A Composite Indicator of Economic Activity in Mozambique

A Study for the Mozambique Public-Private Partnership Pilot Project

Executive Summary

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Content

1. Introduction

1.1. This Executive Summary presents the principal results of the study for the construction of the Composite Indicator of Economic Activity (*ICAE*) in Mozambique.

1.2. The study was undertaken by the author under contract with the Development Centre of the Organization for Economic Co-Operation and Development (DC-OECD), and was initiated in November 2001. The Steering Committee of the Mozambique Pilot Project on Public-Private Partnership supervised the study and facilitated the cooperation of the local partners, namely the various governments departments, business organizations, and representatives of international development finance institutions and bilateral donor agencies represented in Mozambique. The Development Centre of the OECD provided financial support and facilitated technical backstopping to the study by opening channels of communication and organizing contacts between the consultant and specialists involved in related work at the OECD (namely the Statistics Directorate of the Division for Non-Members and the Economics Department) and the Research Department of the Banco de Portugal. Also during the study the DC-OECD organized two informal seminars (February and July 2002) during which the consultant made presentations and received feedback from a wider audience. In July 2002 the Steering Committee organized an informal seminar involving participants from the public sector (government officers and managers from public enterprises) and the private sector. As the study was concluded and the first full results were produced, in October 2002 the Steering Committee also organized a launching seminar in Maputo, attended representatives of the private sector, members of Government, representatives of bilateral and multilateral donors, diplomatic missions, and staff and consultants from the DC-OECD.

1.3. The objective of the Mozambique Pilot Public-Private Partnership (PPP) project is to strengthen the relations between the public and the private sector in the development process in the country. Upon an assessment of the experience of PPP

dialogue and practice, Mozambican partners in government and the business community concluded that there is a substantial gap in information and knowledge that works as a handicap to improved business and policy dialogue, decision making and performance. In particular, it was perceived that both the dissemination and use of economic statistics in Mozambique are still not sufficiently supportive of the developmental aims and activities of public-private partnerships. They thus sought the assistance of the DC-OECD that resulted in the present study.

1.4. The terms of reference of the study required the Consultant to assess the national statistical system and its products, and to develop a quantitative framework for tracking and assessing the medium-and short-term performance of the economy of Mozambique. The consultant was also asked to devise means of making the results of the study available to PPP partners, and the procedures for regularly updating them. An over-riding guideline was that the work should help improving transparency and the sharing of knowledge amongst PPP partners about the past and the likely future performance of the economy, as this is seen as a positive factor to the development of a healthy PPP dialogue and business initiatives.

1.5. Following an initial review of the local statistical resources, and upon technical consultation with other specialists and the Steering Committee members it was agreed that the study should: i) develop a Composite Indicator of Economic Activity in Mozambique; ii) identify a set of its leading indicators; and iii) design and implement a methodology for its forecasting and updating.

2. Principal results of the study

2.1. The results of this study respond to the principal tasks drawn in the terms of reference. In particular, the study presents:

1. A methodology for the computation, regular updating and forecasting of an Indicator of Economic Activity in Mozambique (ICAE);

2. The computed monthly ICAE covering the period from January 1991 to June 2002; and
3. Forecasts of the ICAE for the period between July and December 2002, with extensions up to March 2003.

All these results update those presented in the earlier version of the study presented to the Seminar held in Maputo in October 2002.

2.2. The computed and forecast indicators are presented in **Figure 12** bellow which is hereby brought from the full text of the full report for the benefit of the reader. In addition to the cyclical indicator in the form of deviations from trend computed as $C = \left(\frac{TC}{T} - 1\right) * 100$, the figure reproduces the long-term trend (T), as well as the trend-cycle (TC) which is a combination of trend and the short-and-medium term fluctuation (C). **Figure 13**, of the full text is also brought here to present the cyclical indicator in an index form with base 100, as $C = \left(\frac{TC}{T} - 1\right) + 100$, to conform and make it comparable to the usual presentation of business-cycle indicators. In the form presented in **Figure 12** the ICAE can be read directly as the degree, in percentage, of departure of monthly activity from the long-term trend. Thus when the indicator reaches value 5.0 on the horizontal scale it means that in that particular month activity was cyclically 5.0% higher than its long-term trend level. The equivalent value for the ICAE in the form presented in **Figure 13** would be 105.0.

