daily remuneration and the same proportion are paid on a monthly basis while the rest are paid weekly. In the case of non-family members, around 42% are remunerated weekly while 36.1% are paid monthly; the remaining are paid on a fortnightly basis.
- v The frequency of payment varies by type of individuals employed (that is, family and non-family members). For instance, all family members working in the Manufacturing sector (and working for self-employed individuals) are paid on a daily basis while all those working in the Agricultural and Personal Services sectors respectively are paid on a monthly basis. In the construction sector, all family members are paid weekly. In the Wholesale and Transport sectors respectively, 50% are paid on a daily basis while the rest are paid either weekly or monthly. In the case of non-family member employees, a larger proportion are paid on a monthly basis in the Wholesale (46%) and Transport (67%) sectors respectively. In the Manufacturing sector, the same proportion of employees (29%) are paid on a weekly and monthly basis. The table below presents the frequency of payments for family-members and non-family member employees operating in a self-employed business by sector.

Sectors		Frequency of payment (%)				
		Daily	Weekly	Fortnight	Monthly	Others
Agriculture	Family				100	
	Non-family					
Manufacturing	Family	100				
	Non-family	5.9	29.4	17.6	29.4	
Construction	Family		100			
	Non-family	7.7	30.8		46.2	
Wholesale	Family	50	50			
	Non-family					
Transport	Family	50			50	
	Non-family				66.7	
Personal services	Family				100	
	Non-family					

- v The most popular mode of payment for those working in a self-employed business is cash. In fact, all the family workers and 97.2% of non-family member employees are paid in cash. This observation holds true irrespective of the sector considered

6.2 Fringe benefits

Employees working in the formal sector are not only remunerated financially but also through fringe benefits which include medical insurance, pension scheme, end of year bonus and vehicle among others. However, employees working in the informal economy are generally perceived not to benefit from these facilities. This is confirmed by the observations made from the survey results, as detailed out below.

	Employees in the informal sector	Self employed		Secondary employment	Formal employment
		Family member employees	Non-family member employees		
FACILITIES	Base=333	Base = 54	Base =77	Base=203	Base=203
Pension scheme	0.3%	-	-	0.5%	44.3%
Medical insurance	1.8%	-	7.8%	-	29.6%
Paid leave	7.8%	3.7%	24.7%	2.5%	74.9%
End of year bonus	12.3%	5.6%	40.3%	3.4%	84.7%
Productivity bonus	2.4	3.7%	6.5%	0.5%	17.7%
None	78.1%	79.6%	48.1%	88.7%	12.3%

The following observations can be made from the above table:

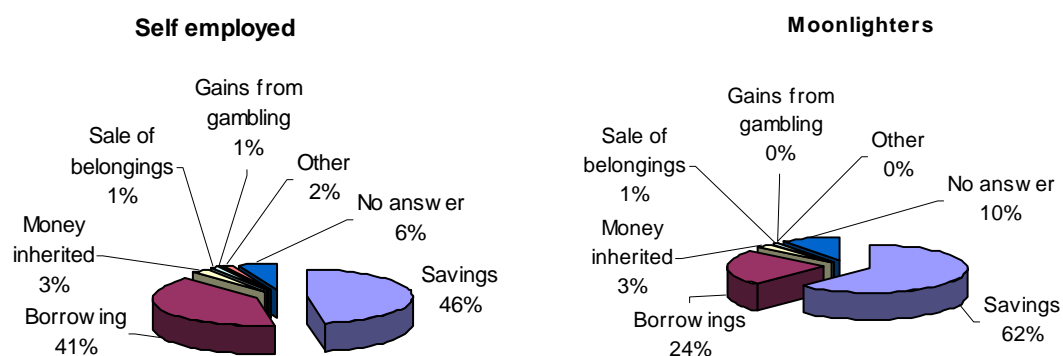
- v There exists a sharp contrast between employees in the formal and informal sector regarding fringe benefits made available to them at their workplace. 78% of all employees operating in the informal economy do not benefit from any form of fringe benefits compared to only 12% in the formal sector
- v Among those working for self-employed individuals, family member employees appear to be worse off. Only some 20% benefit from such facilities compared to non-family member employees whereby more than half are beneficiaries. Moonlighters are in a far worse situation whereby around 89% do not receive any form of fringe benefits
- v The most common form of fringe benefit to which employees in the informal economy are entitled to is the end of year bonus, followed by paid leave

The absence of pension schemes and medical insurance facilities in the informal sector workplace is a serious cause for concern, especially considering that the large majority of those operating in the sector belong to low-income groups.

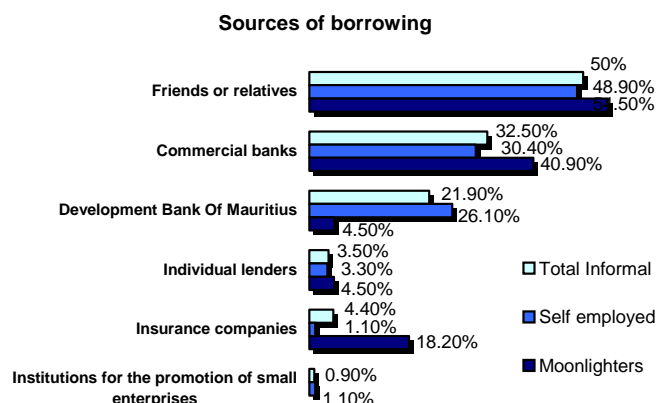
6.3 Investment threshold and sources of funding

- v Initial minimum investment in informal sector activities by the self-employed amount to Rs200 while the maximum value is Rs500,000. The average value invested by the self-employed individuals stands at around Rs51,600
- v Savings appears to be the most common source of finance to fund investment. More than half of those operating in the informal sector have recourse to savings for investment purposes. However, this method of financing is more prevalent among those with a secondary employment. In fact, more than 60% of this category of employees finance their activities through savings compared to some 46% of the self employed

- v Borrowing is the second most popular source of funding for those operating in the informal economy with around 35% resorting to this form of finance. Around 41% of the self-employed and 24% of those with secondary employment have recourse to borrowing. The charts below illustrate the different forms of financing resorted to by the self-employed and the moonlighters respectively



- v The major source of borrowing for almost 50% of the participants of the informal sector is friends or relatives, followed by commercial banks (33%) and the Development Bank of Mauritius (22%). The various sources of borrowing by total informal sector participants, categorised in terms of the self-employed and moonlighters, are illustrated in the graph below (note that one individual may have different sources of borrowing).



