A Macroeconomic Perspective on the Real Sector: Growth, Economic Fluctuations and Inflation

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TAOLAM

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Outline

I. Real Sector Overview

II. Measuring and Analyzing GDP

III. Sources of Growth

IV. Inflation

V. Forecasting GDP
Real Sector Overview

### Table 1. Myanmar: Selected Economic Indicators, 2010/11–2015/16 1/

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Output and prices</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Real GDP (authorities)</td>
<td>10.4</td>
<td>5.9</td>
<td>7.3</td>
<td>8.7</td>
<td>9.1</td>
<td>...</td>
</tr>
<tr>
<td>Real GDP (staff working estimates)</td>
<td>5.3</td>
<td>5.9</td>
<td>7.3</td>
<td>8.3</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>CPI (end-period)</td>
<td>8.9</td>
<td>-1.1</td>
<td>4.7</td>
<td>6.3</td>
<td>5.9</td>
<td>6.7</td>
</tr>
<tr>
<td>CPI (period average)</td>
<td>8.2</td>
<td>2.8</td>
<td>2.8</td>
<td>5.7</td>
<td>6.6</td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Memorandum items</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>GDP (billions of kyats) 4/</td>
<td>39,847</td>
<td>43,368</td>
<td>47,851</td>
<td>54,756</td>
<td>63,323</td>
<td>73,042</td>
</tr>
<tr>
<td>GDP (billions of US$)</td>
<td>49.6</td>
<td>56.2</td>
<td>55.8</td>
<td>56.8</td>
<td>65.3</td>
<td>73.6</td>
</tr>
<tr>
<td>GDP per capita (US$)</td>
<td>998</td>
<td>1,121</td>
<td>1,103</td>
<td>1,113</td>
<td>1,270</td>
<td>1,420</td>
</tr>
</tbody>
</table>
Real Sector Overview

What is the real sector about?

At one level, it is about

• Level of production in the economy

This means it is also about

• Employment
• Investment
• Income
• Consumption
Real Sector Overview

What is the real sector about?

At another level, it is about prices such as:

- Consumer prices
- Input prices
- Wages

In a market economy, prices clear markets which in turn determines production levels. We cannot separate between the two.
Real Sector Overview

How do we measure economic output?

• Should we just add up all the **(gross) output** produced by businesses and households in the economy?

• No, this would lead to double counting! Example: wheat used in production of bread

• To avoid double counting, we need to subtract intermediate inputs:
  
gross output - intermediate consumption = **value added**

• **Gross domestic product (GDP)**: sum of value added across all sectors in the economy
Real Sector Overview

Why is GDP so important?

• Measure of output
• Approximation of welfare
• Many other variables are moving broadly proportional to GDP (e.g., revenues)
  → GDP ratios
  → GDP forecast is basis for revenue forecasts etc.
• Macroeconomic management: keeping GDP roughly in line with its potential
Real Sector Overview

Key concepts: Consumption

We distinguish between

• Final household consumption—e.g., food, housing, transportation
• Final government consumption—e.g., electricity, fuel, office supplies
• Intermediate consumption— aforementioned inputs into production

Source: Eurostat (nama_co2_c)

(1) Figures do not sum to 100 % due to rounding.
Real Sector Overview

Key concepts: Investment

Additions to the capital stock, e.g., purchase of machinery or construction of buildings
Real Sector Overview

Key concepts: Exports

What Myanmar sells abroad...

Main Exports
(In percent of GDP)

<table>
<thead>
<tr>
<th>Year</th>
<th>Food</th>
<th>Garments</th>
<th>Gas</th>
<th>Wood</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2009</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2011</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2012</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>
Real Sector Overview

Key concepts: Imports

What you buy from abroad ...
Real Sector Overview

Key concepts: Nominal versus Real

- **Nominal GDP**: measures the value of output of the economy at current prices
- **Real GDP**: measures the value of output of the economy -- changes in an economy’s physical output -- using prices of a fixed base year
- Changes in nominal GDP over time reflect changes in both prices and physical output
Key concepts: Distinction between nominal versus real is useful for (1) measuring purchasing power:

Example: Nominal wages ↑ 20%

↑ If inflation was 10%,
Real buying power grew

BUT

↓ If inflation was 30%,
Real buying power shrank
Real Sector Overview

Key concepts: Distinction between nominal versus real is useful for (2) accounting for different GDP factors:

Value (V) = Price (P) * Quantity (Q)

Nominal GDP (V) = GDP Deflator (P) * Real GDP (Q)

Fundamental relation to be used over & over !