Figure 12. Actual and Forecast Indicators of Economic Activity in Mozambique

Figure 12.1 Trend-cycle and long-term trend (Index: 1991=100)

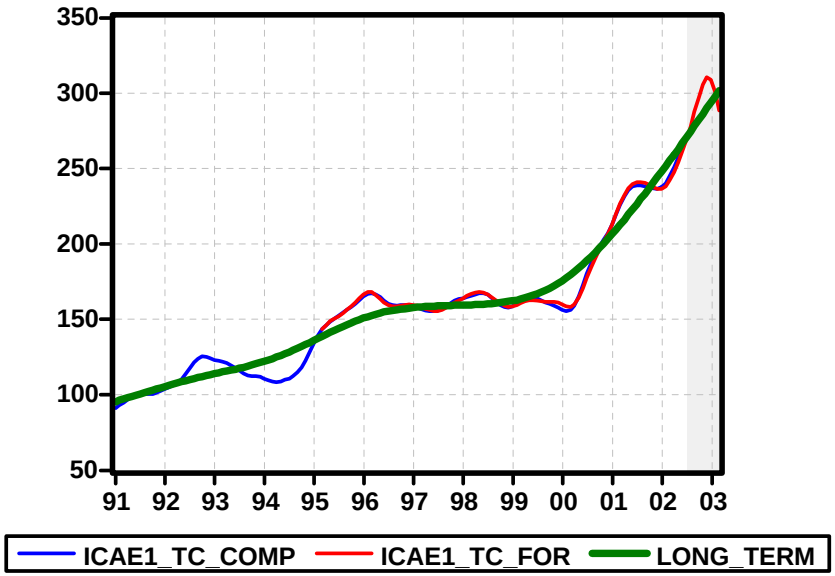


Figure 12.2. Cyclical deviations from the long-term trend (Percentage)

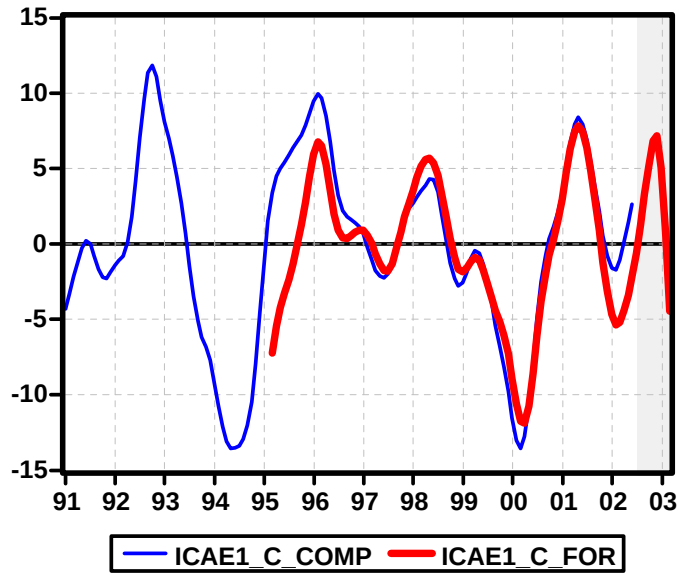
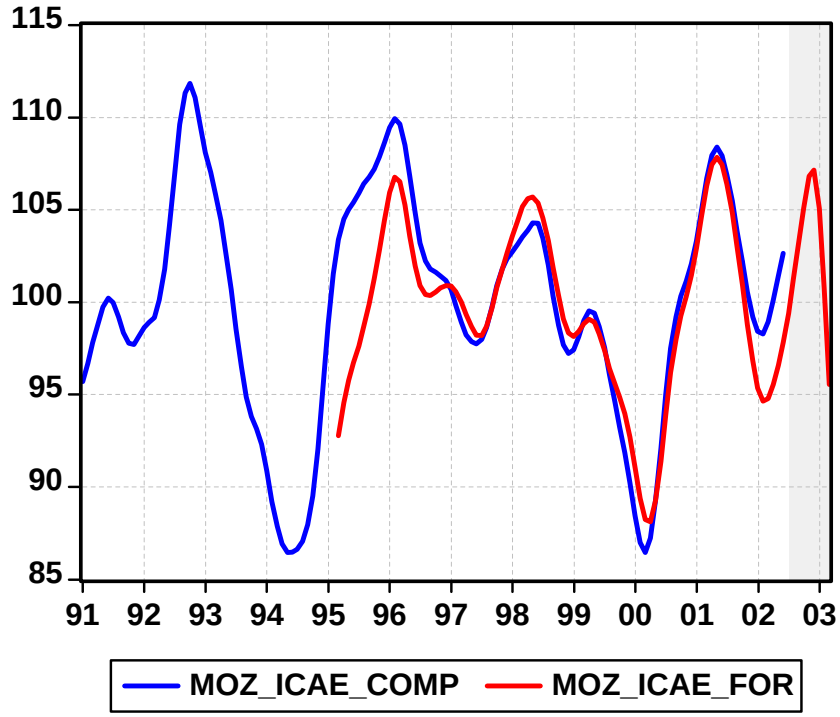


Figure 13. Mozambique Cyclical Indicator of Economic Activity (Base=100)



