THE UNIVERSITY OF
**WESTERN
AUSTRALIA**

ECONOMICS

MEDIUM-TERM MACROECONOMIC VOLATILITY AND ECONOMIC DEVELOPMENT: A NEW TECHNIQUE

by

**Sam Hak Kan Tang
Business School
University of Western Australia**

DISCUSSION PAPER 15.29

Medium-Term Macroeconomic Volatility and Economic Development: A New Technique

Sam Hak Kan Tang^a

Abstract:

A key question in development economics is why developing countries as a group experience so much growth volatility. This paper introduces a new technique to measure medium-term macroeconomic volatility that is defined by the trend-growth volatility of output. It shows that medium-term volatility, ∂_{MT}^2 , can be derived by subtracting the average short-term volatility, $(1/n) \sum_j^n \partial_{Sj}^2$, from the total variations of output growth, ∂_{LT}^2 . Applying the new measure to the World Bank's output data reveals an inverted-U shaped relationship between medium-term volatility and economic development, indicating that economic development is likely to increase trend-growth volatility for developing countries.

JEL classification: O47, O11, E32

Keywords: Medium-term macroeconomic volatility, Business-cycle volatility, Trend-growth breaks, Structural breaks, Economic fluctuations.

^a Business School, the University of Western Australia, 35 Stirling Highway, Crawley WA 6009, Australia. Tel: +618-6488-2931. Fax: +618-6488-1016. E-mail: sam.tang@uwa.edu.au

1. Introduction

Researchers in the area of macroeconomic volatility are increasingly concerned about the determinants of medium-term trend-growth volatility (Jerzmanowski and Cuberes, 2011). This concern is caused by the finding that the growth path of most developing countries is highly unstable in the medium term; that is, the main source of fluctuations for developing countries comes from shocks to trend growth as opposed to transitory fluctuations around the trend (Easterly et al., 1993; Pritchett, 2000; Aguiar and Gopinath, 2004; Hausmann et al., 2005; Jerzmanowski, 2006; Jones and Olken, 2008; Cuberes and Jerzmanowski, 2009). In this literature, regime changes, political institutions, international trade, and macroeconomic policies have been identified as potential factors that drive the fluctuations of the medium-term cycle for developing countries, but the effects of these potential factors are found to be complex and nonlinear (Jerzmanowski and Cuberes, 2011).

Some previous studies of medium-term business-cycle volatility use conventional filters (such as Band-Pass, Hodrick-Prescott and Kalman filters) to decompose output per capita into trend and transitory components. The medium-term cycle is then defined as a smooth nonlinear trend consisting of variation in the data at frequencies of 200 quarters and below (Comin and Gertler, 2003). Other studies use structural breaks techniques such as Bai and Perron (1998, 2003) to identify the timing of growth breaks. Medium-term macroeconomic volatility can then be measured by the frequency of trend-growth breaks in the data. A common issue of using structural breaks techniques is that empirical studies often encounter limited time-series data, but the testing procedure for structural breaks relies on asymptotic properties. Furthermore, researchers are often required to make arbitrary assumptions about the minimum length of time between structural breaks.

In this paper, I introduce a non-parametric approach to measure medium-term trend-growth volatility that is both intuitive and convenient for large cross-country empirical

studies. More importantly, it generates results which are consistent with the predictions of growth theories and findings of the recent empirical literature. The technique makes use of the fact that the variance of annual growth rates of output per capita calculated over a long horizon is the total variations of output growth that include short-term high-frequency volatility, economic crises and medium-term trend-growth volatility.¹ The basic idea is that if short-term high-frequency volatility can be subtracted from the total variations of output growth, then the amount of volatility left remaining can be attributed to shifts in trend growth. Using this technique, researchers can easily distinguish countries that experience large short-term volatility, but little shifts in trend growth from countries that experience little short-term volatility but large shifts in trend growth.

This paper finds that low-income countries have the most volatile output growth among all other income country groups, but their volatile growth is driven mainly by short-term fluctuations rather than medium-term trend-growth volatility. In contrast, middle-income countries have a substantially higher proportion of medium-term trend-growth volatility in their total variations of output growth. This result suggests that low-income countries have yet to experience structural transformation in their economy for development and are likely still trapped in the low-income equilibrium. Middle-income countries, on the other hand, have already experienced structural transformation in their economy for development and thus have a higher proportion of medium-term trend-growth volatility in their total variations of output growth. For high-income countries, the proportion of medium-term trend-growth volatility in total variations of output growth decreases, suggesting that high-income countries are converging to their steady-state growth path.

¹ Jones and Olken (2008) use the technique of Bai and Perron (2003) to detect structural breaks and find that the causes of up-breaks and down-breaks are asymmetric.

The remainder of this paper is organized into three sections. Section 2 derives algebraically the method for measuring medium-term trend-growth volatility. Section 3 applies the method to the output data taken from the World Bank's World Development Indicator and presents the empirical results. Section 4 concludes the paper.

2. Method

The variance of annual growth rates of output per capita, ∂_{LT}^2 , calculated over a long horizon is the total variations of output growth that include short-term high-frequency volatility, ∂_{ST}^2 , economic crises and medium-term trend-growth volatility, ∂_{MT}^2 . That is,

$$(1) \quad \partial_{LT}^2 = \partial_{ST}^2 + \partial_{MT}^2.$$

The variance of annual growth rates of output per capita, ∂_{LT}^2 , is given by:

$$(2) \quad \partial_{LT}^2 = \frac{1}{N} \sum_i^N (X_i - \bar{X}_{LT})^2 = \frac{1}{N} \sum_i^N X_i^2 - \bar{X}_{LT}^2$$

where X_i is the annual growth rate of output per capita for year $i = 1 \dots N$, and $\bar{X}_{LT}$ is the long-term mean growth rate of output per capita for the entire period of N years.