- Approximation: \( \Delta \% V \approx \Delta \% P + \Delta \% Q \)
- Exact relationship:
  \[
  (1+ \Delta \% V/100) = (1+\Delta \% P/100) * (1+\Delta \% Q/100)
  \]
Outline

I. Real Sector Overview

II. Measuring and Analyzing GDP

III. Sources of Growth

IV. Inflation

V. Forecasting GDP
Measuring and Analyzing GDP

**Estimate of GDP**

- **Production Approach**
  \( \sum \text{sectoral "value added"} \)

- **Expenditure Approach**
  \( Y = C + I + X - M \)

- **Income Approach**
  \( Y = \text{wages} + \text{OS} + \text{TSP} \)

*OS* = gross operating surpluses of enterprises (including profits, rents, interests)

*TSP* = taxes less subsidies
Measuring and Analyzing GDP

Production approach: GDP Shares

Composition of GDP (Constant 2010/11 Prices)

- Agriculture
- Industry (incl. mining & construction)
- Services and trade

Measuring and Analyzing GDP

Production approach: real GDP growth by sector

GDP Growth (Constant 2010/11 Prices)

- Agriculture
- Industry (incl. mining & construction)
- Services and trade

- GDP (constant 2010/11 prices)

- 2009/10: 4%
- 2010/11: 6%
- 2011/12: 8%
- 2012/13: 10%
- 2013/14: 12%
Measuring and Analyzing GDP

Production approach: growth contributions by sector

GDP Growth (Constant 2010/11 Prices)

- Services and trade
- Industry (incl. mining & construction)
- Agriculture
- GDP (constant 2010/11 prices)
Expenditure approach:

- **Absorption (A)** = Final Consumption (C) + Investment (I)

- **Net Exports (X-M)**
  
  X = Exports of goods and services
  M = Imports of goods and services

\[ \text{GDP} = A + (X - M) \]

*Domestic Demand, Foreign Demand*
Measuring and Analyzing GDP

Expenditure approach links real sector to other sectors:

- **Real Sector**
  - CA=S-I

- **Fiscal Policies**
  - G; T
  - Monetary financing

- **Balance of Payments**
  - Interest rates/exchange rate

- **Monetary Policies**
  - RM=NFA+NDC
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Sources of Growth

A simple metaphor for thinking about growth:

Economy as a machine: Transforming inputs such as labor and capital into outputs such as goods and services.
Sources of Growth

‘Economy as machine’ metaphor suggests ...

... for more growth we need more inputs!

But many inputs such as land, labor or education are difficult to procure in the short run, so ...

... growth in the short run depends really on investment.

Is this really true?
Sources of Growth

Alternatively, we need to use our existing inputs more efficiently!

This is about ...

- Technical innovation (especially in advanced countries), and ...
- ... adoption of best practices and existing technologies (especially in emerging and developing countries)
Sources of Growth

Growth accounting—quantifying growth factors

Growth accounting is based on production function that typically includes the following growth factors:

- Growth rate of capital, which is closely linked to a nation’s investment rate
- Growth rate of ‘Raw’ labor, i.e., growth in labor force measured in the number of available workers
- Growth of human capital, i.e., growth in the quality of individual workers, often linked to schooling
- Technical progress, i.e., increase in efficiency of using above input factors, often called growth rate of total factor productivity (TFP)
Sources of Growth

Growth accounting—advanced economies

So what are typically the most important growth drivers?

For advanced economies, TFP growth is often key:

Growth Accounting for the United States, 1948-2000

<table>
<thead>
<tr>
<th></th>
<th>Annual Growth Rate of Y</th>
<th>Annual Growth Rate of Y/L</th>
<th>Contribution of K/L</th>
<th>Annual Growth Rate of A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948-1973</td>
<td>4.0%</td>
<td>3.0%</td>
<td>1.2%</td>
<td>1.8%</td>
</tr>
<tr>
<td>1973-1995</td>
<td>2.7%</td>
<td>0.9%</td>
<td>0.8%</td>
<td>0.1%</td>
</tr>
<tr>
<td>1995-2000</td>
<td>4.2%</td>
<td>3.0%</td>
<td>1.1%</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

\( \alpha = 0.4 \)

Sources of Growth

Growth accounting—transition economies

- Capital deepening was on average the single most important growth driver
- Closely followed by TFP growth