- v In line with the above, we can conclude that more than half of individuals operating in the hidden economy have recourse to informal means of borrowing (that is, from friends and relatives). The prevailing high interest rates is seen as a major inhibiting factor for both the self-employed (34%) and moonlighters (23.5%) to borrow from banking/other financial institutions

6.4 Law compliance

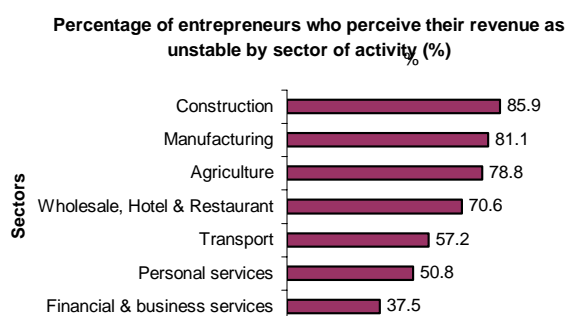
- v According to the survey, half of the entrepreneurs operating in the informal sector claim they do not need a licence to operate their business while 47% state they need one to operate. This implies that more than 50% of such entrepreneurs are not permit holders and therefore do not comply with the existing law in the country

- v More than 70% of those who claim they do not have a licence state that their activities do not require one to operate. This observation applies to both those who are self-employed in a secondary job and those who are in self-employment as their only job
- v Among the self-employed who claim they need a permit to operate, 70% are in possession of all the required permits while the rest either do not have all the required permits or have none at all. Nearly half of those possessing all the required permits operate in the wholesale sector, followed by the manufacturing sector (17%). More than half of the self employed without any permit attribute the lengthy and complex procedures as a major constraint in acquiring the required permit
- v More than half of those who are self-employed in a secondary employment and who are aware of the need for a permit to operate have all the required permits. Among those who do not have a permit to operate, the large majority is engaged in the wholesale sector (30%), followed by the construction sector (20%) and manufacturing sector (15%) respectively. 25% of those not possessing the required permits attribute the length and complexity of the procedures as an important inhibiting factor in their pursuit for a permit

6.5 Revenue stability

- v A large majority of entrepreneurs operating in the informal economy earn a monthly income of less than Rs10,000. More than half of the self-employed (63%) and almost 90% of entrepreneurs in secondary employment fall under this income category. We can therefore reasonably say that the average monthly income of those engaged in informal activities is under Rs10,000
- v The revenue earned from informal sector operations is perceived by the majority of entrepreneurs (more than 70%) to be unstable. This observation holds true for both the self-employed and those entrepreneurs having a secondary employment

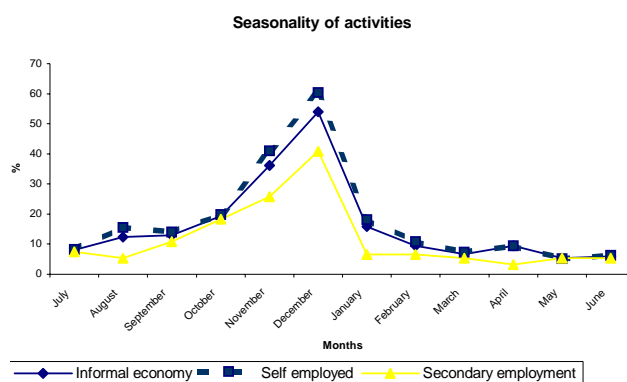
- v The revenue stability appears to vary across sectors, with more than 80% of those operating in the Construction and Manufacturing sectors perceiving their revenue as being unstable compared to 37.5% entrepreneurs in the financial and business services sector (illustrated in the graph).



- v The large variability in revenue has been attributed by a larger proportion of the operators to competition (39%), the purchasing power of consumers (37%) and seasonal factors (31%) among others

6.6 Seasonality of activities

Activities within the informal economy are strongly characterised by seasonality. In the view of more than half of the participants in the sector, the month of December is the peak month whereby activities boom. As the graph illustrates, this perception is more prevalent among the self-employed (60%) as opposed to those with a secondary employment



7. Causes of informal sector participation

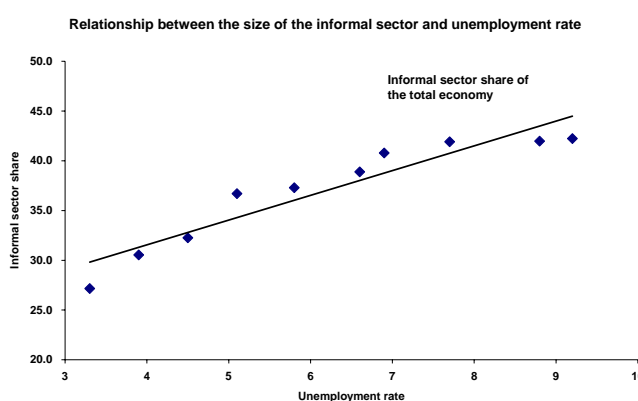
7.1 Economic reasons

7.1.1 Macroeconomic policies

Despite structural adjustment and economic reforms in the country, unemployment has not been abated and informality has increased in the country. Unemployment rate rose from 2.8% in 1990 to reach 9.2% in year 2001. At the same time, informal employment has grown, as reflected by the significant rise in the size and share of the informal sector in the country. This in turn questions the role of macroeconomic policies on the proliferation of informal sector activities and participation.

While macroeconomic policies have been successful in reducing inflation by nearly half over the past decade (from 10.7% in 1990 to 5.4% in year 2001), these policies seem to have created a bias in favour of job creation in the informal sector. The increased trade liberalisation over the past years has adversely affected the competitiveness of the manufacturing sector and many have lost their jobs in the process. At the same time, the increased use of capital intensive methods of production has displaced unskilled labour in various sectors of the economy. Given the lack of unemployment insurance that characterises the country, displaced workers may have chosen to find a job in the informal sector.

To support the above argument, the relationship between informal sector share and unemployment rate in the country has been examined. As can be noted from the graph, there is a strong positive relationship between the two variables, reflected by a high coefficient of determination of 0.89.



7.1.2 Tax evasion

Tax evasion also appears to influence an individual's decision to operate or not to operate in the hidden economy. This can be observed from the following:

- v 90% of moonlighters are not registered for taxation purposes (with the large majority comprising of males) while more than half (67%) are registered for their primary job. This in turn explains why only a very small percentage of moonlighters (6.4%) receive an income tax form for their secondary employment

- v Around 78% of the self employed operating in the informal sector do not pay tax. Of these, around 28% earn a monthly income that is “taxable” (that is income earned at a level which is higher than the threshold below which no income tax is payable)
- v There is a mixed feeling with regard to the level of taxation practised in the country, with over half of informal sector participants claiming that the tax rate is too high

The perceived high level of taxation together with the prevalence of tax evasion among a large majority of participants operating in the hidden economy indicates that taxation acts as a strong incentive to operate in the informal sector. This may be particularly true for the self-employed for the following reasons:

- √ Formal firms face high operational costs related to taxes and other bureaucratic regulations (for instance, costs of licences). These costs, together with high corporate taxes, act as a disincentive to operate in the formal sector, especially small firms which do not have the required market size to benefit from economies of scale on capital investment
- √ Employer contributions (the National Pension Fund and the Employee Welfare Fund) increase the cost of labour. This in turn explains why a large proportion of workers working for the self-employed are family members