The length of short-term cycles can vary from country to country and from time to time, but typically the standard representation of short-term cycles is between 2 and 32 quarters (Comin and Gertler, 2003). If the duration of a typical short-term cycle is less than 32 quarters, then the variances of annual growth rates of output per capita calculated over non-overlapping windows of less than 32 quarters (8 years) reflect the variations of output growth due to short-term high-frequency fluctuations. Take, for example, a time horizon of 30 years between 1980 and 2009. It has ten non-overlapping 3-year windows from which ten short-term variances can be obtained. By averaging these short-term variances, one can measure average short-term volatility.² In general, ∂_{ST}^2 can be expressed as:

² In practice, using 3-, 5- or even 7-year non-overlapping windows in the calculation of short-term volatility does not make a large difference to the results and does not certainly alter the conclusions of the paper. Results

$$(3) \quad \partial_{ST}^2 = \frac{1}{n} \left[\frac{1}{b} \left(\sum_1^b (X_i - \bar{X}_{S1})^2 + \sum_{b+1}^{2b} (X_i - \bar{X}_{S2})^2 + \dots + \sum_{N-b+1}^N (X_i - \bar{X}_{Sn})^2 \right) \right]$$

where $\bar{X}_{S1}, \bar{X}_{S2}, \dots, \bar{X}_{Sn}$ are the average growth rates of output per capita for the short-term windows $1, 2, \dots, n$. Each short-term window has b number of years, which is fixed for the entire period of N years. By collecting and rearranging terms, Equation (3) becomes:

$$(4) \quad \partial_{ST}^2 = \frac{1}{n} \left[\frac{1}{b} \sum_i^N X_i^2 - \sum_j^n \bar{X}_{Sj}^2 \right]$$

where the subscript $i = 1, 2, \dots, N$ denotes the number of years, and $j = 1, 2, \dots, n$ denotes the number of short-term windows.

To find the medium-term trend-growth volatility, the short-term volatility of Equation (4) is subtracted from the total variations of output growth of Equation (2):

$$(5) \quad \partial_{MT}^2 = \partial_{LT}^2 - \partial_{ST}^2 = \left(\frac{1}{N} \sum_i^N X_i^2 - \bar{X}_{LT}^2 \right) - \left(\frac{1}{n} \left[\frac{1}{b} \sum_i^N X_i^2 - \sum_j^n \bar{X}_{Sj}^2 \right] \right),$$

which can be simplified to:

$$(6) \quad \partial_{MT}^2 = \left(\frac{1}{N} - \frac{1}{nb} \right) \left(\sum_i^N X_i^2 \right) + \left(\frac{1}{n} \sum_j^n \bar{X}_{Sj}^2 \right) - \bar{X}_{LT}^2.$$

Since $N = nb$, the first term on the right-hand side of Equation (6) becomes zero and the medium-term trend-growth volatility is:

$$(7) \quad \partial_{MT}^2 = \left(\frac{1}{n} \sum_j^n \bar{X}_{Sj}^2 \right) - \bar{X}_{LT}^2,$$

which can alternatively be expressed as:

$$(8) \quad \partial_{MT}^2 = \frac{1}{n} \sum_j^n (\bar{X}_{Sj} - \bar{X}_{LT})^2.$$

Clearly, Equation (8) states that the medium-term trend-growth volatility is the variance of short-term average growth rates of output per capita. It measures the extent to which short-term average growth rates differ from the long-term trend growth rate. If output growth volatility is caused by short-term high-frequency fluctuations alone without any changes in

in Table 2 show that the differences in volatility between 3- and 5-year windows and between 5- and 7-year windows are no more than 0.5%.

trend growth, average growth rates of output per capita for all the short-term windows, $\bar{X}_{Sj}$, would be the same as the long-term trend growth, $\bar{X}_{LT}$, and the medium-term trend-growth volatility, ∂_{MT}^2 , is zero. On the other hand, if a structural break occurs that changes the growth rate of at least one short-term window, then $\bar{X}_{Sj} \neq \bar{X}_{LT}$, and $\partial_{MT}^2 > 0$.

The following example illustrates the technique using two extreme patterns of growth volatility of output per capita. Suppose two hypothetical countries, A and B, both have the same magnitude of total variations of output growth measured by the variance of annual growth rates of output per capita at 0.25% squared for the entire 30-year period of analysis. Even though they have the same magnitude of total variations of output growth, their volatility patterns are very different as shown in Table 1. Country A has oscillations of growth rates in the short term between 1% and 2%, but no shift in trend growth. In contrast, country B has no oscillations of growth rates in the short term, but a shift of trend growth from 1% in year 1-15 to 2% in year 16-30. What is the medium-term macroeconomic volatility for these two countries? For country A, subtracting the average volatility of non-overlapping 2-year windows (0.25% squared) from the long-term volatility (0.25% squared) gives zero medium-term volatility. For Country B, a one-off shift in the trend growth rate results in an average short-term volatility of 0.017% squared, which leads to a medium-term trend-growth volatility of 0.233% squared ($0.25 - 0.017$).³ Hence, the proportion of medium-term trend-growth volatility in total variations of output growth is 0% for country A and 93% for country B.

Some developed OECD countries such as Germany and the United States resemble Country A in the hypothetical example above. These countries, as will be shown in the next

³ If the shift in trend takes place either towards the beginning or the end of the period rather than in the middle of the period, total variations of output growth for the entire period will be lower with no change in the average short-term volatility, giving a lower level of medium-term trend-growth volatility.

section, have the major source of their macroeconomic volatility coming from short-term business-cycle volatility with medium-term trend-growth volatility accounting for only around 10% of their total variations of output growth for the past 50 years. In contrast, developing countries such as Botswana, Myanmar and Tanzania resemble Country B in the hypothetical example above. These countries experience a far greater extent of medium-term trend-growth volatility which accounts for more than 50% of their total variations of output growth.

3. Results

This section reports and discusses the results obtained from applying the technique to output data from the World Bank's World Development Indicators. The data series is constant GDP per capita in local currency units (NY.GDP.PCAP.KN) between 1960 and 2008. There are 214 economies in the data series in total, but only those 190 economies with at least ten years of data are included in the calculation. I first calculate the annual growth rates of output per capita by taking logarithm of the GDP per capita and subtracting them between consecutive years. Then, I calculate the standard deviations of annual growth rates of GDP per capita for the entire period of 1960-2008, and also for every non-overlapping 3-year, 5-year, 7-year, and 10-year windows. The results of these calculations are presented in Table 2.⁴

In Table 2, the average standard deviations for the entire sample period and for different non-overlapping short-term windows are presented by the World Bank's income classification groups of low-income, lower-middle income, higher-middle income, high-income non-OECD, and high-income OECD. Two main results can be easily observed from Table 2. First, low-income countries experience the most volatile output growth for the past

⁴ For the ease of discussion of the empirical results, standard deviations are used rather than variances because standard deviations have the same unit of measurement as the data observations (%).

five decades, as indicated by their average standard deviation of output growth for the entire sample period (7.2%). In contrast, high-income OECD countries experience the most stable output growth with an average standard deviation of 3%. Middle-income countries and high-income non-OECD countries have average standard deviations of output growth between 5-6% for the entire sample period. It is worthy to note that this result of an inverse relationship between the level and volatility of output growth is consistent with the findings of a large number of cross-country studies accumulated since the seminal study of Ramey and Ramey in 1995.

