Philippine Institute for Development Studies
Surian sa mga Pag-aaral Pangkaunlaran ng Pilipinas

The Business Cycle in the Philippines

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DISCUSSION PAPER SERIES NO. 2005-10

June 2005

Abstract

This paper provides an overall picture of the Philippine business cycles covering the period 1981 to 2003 by characterizing them in terms of volatility, co-movement and persistence. As a trend-cycle decomposition technique, the most frequently used Hodrick Prescott filter was applied. The period under investigation brought about three cycles: 1983-1989, 1989-1997 and 1997-2000 with initially very erratic but over time smoother fluctuations.

In resemblance with industrialized countries, investment turns out to be the most volatile and consumption the least volatile national expenditure component, potentially pointing at Keynes' assertion of "animal spirits" of investors as the source for the former phenomenon.

Further, with the exception of prices, inflation and the terms of trade, all variables have strong and positive correlations with GDP. The strong negative price-output correlation, and the weak positive inflation-output correlation identify supply shocks as the triggering factor for observed business cycles, pointing at either technological change or drastic changes in the weather as possible spurring factors. Moreover, the investigation clearly reveals procyclical fiscal and monetary policy interventions, contradicting theoretical prescriptions of countercyclical stabilization policies to swiftly overcome economic recessions.

Finally, all key macroeconomic variables show fairly low persistence, substantiating the Philippines' popularity for its boom-bust cycles.

Keywords: Business Cycles, Basic Characteristics and Source, Stabilization Policy;

The Business Cycle in the Philippines

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*"Understanding the basic characteristics of observed business cycles is
the first step in designing appropriate stabilization policies."*
Lucas, 1981

Introduction

Economies constantly undergo significant cyclical variations of distinct pattern and origin with differences in depth and length. In duration, business cycles vary from more than 1 year to 12 years, and comprise a boom (or expansionary phase) and a recession (or contractionary phase). Recessions are characterized by high unemployment and low productivity with highly asymmetric short but sharper cycles than expansions. Business cycles represent costly regularities of modern economies. Given the welfare costs associated with economic downturns, stabilization policies become a vital concern of the government that aim to minimize the pains of recessions and initiate an early economic recovery. In order to design appropriate and effective policies, the basic characteristics and potential origins of the business cycle need to be identified and understood.

This paper will provide an overall picture of the Philippine business cycle covering the period 1981 until 2003. The cycle will be characterized in terms of volatility, co-movements and persistence. The paper will also identify the potential sources of observed macroeconomic fluctuations and determine the role of stabilization policies in arresting these fluctuations.

This paper is organized as follows; Section I discusses the methodology applied to extract the business cycle component from observed macroeconomic time series. Section II gives a brief description of business cycles in developing countries while section III reports basic characteristics of the Philippine business cycle for the period 1981 to 2003. Section IV concludes.

I. Methodology

The study of business cycle begins with the processes of detrending key macroeconomic variables. From there, information can be extracted to provide an overall picture of the cycle's basic characteristics--volatility, persistence and co-movements. The literature offers numerous detrending or smoothing procedures which includes first differencing, band-pass filters (Baxter/King (1999)) and Hodrick-Prescott (HP) filters (Hodrick/Prescott (1997)). The latter is the most frequently applied trend-cycle decomposition technique but has its shortcomings (see Ravn/Uhlig (1997) and

Cogley/Nason (1995) for a comprehensive discussion). The Hodrick Prescott filter decomposes a time series y_t into a cyclical y_t^c and a growth component y_t^g. It solves the minimization problem for y_t^g:

$$\min_{\{y_t^g\}_{t=0}^{\infty}} \sum_{t=1}^{\infty} \left\{ \left(y_t - y_t^g\right)^2 + \lambda\left[\left(y_{t+1}^g - y_t^g\right) - \left(y_t^g - y_{t-1}^g\right)\right]^2 \right\},$$

where λ is the smoothing parameter. A high value of λ implies a smooth trend component and an erratic cyclical component, while the reverse is true for lower values of λ. After Burns' and Mitchell's influential work on pre-second world war U.S. business cycle regularities, the length of the business cycles were widely accepted to vary between 11/2 and 8 years. Consequently, filters were specified to cut off components at higher or lower frequencies in order to capture better the cyclical component.