2.3. The results suggest that long-term growth in Mozambique remained strong in 2002 and is likely to continue to be so in 2003 (we have tentatively extended the forecasts up to March 2003). However, there remains a substantial amount of short-to-medium-term volatility. Subsequent to the financial distress of early 2001 and the subsequent monetary tightening imposed by the Bank of Mozambique, the economy entered the second half of that year in a cyclical downturn that aborted the recovery from the recession that started in the first half of 1999. The year 2002 started with real activity in a strong growth mood, if only below the long term (catching up only towards mid-year). However, it once again turned down towards the end of the year. It is thus estimated that medium-term annual growth in real sector activity /(on a trend-cycle basis), which in 2001 was 32% compared to 2000 (a strong recovery from the recession that started in 1999 and was aggravated by flooding of southern Mozambique), may in 2002 have halved to around 15%. By the end of 2002 the

economy was facing another, and rather strong cyclical downturn, which according to our forecasts may prolong at least during the first quarter of the going year of 2003[1]. In effect, the ongoing downturn may be more than a cyclical event, as there are indications that the medium-to-long term growth outlook is itself either slowing severely or indeed turning negative.

3. The ICAE as an instrument of knowledge

3.1. There has been a large information and knowledge gap about the medium- and short-term performance of the economy of Mozambique, as well as about how it relates to perceived long-term developments. This has not facilitated the dialogue between the domestic private and the public sectors, as well as between these and the foreign bilateral and multilateral donors, development and finance agencies. While the government and (to some extent) foreign partners (in particular multilateral development and financial institutions and large foreign direct investors) have emphasized long-term developments, local businesses (in particular representatives of small and medium size enterprises, labor unions and the civil society) have focused attention on the short- and medium-term. Economic and policy analysis has also failed to provide the meaning of apparently high rates of growth as reported by official GPD and relatively substantial inflows of foreign investment, and the notably slow improvement, and even perceived deterioration, of social conditions in the country. Analysts also note the increasing regional discrepancies and perceived widening gap in (and increasingly skewed) income distribution and social conditions between different segments of the population. Despite the increasing entrenchment in different views and perceptions about the process of economic and social development in the country, there subsist a large informational and knowledge gap about it. Based mostly on perceptions and weak in transparent information and knowledge, then dialogue between private and public sector partners has instead been

[1] In an extensive interview (in the fax paper *vertical*, numbers 251 and 252 of 7 and 9 February 2003, with the title: "***Falta de liquidez e procurement ensombraram 2002"*** *-which in English reads "Liquidity and procurement cast dark shadow on 2002"*) Mr. Salimo Abdala, the President of the Commercial Association of Mozambique (a traders´ association) and Deputy-President of the Confederation of Business Associations, CTA, said that "In the last part of the year (2002) there was a very strong recession."

acrimonious. As a consequence, domestic and foreign investors have found it difficult to make informed business decisions that relate to the actual performance and prospective developments of the economy. Public policy making has also not been helped.

3.2. This information and knowledge gap exists because in Mozambique statistical services lack the capabilities and the versatility to generate and disseminate information relevant for business and policy decision making, of quality that is commonly accepted and validated, in a timely and transparent manner. The traditional aggregate measures of activity or output such as GDP are both too time aggregated (annual) and late to come (earliest eighteen/twenty-four months) for them to be relevant and useful to proactive business and policymaking. Individual sectoral and branch indicators of activity which are more frequent (monthly or quarterly), because they reflect developments in individual sectors or branches, are not satisfactory as pointers of the long-term trends and the short-to-medium term cyclical behaviour of the whole economy.

3.3. The under-development of the statistical services is matched by the virtual non-existence of (public or private) economic analysis and forecasting services capable of offering alternative outlooks of the performance of the economy in a transparent and commonly shared framework to both the public and the private partners. Because of the mostly public good nature of information and knowledge, and because of the smallness of the private sector, there is little incentive for the emergence of independent organizations of economic analysis and forecasting. Budgetary limitations and lack of experience and vision also limit the scope for public institutions such as university research centres engaging in such activities. The same occurs with business organizations, as they spend most of their resources and effort lobbying while developing little knowledge basis and foundation work for alternative policy development and effective lobbying.

3.4. In what respect information and knowledge is insufficient or deficient critically matters for business decision-making and management, as well as for policy. For

instance, while it is widely believed that Mozambique's economic growth as measured by the change in GDP has over the last ten or twelve years been quite strong. However, it is not clear how much of it reflects long-term trends and how much are deviations from this that result from cyclical and irregular factors. The same way, it is important to understand what factors dominate the long term trend and what mostly influences the cyclical short- to medium-term fluctuations.

3.5. The evidence about the cyclical behaviour of the economy of Mozambique in the last ten years matters also because of its implications for the understanding of the mechanics of the recent growth process in the country. It is well known that overall growth as measured by GDP in Mozambique is said to have been strongest in 1997-99. On the other hand, observed foreign trade data during the period covered by this study until 2000 (before the coming of Mozal exports of smelted aluminium) suggest no substantial change in the level of exports in the years 1997-98. Yet there it is recording an extraordinary performance in imports in the years 1994-96, with a pronounced hump in both the trend and cyclical components in 1995-96. In addition, in 1998 there was a drastic reduction in both capacity and activity of the critical transport sector, a situation from which it has started to recover only in 2000, aided by the demand generated by the relief effort in the aftermaths of the 2000 floods. The combination of these elements suggests that to the extent that it has actually occurred, the extraordinary growth recorded in the official GDP data for 1997-99 either was not taking place in real sector activity, or was hardly supply (export) led, and rather more demand constrained. The implication would be that by 1999, after more than ten years of stabilization and structural adjustment (of which seven in peace) the economy had not established any solidly export oriented real activity that could tap on the substantial natural resources of the country to propel it into a new era of economic development.