The second main result from Table 2 is that growth volatility increases as the length of non-overlapping time windows increases. For low-income countries, average standard deviations of output growth increase from 4.6%, 4.8%, 5.2%, 5.6% to 7.2% respectively for non-overlapping 3-year, 5-year, 7-year, 10-year windows, and the entire sample period. As explained in Section 2, growth volatility increases as the length of non-overlapping time windows increases because in the longer run, growth volatility is likely to include not only short-term volatility, but also economic crisis and medium-term trend-growth volatility. The last column of Table 2 shows the level of medium-term trend-growth volatility calculated by subtracting the average standard deviation of non-overlapping 3-year time windows from the standard deviation of the entire sample period. For low-income countries, the level of medium-term trend-growth volatility is 2.6% compared to 1.7% for lower-middle-income countries, 2.4% for upper-middle-income countries, 2% for high-income non-OECD countries, and 1% for high-income OECD countries. Results in Table 2 thus show that low-income countries experience the most volatile output growth volatility both in terms of total variations of output growth and medium-term trend-growth volatility.

Although Table 2 shows the levels of short-term volatility and the medium-term trend-growth volatility, it does not tell us how important the two components of volatilities are in

total variations of output growth. I therefore calculate the proportion of medium-term trend-growth volatility in total variations of output growth for each individual country in the sample and summarize the results by the World Bank's income classification groups in Figure 1. Figure 1 shows that low-income countries have the lowest median proportion of medium-term trend-growth volatility in total variations of output growth at 23%. The median proportion of medium-term trend-growth volatility jumps substantially higher to 33% in lower-middle-income countries and to 34% in higher-middle-income countries. It then falls to 32% in high-income non-OECD countries and to 27% in high-income OECD countries. This result is important because it shows that medium-term trend-growth volatility is the least important source of total variations of output growth for low-income countries compared to all other income groups.

Figure 2 presents a scatter plot that reveals an inverted-U shaped relationship between the proportion of medium-term trend-growth volatility in total variations of output growth and individual countries' income level (in log). The scatter plot shows that on average the proportion of medium-term trend-growth volatility increases from low-income countries to middle-income countries and peaks at around 8.5 (logged) income level. Then, the proportion of medium-term trend-growth volatility decreases as income level increases further. This plot provides clear evidence that medium-term trend-growth volatility is more important for middle-income countries as a source of total variations of output growth than any other income country groups.

Table 3 reports the individual countries' medium-term volatility as calculated by subtracting the average standard deviation for the non-overlapping 3-year windows from the standard deviation for all available data from 1960 to 2008. The country with the highest medium-term volatility is Myanmar, followed by Lebanon and Azerbaijan. Myanmar also has the highest short-term volatility, which makes it the most volatile country in the world for the

period 1960-2008, followed by Liberia and Bosnia and Herzegovina. Serbia and Equatorial Guinea are the second and third most volatile countries in the short term. Also, it is worth noting that the median share of the calculated medium-term volatility in total volatility is 31% across 190 countries. Thus, medium-term volatility accounts for approximately one-third of the total volatility and the remaining two-thirds is short-term high-frequency volatility.

Does the medium-term trend-growth volatility calculated using the new technique comparable to other measures of medium-term volatility? To test the validity of this paper's measure of medium-term volatility, I compare it to the numbers of structural breaks estimated by Jones and Olken (2008) using the Bai and Perron (2003) methodology. Jones and Olken detect a total of 73 structural breaks in 48 of the 125 countries that have at least 20 years of Penn World Table data. Therefore, to be a good measure of medium-term trend-growth volatility, I expect the medium-term trend-growth volatility calculated using the new technique to be positively correlated with the number of structural breaks estimated by Jones and Olken. The result of a simple OLS regression is:

$$(1) \quad Breaks = 0.307 * Constant + 23.512 * Medium_Stdev,$$

$$(SE = 0.103) \qquad (SE = 7.694) \qquad (n = 114)$$

where *Breaks* is the number of structural breaks estimated by Jones and Olken, *Constant* is the intercept, and *Medium_Stdev* is the medium-term volatility calculated in this paper. The estimate of 23.512 for the medium-term volatility has a robust standard error of 7.694, which is positive and very statistically significant (t-statistic = 3.06 and p-value = 0.003). Another interesting question is whether the calculated total volatility is related to the medium-term trend-growth breaks estimated by Jones and Olken. If the calculated medium-term volatility is highly correlated with the estimated number of structural breaks, then the calculated total volatility should not be related to the estimated number of structural breaks because total

volatility contains short-term volatility. This is a falsification exercise, and the result of a simple OLS regression is:

$$(2) \quad \text{Breaks} = 0.650 * \text{Constant} - 1.485 * \text{All_Stdev},$$

$$(SE = 0.211) \quad (SE = 4.508) \quad (n = 114)$$

where *All_Stdev* denotes the calculated total volatility. The estimate of -1.485 for total volatility has a robust standard error of 4.508, which is not statistically significant (t-statistic = -0.33 and p-value = 0.743). Thus, as expected, the calculated total volatility and the estimated number of structural breaks are not related.

Another validity exercise is to compare the empirical results obtained from using the calculated medium-term volatility in cross-country studies to results already established by previous studies in the literature. For instance, Cuberes and Jerzmanowski (2009) study the relationship between democracy and medium-term trend-growth volatility, and find that trend-volatility is lower in more democratic countries. Here, I attempt to replicate their cross-country results. Running an OLS regression using the calculated medium-term volatility as a dependent variable rather than using their number of growth reversals gives:

$$(3) \quad \text{Medium_Stdev} = 0.010 * \text{Constant} - 0.782 * \text{Polity2} + 0.672 * \text{GDPPC60L}$$

$$(SE = 0.011) \quad (SE = 0.277) \quad (SE = 1.580)$$

$$(n = 110, r^2 = 0.12)$$

where *Polity2* is the measure of democracy adopted by Cuberes and Jerzmanowski from Polity IV, and *GDPPC60L* is initial income level in logarithm. The estimate for democracy is -0.782, which is negative and highly statistically significant (t-statistic = -2.83, p-value = 0.006), indicating that medium-term volatility is lower in more democratic countries.⁵ Thus,

⁵ In Table 6 of Cuberes and Jerzmanowski (2009), they also add the number of breaks and one other institutional variable in the regression. I find similar results when I add the number of breaks in the regression or excluding countries of OPEC from the sample.

the empirical result generated from using the calculated medium-term volatility corroborates the finding of a previous study well known in the literature. In sum, medium-term trend-growth volatility calculated using the new technique is highly correlated with the number of structural breaks estimated using a parametric approach and produces empirical results which are consistent with major findings of the existing literature.