Rand/Tarp (2001) observed that business cycles in developing countries, as opposed to cycles in industrialized countries, are significantly shorter in duration. This necessitates the adjustment of the smoothing parameter where extra care must be taken in choosing the optimal λ (Pedersen (1998)). A lower value is analogous to shorter cycles since a larger part of the low frequency movements are filtered away. Since the filter eliminates the secular trend component, the cyclical components of the observed time series should be tested for stationarity to ensure that any long term trend is eliminated. To do this, the augmented Dickey-fuller unit root test can be applied. After detrending the series, basic characteristics can be inferred;

Volatility assesses the amplitude of fluctuations and indicates the magnitude of the variable's contribution, and its sensitivity, to aggregate fluctuations. This is measured by the standard deviation, where a low standard deviation implies the variable does not contribute much to aggregate fluctuations.

Co-movements with contemporaneous output series indicate the cyclicality of key macroeconomic variables like private consumption, investment, government expenditures, and money supply. These are measured by the correlation coefficients where positive, negative or near-zero coefficients point to pro-, counter-, and acyclicality, respectively.

Finally, **persistence** indicates the inertia in business cycles, particularly the cyclical component, and captures the length of observed fluctuations. This is measured by the first-order autocorrelation coefficient where a high coefficient implies a very persistent, i.e., long, economic fluctuation. Positive coefficients indicate that high values follow high values or low values follow low ones, whereas negative coefficients indicate reversals from high to low values or the reverse.

II. Business cycles in Developing Countries: A Brief Description

VOLATILITY. Business cycles in industrialized countries are found to cover a period of approximately 8 years with high volatility in investments and low one in consumption. For developing countries, Rand/Tarp (2001) emphasize the comparatively shorter and on average more volatile cycles. In a country sample of Sub-Saharan African countries, Latin American countries, and Asian and North African countries for the period 1980-99 business cycles covered periods of 4 to 5 years only. Particularly outstanding erratic cycles are present in Sub-Saharan African countries. Interestingly, output fluctuations in the group of Asian and North African countries show the strongest resemblance with those of industrialized countries. A more pronounced, however over time decreasing, volatility seems to be present for Asian countries as compared to the G7 countries (Kim et al. (2003)). Additionally, in resemblance with the G7 countries, investment is the most volatile and private consumption the least volatile national expenditure component in Asia. With respect to the inflation rate and money supply, volatility is four times and two times larger, respectively, in Asian economies as compared to industrialized countries.

CO-MOVEMENTS. For industrial countries, King/Rebelo (1999) stress that most macroeconomic variables are procyclical with a particularly high degree of co-movement between aggregate output and total hours worked. Additionally, wages, government expenditures, and the capital stock seem to display no systematic cyclicality with aggregate output. A comparative study conducted by Kim et al. (2003) between the G7 countries and a number of APEC member countries reveals significant similarities in the cyclicality of key macroeconomic variables, with however surprising differences in the fiscal policy variable (Agénor et al. (2000)). Government expenditures are found to vary strongly procyclically, however over time decreasing, with output with the exception of the Philippines with the degree of procyclicality further increasing over time. In resemblance with the group of G7 countries, money stock (M2) of the studied Asian countries moves in a procyclical manner. Hence, fiscal and monetary policies were not directed at stabilizing the economy during difficult and costly times of recessions.

PERSISTENCE. Similar patterns emerge for Asian as well as industrialized countries with macroeconomic variables displaying non-negligible persistence (Kim et al. (2003)).

III. Empirical Test: Philippine Case

The literature on Philippine development depicts an economy popular for its boom-bust cycle. Theoretically, these should be complemented by counter-cyclical policies where a boom phase calls for contractionary policies to prevent the economy from overheating, while a bust phase needs expansionary policies to pump-prime the economy. A detailed description of the Philippine business cycle for the period 1981-2003 is presented. The data cover gross domestic product, private