4. The informational content and the component series of the ICAE

4.1. Like most coincident indicators of economic activity in countries where the practice of their computation has been established, the Mozambique ICAE is a

measure of short- to medium-term directions and intensity of change in economic activity in the country. It is a measure of the cycles around the long-term trend of economic activity that, while not measuring their levels, gives an indication of the direction and rate of output, value added or incomes in the short- to medium term.

4.2. The present version of the computed Composite Indicator of Economic Activity in Mozambique covers a period of more than eleven (11) years, from January 1991 to July 2002. It is based on a combination six component economic series that register the activities and outputs of key sectors of real economic activity in the country, namely:

- Electricity consumption, for all kinds of uses in the economy;
- Commodity exports, which serve as a demand outlet for the outputs of key agricultural and industrial activities;
- Commodity imports, which reflect a substantial part of both the final consumption demand and the intermediate and capital imports demand of the economy;
- Port/harbour operations/activities, which process both domestic, national, regional and international trade entering or crossing Mozambique;
- Activities of the rail transport system, which ferries the domestic, national, regional and international goods;
- Manufacturing production of key commodities (such as cement which already enters the indicator, and others to be included as the available data is scrutinized and admitted).

4.3. The type of data used in the construction of the ICAE is part of a set common in similar work in a number of countries for which short- to medium-term composite or coincident indicators of economic activity have been developed. A principal difference lies in the fact that in those other places the set of components series often includes also valuable qualitative information from regular business surveys on economic activity. In Mozambique there is no such type of information. Another substantial difference is that in other cases the indicator combines both real sector and financial sector data, whilst the indicator computed in this study focuses on real sector

data. Finally, given the pervasiveness of the informal sector and the underground economy in the country, there is the likelihood that the ICAE will fail to capture some of the real sector activities that take place in these segments of the economy. Thus the ICAE for Mozambique should be taken as it is: an indicator that captures mainly (although not exclusively) the activity in the formal real sector of the economy.

4.4. More specifically, the following is the list of the series used in the construction of the Mozambique ICAE, given with the code names with which they appear in graphs and tables, followed by the description of their content:

1. **IELE2**: Index of electricity consumption (originally in Mega-Watts-hour, MWh);
2. **INDXX:** Index of commodity exports (originally in million US dollars, f.o.b.);
3. **INDXM**: Index of commodity imports (originally in million US dollars, c.i.f.);
4. **IOP1**: Index of port/harbor operations (originally in 1000 Metric Tones of total cargo handled, domestic and international, internal destiny and transit);
5. **IOF1**: Index of volume of cargo ferried by the national rail transport system (originally in million metric tones-Km, domestic and international, internal destiny and transit);
6. **ICMNT**: Index of cement production (originally in million metric-tones).

4.5. The component series of the Mozambique ICAE are shown in **Figures 1.1 to 1.6**. **Figure 1.7** shows the sectoral indicators computed in the manner explained bellow.

5. Methodology for the computation of the Mozambique ICAE

5.1. This study that resulted in the ICAE applies methods and techniques of business and growth cycle analysis to short- to medium-term performance of the economy of Mozambique.

5.2. A key methodological approach of the construction of coincident or composite activity indicators involves the use of a reference series to check and validate de computed Indicator. Usually this reference series is the quarterly GDP, or the quarterly or monthly industrial output (where industry is sufficiently large for its cyclical performance to be representative of the performance of the whole economy). In Mozambique neither of the two series is available (nor have we any other valid substitute). Thus, for the evaluation of the quality and informational content of the computed indicator, we have focused on the assessment of its relationships with a set of key financial variables that are assumed, either on the grounds of economic theory or from experience elsewhere, to have effects on short term economic activity. In the specific case of Mozambique these financial variables include the lending interest rates, nominal exchange rates, and real credit (for working capital finance).

5.3. All the six (6) individual indicators used in the construction of the Composite Indicator of Economic Activity in Mozambique are quantitative. Four (4) are physical quantities, and two (2) are money quantities expressed in US dollars.

5.4. The frequency of the variables used is monthly (or, if of lower frequency, where somehow interpolated into monthly), and are available in raw form (i.e., containing the seasonal component).

5.6. It was considered that each original series is decomposed into the following components:

Trend (T): the long-term trend component of the series;

Cycle (C): the short- to medium-term cyclical component of the series;

Trend-Cycle (TC): the combination of the long-term trend and the short-to-medium term cyclical components;

Seasonal (S): The within-year fluctuations around the trend-cycle that recur in a very similar way in the same period or time of observation of the year;

Irregular (I): The residual component that remains after the removal of the seasonal and the trend-cycle components, including any identified trading day and holiday effects (if the later are not taken into account separately).