7.1.3 Livelihood strategy

Individuals operate in the informal economy as a means to survive. In fact, 87% of the moonlighters claim they operate in the informal economy to ‘make both ends meet’, that is, for survival reasons. Also, almost half of the moonlighters claim they will cease their secondary job if they manage to obtain a revenue which guarantees then a ‘reasonable’ standard of living. This reflects the inability to achieve a ‘reasonable standard of living’ from revenue earned from their primary jobs

7.2 Non-economic reasons

7.2.1 Labour market rules and regulations

- v The cost of operating in the formal sector may act as a disincentive to do so. In fact, 45% of informal sector participants without licences find that the procedures are too lengthy and complicated prior to obtaining one (this perception is shared by 55% of the self-employed and 25% of the moonlighters without licences respectively). This leads them not to acquire one in the first place and subsequently, to operate informally
- v It is not only the excessive regulations which explain the proliferation of informal activities but also the lack of or weak enforcement of such regulations in the country. This is reflected by the significantly low request made by the relevant authorities

(including banking institutions) for a licence from informal sector participants. In fact, only 31% have been asked to produce a licence for the operation of their activities. Law enforcement appears to be relatively poor among the moonlighters, whereby only 10% claim they have been asked to produce their licence compared to 34% of the self-employed who have been asked to do so

- v The impetus to operate in the informal sector can also be linked to misallocation of public funds as perceived by informal sector participants. In fact, 46% of the participants claim that public expenditure financed by tax revenue is unjustified. This perception in turn may impact on their decision not to contribute to the tax revenue of the country and hence on their resolution not to register for tax purposes

8. Consequences for the economy

8.1 Economic implications

The nontrivial size of the informal sector raises the issue of the prevalence of tax evasion. It is generally understood that tax compliance is very low among informal participants.

Assuming 0% tax compliance in the informal sector and 100% compliance in the formal sector, the tax gap, i.e. revenue forgone by the government due to non-payment of tax is estimated by using the following formula:

$$\text{Tax gap} = \text{Tax revenue} \times (\text{Hidden GDP} / \text{Measured GDP}).$$

The tax gap for selected years are shown in the following table.

	2000/01	2001/2002	2001*	Tax gap
Tax Revenue(Rsmn)	8,963.7	6,790.2	7,877.0	4,746.7
Taxes on income (Rsmn)	3,039.2	3,500.0	3,269.6	1,970.3
Value added taxes (Rsmn)	5,924.5	3,290.2	4,607.4	2,776.4
Budget deficit	(8,278.4)	(8,935.3)	(8,606.9)	

Source: Budget 2000/2001 and 2001/2002, own calculations

* Calendar year figures from actual financial year and years for 2000-2001 and revised estimates for 2001-2002

As illustrated above, the tax gap (that is, tax revenue foregone as a result of informalisation) for the calendar year 2001 is estimated at Rs4.7 billion. Accordingly, if activities undertaken in the informal sector were “formalised”, the budget deficit would have been reduced to Rs3.9 billion (Rs8.6 minus Rs4.7 billion).

However, there are grounds to believe that the loss in tax revenue to the government is significantly less than the Rs4.7 billion above, since:

- ✓ There may not be 100% tax evasion in the informal sector
- ✓ Due to their low level of investment, a number of informal sector products and services would be anyway exempt from value added taxes.

8.2 Social implications

Informal workers lack social protection. Since informal activities avoid various social security contributions, workers in the sector do not have access to the different forms of social protection such as health insurance and old age pension.

This is a serious cause for concern in a country like Mauritius where the size of the informal sector has increased significantly over the past years. In line with the survey results, 78% of

informal sector participants do not benefit from any form of fringe benefits at their place of work. This implies a poor coverage of social protection programmes among some 177,700 individuals in the country. This in turn will have two major implications for the workers:

- √ Restricted access to health and injuries insurance make informal workers exposed to the normal risks of work
- √ No access to the pension system protection makes retirement a hard reality and may force them to work longer

9. Summary and conclusion

9.1 How significant is the informal sector phenomenon?

- v The average share of the informal economy in Mauritius is significantly below the average in the African region. The average share as a percentage of official GDP for the period 1989-1993 has been worked out for the developing, transition and OECD countries as follows:

<i>Countries</i>	<i>Average share of the informal economy as a percentage of official GDP for the period 1989-93</i>
<u><i>Developing countries</i></u>	
<i>Africa</i>	43.9
<i>Central and South America</i>	38.9
<i>Asia</i>	35.0
<u><i>Transition countries</i></u>	
<i>Former Soviet Union</i>	25.7
<i>Eastern Europe</i>	20.7
<u><i>OECD countries</i></u>	14.2

Source: Friedrich Schneider (2000)

- v Developing countries have by far the largest average informal economies in the world, followed by the transition countries and OECD countries respectively. In Mauritius, the average informal sector share over official GDP figures stood at 30.9% over the period 1990-1993. This compares favourably with the share in the developing countries. However, Mauritius is relatively worse off compared to the other two category of countries³
- v While Mauritius fares better than the region in terms of informal sector share, the size and significance of the sector is a serious cause of concern for the country. For the year 2001, the share of the informal sector as a percentage of official GDP stood at 60% (Rs70.6 bn)⁴. This represents more than a 10-fold increase over the period 1990-2001, from Rs6.4 bn in 1990.

9.2 Why is the informal sector a cause for concern?

There is a wide literature on the positive effects of a sizeable informal sector. In the neo-classical view, the sector provides the economy with a dynamic and entrepreneurial spirit

³ Note that in more recent years, the disparity between Mauritius and the other category of countries may have worsened/improved. Unfortunately, more recent data on informal sector share in other countries was not available for comparison purpose

⁴ Assuming a unitary elasticity scenario

and can lead to more competition and higher efficiency. Other schools of thought postulate a positive relationship between an increase in the informal sector and economic growth whereby earnings generated in the shadow economy are rather immediately spent in the official sector.

However, the emergence and growth of a large unofficial economy also poses serious concerns, which on balance dominate. In Mauritius, the significant size of the informal sector, although it has stabilised over the recent years, is a major cause of concern for the authorities and the population at large for three major reasons: the loss in tax revenue it entails; policy implications using wrong employment figures; and the poor social protection for informal sector participants.

- v The sizeable informal economy in Mauritius represents a significant loss to the government in terms of tax revenue and subsequently, the loss of opportunities to the population in terms of public services foregone. In fact, the budget deficit stood at Rs8.6 billion in 2001 and to achieve a balanced budget, massive expenditure cuts have been undertaken. It is likely that expenditure cuts on public goods and services projects have not been spared in the process. These cuts would have been significantly less if activities in the informal sector were 'formalised' and an additional tax revenue of Rs4.7 billion were raised accordingly
- v Due to the high level of total informal sector employment in the country, the official statistics may be erring on the high side in respect of total unemployment, and additionally failing to pinpoint areas of higher concentration. This may be having an unfavourable effect on the adoption of the right mix of employment creation policies
- v The significant participation in the informal economy entails poor coverage of social protection programmes. An estimated 177,700 individuals are believed to be left out from these programmes. This implies that a significant proportion of those involved in the informal sector may have to work beyond the normal retirement age

9.3 Possible suggestions

In line with results obtained from the survey, some plausible suggestions have been examined in the section which follows. These can be examined and analysed in more depth by the relevant authorities to control informalisation in the country.

