Analysis of Inflation in Timor-Leste

05th of December 2011

Drafted by the National Directorates of Macroeconomics and Budget
Executive Summary

Trends in Inflation
Inflation in Timor-Leste has recently sharply increased. The rate of inflation from September 2010 to September 2011 was 12.4%; driven by sharp increases in food and beverages, clothing, transport and housing. The current rate of inflation in Timor-Leste is high compared to past years and other countries.

The SDP commits the Government to annual inflation below double digits and in the range of 4% to 6% over the long term. The current rate of inflation is well above that envisaged by the SDP.

Costs of Inflation
High inflation can reduce the purchasing power of citizens’ wages. There is evidence that the wages of unskilled labourers have not kept pace with inflation in Timor-Leste.

The costs of doing business are already higher in Timor-Leste than in other comparable countries. The current high level of inflation is likely to further undermine Timor-Leste’s international competitiveness, reducing exports and investment.

Causes of Inflation
A detailed review of the evidence suggests there are three main causes of inflation in Timor-Leste.

First, increases in the international price of imports can cause inflation. The recent increases in food and beverages and some other commodity prices in Timor-Leste are largely explained by increases in international food prices.

Second, the USD has depreciated against the currencies of Timor-Leste’s major trading partners and the major exporters of many commodities. This has probably led to an increase in the prices of Timor’s imports and increased inflation.

Third, Government recurrent expenditure in Timor-Leste has probably contributed to inflation. Recurrent expenditure by month demonstrates a strong relationship with the CPI index in both the short and long term.

The scaling back of the rice subsidy program and unseasonal rain damaging production in 2010 have also led to an increase in domestic rice prices. This has also contributed to inflation.

Modelling Inflation in the Long Term
The model described in this paper shows that growth in recurrent expenditure significantly exceeding 6% a year may result in inflation above the 4% to 6% range targeted in the SDP. High levels of inflation may undermine Timor-Leste’s international competitiveness, private investment and attempts to increase exports.

Recommendations
This paper makes both policy and administrative recommendations. Policy recommendations refer to possible policies that the Government could implement to control inflation. Administrative
recommendations refer to changes the Ministry of Finance could make to improve the monitoring and analysis of inflation.

Regarding administrative recommendations the Government may wish to consider:

1. **Reweighting the CPI index based on the Timor-Leste Standards of Living Survey 2007, and then update again in mid-2012, once the Household Income and Expenditure Survey is completed.**

2. **Drafting a bi-monthly briefing note on inflation, international prices and Government expenditure.** This short paper of one or two pages in length would examine trends in inflation and how these are related to changes in international prices and fiscal policy.

3. **Using the Macroeconomic Framework to analyze inflation and fiscal policy, which are both already monitored within the Framework.**

4. **In the long term, constructing a producer price index to better understand the impact of inflation on the costs of doing business.** In the short term identify a few commodities in the CPI that are important components of business costs and monitor these.

5. **Drafting a separate paper examining the issue and impact of Dutch Disease in more detail.**

Regarding policy recommendations the Government may wish to consider:

1. **Restricting growth in Government recurrent expenditure in the future to between 0% and 6% per year.** This would be in line with moderate increases in inflation and the SDP’s commitment to prudent growth in recurrent expenditure.

2. **Implementing initiatives to spur local rice production** in order to increase supply and bring down prices and reduce imports.

3. **Reviewing projects in the Infrastructure Fund to prioritize projects that have the potential to reduce the costs of imports and boost domestic production in the short term.** The detailed results of this review should not be pre-judged but - a) prioritizing the construction of Tibar port; b) prioritizing road construction projects between Dili and other major towns; c) irrigation projects – may have the potential to reduce inflation in the long term.
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Introduction

Inflation in Timor-Leste has recently sharply increased. Specifically from September 2010 to September 2011 prices increased by 12.4% in Timor-Leste. The SDP commits the Government to a rate of inflation which will remain well below double digits and in the range of 4% to 6% over the long term. The recent increase in inflation, thus, threatens the implementation of the SDP. The Government is also concerned by this increase in inflation because it is likely to reduce consumers’ purchasing power and the international competitiveness of domestic industry. The first section of this paper discusses the measurement of, trends in and costs of inflation in Timor-Leste. The second section discusses the causes of inflation in Timor-Leste. And the third section models the impact of future increases in Government expenditure on inflation.