5.7. Thus the methodological steps taken in the construction of the Composite Indicator are the following:

Step 1: All original data were converted from their original units into index numbers (with base on their average level in 1991: average (1991.Jan-Dec.=100)), so that they reduce to a similar scale of measurement;

Step 2: Seasonal adjustment, treatment of outliers, separation of the irregular component from the seasonally adjusted series, and the derivation of the trend-cycle series of each of the individual variable as a Henderson Moving Average;

Step 3: Aggregation of the individual trend-cycle series into a composite trend-cycle indicator. This step used a variety of procedures that resulted in alternative trend-cycle measures. One procedure consisted in deriving "sub-sector" trend-cycle series using a simple average procedure. These were then aggregated into the overall trend-cycle composite indicator using weights derived from GDP shares of the sectors of the economy represented by those sub-sector composite indicators. The other procedure consisted in applying principal component analysis (PCA) on the original six trend-cycle series to derive the weights used to aggregate them into the trend-cycle composite indicator.

Step 4: Computation of the cyclical Composite Indicator of Economic Activity (the ICAE) in the following manner: first we obtained the composite trend (T) component of the composite trend-cycle (TC) series constructed in step 3 above. For this we applied the Hodrick-Prescot filter. Then we obtained the aggregate cyclical component as a ratio of

the Henderson Moving Average over the derived Hodrick-Prescott trend (i.e., C=TC/T)).

At the end of the four steps described above, we had in hand seven alternative measures of the Trend-Cycle (TC), Trend (T), and Cyclical (C) performance of economic activity, each corresponding to the following alternative modes of aggregation of the component series:

Table 1. Alternative modes of obtaining the Trend Cycle (TC), aggregation weights, and ICAE Symbols

	Principal Component Analysis (PCA) with:		
TC1, T1, C1	No Rotation	On the six original series	ICAE1
TC2, T2, C2	Varimax Rotation		ICAE2
TC3, T3, C3	Quartimax Rotation		ICAE3
TC4, T4, C4	No Rotation	On the three sub-sector indicators	ICAE4
TC5, T5, C5	Varimax Rotation		ICAE5
TC6, T6, C6	Quartimax Rotation		ICAE6
TC7, T7, C7	**GDP sectoral shares attached to the three sub-sector indicators**		**ICAE7**
Sub-Sector Composite Indicators, weights into the ICAE7, and their original component series	COMPINDUS_TC (25%)	IELE2D12; CMNTD12	
	COMPTRADE_TC (50%)	INDXXD12;INDXMD12	
	COMPTRANS_TC (25%)	IOP1D12; OF1D12)	

Note: See **Appendix 3** for an idea of the GDP sectoral structure considered in the assignment of weights to the sub-sector composite indicators aggregated into the ICAE7.

6. Data sources and quality

6.1. The assessment of the data sources and overall quality was the first step in the development of this research. It was then analyzed how the Mozambican National Statistical System works with view to identifying the type and frequency of data collection and dissemination, as well as the degree to which the information is of public domain or not. This findings of this analysis are contained in an earlier report from this study (***The Information Base for Public-Private Partnership in Mozambique – Review of the National Statistical System-*** *Mimeo for the DC-OCDE, Maputo/Paris, March 2002*)**.** While noting the wealth in diversity of the data that has been collected by the national statistical system, and the suitability of some of it for the development of the ICAE, this review raised concerns about the observed discontinuity in the collection frequencies and formats. The review also noted the weaknesses of the cleaning and maintenance of data sets, as well in the reliability and operational readiness of the retrieval procedures of long time series and historical databases. It was however considered that by using the available data to develop the ICAE would be a highly contributory factor to motivate improvements in all these areas of the activity of the national statistical system.

6.2. A number of characteristics of the data limit their statistical suitability for this type of study in Mozambique. These characteristics include: i) short length of the times series, often with differences in the periods covered by related indicators, thus further shortening the time coverage of the resulting aggregate indicators; ii) frequent breaks in their trends reflecting substantial and frequent regime changes; iii) sharp short-term variability of individual series reflecting an unstable institutional or policy environment and disturbances in the activities of one operator in sectors or branches characterized by highly concentrated industrial structures.