Four important issues appear to stand out as the most important and urgent to deal with respect to the size and trend of informal activities in Mauritius, as follows:

- (a) Complex and non-enforced labour market rules and regulations on informal activities
- (b) Participation in the informal sector as a livelihood strategy
- (c) Public goods and services foregone as a result of informalisation
- (d) Lack of social protection for informal sector participants

The first two issues have been identified in the survey as the major causes of the large informal sector in the country while the last two issues relate to the dire consequences of informalisation in Mauritius.

This research paper notes that it is not only the complex regulations which obstruct the creation and growth of formal enterprises but also, their lack of enforcement. Also, individuals increasingly resort to informal activities to complement the low income they receive from their primary formal job. The size of the informal sector would not have been a cause for concern if it were not for the lack of social protection that its participants endure and also, the sizeable expenditure foregone on public goods and services as a result of the prevalence of informal activities.

In view of the above, the survey results call for a series of policies aimed at:

- ✓ reducing the number of involuntary informal workers; and
- ✓ protecting those who choose to remain informal from vulnerability

This paper suggests three such policies, classified under the following categories: (a) regulatory framework; (b); macroeconomic policy; and (c) social programmes design.

In addition to the above, given the sheer size of informal activities in Mauritius, this paper suggests the need to develop a comprehensive system of statistics on employment in the informal sector.

9.3.1 Regulatory framework

Given the limitations of the regulatory framework in the country (as reflected from the survey findings), this paper suggests that regulatory changes be brought to the following three important facets: registration of entrants, law enforcement and simplification of procedures.

Registration - Individuals joining the market to do business must be registered with the relevant organisation. This has been already addressed under the Business Registration Act 2002 whereby every person carrying out business in the country must register with the Register of Companies. In addition to the above, the local government, banks, micro-finance institutions as well as the SMIDO must embark in promotional activities that induce small entrepreneurs to register their firms in order to have access to micro-credits, instruction of managerial skills, etc.

Law enforcement - the 2002/2003 budget has already made provision for an increased manpower resources to revenue departments to allow them to carry out investigation and audit work. In addition to this, it is equally important that property rights be properly enforced. Informal workers should not be allowed to have a competitive advantage by not complying with land use or pollution control programmes. Regulations on public areas, urban land use, garbage disposal and pollution must be enforced. This may result in some informal workers being displaced from their current areas of operation. In this context,

alternative land plots must be provided by the local authorities, with adequate services and in line with land use regulation. One example which is working well currently on the island has been the creation of commercial centres in a number of urban areas whereby informal workers who were previously selling their goods on the street are now doing so in a sheltered area, identified by the municipalities

Simplification of procedures - Registration of new firms, irrespective of their size or economic activity, must be made an easy, fast and inexpensive procedure. This also applies to procedures to obtain business permits and licenses. Also, relevant business-related information and training such as how to obtain permits, the procedures to start a business and how to run a business should be made readily accessible

9.3.2 Macroeconomic policy

The trends in employment expansion and structural change generally conform to the concept of a shifting comparative advantage within a country. At a low level of development, a country with abundant labour may offer relatively low wages, and its comparative advantage would lie in labour-intensive basic industry. At higher economic and social development levels, educational levels and wages rise and the economy's comparative advantage shifts to more value added manufacturing based on higher levels of technology. As the economy continues to develop, its comparative advantage may shift to the tertiary sector and knowledge-based enterprises, such as business and financial services, research and development, and information and communications.

Mauritius is currently in the latter stage of development. Modern technology is complementary to skilled labour such that new investments in the economy are likely to shed unskilled labour which characterise the informal sector. Moreover, formal sector workers usually have difficulty moving from one labour-market segment to another because of barriers such as entry requirements, education and skills requirements and non-job related aspects like discrimination based on status. It is easier for workers to move from the formal to the informal sector or from wage employment to self-employment because neither the informal sector nor self-employment has significant entry barriers.

Macroeconomic policy must therefore strive to create jobs which are 'formal bias' and in the new emerging sectors of the economy. The rapid changes in job-market requirements and needed skills in the country increase the emphasis on training and lifelong learning to raise workers' employability and improve access to employment. The government is currently investing massively in skills and knowledge development and the training of the workforce in the light of these changes, including advances in technology. However, the risks are higher for the vulnerable groups and reduce their opportunities and incentives for training. Therefore, as policy attends to the development of human capital, one element deserves special attention: the need for targeted employment creation programmes such that higher levels of value added employment (and thus towards higher incomes at the individual and aggregate levels) are made available to wider segments of the population.

9.3.3 Design social programmes

Forcefully pushing into "formality" may entail much greater costs for the government than tolerating a manageable informal sector. However, in the absence of adequate social safety nets, informal participants currently operate in a vulnerable environment. Also, since the large majority of informal sector participants come from low-income groups, they have limited capacity to contribute to social protection schemes. It is therefore imperative to give priority to schemes specially designed to meet the needs of informal sector workers. The following two options can be considered to meet this goal, namely (a) extension of existing programmes and (b) creation of new programmes which target informal sector workers.

Under the first option, the scope of existing schemes can be extended to cater for non-covered employees in regular employment as well as employees in casual or intermittent employment. The social insurance programmes should be designed in such a way that they cater for potential risks faced by informal participants, for instance, old age, health and job accidents respectively.

However, integrating self-employed workers into such schemes can be complicated since they may not be prepared or able to pay for employer contributions under the current social security scheme. A priority in such cases may be the development of (self-financed) social protection schemes for workers outside the formal sector. These schemes, called "micro-insurance", can be set up by various groups of workers (by sector of activity) whereby flexible contributions from the workers are allowed. For those with seasonal jobs and fluctuating incomes, a 'fair' contribution level may need to be defined and special means devised to collect the premium, bearing in mind that the scheme designed should not create an unacceptable cross-subsidisation burden on regular income earners. The government can support such schemes by (a) creating the necessary legal and institutional environment, thereby promoting a transparent and participative governance structure and (b) providing technical assistance on how to design such schemes.