Section 1: Measurement, Trends and Costs of Inflation in Timor-Leste

Definition and Measurement of Inflation

Inflation is an increase in the general level of prices of goods and services in an economy over a period of time. Inflation in Timor-Leste, and in many other countries, is measured by calculating the percentage change in the Consumer Price Index (CPI) over a period of time. The CPI is a weighted basket of goods and services purchased by a typical consumer and is therefore only a proxy for the development in the overall price level. In Timor-Leste, the percentage change in the CPI is measured on a monthly and yearly basis for Dili, and on a quarterly and yearly basis for the whole country. Monthly measurements compare the present month to the previous month and also the present month to the same month in the previous year. This latter figure provides a seasonally adjusted measure of inflation that cannot be biased by the time of year under consideration. Quarterly measurements compare the present quarter with the previous quarter and compare the present quarter with the same quarter from the previous year. Yearly changes in the CPI are measured from December to December and the average annualized rate is also given (the average of the annual rate of change for each of the 12 months in the year).
The CPI shows how inflation affects the prices of goods that the average consumer purchases. So it is a good measure of the impact of inflation on consumers’ real income. The following disadvantages to this measure of inflation are, however, relevant to Timor-Leste:

- **The CPI basket of goods in Timor-Leste is weighted based on the 2001 Household Income and Expenditure Survey.** This may cause inaccuracies in the measurement of inflation because the average basket of goods consumers purchase may have changed since 2001. Very few Timorese owned cars, mobile telephones, electronic goods or purchased petrol in 2001 compared to today, so these goods may be underweighted in the CPI.

- **The CPI is affected by changes in internationally traded commodities such as oil.** The price of these commodities can quickly and significantly change on international markets; making it difficult to detect the long run trend in other prices.

- **The CPI represents the typical consumer: not the typical producer.** The goods producers purchase may be very different from that of a typical consumer. Producers might purchase large amounts of Iron Ore – a commodity which the typical consumer rarely buys. So a significant increase in the price for Iron Ore might increase producers’ costs, but not lead to a higher CPI. It follows that the CPI index is not necessarily as good measure of increase in costs faced by firms.

Because of the criticisms to the CPI outlined above, alternative measures of inflation have been developed. These include: a) the GDP deflator – which is a measure of all the prices of goods and services included in Gross Domestic Product; b) A producer price index – which can measure the costs of goods purchased by the typical producer or the amount they receive for their output; c) a core price index which does not include particularly volatile commodities such as oil. The Government may consider establishing producer price indexes, core price indexes and reweighting the CPI in the medium and long term. In the short term, selecting a few commodities which are key to the international competitiveness of industry in Timor-Leste and monitoring these on a monthly basis may be beneficial.

Despite these criticisms, the CPI is still a common and broadly accepted measure of inflation. This paper also looks at prices of specific commodities to better understand the impact of inflation on consumers and producers.

**Trends in Inflation**

Chart 1 shows the CPI measure of the Inflation from 2004 to 2010 for the whole of Timor-Leste. The blue line on this chart shows there was an increase in inflation to 8% in 2010. This represents a very sharp increase in inflation compared to 2009, when inflation increased by only 1.1%, and is a higher rate than the average over the last six years (4.2%). Inflation has further increased during the first 9 months of 2011. The rate of inflation from September 2010 to September 2011 was 12.4%.
Chart 1: Timor-Leste’s CPI change December - December and contribution by type of good

Chart 2 shows year-on-year changes in the CPI for each month in Dili. The chart illustrates how the pace of inflation accelerated throughout 2010 and early 2011.

The bars in Charts 1 and 2 show how different commodities have contributed to inflation. The main driver of inflation has been food and beverages. Clothing and Footwear, Housing and Transport (which is in the other category) have also significantly contributed to inflation, although not by as much as food.

Chart 3 breaks down inflation by sub-category for food items. It shows that for all sub-categories of food (with the exception of preserved fish) prices increased by a higher percentage across the period June 2010 to June 2011 than the year before.
Chart 2: Monthly year-on-year inflation in Dili and contribution by type of good

Chart 3: Monthly year-on-year inflation in Dili by type of food and beverage
What are the Costs of Inflation?
There are a number of potential costs to high inflation. The most important of these in Timor-Leste are a loss of purchasing power (and related problems) and a loss of international competitiveness (and related problems).

High inflation, without a corresponding increase in wages, reduces the amount of goods citizens can purchase. This can increase poverty and cause social unrest. Chart 4 examines whether wages for unskilled labour have kept pace with inflation in Timor-Leste. It shows the percentage change in the wages of unskilled labourers compared to the Consumer Price Index. Unskilled labourers saw an above inflation increase in their wages in three years, but in the other four years their wages failed to keep pace with inflation.