6.3. The concentration in industrial structures that is typical of many African-type economies has particular implications. While resulting in larger variability of branch or sector indicators as they reflect the activities of relatively small number of enterprises, it can in effect facilitate the development and interpretation of the type of composite indicators such as the one described in this paper. This is because the more concentrated the industrial structure of the economy, and once the activities of the few

economic entities are statistically captured, the less is left out of the measurement of the overall economic activity in the country. On the other hand, there is the danger that if even only one entity is excluded, the resulting branch indicator (or even the overall composite indicator) will be a highly distorted measure of economic activity in the country. One example in Mozambique is that of the bear and soft drinks industry, where the gaps in the series of one particular company (apparently deriving from flaws in statistical work rather than actual brakes in the activities of the company) makes such difference that the indicator for the whole industry had to be excluded from the computation of the ICAE in order to avoid artificial variation. Thus, while the smallness and less complexity of the economies can facilitate the establishment of the techniques and the tradition of the analysis of cyclical behaviour of economies such as Mozambique's, this requires that the statistical service is good enough and attention is paid to the implications of flaws in coverage that would otherwise be innocuous in less concentrated economic structures.

6.4. The computed ICAE for Mozambique includes variables directly measuring only the activities in the real sector of the economy. It does not include financial or monetary variables, as is common in similar composite indicators. This focus on the real sector was a deliberate choice grounded on three reasons: First, the fact that the real sector of the economy of Mozambique is the least well and consistently captured by the available statistics, and the one on which much disagreement concerning its actual performance has abounded. This suggests that it is with respect to this aspect of the economy that there is a larger information and knowledge gap, thus presenting more scope for the study to add more value to the existing knowledge. Second, aggregate real sector data is precisely the one that is most untimely to come-by in official statistics (often taking more than a quarter to be made available). This makes the real sector the most relevant area of priority in the development of an indicator of economic activity based on selected higher frequency data (in this case monthly series) that is sufficiently representative and relatively easy to update within a quarter. Third, given the limited pool of real sector data, it was going to prove hard to find real sector leading indicators for the Mozambique ICAE. It was thus thought adequate to keep the most relatively readily available, reasonably systematic and widely cross-

checked financial data as a reserve from where to develop potential short- to medium-term leading indicators for forecasting the ICAE.

6.5. All the data used in this study comes from official institutions of the Republic of Mozambique. This was combined with data from reliable international sources that collect and exchange economic information and data with the national authorities (namely the IFM, from whose DOTS source we have taken data to complement the domestic trade customs information). Most monthly data from domestic sources are non-published (except, and increasingly more so, financial data). This is not because of confidentiality, but simply because it is monthly data that is not yet the focus of the dissemination effort of the national statistical system.

7. The computed ICAE and its assessment

7.1. The computed alternative trend-cycle (TC), trend (T), and cyclical (C) indicators of economic activity are presented in **Figures 2.1 to 3.2.b.**

7.2. Table 2 below (a summary of Table 3 of the full text of the report) reports the growth rates of trend-cycle, trend and cyclical components of economic activity in Mozambique for selected sub-periods of the sample. These sub-periods are:

- Period I: 1991-1993: War and transition to peace
- Period II: 1994-1995: Rehabilitation and political transition
- Period III: 1996-1999: Big-projects investment
- Period IV: 2000-2002: Take-off growth.

Table 2. Average Annual Growth Rates of Economic Activity 1991:01-2002:06 and selected sub-periods In Percentage (%)

	Cyclical compone	Long-term	Trend-

	nt	compone nt	Cycl e
	CGA	**TGA**	**TCG A**
All sample period: (1991:01 2002:06)	**1.1**	**8.7**	**9.8**
Sub-Period I: War and transition to peace (1991:01 1993:12)	1.5	8.6	10.1
Sub-Period II: Rehabilitation and Political Transition (1994:01 1995:12)	4.4	10.4	14.8
Sub-Period III: Start of big-projects (1996:01 1999:12)	-2.0	3.8	1.8
Sub-Period IV: Take-off growth (2000:01-2002:06)	3.4	15.1	18.5
Source: Author computation (Software: XLSTAT &EViews)			

7.3. The growth measures reported in **Table 2** are averages taken across the seven alternative measures of economic activity pictured in attached Figures 2.1-2.2. The following aspects are noteworthy. First, the overall long-term growth rate of economic activity in Mozambique appears to be around 9%[2]. Second, both the long-term trend and the trend-cycle growth that had been increasing since at least the beginning of the 1990's was by middle of the decade slowing down, virtually stagnating over the period 1996:01 – 1999:12. It was during these years that the projects were prepared and the construction started of MOZAL aluminum smelter plant and the Wit Bank Highway linking Mozambique to South Africa[3]. The coming into operation of these two undertakings has been the principal source of the high rates of economic growth recorded in the subsequent years.

7.4. With the respect to the trend-cycle and cyclical measures of economic activity the following is noted. First, following a recovery from the war (and the draught that affected the country in 1989/90-1990/91), the economy grew strongly during most of the first half of the 1990s up to 1995. Overall (i.e. trend-cycle) growth was 14.8% between 1994 and 1995, compared to 10% in the sub-period 1991-93. Cyclically, between 1994 and 1995 activity tended to grow at around 4.4% above the long-term

[2] This is consistent with the results we had arrived at in the previous version of this study.
[3] This is also consistent with earlier findings of this study.

trend. However, by the mid 1990´s the economy started showing signs of exhaustion of its growth potential, with average annual trend-cycle growth falling below 2% against 14.8% in the previous period. Trend-cycle growth has thus been highest as new capacities enter operation. However, cyclically the economy entered the new century on the downside.