4. Conclusion

The literatures on development economics and economic volatility have increasingly focused on medium-term trend-growth volatility in the past decade. The increasing awareness of the importance of medium-term trend-growth volatility is due to the finding that developing countries experience large trend volatility in the medium term. As Pritchett puts it: “A single time trend does not adequately characterize the evolution of GDP per capita in most developing countries. Instability in growth rates over time for a single country is great, relative to both the average level of growth and the variance across countries (Pritchett, 2000).” It is thus imperative to find the determinants of medium-term trend-growth volatility.

This paper proposes an intuitive way to measure medium-term trend-growth volatility; it shows that medium-term trend-growth volatility for a country can be measured by the difference of two variances: one is the variance of annual growth rates of output per capita calculated over a long horizon, and the other is calculated from averaging the variances of annual growth rates of output per capita of non-overlapping short-term windows over the same time horizon. Not only does this measure easy to understand and implement, but also highly correlated with the number of structural breaks estimated by using structural break econometric technique and produce empirical results which are consistent with findings of previous cross-country studies in the literature. However, the new technique neither detects the number nor the timing of structural breaks, but only gives a measure of medium-term

trend-growth volatility. Given its limitation, the technique can be a handy tool for researchers aiming to study the determinants of medium-term trend-growth volatility of developing countries.

The finding in this paper of an inverted-U shaped relationship between medium-term trend-growth volatility and country income level provides further empirical evidence that economic development is likely to increase trend-growth volatility for developing countries. The causes of this increase in trend-growth volatility for developing countries have yet to be fully understood. It is thus the objective of this paper to aid future research in the area by providing a convenient and accurate way of measuring medium-term trend-growth volatility.

Table 1: A Comparison of Two Hypothetical Countries' Volatility Patterns

	Annual Growth Rate of GDP Per Capita From Year 1 to Year 30 (%)																							
A	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
B	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
	Growth Volatility Measured by Variance (% squared)																							
	Long-term								Short-term								Medium-term							
A	0.25								0.25								0.00							
B	0.25								0.017								0.233							

Notes:

1. Total growth volatility is the variance of annual growth rates of output per capita for the entire 30 years.
2. Short-term volatility is the average variance of the non-overlapping 2-year windows.
3. Medium-term volatility is the residual after subtracting the short-term volatility from the long-term volatility.

Table 2: Mean Standard Deviation of Output Volatility for Different Panel Lengths and Income Groups (%)

1960-2008	Non-overlapping Panel Window					
	3-year	5-year	7-year	10-year	All years	Medium
Low income (33)	4.6	4.8	5.2	5.6	7.2	2.6
Lower-middle income (47)	3.6	3.8	4.3	4.3	5.3	1.7
Upper-middle income (46)	3.7	4.2	4.7	4.8	6.1	2.4
High income non-OECD (31)	3.7	3.9	4.2	4.6	5.7	2.0
High income OECD (31)	2.0	2.2	2.3	2.5	3.0	1.0
All countries	3.5	3.8	4.2	4.4	5.5	2.0

Notes:

1. Income groups are defined according to the World Bank classifications. Total number of countries in each income group is in the parenthesis. OPEC countries are excluded.
2. Each figure in the table represents the average of all the standard deviations of output growth for the non-overlapping panel windows of indicated length over 1960-2008.

Figure 1: Proportion of Medium-Term Trend-Growth Volatility by Income Country Group

Figure 2: Proportion of Medium-Term Trend-Growth Volatility by Country

Table 3: Total, Short, and Medium-Term Economic Volatility by Country (%)

Country	All	Short	Medium	Country	All	Short	Medium
Albania	9.6	5.0	4.6	Lebanon	15.7	4.6	11.0
Algeria	7.6	4.5	3.1	Lesotho	6.1	5.3	0.8
Angola	9.9	5.5	4.4	Liberia	18.3	9.0	9.2
Antigua and Barbuda	4.4	2.6	1.8	Liechtenstein	5.4	3.1	2.2
Argentina	5.8	5.1	0.8	Lithuania	9.7	5.5	4.2
Armenia	15.4	7.8	7.6	Luxembourg	3.2	2.8	0.4
Aruba	5.7	4.2	1.6	Macao SAR, China	6.6	4.1	2.5
Australia	2.9	2.0	0.9	Macedonia, FYR	4.5	2.1	2.4
Austria	1.7	1.4	0.3	Madagascar	4.3	2.9	1.4
Azerbaijan	16.3	6.6	9.7	Malawi	5.5	5.0	0.4
Bahamas, The	9.7	5.9	3.8	Malaysia	3.3	2.2	1.1
Bahrain	4.8	3.3	1.5	Maldives	4.9	3.2	1.6
Bangladesh	4.2	2.8	1.4	Mali	5.1	4.6	0.5
Barbados	4.5	2.8	1.6	Malta	3.9	2.0	1.9
Belarus	8.1	2.9	5.2	Marshall Islands	6.1	4.0	2.1
Belgium	1.8	1.2	0.6	Mauritania	5.7	5.3	0.4
Belize	3.9	1.9	2.0	Mauritius	3.5	2.5	1.0
Benin	3.0	2.3	0.7	Mexico	3.2	2.1	1.1
Bermuda	3.3	2.3	1.1	Micronesia, Fed. Sts.	3.1	2.8	0.3
Bhutan	3.0	2.0	1.1	Moldova	11.2	7.5	3.7
Bolivia	3.7	2.2	1.5	Mongolia	4.9	2.0	2.8
Bosnia & Herzegovina	16.7	7.7	9.0	Montenegro	5.5	3.7	1.8
Botswana	4.6	2.2	2.4	Morocco	4.3	4.3	0.1
Brazil	3.8	2.1	1.7	Mozambique	6.7	4.1	2.7
Brunei	6.7	4.6	2.1	Myanmar	48.8	14.4	34.4
Bulgaria	5.2	2.4	2.8	Namibia	3.3	2.3	0.9
Burkina Faso	3.0	2.9	0.1	Nepal	2.7	2.5	0.2
Burundi	5.7	5.0	0.8	Netherlands	1.9	1.5	0.4
Cambodia	2.6	1.6	1.0	New Caledonia	8.4	6.1	2.2
Cameroon	5.7	3.4	2.3	New Zealand	2.7	1.6	1.1
Canada	2.0	1.6	0.4	Nicaragua	6.8	3.6	3.2
Cape Verde	2.9	2.4	0.5	Niger	6.1	5.1	1.0
C.A.R.	3.9	3.4	0.5	Nigeria	7.1	4.2	2.8
Chad	8.4	6.8	1.6	Norway	1.6	1.1	0.4
Chile	4.7	3.1	1.5	Oman	12.2	7.3	4.9
China	7.5	4.0	3.5	Pakistan	2.3	1.8	0.5
Colombia	2.1	1.5	0.7	Palau	6.1	5.7	0.4
Comoros	3.1	2.9	0.3	Panama	4.3	2.4	1.9
Congo, Dem. Rep.	6.2	4.3	1.9	Papua New Guinea	4.6	3.3	1.3
Congo, Rep.	5.5	3.7	1.7	Paraguay	3.6	2.1	1.5
Costa Rica	3.3	2.8	0.5	Peru	5.2	3.3	1.9
Cote d'Ivoire	5.1	3.5	1.6	Philippines	3.1	1.7	1.4
Croatia	7.5	4.0	3.5	Poland	3.3	2.4	0.9
Cyprus	4.0	1.9	2.1	Portugal	3.6	2.2	1.4
Czech Republic	4.1	3.0	1.1	Puerto Rico	2.9	2.0	0.9