Comparison of overall wage inflation with consumer price inflation also suggests wages did not rise in line with prices in 2010. No published data on wage inflation rates earlier than 2010 was available.

There is, then, evidence that the purchasing power of some groups has decreased due to inflation, especially in 2010. This should not, however, be interpreted as overwhelming evidence that the real wages of all groups have declined because this paper has not examined trends in the wages of other groups of workers such as skilled labourers, because data was unavailable.

Chart 4: Inflation and Wages

Inflation can also increase costs for manufactures. Wages in manufacturing are an important component of the overall level of costs. Chart 5 compares wage costs in the manufacturing sector in Timor-Leste with other developing countries and compares them to the level of education of the population. The data show Timor-Leste has the lowest level of primary school enrolment of the countries in the chart but
the second highest wages for manufacturing. Anecdotal evidence from the private construction sector supports the finding that quality of labour in Timor-Leste is lower than in neighbouring countries and more costly. This puts Timorese businesses at a disadvantage as it suggests companies must pay higher wages for less skilled workers compared to other countries in the region, which may discourage investment. The higher wages of Timorese workers in manufacturing does not mean they are better off than workers in other countries, for they may be paying a higher price for the goods they consume.

Chart 5: Manufacturing Wages in 2010 and the level of education

As shown in Chart 6, inflation in Timor-Leste was not significantly higher than in neighbouring countries prior to 2010, but was significantly higher in 2010. There is evidence that this trend continued in the first half of 2011. There is also substantial evidence that Timor-Leste had a higher rate of inflation than its major trading partners in 2010.

Higher inflation in Timor-Leste relative to other countries in the region can discourage investment. Companies will be deterred from investing in Timor-Leste if the costs of inputs into the production processes (wages, electricity, raw materials, transport etc) are already higher in Timor-Leste and are increasing faster than in other countries. International companies would be incentivised to base production in other countries where inputs are cheaper and export to Timor-Leste. Domestic companies who mostly satisfy domestic demand would see their higher costs of production offset by higher market prices, but they would be unable to compete with foreign companies in the export market.

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1 A comparison of the minimum wage of 85$ a month recommended in Timor-Leste by the Directorate of Labour Inspection to other countries’ minimum wages also suggests that labour costs in Timor-Leste are higher than those of comparable countries. See chart in appendix 1.
2 See chart in appendix 1.
3 See chart in appendix 1.
Monitoring and controlling the rate of inflation in Timor-Leste compared to other countries is particularly important because of dollarization. In many developing countries the Government can offset the impact on firms of high comparative inflation by allowing the exchange rate to depreciate relative to other countries. The Government of Timor-Leste does not have this option. It cannot implement policies to depreciate the USD relative to other currencies such as the Indonesian Rupiah.

The USD did fall relative to many Asian countries’ currencies in 2010. This partially offset the loss of competitiveness suffered by Timorese firms due to high comparative inflation, but this depreciation of the USD was not due to the policies of the Government of Timor-Leste. In addition, it is debatable whether there is any reason to expect high inflation in Timor-Leste to be consistently offset by depreciation of the USD. A high rate of inflation in Timor-Leste compared to other countries may then cause a loss of competitiveness for domestic firms (who already have a high cost base) and should be of concern to the Government.

Chart 6: Inflation in Timor-Leste Compared to Neighbouring Countries

Section 2: Causes of Inflation in Timor-Leste

There are two main potential causes of inflation in Timor-Leste. The first is an increase in the price of imports. A depreciation of the USD compared to the currencies of Timor-Leste’s major trading partners can cause the price of imports to increase. The second is higher Government expenditure increasing aggregate demand. These two causes are further discussed below.

Imported Inflation (including depreciation)

The price of foods and beverages has sharply increased on international markets over the last 12 months. As shown in Chart 7, this increase in international prices has fed through to domestic food
prices in Timor-Leste. Specifically, a unit increase in the IMF food and beverage index may cause a 0.69 unit increase in the Dili Food and Beverages index, and changes in international prices may explain over 80% of the variation in domestic prices\(^4\). Therefore, there is strong evidence that international food prices have contributed to Timor-Leste’s recent increase in inflation.

**Chart 7: Foods and Beverage Indices – World and Dili\(^\text{xi}\)**

We can also examine the relationship between international prices and domestic prices for specific foods and commodities. International and domestic price data is available for Wheat, Beef, Sugar, Rice, Iron and Oil. Charts for these items are included in Appendix 2. These charts show that for:

- **Wheat.** There is only a weak relationship between this commodity and international prices\(^\text{xii}\).