7.5. Given the controversy surrounding the official record on the growth of the economy of Mozambique over much of the period covered by this research, we have avoided the temptation to validate the ICAE by comparison with the officially recorded annual growth of Mozambique's GDP. In this study the assessment of the informational content and consistency of the ICAE relies on the nature and strength of its relationship with key financial variables. This approach is centered on the capacity of the computed Composite Indicator to relate in an economically meaningful way with key financial variables, and centres on the unification of the validation of the computed ICAE with the development of its forecasting framework.

8. Forecasts of the ICAE: Outlook to the end of 2002

8.1. The forecasting framework for the Mozambique ICAE is based on an auto-regressive distributed lag (ADL) structure of the trend-cycle composite (the entity nearest to the observed data after purging it of the seasonal and the irregular components). Once this is forecast, a similar procedure to extract the long-term trend and the cyclical components as those applied on the computed composites are employed, namely the Hodrick Prescott filter to extract the long-term trend component from the forecast trend-cycle, and the calculation of the TC/T ratio. This forecasting framework explores the long run and short-run dynamic relationship between real financial prices (lending interest rate and real bilateral exchange rate of the Metical with the US Dollar), and a real financial flow variable (real credit for working capital). The real interest rate is meant to capture the real cost of capital and is deemed to influence investment demand which is bound to have a bearing in the creation of the productive potential of the economy. The real exchange rate is meant to capture relative price movements with implications for medium- and long-term

demand and output. In the short and medium term, the availability and utilization of credit for working capital financing is assumed to be a determinant of capacity utilization. Thus the forecasting framework is built around a conceptualization that, while obviously a reduced form, is not completely devoid of economic intuition about the determinants of trend-cycle and cyclical behavior of economic activity.

8.2. The financial indicators prepared and used in the forecasting exercise are:

- **INDRFP1 (or RINT)**: Index of the real price of domestic currency denominated financial liabilities (the average real lending interest rate, across all time term structure and the sectors of economic activity, originally in percentage per annum);
- **INDRFP2 (or RER)**: Index of the real exchange rate (of the Metical against the US dollar, originally in units of MTs per US dollar, corrected by the inverse of the relative Mozambique to US prices, where the Mozambique price is the aggregate CPI, and the US price is the price of the US industrial goods).
- **ICRUWK**: Index of the real volume of credit utilized for working capital financing.

These variables are represented in the attached **Figures 5, 7 and 8** of the full report and that have been attached to this summary.

8.2. The results from the estimation of the ADL model for the trend-cycle level of activity in Mozambique confirm our *a priori* beliefs and expectations. In particular:

1. The effects on activity of changes in the key financial variables, and the shocks to activity itself, are significant and can be felt more than twelve (12) months after taking place;
2. There is a significant negative effect of the real lending interest rate, as well as a significant positive effect of the real credit utilized for working capital finance, on activity; these effects are detected despite the obvious difficulties of the single equation framework, knowing that there is a demand/supply mutual effect between the these two variables; and
3. There is a significant and positive effect of the real exchange rate on activity.

8.3. In evaluating the model for the forecasting framework we have focused on its stability. For this we generated and look at the recursive residuals and coefficients of the key financial variables. Generally the model is relatively stable for a substantial portion of the estimation sample, given the parsimonious specification and estimation techniques; in particular, we cannot visualize any substantial breakdown in recursive residuals and most of the coefficients in the last years of the sample.

8.4. The out-of sample forecasts presented in this section cover the period between July 2002 and December 2002, with extensions to March 2003. In building the forecasts we considered the stance and outcome of the monetary policy on those key variables that enter our model during the last quarter of 2002 (i.e. 2002:10-2002:12), and made assumptions about their possible evolution during the last quarter of the year. The lower limit of the forecasts (July 2002) is imposed by the date up to which the real sector data (i.e. the observed series of the economic variables of real activity) are available. The observed values of the drivers of the forecasts (i.e., the leading indicators, or the explanatory variables in the ADL forecasting framework) are available up to November 2002 for the real exchange rate, and up to September for the real lending interest rate and real credit for working capital finance (as available in the latest published Statistical Bulletin of the Banco de Moçambique). Values of each of these series (from October 2002 in the case of real credit and real lending interest rates, and from December 2002 in the real exchange rate), are author's assumptions based on the latest end-of year reviews of the economic performance of Mozambique in 2002 (Bank of Mozambique), and the daily observations of the banking sector indicators as published daily by Banco de Moçambique in the local press.