9.3.4 Development of a comprehensive system of statistics

Since the informal sector plays an important role in employment and income generation, it is suggested that a comprehensive system of statistics on employment in the informal sector be developed to provide an adequate statistical base for the various users of the statistics. The system to be developed should:

- √ contribute to the improvement of labour statistics and national accounts as an information base for macroeconomic analysis, planning, policy formulation and evaluation
- √ provide quantitative information on the contribution of the informal sector to various aspects of economic and social development, including employment creation, production, income generation, human capital formation and the mobilisation of financial resources

- √ provide data for the design and monitoring of specific support policies and assistance programmes for the informal sector with a view to increasing the productive potential and employment- and income-generating capacity of informal sector units, improving the working conditions and social and legal protection of informal sector workers

In order to fulfil the above objectives, comprehensive, detailed and reliable statistics should be compiled, as far as possible, be compiled on: (i) the total number of informal sector units and their composition; (ii) total employment in such units by socio-demographic and other characteristics and on the conditions of their employment and work; (iii) production and incomes generated through informal sector activities (iv) other characteristics pertaining to conditions under which informal sector units are created and carry out their activities. In addition, to monitor changes in the size and characteristics of the informal sector over time, it is recommended that the above-mentioned statistics be compiled at regular intervals.

One plausible way to achieve the above objective could be to consider integrating the collection of data on the informal sector into the regular national statistical system. The data collection programme should provide both for (a) the current monitoring, if possible once a year, of the evolution of employment in the informal sector and (b) the in-depth examination, if possible every five years, of informal sector units with respect to their numbers and characteristics, in particular, their organisation and functioning, their production activities and levels of income generation, as well as their constraints and potentials among others.

The Housing and Population Census recently published by the CSO produces, in a very comprehensive manner, data on the economic characteristics of the resident population in Mauritius. To produce data on the economic characteristics of informal sector participants, it is therefore recommended that an appropriate definition be reached on who comprises informal sector participants. This research paper is one step in this direction. However, the definition used in this paper may need to be refined further to obtain more comprehensive and exhaustive data on the characteristics of the hidden economy.

APPENDIX A – INCEPTION REPORT

1. Introduction

1.1 Background

De Chazal du Mée has been commissioned by the Mauritius Research Council to conduct a research project to gauge the importance of the informal sector in the Mauritian economy. The principal objective of the study is to estimate the global size of the informal sector, through which its implications for the economy- causes and consequences- can be analysed.

The first phase of the study consisted in a literature review of studies on the informal economies of Mauritius and other countries. The scope of the review has been mainly to analyse methodologies, in a view of finding the most efficient way of proceeding with the research.

1.2 Preliminary findings from literature review

The main findings of the literature review can be summarised as follows:

1. Several definitions have been used for the informal sector, and one generally accepted definition- which is also the one that will be used in this project- is in terms of unrecorded economic value-added.
2. While there is a growing literature on the phenomenon of the informal sector world-wide, relatively few attempts have been made at quantifying the size of the informal sector.
3. Even among those studies that have tried to quantify the size of the informal sector, the methodologies used differ, largely to adapt to data requirements, and country-specific or country category-specific considerations.

Bearing the above in mind, the approach used has been to review the different methods used for determining the size of the informal sector, and assess the applicability and effectiveness with respect to the Mauritian context.

2 Review of methods

There are broadly two approaches for quantifying the size of the informal sector: the micro approach and the macro approach. This section reviews the most commonly used methods under these two approaches.

2.1 The micro approach

The micro approach uses survey-based methods, which consist in extrapolating population values based on information obtained from an appropriate sample of respondents. Two such methods used for estimating the size of the informal sector are employment surveys and fiscal audits.

Employment surveys

Employment surveys are designed to capture the extent of undeclared work in the economy. These include both people working solely in the informal sector, and those having an informal secondary employment.

Fiscal audits

Fiscal audits are selective checks of declared income. Income declared in the survey are compared to income declared for income tax purposes, and the difference is taken to represent the size of the informal economy.

Direct surveys to estimate the size of the informal economy have been used extensively in countries like Denmark and Norway, and, to a lesser degree, in other OECD countries. They have been used much less in developing and transition economies, where there is an allegedly high incidence of tax evasion and/or a large parallel sector.

2.2 The macro approach

Contrary to the micro approach, the macro approach uses observable indicators, whether as proxies or explanatory variables, to derive the size of the informal sector, often through econometrically explored relationships. There are a variety of macro models that have been used to determine the size of the informal sector. Some of the most commonly used methods are described hereafter.

The national accounting method

This method explores the contradiction to national accounting theory, which claims that the sum of all incomes must equal the sum of all expenditures, which is usually observed when National Accounts are compiled. Since expenditure is usually harder to hide than income, GDP is usually higher when measured by the expenditure method than by the income

method. The difference between these two measures gives an indication of the size of the informal sector.

Schneider and Enste used the expenditure and income discrepancy method to estimate the informal sector size for countries such as Germany, Great Britain, and United States. The results are that, for the period 1981/85, Germany had a hidden economy 13.4% of its GDP, Great Britain had 4.2 % of its GDP, and United States had 6.1% of its GDP.

The labour force participation method

This method assumes that the total labour force participation is by and large constant, indicating that a decline in the rate implies an increase in informal sector activities. Hence, the size of the informal sector is estimated by analysing differences in the labour force participation rate, while controlling other variables in the labour market. This method has been used notably in European union and the United States.

The transactions method

This method relies on Fisher's Quantity Theory of Money equation $MV=PT$, where M is money, V is the velocity of money, P is the price level, and T is total transactions. PT, which is the value of total transactions, can be related to total nominal GDP, which consists of both official and unofficial GDP. The size of the informal economy is obtained through the deduction of the official GDP from the total nominal GDP. The main assumption underlying the model is that the relation between the volume of transaction and official GDP remains constant over time.

This approach has been used in countries such as Netherlands, Canada, Great Britain, Italy, United States and in Germany, for the informal sector size calculation.

The currency demand method

The currency demand approach assumes that informal transactions are undertaken in form of cash payments. Therefore an increase in the size of the informal economy will result in an increase in the demand for currency. Tanzi⁵ developed an econometric model based on this approach, whereby the size of the informal sector is proxied by the weighted average tax rate, which is incorporated in a regression equation containing macroeconomic parameters.

This model has been extensively used in OECD countries, and also in some developing (and emerging) economies such as South Africa, Tanzania, Mexico and India. Using this method, it was found that, in 1989-1990, OECD countries had, on average, a smaller informal sector (as a percentage of total GDP) than developing economies (except South Africa).

The physical input (electricity) method

⁵ Tanzi, Vito (1982) (ed.), "The Underground Economy in the United States and Abroad" pp 38-56

This method explores the belief that electricity consumption is the single best indicator of economic activity. Throughout the world, growth in electricity consumption has been observed to move in lockstep with real growth of the economy. One use of this method compares household electricity regular economy output utilisation rate to estimate the size of the shadow economy.

The electricity approach has been used in a large number of countries, at all levels of development. It is the only approach throughout the literature review that has been applied to carry out a world-wide cross-country comparison. In a study conducted for the IMF⁶, it was found that, in 1989-93, African economies had, on average, the largest informal sector (43.9%) and OECD economies had the lowest (15.1%). This is illustrated in the table that follows.