Denmark	2.1	1.7	0.4	Romania	5.7	3.3	2.4
Djibouti	3.6	1.8	1.8	Russian Federation	7.8	3.3	4.6
Dominica	5.8	4.3	1.5	Rwanda	11.8	7.5	4.4
Dominican Rep.	5.2	4.2	1.0	Samoa	3.4	2.8	0.7
Ecuador	3.3	2.7	0.7	Saudi Arabia	7.7	3.6	4.1
Egypt, Arab Rep.	2.8	1.5	1.3	Senegal	3.8	3.5	0.2
El Salvador	4.1	2.2	1.9	Serbia	14.1	10.4	3.7
Equatorial Guinea	15.5	9.5	6.0	Seychelles	5.9	5.2	0.8
Eritrea	8.3	5.8	2.5	Sierra Leone	6.6	5.0	1.6
Estonia	7.0	3.4	3.7	Singapore	4.1	3.3	0.9
Ethiopia	7.1	5.7	1.5	Slovak Republic	5.5	2.4	3.1
Fiji	4.7	4.5	0.2	Slovenia	3.9	1.2	2.7
Finland	2.8	1.7	1.1	Solomon Islands	6.8	3.9	2.9
France	1.7	1.0	0.7	Somalia	8.3	6.6	1.7
French Polynesia	4.9	4.2	0.7	South Africa	2.6	1.6	1.0
Gabon	9.8	6.5	3.3	Spain	2.6	1.3	1.3
Gambia, The	3.3	3.0	0.3	Sri Lanka	2.0	1.2	0.8
Georgia	12.9	5.8	7.1	St. Kitts and Nevis	4.0	1.8	2.2
Germany	1.5	1.3	0.2	St. Lucia	6.9	5.4	1.5
Ghana	4.3	2.1	2.2	St. Vincent & the Grenadines	6.2	4.9	1.3
Greece	3.6	2.2	1.4	Sudan	5.5	4.2	1.4
Greenland	4.7	3.3	1.4	Suriname	5.3	4.4	1.0
Grenada	4.7	4.2	0.5	Swaziland	3.9	3.4	0.5
Guatemala	2.4	1.2	1.2	Sweden	1.9	1.5	0.4
Guinea	1.4	1.1	0.4	Switzerland	2.1	1.6	0.5
Guinea-Bissau	8.2	6.7	1.6	Syrian Arab Republic	7.6	6.4	1.2
Guyana	5.2	4.2	1.0	Tajikistan	12.7	7.1	5.6
Haiti	4.9	3.4	1.5	Tanzania	2.4	0.9	1.5
Honduras	2.9	2.5	0.4	Thailand	3.5	2.0	1.5
Hong Kong, SAR	4.3	3.5	0.9	Togo	6.0	4.3	1.7
Hungary	3.3	1.7	1.7	Tonga	2.7	2.1	0.6
Iceland	3.6	2.9	0.8	Trinidad and Tobago	4.9	3.1	1.7
India	3.2	2.5	0.6	Tunisia	3.3	2.9	0.5
Indonesia	3.9	2.4	1.5	Turkey	3.7	3.1	0.6
Iran, Islamic Rep.	7.2	4.0	3.3	Turkmenistan	11.9	4.7	7.2
Ireland	2.8	2.3	0.5	Uganda	3.2	1.7	1.5
Isle of Man	3.8	3.0	0.8	Ukraine	9.9	3.6	6.3
Israel	3.4	2.5	0.8	United Arab Emirates	8.3	6.3	2.0
Italy	2.2	1.3	1.0	United Kingdom	1.7	1.3	0.4
Jamaica	4.6	3.0	1.5	United States	1.9	1.7	0.2
Japan	3.5	1.9	1.6	Uruguay	4.8	3.3	1.5
Jordan	6.6	4.2	2.4	Uzbekistan	5.3	2.6	2.7
Kazakhstan	8.0	2.9	5.1	Vanuatu	5.5	3.7	1.8
Kenya	4.5	3.9	0.7	Venezuela, RB	5.3	4.2	1.1
Kiribati	14.2	8.9	5.4	Vietnam	2.0	1.2	0.8
Korea, Rep.	4.0	3.2	0.8	Virgin Islands (U.S.)	5.1	4.4	0.7

Kuwait	9.6	7.8	1.8	West Bank and Gaza	9.0	9.1	-0.1
Kyrgyz Republic	8.7	5.2	3.6	Yemen, Rep.	2.3	2.1	0.2
Lao PDR	3.1	1.8	1.3	Zambia	4.7	3.6	1.0
Latvia	8.1	3.8	4.3	Zimbabwe	5.8	4.6	1.2

5. References

- Aguiar, Mark, and Gita Gopinath, "Emerging Market Business Cycles: The Cycle is the Trend," NBER Working Paper 10734 (2004).
- Bai, Jushan, and Pierre Perron, "Estimating and Testing Linear Models with Multiple Structural Changes," *Econometrica*, 66:1 (1998), 47-78.
- Bai, Jushan, and Pierre Perron, "Computation and Analysis of Multiple Structural Change Models," *Journal of Applied Econometrics*, 18 (January/February 2003), 1-22.
- Cuberes, David, and Michal Jerzmanowski, "Democracy, Diversification and Growth Reversals," *Economic Journal*, 119 (October 2009), 1270-1302.
- Easterly, W., M. Kremer, L. Pritchett, and L. Summers, "Good Policy or Good Luck: Country Growth Performance and Temporary Shocks," *Journal of Monetary Economics*, 32:3 (1993), 459-483.
- Hausmann, R., L. Pritchett, and D. Rodrik, "Growth Accelerations," *Journal of Economic Growth*, 10:4 (2005), 303-329.
- Jerzmanowski, M., "Empirics of Hills, Plateaus, Mountains and Plains: A Markow-Switching Approach to Growth," *Journal of Development Economics*, (December, 2006), 357-385.
- Jerzmanowski, M., and D. Cuberes, "Medium-Term Growth: The Roles of Policies and Institutions," (pp. 319-366) in Olivier de La Grandville, eds., *Economic Growth and Development, Frontiers of Economics and Globalization, Volume 11* (Emerald Group Publishing Limited)
- Jones, Benjamin F., and Benjamin A. Olken, "The Anatomy of Start-Stop Growth," *Review of Economics and Statistics*, 90:3 (August 2008), 582-587.
- Klomp, Jeroen, and Jakob de Hann, "Political Institutions and Economic Volatility," *European Journal of Political Economy*, 25 (2009), 311-326.