8.5. The key assumption is that for the last quarter of 2002 we could do not see much space for the monetary authority to further tighten the conditions without further jeopardizing the much desired (yet often aborted) recovery from the negative exogenous shock of 2000 (floods) and policy shock of 2001 (monetary squeeze). On the other hand, with the reduction in the amounts of credit extended in the previous quarter the lenders must have had enough slack to cater for any additional seasonal

demand for the end of year. As officially recorded inflation remained subdued, it was not unreasonable to expect real interest rates to remain unchanged at their levels of the end of third quarter, although they could go either way depending on how the end-of-year spending worked on inflation and the response of the banks and the monetary authority. The forecasts optimistically assumed some resumption of credit for the last quarter of year 2002, with no major upset in the key financial prices (exchange rates and interest rates).

8.6. These assumptions above build a rather optimistic scenario in terms of the key short to medium term financial conditions surrounding activity in Mozambique. However, as shown in **Figures 12 and 13** reproduced in the introduction to this summary it does not necessarily suggest that the economy will in cyclical terms do better in 2002 than in 2001. Were the exchange rate to continue to appreciate, or credit for working capital finance to remain tight, or the interest rates to rise, then the medium (and even the short) term scenario would be bleaker.

8.5. The folrecasts were run for each one of the alternative ICAEs. We then produced an equal weight combination forecast of six alternative indicators (only excluding TC5 from the initial set of seven due to its very idiosyncratic behavior as compared to all others). The results are the one that are reproduced in **Figures 12 and 13** and discussed in the introduction to this summary.

8.6. **Table 3** (a reproduction of Table 7 from the full report) shows the business cycle events in Mozambique between January 1991 and December 2002. On average, as typical of many countries´ business cycles, periods of recovery have tended to last longer than periods of recession. In this case the results show that in 54.2% of the time (78 out of total 144 months) economic activity in Mozambique was cyclically upwards. However, this pattern seems to have been strongly so in the first half of our study sample. During the second half, periods of recessions (or aborted recovery) have tended to dominate the business cycle events.

Table 7. Mozambique Business Cycles: Jan: 1991-Dec-2002

Cycles	Recession		Recovery	
	Trough	Duration in Months	Peak	Duration in months
I	?	?	Oct-92	? 22
	May-94	19	Feb-96	21
II	Jun-97	16	May-98	11
	Mar-00	22	May-01	14
III	Feb-02	9	?	10 ?
TOTAL		**66**		**78**
144		**45.8%**		**54.2%**

Source: Computed by the author from actual and forecast ICAE

8. Dissemination, institutional placement, and updating arrangements

8.1. The ICAE was launched amongst PPP partners in Mozambique in a seminar that took place in October (see introduction). At the end of the seminar there was a press conference co-chaired by the President of the Steering Committee and the President of the Development Centre of the OECD (also member of the Steering Committee). A separate TV interview was also delivered by the consultant, who also wrote articles to business sections and the columns he holds in the local press.

8.2. Meeting on October 1, 2000, the Steering Committee of the Public Private Pilot Project in Mozambique has decided that the Composite Indicator of Economic Activity in Mozambique (ICAE) will be hosted by the Associação Industrial de Moçambique (AIMO) and disseminated through its web site and newsletter. It was also agreed that the consultant would be put in charge of the appropriate technical work to ensure that the ICAE is updated at least four times a year. This has been assured by a recent contract offered to the consultant by the Development Centre of the OECD for the ICASE to be updated four times between Last quarter of 20002 and the last quarter of 2003.

8.3. In order to maintain continuity in the publicity and education of the user public, and given that the AIMO web page and Newsletter are still not operational, the

consultant has taken the initiative, with the agreement of AIMO, to post the ICAE in his company web site, until AIMO have established their own.

8.5. The current version of the study represents the first update of the ICAE. This has also been subject to wide publicity and explanatory articles written by the consultant through the weekly supplement (*Economics and Business*, February 21, 2003) of the main country's daily broad-sheet newspaper paper. Similarly to the previous dissemination effort, this update is generating substantial interest from business people, organizations and policymakers, and is beginning to receive reviews in the press. Following the dissemination of this update, the Centre for Investment Promotion has taken the initiative of running a brief summary of the ICAE in its e-mail based daily newsletter *MozBissness* (26 February 2003) and of directing the investors to the consultant's web page where it has been posted. This is an important achievement in the dissemination of the CAE, as it means that the government, through its principal investment promotion organization, has endorsed it as an important source of information for investors.

8.3. It is proposed that the following aspects be considered in a future work plan for the maintenance and development of the Composite Indicator of Economic Activity in Mozambique: 1) continued scrutiny of the available data, particularly of the manufacturing sector, and construction of additional candidate component series to either the composite indicator of activity or its leading indicator set; 2) continued improvement of the specification, estimation, testing, indicator and model selection and forecasting, both to explain the performance of real economic activity shown in the ICAE, and to use the indicator in models to explain the behaviour of other relevant economic variables; 3) development of presentation formats for the various audiences and potential users, with priority to the domestic and international business community, as a means not only of exposing the indicator to scrutiny and wider peer review, but of using it for its purpose of informing and providing analysis useful to economic agents.

9. Appended Figures taken from the main report