- **Beef.** There is a fairly close relationship between international and domestic beef prices. The recent large increase in the price of beef in Timor-Leste is probably due to changes in international prices. Although there is also some evidence that domestic retailers do not pass on small changes in the international price to consumers.

- **Sugar.** There is a fairly strong relationship between domestic and international sugar prices; with sharp price increases domestically and internationally in 2010. There is, however, some evidence that past decreases in the international price have not been fully passed onto consumers, leading instead to higher margins for retailers and importers.

\(^4\) See Chart 4 in appendix 2.
- **Rice.** There has only been a weak relationship between international and domestic rice prices in recent years. The domestic price of rice has recently increased for two reasons. First, the scaling back of the rice subsidy program. Secondly, unseasonal rains led to a contraction in rice production. In the absence of the subsidy program there would probably have been a stronger relationship between international and domestic prices for rice.

- **Oil.** Prices in Timor-Leste closely mirror international prices.

- **Iron.** The relationship between domestic and international prices is weak and it could be argued that domestic prices have steadily increased over time with limited linkage to international prices.

Overall, the increase in international food and commodity prices has undoubtedly contributed to inflation.

As can be seen in the next table (Table 1), the currencies of many of Timor-Leste’s major trading partners appreciated against the USD. The weighted average of these currencies also appreciated by over 9% against the USD. An appreciation of the currencies of Timor-Leste’s major trading partners against the USD makes imports from these countries more expensive and has probably contributed to inflation.

**Table 1: Appreciation of the Currencies of Timor-Leste’s Trading Partners against the USD**

<table>
<thead>
<tr>
<th>Currencies</th>
<th>Percentage Appreciation Against USD from end of May 2010 to end of May 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesian Rupia</td>
<td>9%</td>
</tr>
<tr>
<td>Australian Dollar</td>
<td>26%</td>
</tr>
<tr>
<td>Singapore Dollar</td>
<td>14%</td>
</tr>
<tr>
<td>Japanese Yen</td>
<td>13%</td>
</tr>
<tr>
<td>Vietnamese Dong</td>
<td>0%</td>
</tr>
<tr>
<td>Thai Baht</td>
<td>9%</td>
</tr>
<tr>
<td>Malaysian Ringgit</td>
<td>9%</td>
</tr>
<tr>
<td>Euro (Portugal)</td>
<td>16%</td>
</tr>
<tr>
<td>Weighted Exchange Rate</td>
<td>9%</td>
</tr>
</tbody>
</table>

The international prices of many of the commodities discussed earlier are quoted in USD. This means that when the USD depreciates against the currencies of the countries that export these commodities the USD denominated international market price may increase. Therefore, in order to understand the impact of depreciation on domestic prices we have to understand: a) the impact of USD depreciation on international market prices, and b) the impact of international market prices on domestic prices. These linkages are complex and difficult to fully untangle. A preliminary statistical analysis of these linkages
was, nevertheless, undertaken and the results are presented in table 2. The main conclusions that can be drawn from these results are:

- **Rice.** Depreciation of the USD could explain the majority of the increase in international rice prices, but international rice prices explain none or very little of the change in domestic rice prices. The scaling back of the rice subsidy program and unseasonal rains limiting production explain why domestic rice prices have increased. Depreciation and international market prices have not driven increases in domestic rice prices.

- **Sugar.** Depreciation of the USD could explain some of the increase in international prices. International price increases explain nearly all of the increase in domestic prices. Depreciation alone may have resulted in domestic prices increasing by 7.15%.

- **Petrol.** Depreciation of the USD only explains a small amount of the increase in international prices, but international price increases explain nearly all of the inflation in domestic petrol prices. Depreciation probably only led to a 1.43% increase in domestic prices.

- **Palm Oil.** Depreciation of the USD explains some of the increase in international prices. And international prices explain nearly all of the increase in domestic prices. Depreciation alone probably led to a 9.52% increase in domestic prices.

- **Chicken.** International prices have hardly increased and cannot explain the increase in domestic prices.