Malik, Adeel, and Jonathan R. W. Temple, "The Geography of Output Volatility," *Journal of Development Economics*, 90:2 (2009), 163-178.

Pritchett, Lant, "Understanding Patterns of Economic Growth: Searching for Hills among Plateaus, Mountains, and Plains," *World Bank Economic Review*, 14:2 (2000), 221-250.

Ramey, G., & Ramey, V. "Cross-country evidence on the links between volatility and growth," *American Economic Review*, 85, (1995), 1138–1151.

Editor, UWA Economics Discussion Papers:
 Sam Hak Kan Tang
 University of Western Australia
 35 Sterling Hwy
 Crawley WA 6009
 Australia

Email: ecoadmin@biz.uwa.edu.au

The Economics Discussion Papers are available at:

1980 – 2002: <http://ecompapers.biz.uwa.edu.au/paper/PDF%20of%20Discussion%20Papers/>

Since 2001: <http://ideas.repec.org/s/uwa/wpaper1.html>

Since 2004: <http://www.business.uwa.edu.au/school/disciplines/economics>

ECONOMICS DISCUSSION PAPERS 2013		
DP NUMBER	AUTHORS	TITLE
13.01	Chen, M., Clements, K.W. and Gao, G.	THREE FACTS ABOUT WORLD METAL PRICES
13.02	Collins, J. and Richards, O.	EVOLUTION, FERTILITY AND THE AGEING POPULATION
13.03	Clements, K., Genberg, H., Harberger, A., Lothian, J., Mundell, R., Sonnenschein, H. and Tolley, G.	LARRY SJAASTAD, 1934-2012
13.04	Robitaille, M.C. and Chatterjee, I.	MOTHERS-IN-LAW AND SON PREFERENCE IN INDIA
13.05	Clements, K.W. and Izan, I.H.Y.	REPORT ON THE 25 TH PHD CONFERENCE IN ECONOMICS AND BUSINESS
13.06	Walker, A. and Tyers, R.	QUANTIFYING AUSTRALIA'S "THREE SPEED" BOOM
13.07	Yu, F. and Wu, Y.	PATENT EXAMINATION AND DISGUISED PROTECTION
13.08	Yu, F. and Wu, Y.	PATENT CITATIONS AND KNOWLEDGE SPILLOVERS: AN ANALYSIS OF CHINESE PATENTS REGISTER IN THE US
13.09	Chatterjee, I. and Saha, B.	BARGAINING DELEGATION IN MONOPOLY
13.10	Cheong, T.S. and Wu, Y.	GLOBALIZATION AND REGIONAL INEQUALITY IN CHINA
13.11	Cheong, T.S. and Wu, Y.	INEQUALITY AND CRIME RATES IN CHINA
13.12	Robertson, P.E. and Ye, L.	ON THE EXISTENCE OF A MIDDLE INCOME TRAP
13.13	Robertson, P.E.	THE GLOBAL IMPACT OF CHINA'S GROWTH
13.14	Hanaki, N., Jacquemet, N., Luchini, S., and Zylbersztejn, A.	BOUNDED RATIONALITY AND STRATEGIC UNCERTAINTY IN A SIMPLE DOMINANCE SOLVABLE GAME
13.15	Okatch, Z., Siddique, A. and Rammohan, A.	DETERMINANTS OF INCOME INEQUALITY IN BOTSWANA
13.16	Clements, K.W. and Gao, G.	A MULTI-MARKET APPROACH TO MEASURING THE CYCLE

13.17	Chatterjee, I. and Ray, R.	THE ROLE OF INSTITUTIONS IN THE INCIDENCE OF CRIME AND CORRUPTION
13.18	Fu, D. and Wu, Y.	EXPORT SURVIVAL PATTERN AND DETERMINANTS OF CHINESE MANUFACTURING FIRMS
13.19	Shi, X., Wu, Y. and Zhao, D.	KNOWLEDGE INTENSIVE BUSINESS SERVICES AND THEIR IMPACT ON INNOVATION IN CHINA
13.20	Tyers, R., Zhang, Y. and Cheong, T.S.	CHINA'S SAVING AND GLOBAL ECONOMIC PERFORMANCE
13.21	Collins, J., Baer, B. and Weber, E.J.	POPULATION, TECHNOLOGICAL PROGRESS AND THE EVOLUTION OF INNOVATIVE POTENTIAL
13.22	Hartley, P.R.	THE FUTURE OF LONG-TERM LNG CONTRACTS
13.23	Tyers, R.	A SIMPLE MODEL TO STUDY GLOBAL MACROECONOMIC INTERDEPENDENCE
13.24	McLure, M.	REFLECTIONS ON THE QUANTITY THEORY: PIGOU IN 1917 AND PARETO IN 1920-21
13.25	Chen, A. and Groenewold, N.	REGIONAL EFFECTS OF AN EMISSIONS-REDUCTION POLICY IN CHINA: THE IMPORTANCE OF THE GOVERNMENT FINANCING METHOD
13.26	Siddique, M.A.B.	TRADE RELATIONS BETWEEN AUSTRALIA AND THAILAND: 1990 TO 2011
13.27	Li, B. and Zhang, J.	GOVERNMENT DEBT IN AN INTERGENERATIONAL MODEL OF ECONOMIC GROWTH, ENDOGENOUS FERTILITY, AND ELASTIC LABOR WITH AN APPLICATION TO JAPAN
13.28	Robitaille, M. and Chatterjee, I.	SEX-SELECTIVE ABORTIONS AND INFANT MORTALITY IN INDIA: THE ROLE OF PARENTS' STATED SON PREFERENCE
13.29	Ezzati, P.	ANALYSIS OF VOLATILITY SPILLOVER EFFECTS: TWO-STAGE PROCEDURE BASED ON A MODIFIED GARCH-M
13.30	Robertson, P. E.	DOES A FREE MARKET ECONOMY MAKE AUSTRALIA MORE OR LESS SECURE IN A GLOBALISED WORLD?
13.31	Das, S., Ghate, C. and Robertson, P. E.	REMOTENESS AND UNBALANCED GROWTH: UNDERSTANDING DIVERGENCE ACROSS INDIAN DISTRICTS
13.32	Robertson, P.E. and Sin, A.	MEASURING HARD POWER: CHINA'S ECONOMIC GROWTH AND MILITARY CAPACITY
13.33	Wu, Y.	TRENDS AND PROSPECTS FOR THE RENEWABLE ENERGY SECTOR IN THE EAS REGION
13.34	Yang, S., Zhao, D., Wu, Y. and Fan, J.	REGIONAL VARIATION IN CARBON EMISSION AND ITS DRIVING FORCES IN CHINA: AN INDEX DECOMPOSITION ANALYSIS