Average Size of the Shadow Economy for Developing, Transition, and OECD countries in 1989-90 using the physical input (electricity) method.

Country group	Average Size of the Shadow economy (in percent of GDP) 1989-93
<u>Developing countries</u>	
Africa (including South Africa)	43.9
Central and South America	38.9
Asia	35.0
<u>Transition countries</u>	
Former Soviet Union	25.7
Eastern Europe	20.7
<u>OECD countries</u>	15.1

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The model approach

This method is also known as the MIMIC (multiple-indicator, multiple-cause), since it considers the multiple effects of, as well as the multiple causes of the growth and existence of, the informal sector. This method is based on the statistical theory of unobserved variables. In this case, the size of the informal economy is the unobservable variable, whose size is assumed to be influenced by a set of indicators. The coefficients for these indicators are measured in a set of structural equations, and are used to predict the future size and movement of the informal sector.

⁶ Scheneider, F. and D. Enste, "Shadow Economies Around the World: Size, Causes, and Consequences", *Journal of Economic Literature* (March 2000).

Loayza⁷ used a model approach for economies of Central and South America, finding relatively large informal economies in Bolivia (65.6%), Panama (62.1%) and Peru (57.4%) over the period 1990-93.

Schneider and Enste⁸ also used the model approach and they estimated Canada to have an informal economy of about 8.7% of GDP, Germany to have 6.1% of GDP, Great Britain to have 8% of GDP, Italy to have 10.5% of GDP, and United States to have 8.2% of GDP for the period 76/80.

The model approach has further been used by Giles⁹ to estimate the size of the New Zealand's informal sector and he concluded that in 1992, the informal economy represented 8.7% of GDP, and in 1994, it rose to 11.3% of GDP.

3 Assessment of estimation methods

3.1 Summary of assumptions and limitations of methods

There is no single best method to estimate the size of the informal sector, each one having its usefulness depending on the context and scope of the study in which they have been estimated. The table below summarises the assumptions and limitations of each model.

MODELS	ASSUMPTIONS	LIMITATIONS
Micro approach		
Surveys	Reliable answers from respondents population estimates can be extrapolated from sample values	The sensitivity of the issue increases the unwillingness of respondents to give accurate answers
Macro approach		
National accounting method	Incomes may be hidden from authorities but most expenditures cannot	A lot of expenditures may be unrecorded as well as income First approximation at best.
Transactions method	Constant relation over time between transactions volume and official GDP, Existence of a base year where there is no informal economy.	restrictive assumptions unreliable estimates data limitations

⁷ Loayza, Norman V. (1996), The Economics of the Informal Sector: a Simple Model and Some Empirical Evidence from Latin America. *Carnegie-Rochester Conference Series on Public Policy* 45, pp129-162.

⁸ Friedrich Schneider and Dominik Enste(1998), Shadow economies around the world: Size, causes, and consequences. IMF working Paper.

⁹ David E. A. Giles(1998), modelling the hidden economy and the tax-gap in New Zealand. Econometrics Working Paper, university of Victoria.

Currency demand method	Informal transactions are undertaken in the form of cash payments	not all transactions are conducted in cash
Discrepancy between official and actual labour force	total labour force participation is Constant	existence of moonlighting causes underestimation. labour force participation rate changes over time
Physical input method	the best indicator of economic activity is electricity consumption	not all informal economy activities require the use of a considerable amount of electricity.
Model Method (MIMIC)	causes of the informal sector can be proxied by appropriate indicators	extensive data requirements, possibility that estimates lack robustness

3.2 Assessment criteria

Experience of studies conducted abroad can help to assess the suitability and adaptability of the approach to be used to estimate the size of the informal sector for Mauritius. The following criteria will be particularly emphasised.

1. Reliability of results
2. Usefulness of results for analysis purposes
3. Data availability
4. Plausibility of model assumptions

3.3 Choice of methods

Micro versus macro approach

The scope of the study warrants the use of a macro approach over a micro approach for the following reasons:

1. Estimations of the informal sector will be based on observable variables and statistically tested correlations, which are much more reliable than survey responses that largely depend on the honesty of respondents and their proper understanding of the questions. Those individuals not ready to disclose any information to the tax or other governmental departments will not choose to provide information to interviewers, despite guarantees of anonymity. However well the questions are formulated, the data derived from the responses may not be very reliable.
2. The macro approach enables testing of hypotheses and formulation of scenarios based on alternative assumptions.
3. The survey approach gives only a point estimate, while many macro approaches enable to find estimates over time of the informal sector. These methods not only enable to

observe the time series evolution of the informal sector, but also allow for forecasting the future evolution thereof.

4. Macro methods enable to statistically analyse the impact of various indicators on the informal sector, and on the economy. Therefore it enables the prioritisation of policy measures. By contrast, survey methods can, at best, identify such consequences and allow no prioritisation.

Choice of macro method

The national accounting method and the labour force participation method do not share many of the statistical advantages presented by macro models. The national accounting method, moreover, is constrained by some of the same data measurement limitations as with measuring the size of the informal sector. The assumption of constant labour force participation rate is not plausible in the case of Mauritius, considering the notable increase in the female labour force participation rate, as well as changes in the demographic composition of the country. Moreover, it is also unreliable due to 'moonlighting', that is simultaneous operation in both formal and informal sectors. The usefulness of these two methods for the study is hence limited.

Similarly, the assumptions used for the transactions approach are too restrictive. In particular, a base year has to be taken in which it is assumed there is no informal sector, and the coefficients in the Quantity equation are 'normal'. These coefficients are furthermore assumed to remain constant across time, and the size of the informal sector is extrapolated from variations to these 'normal' coefficients. Even if the assumptions were reasonable, it remains very difficult to test them.

The model (MIMIC) approach, on the other hand, is theoretically very appealing, as it explores multiple causes of the informal sector within an econometric model. However, regressions are based on proxy indicators, and depend on how good these proxies are. Moreover, this model incorporates several variables and is usually carried out by 2-stage estimations. Such estimations necessitate extensive data requirements over long periods of time. Lack of adequate data may lead to non robust estimations, on which inferences are unreliable. This is perhaps the reason why this approach has mostly been used in OECD countries.

The remaining two models- the currency demand model and the physical input method are therefore better suited for the study. The methodology for both these methods is based on correlation analysis, which can be tested using standard statistical techniques. Moreover, the data requirements for these two models are less extensive than the MIMIC model and more reliable than the labour force participation and the national accounting methods.

In addition, these are the only two methods that have been applied to developing and developed countries alike. This fact may be indicative electricity and currency demand are the best indicators of economic activity in developing as well as developed economies, and that their relation to output, whether in the formal or the informal sector, is more or less

uniform. It also suggests that the data requirements to carry out these approaches are not as restrictive as some other methods. Moreover, the use of these two methods enables cross-country comparisons with informal sectors in developing, transition and developed economies.