consumption, government expenditures, investments, exports, imports, money supply (M1), the consumer price index (CPI), the inflation rate and the terms of trade. The HP filter process was done to decompose the output series with λ set equal to 6.25. Figure 1 depicts the business cycles for the Philippines between 1981 and 2003. Interestingly, the observed data comprise three business cycles of different lengths and depths: One cycle covers the period 1983 to 1989 characterized by a deep recession in 1985 followed by an impressive boom in 1989. The other two cycles, one from 1989 to 1997, and the other from 1997 to 2000, are comparatively smoother, hence less destabilizing in nature. Interestingly, the identified business cycles seem to become less erratic over time.
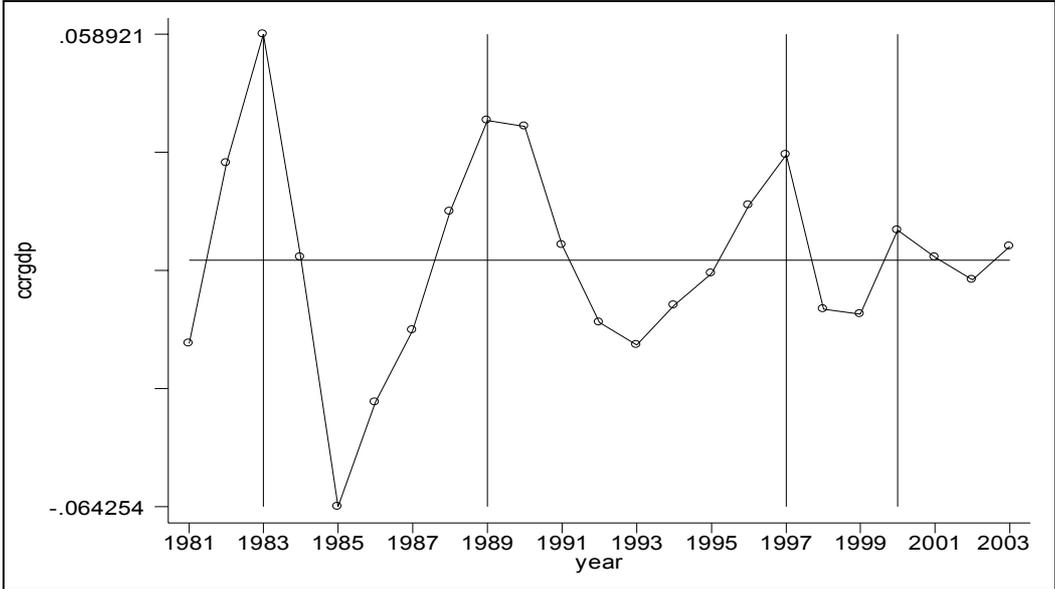
Figure 1: HP-cycle

Volatility. Table 1 reports standard deviations of HP-filtered national expenditure components, M1, the CPI, the inflation rate and the terms of trade. Among the national expenditure components, investment is the most volatile variable while private consumption is the least volatile. With the exception of private consumption, all components show higher volatility than GDP, with investments five times more volatile than GDP. Poor physical infrastructure and an inadequate level of human resource development might account for highly volatile investments[1]. Among the monetary and price variables, money supply M1 is three times and CPI is two times more volatile than GDP, while the inflation rate is 17 times more volatile than GDP. The high volatility of investments is typically associated with Keynes' famous assertion of "animal spirits" of investors. This also forms part of the widely accepted belief that investment bursts set off business cycles.

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[1] A point stressed by Josef Yap.

Table 1
Standard Deviation

Variable	No. of Obser-vations	Std. Dev.
Real GDP	23	.0265155
Private Consumption	23	.0107442
Government Expenditures	23	.0350056
Investments	23	.1205639
Exports	23	.0639919
Imports	23	.0775841
M1	23	.0851045
CPI	23	.0490538
Inflation	22	.4427948
Terms of Trade	22	.0508288

Co-movements. Table 2 reports cross-correlations of national expenditure components, M1, CPI, inflation rate and the terms of trade with output. With the exception of prices, inflation and the terms of trade, all variables have strong and positive correlation with GDP. This positive relationship implies that government expenditure as a fiscal policy tool, and M1 as a monetary policy tool, turn out to be clearly procyclical. This also means that for the sample period, no active countercyclical stabilization policy was conducted to swiftly overcome economic recessions. This policy stance directly contradicts theoretical prescription of counter cyclical policies during boom-bust period.