Source: See Iradian (2007), Rapid Growth in Transition Countries: Growth-Accounting Approach, p. 16
Sources of Growth

Growth Experience in Asia

- Capital deepening was especially important in Asia, resulting from very high investment (and savings) ratios
- Human capital accumulation was another key factor in East Asia during 1966-90

Table 1-2: Educational Attainment of the Working Population (%)

<table>
<thead>
<tr>
<th></th>
<th>Hong Kong</th>
<th>Singapore</th>
<th>South Korea</th>
<th>Taiwan</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>19.2</td>
<td>5.6</td>
<td>55.1</td>
<td>↓</td>
</tr>
<tr>
<td>Primary</td>
<td>53.6</td>
<td>22.9</td>
<td>28.2</td>
<td>33.7</td>
</tr>
<tr>
<td>Secondary</td>
<td>27.2</td>
<td>71.4</td>
<td>15.8</td>
<td>66.3</td>
</tr>
</tbody>
</table>

Notes: Self-taught are included under primary. Hong Kong, Korean and Taiwanese data refer to highest level of education "attended" rather than completed. All percentages calculated net of those reported as "unknown.

Source: See Young (1994), Tyranny of Numbers, p. 3
Sources of Growth

Recent IMF Research Results on Growth Factors
Sources of Growth

Investment is associated with higher growth...

- This is consistent with the finding from growth-accounting that capital deepening is a significant growth driver.
- But notice also that the difference in investment ratios between the two groups is not very large.

→ Investment is not the only factor that matters!

Real Investment (percent of GDP)

- LICs with strong growth
- LICs with weak growth
Sources of Growth

... and FDI appears especially beneficial

- FDI affects growth through capital deepening, similar to general investment
- More important is probably that FDI helps to adopt best practices and new technology, boosting TFP growth
- Last channel is likely to be especially effective for manufacturing-related FDI
Sources of Growth

Growth takeoffs are associated with openness:

- Similar to FDI, trade linkages help to import new technology and adopt best practices
- Trade linkages also allow a greater degree of specialization, which also helps with efficiency and innovation

→ both of these factors help boost TFP growth
Sources of Growth

Reigning in high inflation promotes growth:

High inflation is bad for growth, so reigning in inflation helps to return growth to its normal level.

Inflation (1990-2011)

- LICs with strong growth
- LICs with weak growth
Sources of Growth

Quality of institutions and governance is another important growth factor

Diagram: GOOD GOVERNANCE
- Consensus oriented
- Accountable
- Participatory
- Transparent
- Follows the rule of law
- Responsive
- Effective and efficient
- Equitable and inclusive
Sources of Growth

Source: See Kaufmann and Kray, Growth Without Governance, p. 40
Sources of Growth

Source: See Kaufmann and Kray, Growth Without Governance, p. 40
Sources of Growth

Source: See Kaufmann and Kray, Growth Without Governance, p. 41
Sources of Growth

Source: See Kaufmann and Kray, Growth Without Governance, p. 41
Sources of Growth

What does this imply for Myanmar?

Myanmar’s growth performance in coming years should benefit from

- Ongoing transition to market economy
  → efficiency gains
- Greater trade integration
  → efficiency gains, innovation
- Public sector reforms
  → quality of institutions
- Boost to education and health spending
  → human capital formation
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Inflation

What is inflation?

- Inflation is a **sustained** increase in the **overall** price level
  
  - Increase in average prices of all goods and services vs. change in relative prices of individual goods and services
  
  - Sustained increase vs. one-time increase in the price level
Inflation

Why do we care about inflation?

• Reasonably low inflation is equivalent to price stability
  → key element of macroeconomic stability
  → matters for growth

• High inflation has adverse impact especially on poor

• Many macroeconomic variables have a price component, for example:

  Nominal GDP = Real GDP * GDP Deflator

  → Inflation helps understanding the price component
Inflation

Inflation determinants

Demand pressures

Imported inflation

(Price Inflation)

Cost-push shocks
Inflation determinants in Myanmar: reserve money matters ...
Inflation

... and so do international commodity prices:

[Commodity Prices & Headline CPI (Y-o-Y Change in %) chart]

- CPI (headline, 2010=100)
- All Commodity Price Index, 2005 = 100, includes both Fuel and Non-Fuel Price Indices
Inflation

The role of the exchange rate becomes visible when we consider quarterly inflation rates:

![Exchange Rate & Headline CPI (Q-o-Q Change in %)]
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Forecasting GDP

Why does forecasting GDP matter?