Optimising use of surveys

The main problem of these indicator models- currency demand and physical input models- is that they do not, in themselves, explore causes and consequences of the informal sector. This can be addressed, however, by using side models and mini surveys. Surveys to explore causes and consequences of the informal sector are more likely to generate reliable answers than those which attempt to directly measure the size of the informal sector. The survey can also be used to validate the assumptions made in the chosen models.

4 Conclusion

For the purpose of this project, the definition retained for the informal sector is that of unrecorded value added activities. Several methods of estimating the size of the underground economy have been considered namely:-

- Surveys,
- National accounting method,
- Labour force participation method,
- Transactions method,
- Currency demand method,
- Physical input method, and
- Model approach.

After having looked into each method, it can be deduced that the currency demand method and the physical input method are best suited for the purpose of the study, since they are more adaptable to the Mauritian context, their data requirements are reasonable, and their potential results more reliable and useful.

For simplicity of modelling and as per available data, the physical input method has been retained for the purpose of this study to estimate the size of the informal sector in this paper.

APPENDIX B - FIELDWORK REPORT

METHODOLOGY

Coverage	<ul style="list-style-type: none"> • Adult respondents • Coverage of the island
Number of respondents	<ul style="list-style-type: none"> • 595 respondents
Stratification Criteria	<ul style="list-style-type: none"> • A quota-based sampling were used to select the respondents and the criteria retained for the definition of quotas were: <ul style="list-style-type: none"> ❖ Income group ❖ Household size ❖ Ethnic Origin ❖ Region
Type of interviews	<ul style="list-style-type: none"> • In-home face-to-face interviews were conducted : <ul style="list-style-type: none"> ❖ After office hours during weekdays, and ❖ At any time convenient to respondents during weekends
Field Materials	<ul style="list-style-type: none"> • Questionnaire translated into French and administered in either French or Creole • Showcards

SAMPLE SIZE

Sample size:	595
Households with at least one member involved in the informal sector	463
Households with no family member in the informal sector	132

FIELDWORK ORGANISATION, MONITORING AND CONTROL

Fieldwork	<ul style="list-style-type: none"> ↪ A team of 41 surveyors ↪ Individual workloads
Briefing	<ul style="list-style-type: none"> ↪ 2 sessions (25th and 26th of May 2001)
Responsibilities of Field Manager	<ul style="list-style-type: none"> ↪ Monitoring fieldwork, i.e regularly collecting completed questionnaires, ↪ Following-up workloads targeted, ↪ Random spot checks and field accompaniments ↪ Giving post-fieldwork cross-check phone calls (around 20 % of contacts), ↪ Reviewing all the questionnaires and checking on the following criteria: <ul style="list-style-type: none"> • Adherence to sampling instructions • Legibility and intelligibility of open-ended questions • Completeness • Consistency • Correctness of records
Fieldwork Period	<ul style="list-style-type: none"> • 27th of May to 11th of June 2001

ACHIEVEMENTS

595 questionnaires were used for data input. The table below gives an indication of the quota achieved as compared to the targeted ones.

		Number of respondents targeted	Number of respondents encountered	Deviation	Theoretical %	% in sample	Deviation
Income group	Less than Rs5000	142	118	-24	23.7	19.8	-3.9
	Rs5000- Rs9999	252	243	-9	42.0	40.8	-1.2
	Rs10000 -Rs14999	108	115	7	18.0	19.4	1.4
	Rs15000-Rs19999	46	51	5	7.7	8.6	0.9
	Rs20000-Rs24999	20	27	7	3.3	4.5	1.2
	Rs25000+	32	37	5	5.3	6.2	0.9
	Not specified	-	4	4	-	0.7	0.7
	Total	600	595	-5	100.0	100.0	0.0
Ethnic Origin	Hindu	312	310	-2	52.0	52.1	0.1
	Muslim	96	99	3	16.0	16.6	0.6
	G Population	174	167	-7	29.0	28.1	-0.9
	Sino-mauritian	18	19	1	3.0	3.2	0.2
	Total	600	595	-5	100.0	100.0	0.0
Household Size	2 or less	100	103	3	16.7	17.3	0.6
	3	111	120	9	18.5	20.2	1.7
	4	178	183	5	29.6	30.7	1.1
	5+	211	189	-22	35.2	31.8	-3.4
	Total	600	595	-5	100.0	100.0	0.0
Region	P Louis	74	72	-2	12.3	12.1	-0.2
	Plaines Wilhems	189	189	-	31.5	31.8	0.3
	Pamplemousses	61	58	-3	10.2	9.7	-0.5
	Rivière du rempart	52	56	4	8.7	9.4	0.7
	Flacq	66	66	-	11.0	11.1	0.1
	Moka	39	38	-1	6.5	6.4	-0.1
	Grand-Port	56	54	-2	9.3	9.1	-0.2
	Savanne	35	34	-1	5.8	5.7	-0.1
	Black River	28	28	-	4.7	4.7	-
	Total	600	595	-5	100.0	100.0	0.0

APPENDIX C

ILO DEFINITION OF INFORMAL EMPLOYMENT

Production units by type	Jobs by status in employment								
	<i>Own-account workers</i>		<i>Employers</i>		<i>Contributing family workers</i>	<i>Employees</i>		<i>Members of producers' cooperatives</i>	
	Informal	Formal	Informal	Formal	Informal	Informal	Formal	Informal	Formal
Formal sector enterprises					1	2			
Informal sector enterprises ^(a)	3		4		5	6	7	8	
Households ^(b)	9					10			

(a) As defined by the Fifteenth International Conference of Labour Statisticians (excluding households employing paid domestic workers).

(b) Households producing goods exclusively for their own final use and households employing domestic workers.

Dark grey cells refer to jobs that by definition do not exist in the type of production units in question.

Light grey cells refer to jobs which exist in the type of production units in question but which are not relevant

to informal employment.

The un-shaded cells refer to types of jobs that represent the different segments of informal employment.

Cells 1 and 5: Contributing family workers: no contract of employment and no legal or social protection arising from the job, in formal sector enterprises (cell 1) or informal sector enterprises (cell 5). The informal nature of their jobs follows directly from the status in employment.

Cells 2, 6 and 10: Employees who have informal jobs, whether employed by formal sector enterprises (cell 2), informal sector enterprises (cell 6) or as paid domestic workers by households (cell 10).

Cells 3 and 4: Own-account workers (cell 3) and employers (cell 4) who have their own informal sector enterprises. The informal nature of their jobs follows directly from the characteristics of the enterprise they own.

Cell 7: Employees working in informal sector enterprises but having formal jobs.

Cell 8: Members of informal producers' cooperatives. The informal nature of their jobs follows directly from the characteristics of the producers' cooperative of which they are member.

Cell 9: Producers of goods exclusively for own final use by their household (e.g. subsistence farming).

Employment in the informal sector: Cells 3 to 8.

Informal employment: Cells 1 to 6 and 8 to 10.

Informal employment outside the informal sector: Cells 1, 2, 9 and 10.