In contrast, a strong and negative correlation between CPI and GDP is observed. This supports predictions of supply-side led theories of economic fluctuations, like the real business cycle approach. In general, the economic literature uses price-output correlations to help discriminate between either real or supply-side, versus nominal or demand-side sources of cycles. Hence, if supply shocks like technological change or terms of trade shocks are identified as the basic source of fluctuation, a negative price-output correlation should be observed. Conversely, if demand shocks represent the source of the business cycle, as advocated by the traditional Keynesian theorists, a positive price-output correlation should be identified. An alternative view in the Keynesian demand driven models focuses on the *inflation rate rather than the price level* as the variable of interest.

The strong negative price-output correlation, and the weak positive inflation-output relation, point at supply shocks as the triggering factor for the Philippine business cycles between 1981 and 2003. Additional empirical support for supply-led shocks for Asia as a whole, and the Philippines in particular, is provided by Apergis (1996), Hoffmaister/Roldos (1997), Kim et al. (2003) and Rand/Tarp (2001). Moreover, Reside (2002) suggests the obvious supply-led cycles in the Philippines as predominantly emanating from changes in the weather with sometimes disastrous effects on

agricultural output and consequently overall GDP. However, despite the Philippines' alleged comparative advantage in the agricultural sector, a decomposition of the annual real GDP growth rate into its sectoral contributors point at a negligible role of the agricultural sector for the sample period. In fact, the service sector turns out to be dominant contributor to economic growth.

Additionally, the low and negative correlation between GDP and the terms of trade suggests that terms of trade shocks may not have been an important source behind the observed output fluctuations.

Table 2
Cross-Correlation Matrix

Variable	Real GDP
Private Consumption	0.8641
Government Expenditures	0.7879
Investments	0.9343
Exports	0.5734
Imports	0.8756
M1	0.6987
CPI	-0.7100
Inflation	0.0644
Terms of Trade	-0.3318

Table 3
First Order Autocorrelations

Variable	First-Order Autocorrelation
Real GDP	0.4056
Private Consumption	0.4625
Government Expenditures	0.2668
Investments	0.2720
Exports	-0.0183
Imports	0.4701
M1	-0.0990
CPI	0.1629
Inflation	0.0380
Terms of Trade	0.2605

Persistence. Table 3 shows the persistence of the variables as measured by the first order autocorrelation. The data reveal weak persistence, with GDP, private consumption and imports as the most persistent macroeconomic variables. Hence, the low serial correlations leave hardly any grounds for predicting the course of business cycles.

IV. Conclusion/Overall Findings

The Philippine economy underwent three business cycles from the period 1981-2003 broken down into the following--1983-1989, 1989-1997, and 1997-2000. The first cycle appears to be the strongest with output growing, and contracting significantly, within a span of four years. The span of the first two cycles is approximately 7 years while the latter covers only three periods. Thus, it is very likely that the third cycle is still on going. Below is a general description of the cycle's basic characteristics;

1. *Volatility*, as a preliminary indication of significance for macroeconomic fluctuations, point to investments as the most volatile while private consumption is the least. This is suggestive of investors' animal spirits affecting fluctuations.
2. The *co-movements* of GDP and all variables, with the exception of prices, inflation and the terms of trade, exhibit strong and positive correlation.
3. All key macroeconomic variables reveal fairly low *persistence*, with GDP, private consumption and imports as the most persistent ones.

The potential sources of economic fluctuations for the entire period lead to one culprit—supply-side shocks. This is implied from the strong and negative correlation of the price and output. Further, the weak and positive relationship of inflation and output supports the finding that fluctuations are more supply-side, than demand-side, in origin. Supply-side shocks can be identified to be technological change, terms of trade shocks, or changes in weather. However, test for terms of trade shocks reveal a weak and negative correlation between trade and output. This leads to the hypothesis that technological change or changes in weather (the El Niño effect) spurred economic fluctuations for the Philippine economy.[2]

Generally, the boom-bust cycle calls for a counter-cyclical policy approach. The Philippines contradicted this approach and applied a pro-cyclical stabilization policy. This claim is supported by the highly positive and strong correlation of government expenditures and money supply with output. This is tantamount to saying that the government failed in its role to stabilize the economy. Moreover,

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[2] On-going study.

it lacked an understanding of the nature of the fluctuation making it inefficient in designing a more appropriate stabilization policy.

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