ECONOMICS DISCUSSION PAPERS

2014

DP NUMBER	AUTHORS	TITLE
14.01	Boediono, Vice President of the Republic of Indonesia	THE CHALLENGES OF POLICY MAKING IN A YOUNG DEMOCRACY: THE CASE OF INDONESIA (52ND SHANN MEMORIAL LECTURE, 2013)
14.02	Metaxas, P.E. and Weber, E.J.	AN AUSTRALIAN CONTRIBUTION TO INTERNATIONAL TRADE THEORY: THE DEPENDENT ECONOMY MODEL
14.03	Fan, J., Zhao, D., Wu, Y. and Wei, J.	CARBON PRICING AND ELECTRICITY MARKET REFORMS IN CHINA
14.04	McLure, M.	A.C. PIGOU'S MEMBERSHIP OF THE 'CHAMBERLAIN-BRADBURY' COMMITTEE. PART I: THE HISTORICAL CONTEXT
14.05	McLure, M.	A.C. PIGOU'S MEMBERSHIP OF THE 'CHAMBERLAIN-BRADBURY' COMMITTEE. PART II: 'TRANSITIONAL' AND 'ONGOING' ISSUES
14.06	King, J.E. and McLure, M.	HISTORY OF THE CONCEPT OF VALUE
14.07	Williams, A.	A GLOBAL INDEX OF INFORMATION AND POLITICAL TRANSPARENCY
14.08	Knight, K.	A.C. PIGOU'S <i>THE THEORY OF UNEMPLOYMENT</i> AND ITS CORRIGENDA: THE LETTERS OF MAURICE ALLEN, ARTHUR L. BOWLEY, RICHARD KAHN AND DENNIS ROBERTSON
14.09	Cheong, T.S. and Wu, Y.	THE IMPACTS OF STRUCTURAL TRANSFORMATION AND INDUSTRIAL UPGRADING ON REGIONAL INEQUALITY IN CHINA
14.10	Chowdhury, M.H., Dewan, M.N.A., Quaddus, M., Naude, M. and Siddique, A.	GENDER EQUALITY AND SUSTAINABLE DEVELOPMENT WITH A FOCUS ON THE COASTAL FISHING COMMUNITY OF BANGLADESH
14.11	Bon, J.	UWA DISCUSSION PAPERS IN ECONOMICS: THE FIRST 750
14.12	Finlay, K. and Magnusson, L.M.	BOOTSTRAP METHODS FOR INFERENCE WITH CLUSTER-SAMPLE IV MODELS
14.13	Chen, A. and Groenewold, N.	THE EFFECTS OF MACROECONOMIC SHOCKS ON THE DISTRIBUTION OF PROVINCIAL OUTPUT IN CHINA: ESTIMATES FROM A RESTRICTED VAR MODEL
14.14	Hartley, P.R. and Medlock III, K.B.	THE VALLEY OF DEATH FOR NEW ENERGY TECHNOLOGIES
14.15	Hartley, P.R., Medlock III, K.B., Temzelides, T. and Zhang, X.	LOCAL EMPLOYMENT IMPACT FROM COMPETING ENERGY SOURCES: SHALE GAS VERSUS WIND GENERATION IN TEXAS
14.16	Tyers, R. and Zhang, Y.	SHORT RUN EFFECTS OF THE ECONOMIC REFORM AGENDA
14.17	Clements, K.W., Si, J. and Simpson, T.	UNDERSTANDING NEW RESOURCE PROJECTS
14.18	Tyers, R.	SERVICE OLIGOPOLIES AND AUSTRALIA'S ECONOMY-WIDE PERFORMANCE
14.19	Tyers, R. and Zhang, Y.	REAL EXCHANGE RATE DETERMINATION AND THE CHINA PUZZLE

ECONOMICS DISCUSSION PAPERS**2014**

DP NUMBER	AUTHORS	TITLE
14.20	Ingram, S.R.	COMMODITY PRICE CHANGES ARE CONCENTRATED AT THE END OF THE CYCLE
14.21	Cheong, T.S. and Wu, Y.	CHINA'S INDUSTRIAL OUTPUT: A COUNTY-LEVEL STUDY USING A NEW FRAMEWORK OF DISTRIBUTION DYNAMICS ANALYSIS
14.22	Siddique, M.A.B., Wibowo, H. and Wu, Y.	FISCAL DECENTRALISATION AND INEQUALITY IN INDONESIA: 1999-2008
14.23	Tyers, R.	ASYMMETRY IN BOOM-BUST SHOCKS: AUSTRALIAN PERFORMANCE WITH OLIGOPOLY
14.24	Arora, V., Tyers, R. and Zhang, Y.	RECONSTRUCTING THE SAVINGS GLUT: THE GLOBAL IMPLICATIONS OF ASIAN EXCESS SAVING
14.25	Tyers, R.	INTERNATIONAL EFFECTS OF CHINA'S RISE AND TRANSITION: NEOCLASSICAL AND KEYNESIAN PERSPECTIVES
14.26	Milton, S. and Siddique, M.A.B.	TRADE CREATION AND DIVERSION UNDER THE THAILAND-AUSTRALIA FREE TRADE AGREEMENT (TAFTA)
14.27	Clements, K.W. and Li, L.	VALUING RESOURCE INVESTMENTS
14.28	Tyers, R.	PESSIMISM SHOCKS IN A MODEL OF GLOBAL MACROECONOMIC INTERDEPENDENCE
14.29	Iqbal, K. and Siddique, M.A.B.	THE IMPACT OF CLIMATE CHANGE ON AGRICULTURAL PRODUCTIVITY: EVIDENCE FROM PANEL DATA OF BANGLADESH
14.30	Ezzati, P.	MONETARY POLICY RESPONSES TO FOREIGN FINANCIAL MARKET SHOCKS: APPLICATION OF A MODIFIED OPEN-ECONOMY TAYLOR RULE
14.31	Tang, S.H.K. and Leung, C.K.Y.	THE DEEP HISTORICAL ROOTS OF MACROECONOMIC VOLATILITY
14.32	Arthmar, R. and McLure, M.	PIGOU, DEL VECCHIO AND SRAFFA: THE 1955 INTERNATIONAL 'ANTONIO FELTRINELLI' PRIZE FOR THE ECONOMIC AND SOCIAL SCIENCES
14.33	McLure, M.	A-HISTORIAL ECONOMIC DYNAMICS: A BOOK REVIEW
14.34	Clements, K.W. and Gao, G.	THE ROTTERDAM DEMAND MODEL HALF A CENTURY ON