APPENDIX E – THE SIZE OF THE INFORMAL ECONOMY AS A % OF OFFICIAL GDP

The table below summarises the size of the informal economy as a percentage of official GDP for developing countries, Central and South America, transition countries and OECD countries respectively based on three methods of estimation, namely the physical input, currency demand and the model method respectively.

SIZE OF THE INFORMAL ECONOMY AS A % OF OFFICIAL GDP			
COUNTRIES	Physical Input Method	Currency demand method	The model method
Developing countries	(for the year 1990)	(for the year 1990)	(for the period 1990-93)
<i>Africa</i>			
Nigeria	76.0	-	-
Egypt	68.0	-	-
Mauritius	20.0	-	-
<i>Central and South America</i>			
Guatemala	61.0	-	50.4
Mexico	49.0	33.3	27.1
Peru	44.0	-	57.4
Panama	40.0	-	62.1
<i>Asia</i>			
Thailand	71.0	-	-
Philippines	50.0	-	-
Sri Lanka	40.0	-	-
Israel	29.0	-	-
Transition countries	(for the period 1990-93)		
<i>Former Soviet Union</i>			
Georgia	50.8	-	-
Azerbaijan	41.0	-	-
Lithuania	38.1	-	-
<i>Central and Eastern Europe</i>			
Macedonia	40.4	-	-
Croatia	39.0	-	-
Bulgaria	32.7	-	-
OECD countries		(for the period 1990-93)	
Greece	-	24.9	-
Belgium	-	20.8	-
Great Britain	-	11.2	-
France	-	13.8	-

Source: Lacko, Loayza, Johnson, Kaufmann, Shleifer, Zoida-Lobaton and Schneider

APPENDIX F - SIZE ESTIMATION OF THE INFORMAL SECTOR UNDER THE 0.9 AND 1.15 ELASTICITY SCENARIOS

The figures of overall GDP proxy, based on overall electricity consumption, has been calculated for the period 1990 to 2001 for the other two elasticity scenarios and the size of the informal sector has been estimated as follows.

1.15 elasticity scenario (energy- inefficient bound)

YEAR	HEC	Growth rate in HEC	REAL GDP	Growth rate in total economy	Size of total economy	Informal economy	Size of total economy	Informal economy	Informal to formal	Informal to total economy
	Gwh	%	Rs million (1990 = 100)	%	Rs million (1990 = 100)	Rs million (1990 = 100)	Rs million (current prices)	Rs million (current prices)	%	%
1990	198.9	9.2	31,790	8.0	38,148	6,358	38148	6358	20.0	16.7
1991	223.8	12.5	33,152	10.9	42,302	9,150	45703	9886	27.6	21.6
1992	253.3	13.2	35,375	11.4	47,146	11,771	53752	13420	33.3	25.0
1993	278.8	10.1	37,738	8.8	51,280	13,542	63201	16690	35.9	26.4
1994	300.8	7.9	41,069	6.9	54,797	13,728	72783	18234	33.4	25.1
1995	340.0	13.0	43,635	11.3	60,997	17,362	84843	24149	39.8	28.5
1996	364.5	7.2	46,078	6.3	64,822	18,744	95633	27653	40.7	28.9
1997	394.9	8.4	48,635	7.3	69,533	20,898	107657	32356	43.0	30.1
1998	431.2	9.2	53,285	8.0	75,086	21,801	124276	36083	40.9	29.0
1999	449.6	4.3	54,063	3.7	77,872	23,809	134430	41102	44.0	30.6
2000	491.9	9.4	59,126	8.2	84,248	25,122	148926	44409	42.5	29.8
2001	522.8	6.3	62,567	5.5	88,845	26,278	166476	49239	42.0	29.6

0.9 elasticity scenario (energy- efficient bound)

YEAR	HEC	Growth rate in HEC	REAL GDP	Growth rate in total economy	Size of total economy	Informal economy	Size of total economy	Informal economy	Informal to formal	Informal to total economy
	Gwh	%	Rs million (1990 = 100)	%	Rs million (1990 = 100)	Rs million (1990 = 100)	Rs million (current prices)	Rs million (current prices)	%	%
1990	198.9	9.2	31,790	9.7	38,148	6,358	38148	6358	20.0	16.7
1991	223.8	12.5	33,152	13.2	43,177	10,025	46648	10831	30.2	23.2
1992	253.3	13.2	35,375	13.9	49,162	13,786	56050	15718	39.0	28.0
1993	278.8	10.1	37,738	10.6	54,380	16,642	67021	20510	44.1	30.6
1994	300.8	7.9	41,069	8.3	58,894	17,826	78226	23677	43.4	30.3
1995	340.0	13.0	43,635	13.7	66,961	23,326	93139	32445	53.5	34.8
1996	364.5	7.2	46,078	7.6	72,045	25,966	106288	38308	56.4	36.0
1997	394.9	8.4	48,635	8.8	78,383	29,747	121358	46057	61.2	38.0
1998	431.2	9.2	53,285	9.7	85,960	32,675	142274	54081	61.3	38.0
1999	449.6	4.3	54,063	4.5	89,821	35,758	155057	61729	66.1	39.8
2000	491.9	9.4	59,126	9.9	98,723	39,597	174514	69997	67.0	40.1
2001	522.8	6.3	62,567	6.6	105,244	42,677	197204	79967	68.2	40.6

APPENDIX G – LOGISTIC REGRESSION MODEL

What are logistic regressions?

Logistic regression is a variation of ordinary regression, useful when the observed outcome is restricted to two values, which usually represent the occurrence or non-occurrence of some outcome event. Whilst standard regression techniques predict the population mean value of the dependent variable at given levels the independent variable(s) in the model, logistic regressions generate the probability of the occurrence as a function of the independent variables.

Benefits of using logistic regressions for determining incidence

The use of logistic regressions for determining incidence of socio-economic factors on informal sector participation allows for a more integrated approach in contrast to a comparison of sample statistics. In particular, it enables one to ascertain the economic significance of variables through specific coefficients and confidence intervals while allowing for a number of statistical tests, for instance in relation to variable deletion and functional form.

Given that informal sector participation displays a classic case of a dichotomous dependent variable, that is, taking only two values – 1 for individuals operating in the informal sector and 0 otherwise – incidence of socio-economic factors thereon would be interpreted as a probability. In such case, logistic regressions can produce superior results than standard regression techniques such as ordinary least squares. Given that the logistic regression equation limits generation of the predicted values of the dependent variable to the interval of zero to one; whereas OLS regression often results in values of the dependent variable take on values of less than zero or greater than one, which are substantively irrelevant and have no interpretative value.

Determining profiles of informal sector participants

The general-to-specific methodology has been used in the model implying that a maximum number of socio-economic factors have been specified as explanatory variables at the beginning and through a series of statistical tests these have been filtered through to generate the most realistic logistic regression model. Particular emphasis has been laid upon statistical significance of variables and their functional specification.

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