• GDP forecast is the starting point for many other forecasts, e.g., revenues or imports
• Similarly, GDP forecasts are necessary for projecting GDP ratios
• GDP forecasts are central for macroeconomic management
Forecasting GDP

It’s difficult ...

- It’s very rare that the forecast hits exactly the mark (if so, it’s just luck!)
- The forecast ‘number’ is important (e.g., for the budget), but ...
- … the ‘story’ behind the forecast is often as important
Forecasting GDP

General procedure

• Start with analyzing the past → what were key developments and how are they going to affect the present and future?
• What do we know about the present (nowcast)?
• Forecast is an extrapolation of past and present, taking policy (changes) into account
Forecasting GDP

Remember distinction between nominal and real:

- **Nominal GDP**: measures the value of output of the economy at current prices
- **Real GDP**: measures the value of output of the economy -- changes in an economy’s physical output -- using prices of a fixed base year
- **GDP deflator**: price component of GDP, computed as $\frac{Nominal\ GDP}{Real\ GDP}$
Forecasting GDP

Typical forecasting approach:

- Start with forecasting real GDP
- Forecast inflation
- Forecast GDP deflator as function of inflation forecast
- Compute
  Nominal GDP = Real GDP x GDP Deflator
Various approaches for forecasting real GDP:

- **Forecast**
  - Potential output and output gap
  - Supply-side approach:
    - Production function
    - Sectoral forecasts
  - Demand-side approach:
    forecast expenditures \((C + I + X - M)\)
  - Reconciliation of Supply & Demand
Forecasting Real GDP
—Potential GDP & Output Gap

Positive output gap: demand > supply

Negative output gap: demand < supply
Forecasting Real GDP
—Production Function Approach

- $Q = f(K, L, A)$
  
  where $K =$ Capital
  
  $L =$ Labor
  
  $A =$ Technology, Institutions

- In the long run, increasing *supply* requires increasing $A$ (through structural policies)
Supply-side: sectoral forecasts

Forecast production in each sector separately as they may have different determinants, then add up the individual forecasts to obtain the total:

Let’s practice this!
Demand-side: forecasting expenditures

\[ \text{GDP} = (C_P + C_G) + (I_P + I_G) + (X - M) \]

We should be able to forecast public consumption and investment \((C_G \text{ & } I_G)\) using information from the budget.

We might be able to construct forecast equations for exports and imports \((X - M)\) [External sector].

Private consumption \((C_P)\) is often fairly steady and not that difficult to forecast.

Leaves private investment \((I_P)\) as a very difficult element to forecast because this tends to be fairly volatile.
Forecasting GDP Deflator

Real Consumption \times \text{Consumption Deflator} = \text{Nominal Consumption}

Real Investment \times \text{Investment Deflator} = \text{Nominal Investment}

Real Exports \times \text{Export Deflator} = \text{Nominal Exports}

\text{Real Imports} \times \text{Import Deflator} = \text{Nominal Imports}

Real GDP \times \text{Nominal GDP} = \text{Nominal GDP}

\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100
Forecasting Components of GDP Deflator

- **Consumption:** \( \% \Delta P_C = \% \Delta \text{CPI} \)
- **Investment:** \( \% \Delta P_I = (1-a) \% \Delta \text{CPI} + a \% \Delta P_M \)
  
  \((a = \text{share of imported investment goods})\)
- **Export:**
  \( \% \Delta P_X = \left( (1 + \% \Delta \text{Export price in US$/100}) \times (1 + \% \Delta \text{Exchange rate/100}) - 1 \right) \times 100 \)
- **Import:**
  \( \% \Delta P_M = \left( (1 + \% \Delta \text{Import price in US$/100}) \times (1 + \% \Delta \text{Exchange rate/100}) - 1 \right) \times 100 \)
Forecasting Nominal GDP

Putting it all together:

• Forecast real GDP growth
• Forecast GDP deflator
• Compute nominal GDP growth, using

\[ \text{Value}_{t+1} = \text{Value}_t \times (1 + \% \Delta P) \times (1 + \% \Delta Q) \]
Forecasting GDP—Other Sources

Forecasting tools

Compare your own forecasts to those of the IMF!
Outlook

Next, we will explore in more detail ...

• ... the fiscal sector, which helps with analyzing public consumption and investment ($C_G$ & $I_G$)