Table 2: Depreciation, Prices of International Foods and Commodity Prices and Domestic Inflation

<table>
<thead>
<tr>
<th>Commodity (Major Imports)</th>
<th>Major Exporters’ Currencies Weighted % Appreciation Against Dollar from May 2010 to May 2011</th>
<th>% Change in International Prices from May 2010 to May 2011</th>
<th>% Change in Domestic Prices from May 2010 to May 2011</th>
<th>Significant Statistical Relationship between domestic and international prices?</th>
<th>% Change in Domestic Prices Explained by International Prices</th>
<th>% change in domestic prices due to appreciation against USD[^6]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>3.93%</td>
<td>5.94%</td>
<td>33.33%</td>
<td>No</td>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Sugar</td>
<td>13.73%</td>
<td>44.54%</td>
<td>22.41%</td>
<td>Yes</td>
<td>Nearly All</td>
<td>7.15%</td>
</tr>
<tr>
<td>Petrol</td>
<td>2.31%</td>
<td>43.24%</td>
<td>25.93%</td>
<td>Yes</td>
<td>Nearly All</td>
<td>1.43%</td>
</tr>
<tr>
<td>Palm Oil</td>
<td>9.76%</td>
<td>47.43%</td>
<td>11.11%</td>
<td>Yes</td>
<td>Nearly All</td>
<td>9.52%</td>
</tr>
<tr>
<td>Chicken</td>
<td>10.35%</td>
<td>0.10%</td>
<td>19.29%</td>
<td>No</td>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>8.02%</strong></td>
<td><strong>28%</strong></td>
<td><strong>22%</strong></td>
<td><strong>N/A</strong></td>
<td>**N/A</td>
<td><strong>N/A</strong></td>
</tr>
</tbody>
</table>

In summary, increases in International market prices for commodities and depreciation of the USD have contributed to inflation. There are, however, three reasons to consider that depreciation and international prices do not fully explain inflation in Timor-Leste. First, an examination of house building costs in Dili, which are a component of the Dili CPI[^7], show that inflation since 2006 was highest for two

[^5]: See table 1 in appendix 2.
[^6]: Assuming a 1% appreciation in the USD leads to a 1% increase in the USD international price.
[^7]: See appendix 2 charts 14 and 15.
materials – sand and concrete blocks - that were locally sourced. If inflation was solely driven by depreciation and international market prices we would not expect locally produced commodities to be showing above average increases in prices. Second, for some commodities such as chickens and wheat, USD depreciation and international prices cannot explain increases in domestic prices. Third, according to economic theory, an increase in the costs of imports can only cause a temporary increase in prices unless there is an increase in aggregate demand and the supply of money. So demand side factors, such as Government spending, may also be contributing to inflation.

**Fiscal Policy / Demand Driven Inflation**

Government spending can increase the amount of aggregate demand in the economy. Increased demand without an increase in the ability of the economy to supply goods can cause inflation. In Timor-Leste Government spending is likely to dominate demand for three reasons. First, monetary policy has a very limited impact on demand. The Government cannot print money and because many citizens do not have bank accounts or borrow money from financial institutions, other monetary policy measures, such as Government regulation of the amount of capital banks must hold, have a limited impact on demand and inflation. Second, the Government sector is large compared to the rest of the economy. And third, the Government can sharply increase expenditure by withdrawing money from the petroleum fund. Expenditure financed by oil revenue may be more inflationary than expenditure financed by domestic revenue. The reason for this is that when expenditure is financed by domestic revenue the increase in demand caused by Government spending is partially offset by the increases in taxes necessary to fund this expenditure. Yet, when expenditure is financed by withdrawals from the petroleum fund there is no such offsetting effect – nobody in Timor-Leste has to pay more taxes to finance this expenditure.

Government spending can also potentially reduce inflation by increasing the productive potential of the economy and reducing the cost and capacity constraints involved in importing goods. Ongoing Government reforms may increase the efficiency in public spending both in recurrent and especially in capital expenditures increasing their impact on aggregate supply, stimulating economic growth and reducing the potential impact of Government spending on inflation.

Total Government spending over the last 11 years is shown in chart 10. Since 2008 there has been a large and sustained increase in Government expenditure. This increase in expenditure has mainly been financed by withdrawals from the petroleum fund and not by domestic revenue. In 2010, less than 13% of expenditure was financed by domestic revenue.
Has this large, mainly oil financed, increase in expenditure resulted in higher inflation? This paper seeks to answer this question by examining trends in Government spending and inflation by month. The next chart plots the CPI and Government expenditure by month\textsuperscript{xiv}. Recurrent expenditure and capital expenditure are shown separately. This is an important distinction because capital expenditure\textsuperscript{xv} on large projects often goes directly abroad. If, for example, the Government directly purchases generators from a foreign company and pays this money into a foreign bank account in Hong Kong then this money does not enter into the domestic economy and would thus not cause inflation in Timor-Leste. Government spending on Salaries and Wages, in contrast, does enter the domestic economy and may cause inflation. In addition, capital expenditure on roads, electricity and ports may have a larger impact on the supply side of the economy than recurrent expenditure.

The main point illustrated by chart 11 is that there is probably a relationship between Government spending and inflation. Specifically, the sharp increases in spending in mid-2007 and late 2009 and 2010 seem to have contributed to the increases in the CPI in these periods. The large increase in spending in late 2008 did not result in higher inflation, though rises in spending earlier in 2008 are associated with increases in the CPI.

Chart 12\textsuperscript{xvi} further investigates the relationship between recurrent expenditure and inflation. It uses monthly data from December 2003 to April 2011 (89 months) and plots the relationship between recurrent expenditure and the CPI in Dili four months later. The chart correlates the CPI for Dili\textsuperscript{xvii} with expenditure from four months previously because it is unlikely that people spend new income immediately and cause prices to rise within the same month. Chart 12 shows that every million USD increase in Government recurrent expenditure is associated with a 0.7 unit increase in the consumer price index four months later. It also demonstrates that 58\% of the variation in the CPI may be explained.
by recurrent expenditure\textsuperscript{xviii}. In conclusion, there is reasonable evidence that increased recurrent expenditure has contributed to inflation.

**Chart 11: Monthly Government Expenditure and Inflation in $ million\textsuperscript{xix}**

![Chart 11: Monthly Government Expenditure and Inflation in $ million](image)

**Chart 12: Relationship Between Lagged Recurrent Expenditure and Inflation\textsuperscript{xx}**

![Chart 12: Relationship Between Lagged Recurrent Expenditure and Inflation](image)

\[ y = 0.7018x + 122.79 \]

\[ R^2 = 0.5784 \]
Section 3: Modelling Future Inflation and Comparison to IMF’s Analysis

Modelling Future Inflation
This section models the impact of future Government spending on the change in the CPI. Our results should be interpreted with caution for three reasons. First, Timor-Leste has not created an advanced economic model of inflation and Government spending and the results presented here are based on the brief statistical analysis contained in the previous section. Second, the results of the statistical analysis in the last section should themselves be interpreted cautiously. Third, even advanced economic models cannot accurately predict the future and are best interpreted as ways of usefully showing underlying relationships and possible outcomes. More detailed work based around a more advanced economic model should be undertaken in this area in the future.

Chart 13 shows the projected average inflation rates for five year periods until 2030, based on the model in Chart 12. The projections are only illustrative and should not be considered official Government projections. The projections assume a baseline inflation rate of 4% and calculate additional inflation caused by a 3%, 6%, 9% and 12% growth in Government recurrent expenditure each year. A 6% increase in recurrent expenditure each year from 2012 is associated with annual inflation rates that are often above 6% until 2030, assuming 4% inflation caused by other factors (most notably rises in international consumer goods and services). Growth in recurrent expenditure, that is significantly higher than 6% a year, may result in inflation that is high, relative to other countries, undermining Timor-Leste’s international competitiveness. Between 2008 and 2010 recurrent expenditure grew by much more than 6% a year.

The overall rate of growth in recurrent expenditure contributes to inflation. But inflation can also lead to demands for higher wages and transfers from citizens. This can spark a negative spiral whereby high spending causes inflation, leading to demands for higher Government wages and transfer payments, resulting in higher recurrent expenditure, which in turn causes inflation. The net result is an economy with high Government spending, high wages, high prices, uncompetitive domestic industry and high imports. In addition, growth in domestic expenditure may lead to above ESI withdrawals from the petroleum fund and a reduction in the petroleum fund net wealth. Going forward, prudent growth in recurrent expenditure is vital if inflation is to be kept in the 4% to 6% range stated in the SDP.
Comparison between this Paper and the Analysis of Inflation Recently Undertaken by the IMF

The IMF recently drafted an analysis of inflation in Timor-Leste. The IMF’s analysis and the work contained in this paper reach similar conclusions. The main points of similarity are that both papers conclude that:

- the rate of inflation sharply increased in 2011;
- food prices have contributed to inflation, but other types of goods such as clothing and footwear have also contributed to inflation;
- international prices and government expenditure have significantly contributed to inflation;
- there is a significant relationship between international food prices and domestic food prices;
- there is a significant relationship between components of government expenditure and inflation;
- inflation can contribute to increased poverty if nominal wages increase by less than the price of goods.

There are, however, a few differences between the IMF’s paper and this paper. More specifically:

- this paper distinguishes between the increase in international prices due to the depreciation of the USD and the increase in international prices caused by other factors. The IMF’s analysis does not explicitly make this distinction;
- this paper discusses the impact of inflation on Timor-Leste’s international competitiveness. The IMF’s presentation does not discuss this issue;
- the IMF’s paper does not consider the impact of the scaling back of the rice subsidy programme on inflation;
- the IMF formally distinguishes between imported and local produced commodities. This paper does not formally make this distinction for all commodities, although we do note that some locally
produced commodities such as sand and concrete blocks have seen increases in their price and that this cannot be explained by international prices.

- the IMF concentrate on modelling future inflation. This paper concentrates on estimating the impact of future growth in recurrent expenditure on inflation.

Overall the IMF’s paper and this paper reach similar conclusions and use broadly similar methodologies.

**Conclusion**

Inflation in Timor-Leste has sharply increased. The main drivers of inflation are food, clothing, housing and transport. Sharp rises in food and clothing are undoubtedly hurting consumers. Inflation also increases the costs faced by businesses in Timor-Leste undermining their international competitiveness.

Increases in international food and beverage and commodity prices, together with a depreciation of the USD, have definitely contributed to the recent rise in inflation. There is also evidence that increased recurrent expenditure, financed by oil revenues, has increased inflation. Because international prices and the value of the USD are not under the control of the Government, but recurrent expenditure is, the pressure for stabilizing inflation will lie with fiscal policy. Going forward, prudent fiscal management will be important in curtailing inflation. Annual growth in recurrent expenditure that is significantly higher than 6% a year may result in inflation which is higher than the 4% to 6% targeted in the SDP. Such high inflation would also undermine the international competitiveness of Timorese businesses.
Appendix 1: Additional Charts on the Costs of Inflation

Chart 1: Effective Annual Minimum Wages in Developing Asia

Chart 2: CPI change March 2010 to March 2011 (%) Timor-Leste and selected Asian Countries
Chart 3: Inflation in 2010 in Timor-Leste’s major trading partners

- India
- Timor-Leste
- Vietnam
- Solomon Islands
- Indonesia
- China
- Thailand
- Australia
- Singapore
- Hong Kong
- Malaysia
- Denmark
- Taiwan
- Portugal
- Switzerland
- Japan

Percentage
Appendix 2: Additional Charts on the Causes of Inflation

Chart 1: Relationship Between Food and Beverage Indices

\[ y = 0.6899x + 48.563 \]
\[ R^2 = 0.876 \]

World Food & Beverage Index, IMF

Chart 2: International and Domestic Wheat Prices Compared

\[ y = 1.5996x + 0.3071 \]
\[ R^2 = 0.3923 \]

Chart 3: Relationship Between Domestic and International Wheat Prices

Wheat Flour Timor Wheat, No. 1 Hard Red Winter, ordinary protein, FOB Gulf of Mexico, per kg

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Chart 4: International and Domestic Beef Prices Compared

Chart 5: Relationship Between International and Domestic Beef Prices

y = 0.7712x + 0.9548
R² = 0.4859

Chart 6: International and Domestic Sugar Prices Compared

Chart 7: Relationship Between International and Domestic Sugar Prices

y = 1.2221x + 0.3351
R² = 0.6755
Chart 8: Monthly Average Rice Prices Dili and World

Chart 10: Domestic and International Oil Prices Compared

Chart 9: Relationship Between International and Domestic Rice Prices

Chart 11: Relationship Between International and Domestic Oil Prices
Table 1: Details of Regressions on Selected Commodities (results underlie table 2 in the main text)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Function Form</th>
<th>Intercept</th>
<th>Beta</th>
<th>P-value Beta</th>
<th>R-Squared</th>
<th>% Change in Domestic Price May 2010 to May 2011</th>
<th>Estimated % Change from Model in Domestic Price May 2010 to May 2011 due to International Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Rice</td>
<td>International Rice</td>
<td>Linear</td>
<td>0.842</td>
<td>-0.000102</td>
<td>0.289</td>
<td>2.90%</td>
<td>33.33%</td>
<td>-0.36%</td>
</tr>
<tr>
<td>Domestic Rice</td>
<td>International Rice</td>
<td>Double Log</td>
<td>0.249</td>
<td>-0.0786</td>
<td>0.289</td>
<td>2.90%</td>
<td>33.33%</td>
<td>-0.47%</td>
</tr>
<tr>
<td>Domestic Price Sugar</td>
<td>International Price Sugar</td>
<td>Linear</td>
<td>0.329</td>
<td>1.282</td>
<td>0</td>
<td>66.60%</td>
<td>22.41%</td>
<td>25.16%</td>
</tr>
<tr>
<td>Domestic Price Sugar</td>
<td>International Price Sugar</td>
<td>Double Log</td>
<td>0.299</td>
<td>0.521</td>
<td>0</td>
<td>63.60%</td>
<td>22.41%</td>
<td>23.21%</td>
</tr>
<tr>
<td>Domestic Price Petrol</td>
<td>International Price Petrol</td>
<td>Linear</td>
<td>0.339</td>
<td>0.69</td>
<td>0</td>
<td>79.70%</td>
<td>25.57%</td>
<td>27.91%</td>
</tr>
<tr>
<td>Domestic Price Petrol</td>
<td>International Price Petrol</td>
<td>Double Log</td>
<td>0.0428</td>
<td>0.62</td>
<td>0</td>
<td>82.60%</td>
<td>25.57%</td>
<td>26.81%</td>
</tr>
<tr>
<td>Domestic Price Palm Oil</td>
<td>International Price Palm Oil</td>
<td>Linear</td>
<td>0.143</td>
<td>0.000806</td>
<td>0</td>
<td>76.00%</td>
<td>11.67%</td>
<td>38.60%</td>
</tr>
<tr>
<td>Domestic Price Palm Oil</td>
<td>International Price Palm Oil</td>
<td>Double Log</td>
<td>-0.00435</td>
<td>0.975</td>
<td>0</td>
<td>93.40%</td>
<td>11.67%</td>
<td>46.25%</td>
</tr>
<tr>
<td>Domestic Price Chicken</td>
<td>International Price Chicken</td>
<td>Linear</td>
<td>16.2</td>
<td>-0.149</td>
<td>0.09</td>
<td>23.80%</td>
<td>19.29%</td>
<td>-0.40%</td>
</tr>
<tr>
<td>Domestic Price Chicken</td>
<td>International Price Chicken</td>
<td>Double Log</td>
<td>18.2</td>
<td>-3.812</td>
<td>0.08</td>
<td>25.30%</td>
<td>19.29%</td>
<td>-0.40%</td>
</tr>
</tbody>
</table>
End Notes

i From Blanchard (2000)
ii The CPI measurements are made by the National Directorate of Statistics, DGAR, Ministry of Finance
iii The rate of inflation used in this graph is the percentage change in prices between the December of that, and the previous, year.
iv Source: National Directorate of Statistics, DGAR, Ministry of Finance
v Source: National Directorate of Statistics, DGAR, Ministry of Finance
vi Source: National Directorate of Statistics, DGAR, Ministry of Finance
vii Source: National Directorate of Statistics, DGAR, Ministry of Finance
viii Sources: ILO Labour Statistics Database for manufacturing wages, adjusted by inflation to give 2010 figures where 2010 data were not available and converted to USD using Oanda. Labour Force Survey 2010 for Timor-Leste wage data. World Bank World Development Indicators for school enrolment data, which relates to 2009 for all countries apart from Philippines, which is 2008 data.
ix The non-oil fiscal deficit was not used because this was driven by Government spending to such a large extent that plotting it on the graph in addition to expenditure does not really provide any useful additional information.
xx All expenditure and revenue data from DNO and Macroeconomic Directorates.
4% was assumed for 2 reasons; it is Timor-Leste’s target rate for 2012 onwards, assuming no policy change (Table 4.3, Budget Book1); 3.8% is the weighted average of Timor-Leste’s trading partners’ projected CPI change for 2011, in the IMF World Economic Outlook Jan 2011 (weighted by trade volumes with Timor-Leste 2010), this gives an estimate of imported inflation 2011.

Note: Projected inflation for 2011 uses actual and budgeted Government expenditure, rather than the 4 spending scenarios, and is therefore slightly higher (at 6.7%). This pulls up the average of the 2011-2015 period. The contribution to inflation is increasing over time after 2011, because X% of a rising budget is a greater amount of dollars each year. CPI is projected using a 4 month lag on spending.

The axes are formatted around the average rate of inflation for the other countries. This means that all countries with bars going to the right have an above average rate of inflation. Data Sources: individual country National Statistics Office websites and for Timor-Leste: National Directorate of Statistics, Ministry of Finance. December to December data showed the same pattern as March to March (see appendix).

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Data Sources for all graphs: local prices from National Directorate of Statistics and world prices from IMF.