ECONOMICS DISCUSSION PAPERS

2015

DP NUMBER	AUTHORS	TITLE
15.01	Robertson, P.E. and Robitaille, M.C.	THE GRAVITY OF RESOURCES AND THE TYRANNY OF DISTANCE
15.02	Tyers, R.	FINANCIAL INTEGRATION AND CHINA'S GLOBAL IMPACT
15.03	Clements, K.W. and Si, J.	MORE ON THE PRICE-RESPONSIVENESS OF FOOD CONSUMPTION
15.04	Tang, S.H.K.	PARENTS, MIGRANT DOMESTIC WORKERS, AND CHILDREN'S SPEAKING OF A SECOND LANGUAGE: EVIDENCE FROM HONG KONG
15.05	Tyers, R.	CHINA AND GLOBAL MACROECONOMIC INTERDEPENDENCE
15.06	Fan, J., Wu, Y., Guo, X., Zhao, D. and Marinova, D.	REGIONAL DISPARITY OF EMBEDDED CARBON FOOTPRINT AND ITS SOURCES IN CHINA: A CONSUMPTION PERSPECTIVE
15.07	Fan, J., Wang, S., Wu, Y., Li, J. and Zhao, D.	BUFFER EFFECT AND PRICE EFFECT OF A PERSONAL CARBON TRADING SCHEME
15.08	Neill, K.	WESTERN AUSTRALIA'S DOMESTIC GAS RESERVATION POLICY THE ELEMENTAL ECONOMICS
15.09	Collins, J., Baer, B. and Weber, E.J.	THE EVOLUTIONARY FOUNDATIONS OF ECONOMICS
15.10	Siddique, A., Selvanathan, E. A. and Selvanathan, S.	THE IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM HIGHLY INDEBTED POOR COUNTRIES
15.11	Wu, Y.	LOCAL GOVERNMENT DEBT AND ECONOMIC GROWTH IN CHINA
15.12	Tyers, R. and Bain, I.	THE GLOBAL ECONOMIC IMPLICATIONS OF FREER SKILLED MIGRATION
15.13	Chen, A. and Groenewold, N.	AN INCREASE IN THE RETIREMENT AGE IN CHINA: THE REGIONAL ECONOMIC EFFECTS
15.14	Knight, K.	PIGOU, A LOYAL MARSHALLIAN?
15.15	Kristoffersen, I.	THE AGE-HAPPINESS PUZZLE: THE ROLE OF ECONOMIC CIRCUMSTANCES AND FINANCIAL SATISFACTION
15.16	Azwar, P. and Tyers, R.	INDONESIAN MACRO POLICY THROUGH TWO CRISES
15.17	Asano, A. and Tyers, R.	THIRD ARROW REFORMS AND JAPAN'S ECONOMIC PERFORMANCE
15.18	Arthmar, R. and McLure, M.	ON BRITAIN'S RETURN TO THE GOLD STANDARD: WAS THERE A 'PIGOU-MCKENNA SCHOOL'?
15.19	Fan, J., Li, Y., Wu, Y., Wang, S., and Zhao, D.	ALLOWANCE TRADING AND ENERGY CONSUMPTION UNDER A PERSONAL CARBON TRADING SCHEME: A DYNAMIC PROGRAMMING APPROACH
15.20	Shehabi, M.	AN EXTRAORDINARY RECOVERY: KUWAIT FOLLOWING THE GULF WAR

ECONOMICS DISCUSSION PAPERS

2015

DP NUMBER	AUTHORS	TITLE
15.21	Siddique, A., Sen, R., and Srivastava, S.	AUSTRALIA-THAILAND TRADE: AN ANALYSIS OF COMPETITIVENESS AND THE EFFECTS OF THE BILATERAL FTA
15.22	Tyers, R.	SLOWER GROWTH AND VULNERABILITY TO RECESSION: UPDATING CHINA'S GLOBAL IMPACT
15.23	Arthmar, R. and McLure, M.	PIGOU ON WAR FINANCE AND STATE ACTION
15.24	Wu, Y.	CHINA'S CAPITAL STOCK SERIES BY REGION AND SECTOR
15.25	Clements, K. and Si, J.	ENGEL'S LAW, DIET DIVERSITY AND THE QUALITY OF FOOD CONSUMPTION
15.26	Chen, S.	SHIFTS OF DISTORTION AND CORRUPTION OVER LOCAL POLITICAL CYCLES IN CHINA
15.27	Chen, S.	THE EFFECT OF A FISCAL SQUEEZE ON TAX ENFORCEMENT: EVIDENCE FROM A NATURAL EXPERIMENT IN CHINA
15.28	Jetter, M.	BLOWING THINGS UP: THE EFFECT OF MEDIA ATTENTION ON TERRORISM
15.29	Tang, S.	MEDIUM-TERM MACROECONOMIC VOLATILITY AND ECONOMIC DEVELOPMENT: A NEW TECHNIQUE
15.30	Alim, A., Hartley, P. and Lan, Y.	ASIAN SPOT PRICES FOR LNG OTHER ENERGY COMMODITIES
15.31	Gannon, B., Harris, D., Harris, M., Magnusson, L., Hollingsworth, B., Inder, B., Maitra, P. and Munford, L.	ASIAN SPOT PRICES FOR LNG OTHER ENERGY COMMODITIES
15.32	Czaika, M. and Parsons, C.	THE GRAVITY OF HIGH SKILLED MIGRATION POLICIES
15.33	Parsons, C., Rojon, S., Samanani, F. and Wettach, L.	CONCEPTUALISING INTERNATIONAL HIGH-SKILLED MIGRATION
15.34	Chen, S.	VAT RATE DISPERSION AND TFP LOSS IN CHINA'S MANUFACTURING SECTOR
15.35	Siddique, A.	FOREIGN AID AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA