INVESTIGATING BUSINESS CYCLE SYNCHRONIZATION IN WEST AFRICA

SIMEON COLEMAN

March 2011
DISCUSSION PAPERS IN ECONOMICS

The economic research undertaken at Nottingham Trent University covers various fields of economics. But, a large part of it was grouped into two categories, *Applied Economics and Policy* and *Political Economy*.

This paper is part of the new series, *Discussion Papers in Economics*.

Earlier papers in all series can be found at:

[http://www.ntu.ac.uk/research/academic_schools/nbs/working_papers/index.html](http://www.ntu.ac.uk/research/academic_schools/nbs/working_papers/index.html)

Enquiries concerning this or any of our other Discussion Papers should be addressed to the Editors:

Dr. Simeon Coleman, Email: simeon.coleman@ntu.ac.uk
Dr. Marie Stack, Email: marie.stack@ntu.ac.uk
Dr. Dan Wheatley, Email: daniel.wheatley2@ntu.ac.uk

Division of Economics
Nottingham Trent University
Burton Street, Nottingham, NG1 4BU
UNITED KINGDOM.
Investigating Business Cycle Synchronization in West Africa

By Simeon Coleman

Economics Division, Nottingham Business School, Nottingham Trent University, Burton Street, Nottingham, NG1 4BU, UK. Email: simeon.coleman@ntu.ac.uk.

This paper contributes to the discussion on the long term sustainability of the embryonic second monetary union in Africa, the West African Monetary Zone (WAMZ). We analyse the level of economic and monetary integration in West Africa by analysing the degree of growth cycle synchronisation between five candidate countries over the past thirty years. Our empirical approach improves on the standard Pearson Correlation between trend and cyclical components of GDP by analyzing a measure of co-movement at higher frequencies between computed z-scores for all possible pairings of the candidate countries. Our results indicate a lack of a consistent pattern of synchronized growth cycles, which raises concerns about the economic sustainability of the WAMZ, as it implies that members may face significant stabilisation costs. Some policy implications are discussed.

**JEL classification:** E32, E61, F42

1. Introduction

Events of recent years, including the global financial crisis of 2007 onwards, have generated renewed interest in the study of business cycles within and between different countries. Of key importance to policymakers being the reaction of the domestic economy to disturbances in regions either in close geographic proximity or with economic links. To this end, the recent surge of research on the topic has led to a number of papers that seek to explain cross-country business cycle correlations. As a result, much effort has gone into trying to explain synchronisation, and also into trying to predict the impact that changes such as the formation of a currency union and greater trade integration has on business cycle synchronisation. The consensus appears to be that the desirability of a currency union depends, in part, on the
extent to which participating countries economies are synchronised.\textsuperscript{1} For instance, in Europe, the term ‘synchronicity’ is often associated with the co-movement in economic performance, which has been used to justify entry criteria to the EMU. Of course, the loss of some country-level control of instruments of economic policy such as exchange rate control has to be accommodated \textit{vis-à-vis} monetary union membership, more so when asymmetric shocks are likely. Without having exchange rate as a policy instrument, it is often argued that the more synchronised the business cycles of member countries, the lower the cost of adjustment, where necessary, for a stable and well-functioning monetary union. While there has been an increase in research associated with different aspects of synchronisation of economies (see examples Imbs 2000; Clark and van Wincoop 2001; Calderón \textit{et al.} 2007; Abbott \textit{et al.} 2008), not much work, if any, has been done on the topic for the presently embryonic West African Monetary Zone (hereafter WAMZ).

Intuitively, West African countries, typically dominant raw material exporters, are exposed to terms of trade shocks, albeit with different degrees of exposure, which in turn raises a number of interesting policy co-ordination issues. First, in a heterogeneous environment, of different inflation rates and output gaps, how would a potential West African central bank conduct monetary policy? Specifically, should the one-size-fits-all monetary policy be fully optimal or aim to achieve output gap stabilization? Second, how possible is it for policymakers achieve the goal of price stability without sacrificing growth in some member countries? Critical consideration of how synchronized the business cycles of member states are, is necessary to provide some answers to these questions. Furthermore,

\textsuperscript{1} Mitchell (1927) provides the seminal work in this area, finding that greater integration of financial markets and international trade across countries was a common feature of countries with positively correlated business cycles.
within the Optimal Currency Area (OCA) literature, Business Cycle Synchronization (BCS) is often cited as one of the pillars in the determination of the success of a monetary union.\(^2\)

This study differs from previous empirical work by specifically analysing business cycles within the context of the candidate members of the WAMZ and examining their co-movement i.e. symmetries and asymmetries in real economic activity, in country pairs at high frequency. Focussing on 1980 onwards, our main findings are (i) that across all the possible cross-country pairings, there is little or no evidence of consistent business cycle synchronisation. We posit that the observed low cross-correlations may be reflective of the structural asymmetries across the candidate countries including differences in their main export commodity, political and legal systems, economic institutions and languages, all of which are likely to support an optimal currency area argument; (ii) that there is little or no evidence of the level of business cycle synchronisation between the possible country pairings improving over time.

The rest of the paper is structured as follows. Section 2 presents the brief background of the proposed monetary union. Section 3 presents the data and reviews the methodology, while Section 4 presents and discusses the empirical results. Section 5 concludes with a summary of the evidence and some policy implications.

2. Background of WAMZ

The conception of the idea of a monetary union in the region dates back to 1987, when Heads of State of the Economic Community of West African States (ECOWAS) adopted the

---

\(^2\) Others are the degree of labour mobility, the system of fiscal transfers, and the extent of trade. The potential inter-relation between these four characteristics has been cited in several empirical and theoretical papers.
Monetary Co-operation Programme to accelerate the process of integration. Heads of State and government of The Gambia, Ghana, Guinea, Nigeria and Sierra Leone met in December 2000 and signed a treaty to create a second monetary union, the West African Monetary Zone (WAMZ). We note that West Africa already has a monetary union mainly comprising former French colonies, the Communauté Financière Africaine (CFA) zone comprising Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. In 1999, following insufficient progress in achieving a harmonized monetary system, a two-stage approach was mooted at the Lomé Summit. The first stage is the formation of a second monetary zone involving West African countries which are not members of the West African CFA zone. The ultimate objective of the treaty signed in 2000, was the establishment of a West African Central Bank, and a single currency, the *eco*. Among other actions, the second stage involves an integration of the WAMZ’s *eco* and the CFA franc of the already existing West African CFA franc zone countries.³ Although a full-blown monetary union was envisioned by 2003, to date, there have been several failed attempts since then following the failure of member states to achieve the various criteria, which include the attainment of single digit inflation, fiscal deficit/GDP ratio of less than 4%, central bank financing of deficit to be less than 10% and gross external reserves of about three months of import cover. As is evident in Table 1, the annual averages of the macroeconomic indicators suggest that the countries are at different stages in their business cycles.

³ An action plan (Banjul Action Plan) proposed the following: Economic convergence (structural and nominal); market integration (customs unions, financial system, and payment systems); institutional preparedness (legal and institutional framework, financial commitment, sensitization, statistical harmonization, and the *eco* currency).
In fact, as of the last quarter of 2008, where data is available, the average inflation rate was 10%; however, there is also significant cross-country variance. For example, Ghana and Nigeria, at 17.61% and 14.84% respectively, exceeded the average by wide margins, while the lowest rates occurred in Sierra Leone and The Gambia, at 9% and 6.62% respectively. Between 1980 and 2009, GDP growth in these countries averaged 3.42%; However, individually, in 2009 growth rates ranged between -0.28% (Guinea) and 5.63% (Nigeria).

3. Data and econometric methodology

3.1 Data

In this paper, we focus on economic fluctuations in business cycles over horizons relevant for short and medium term macro-economic policy. Given the dearth of monthly and quarterly macroeconomic data available for most African economies, we concentrate on the main macroeconomic variable of interest i.e., annual growth rate of the real GDP, which we obtain from the World Economic Outlook Database of the International Monetary Fund, and our data spans thirty years, 1980-2009.

Figure 1 plots real output growth rates at business cycle frequencies for each candidate economy over the sample period 1980–2015, along with the unweighted complete
sample average real output growth rate. A cursory look at the figure suggests significant variability in growth rates across countries.

Figure 1: Percentage change in annual GDP growth rate in candidate countries.

Notably, growth rates for Sierra Leone appear to have been the most volatile over the sample period, and the unweighted mean sample growth peaked in 2002 at 10.8%. The turbulent 1980s (the ‘lost decade’ of terms of trade shocks, debt crisis and subdued growth) with oil shocks and the poor economic performance is reflected in the varied growth rates, as depicted by the performance of all countries in Figure 1. There are indications that following years of economic restructuring and attempts at stable economic growth, GDP growth has improved. Interestingly, after 2002, there is some visual evidence suggesting that member states growth rates are converging. Given the timing of this observation vis-à-vis the preparation toward

---

4 In this graph, data for 2010-2015 are data projected by the IMFs World Economic Outlook, and have been included in graph purely for illustrative purposes, but have not been used in our computations.
formation of the WAMZ, it is instructive that we investigate whether this observation actually implies synchronization in their business cycles?

Table 2: Summary of relative growth rates

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of periods when growth rate is</th>
<th>Number of periods when growth rate is</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; zero</td>
<td>&gt; the unweighted sample average</td>
</tr>
<tr>
<td><em>The Gambia</em></td>
<td>26</td>
<td>21</td>
</tr>
<tr>
<td><em>Ghana</em></td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td><em>Guinea</em></td>
<td>29</td>
<td>16</td>
</tr>
<tr>
<td><em>Nigeria</em></td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td><em>Sierra Leone</em></td>
<td>20</td>
<td>12</td>
</tr>
</tbody>
</table>

As summarised in Table 2, while most of these countries experienced positive growth rates over the sample period, there is also evidence that the countries have experienced variegated growth. For example, Sierra Leone experienced growth above the sample average only 12 times over the thirty-year period whereas rates for Ghana, Nigeria and The Gambia were above at least seven periods more.

3.2 Methodology and related work

It has been argued that regions that have closer trade linkages tend to have more closely synchronised business cycles, therefore policies that enhance economic and trade integration between countries are likely to lead to more synchronised cycles and therefore make currency unions more advantageous (see examples Frankel and Rose 1998; Clark and van Wincoop 2001; Calderón *et al.* 2007; Abbott *et al.* 2008). Both Rose and Engel (2000) and Furceri and Kerras (2008) conclude that countries within a currency union engage in more inter-trading, and have more highly synchronised business cycles than countries not in currency unions. In contrast, Crosby 2003 finds that for the Asia-Pacific region, the role of trade is limited. Using a measure of similarity that depends on the shares of employment in each sector of the
For countries $i$ and $j$, the PC between the cyclical components of the GDP is constructed as:

$$
\rho_{ij} = \frac{\sum_{t=1}^{T}(\Delta y_{it}-\bar{\Delta y}_i)(\Delta y_{jt}-\bar{\Delta y}_j)}{\sqrt{\sum_{t=1}^{T}(\Delta y_{it}-\bar{\Delta y}_i)^2} \sqrt{\sum_{t=1}^{T}(\Delta y_{jt}-\bar{\Delta y}_j)^2}}
$$

(1)

In this paper, we follow Yetman (2011) who highlight the Pearson Correlation’s inability to adequately describe business cycle co-movement at higher frequencies and propose an improvement, based on a $z$-score, which addresses this limitation.

---

5 However, the authors also suggest that there is evidence of misspecification in their basic model.
The z-score of country $x$’s growth rate at time $t$, may be written as:

$$x_{it} = \frac{(\Delta y_{it} - \bar{\Delta y}_i)}{\sqrt{\frac{1}{T-t} \sum_{t=1}^{T} (\Delta y_{it} - \bar{\Delta y}_i)^2}}$$

The proposed measure, which for a pair of countries, is simply the product of the z-score computed for each country (say $i$ and $j$) may be written as:$^6$

$$\rho_{ij}^t = \frac{(\Delta y_{it} - \bar{\Delta y}_i)}{\sqrt{\frac{1}{T-t} \sum_{t=1}^{T} (\Delta y_{it} - \bar{\Delta y}_i)^2}} \cdot \frac{(\Delta y_{jt} - \bar{\Delta y}_j)}{\sqrt{\frac{1}{T-t} \sum_{t=1}^{T} (\Delta y_{jt} - \bar{\Delta y}_j)^2}}$$

At this point, we construct $\rho_{ij}^t$ for each pair and then analyze the behaviour of over time. Having five candidate countries in our sample, we compute ten individual $\rho_{ij}^t$, which we can illustrate graphically over time. Positive values of $\rho_{ij}^t$ imply that growth rates are in the same direction i.e. both either positive or both negative, whereas a negative value implies growth rates in opposite directions. Furthermore, the extent of the spike is indicative of the level of growth. Furthermore, in order to capture differences in the co-movements over time due to constant factors, such as institutional, cultural and political factors which may not be captured otherwise, we regress $\rho_{ij}^t$ on a time variable, including fixed effects for each country pair.

4. Empirical evidence

According to Table 3, which reports the computed Pearson Correlation for each country pair, the results are mixed. While Ghana and Nigeria tend to exhibit positive co-movement with all the other candidates, bar The Gambia, The Gambia appears to be synchronised the least with

---

$^6$ As Yetman (2011) points out that, up to one-degree of freedom correction, $\frac{1}{T} \sum_{t=1}^{T} \rho_{ij}^t = \frac{T-1}{T} \rho_{ij}$. 
the other countries. Interestingly, two countries that share a common geographical border, Guinea and Sierra Leone, show a negative Pearson Correlation, suggesting limited synchronisation of their growth rates.

Table 3: Cross country Pearson Correlation estimates, 1980-2009

<table>
<thead>
<tr>
<th></th>
<th>The Gambia</th>
<th>Ghana</th>
<th>Guinea</th>
<th>Nigeria</th>
<th>Sierra Leone</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Gambia</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td>-0.669</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guinea</td>
<td>0.002</td>
<td>0.157</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>-0.281</td>
<td>0.320</td>
<td>0.006</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>-0.062</td>
<td>0.072</td>
<td>-0.247</td>
<td>0.423</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Admittedly, these results are not highly informative and offer little help in identifying specific periods in time, which can be associated with specific policies or occurrences of interest. Such information is necessary for the policymaker interested in BCS, and one the method we subsequently employ addresses. We illustrate our results graphically for each of the pairwise measures, $\rho_{ij}$, in Figures 2a–2j.

We make the following observations. First, following some clearly negative spikes during the early 1980s, The Gambia’s measures of co-movement (Figures 2a–2d) suggest that there were many periods of insignificant co-movement with the other candidates. However, since 2000, there have also been some fairly significant negative co-movement, particularly in 2001. Second, Figures 2a, 2e–2g (i.e., country-pairs that include Ghana) show that although some co-movement is indeed captured during the early 1980s, possibly due to the aforementioned ‘lost decade’, co-movement is fairly muted. For Ghana, the exception is with Sierra Leone post-2001, a period over which both countries have seen fairly healthy levels of

---

7 Oshikoya (2009) reports that only The Gambia consistently satisfied all 4 of the primary convergence criteria over 2006-2008.
positive economic growth. Third, for country pairs including Nigeria, i.e. Figures 2c, 2f, 2h, and 2i show that, with the exception of 2001, there are not many periods of any significant co-movement, particularly in the post 1990 period. Fourth, for pairs including Guinea, a few notable periods of significant co-movement are worth highlighting: For the Nigeria-Guinea and Sierra Leone-Guinea pairings, Figures 2h and 2j suggest that relative to the other country pairings with Guinea, their co-movements have been similarly diverse, and significantly noticeable.
Overall, there is no clear indication that any of these country-pairings depict consistently positive co-movement (or synchronisation). Over the period under investigation, the Nigeria-Sierra Leone pairing appears to be the most synchronised, and noticeably, in 2002, both countries experienced very high and positive growth rates.

Table 3: Time trend regression results

<table>
<thead>
<tr>
<th></th>
<th>The Gambia</th>
<th>Ghana</th>
<th>Guinea</th>
<th>Nigeria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana</td>
<td>0.115**</td>
<td>-0.017</td>
<td>-0.015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.051)</td>
<td>(0.034)</td>
<td>(0.032)</td>
<td></td>
</tr>
<tr>
<td>Guinea</td>
<td>-0.017</td>
<td>-0.043</td>
<td>-0.009</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.030)</td>
<td>(0.028)</td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td>0.040</td>
<td>-0.043</td>
<td>-0.009</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.030)</td>
<td>(0.028)</td>
<td></td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>-0.003</td>
<td>0.005</td>
<td>-0.011</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.006)</td>
<td>(0.011)</td>
<td>(0.022)</td>
</tr>
</tbody>
</table>

Notes: ** represents rejection of the null of insignificance at the 5% level. Entries are the estimated coefficients on the time trend and the standard errors are provided in parenthesis.

Further, Table 3 reports the results obtained when we regress $\rho_{ij}$ for each of the 10 possible country pairings on a time trend, including a fixed effect. At the conventional significance levels, there is no evidence that, over the period considered, there has been a time effect on the BCS. The exception is in the case of the Ghana-Gambia pairing, where we find a significant positive time effect, over the period, at the 5% level of significance. However, a revisit of Figure 2a suggests that this may be due to the improvement on the extreme level of business cycle ‘unsynchronization’ observed at the start of the 1980s between these two countries.
5. Policy implications and concluding remarks

In this paper, we empirically investigate the extent of business cycle synchronization among the five candidate members of the embryonic WAMZ over 1980–2009. Our analysis is based on the approach employed by Yetman (2011) for a constructed z-score of each country’s growth rate at each point in time. We specifically concentrate on the co-movement between each pair of the candidate countries, but at each point in time.

First, according to our results, there is no consistent and clear indication of positive business cycle synchronization between any of the ten possible pairing of the candidate member states over the period. Second, our analyses, results reported in Table 3, also suggest that, over time, with the exception of the Ghana-Gambia pairing, there has not been a significant increase (or decrease, for that matter) in the level of BCS in any of the ten pairings.

Our empirical analyses of the data provide several interesting findings and some outstanding policy questions arise. First, if there is no improvement in the BCS across the candidate countries, how prepared and willing will these governments be to bear continuing, and possibly increasing, adjustment costs? Second, on the assumption that the size and monetary wealth of Nigeria will imply a central role within such a union, our inability to uncover any credible BCS in any of the possible country pairings with the other countries raises the question of the likelihood of self-interest, which may be problematic. Therefore, how committed will member states be to upholding the merits of the union if they continue to be net losers? To the extent that BCS is important for the operation of an Optimum Currency Area, critical consideration of these findings are crucial in shaping a more formidable, beneficial and sustainable monetary union.
References

DISCUSSION PAPERS IN ECONOMICS


2010/10 Vitor Leone And Bruce Philp, Surplus-Value And Aggregate Concentration In The UK Economy, 1987-2009.

2010/9 Robert Ackrill and Adrian Kay, WTO Regulations and Bioenergy Sustainability Certification – Synergies and Possible Conflicts.

2010/8 Paul Alagidede, Simeon Coleman and Juan Carlos Cuestas, Persistence Of Inflationary Shocks: Implications For West African Monetary Union Membership.

2010/6 Bruce Philp and Dan Wheatley, The time scarcity and the dual career household: competing perspectives

2010/5 Juan Carlos Cuestas, Sebastián Freille and Patricio O’Gorman, The media and public agendas: testing for media effects in Argentina Turing the Kirchner administration

2010/3 Vitor Leone, From property companies to real estate investment trusts: the impact of economic and property factors in the UK commercial property returns

2010/2 Juan Carlos Cuestas and Paulo José Regis, Purchasing power parity in OECD countries: nonlinear unit root tests revisited

2009/7 Juan Carlos Cuestas and Bruce Philp, Exploitation and the class struggle

2009/6 Barry Harrison and Winston Moore, Nonlinearities in Stock Returns for Some Recent Entrants to the EU

2009/5 Joao R. Faria, Le Wang and Zhongmin Wu, Debts on debts

2009/4 Juan Carlos Cuestas and Luis A. Gil-Alana, Unemployment hysteresis, structural changes, non-linearities and fractional integration in Central and Eastern Europe

2009/3 Juan Carlos Cuestas and Javier Ordóñez, Unemployment and common smooth transition trends in Central and Eastern European Countries

2009/2 Stephen Dobson and Carlyn Ramlogan, Is there a trade-off between income inequality and corruption? Evidence from Latin America

2009/1 Juan Carlos Cuestas and Luis Alberiko Gil-Alana, Further evidence on the PPP analysis of the Australian dollar: non-linearities, structural changes and fractional integration

2008/16 Estefanía Mourelle and Juan Carlos Cuestas, Inflation persistence and
2008/15 **asymmetries: Evidence for African countries**
Juan Carlos Cuestas and Barry Harrison, *Further evidence on the real interest rate parity hypothesis in Central and Eastern European Countries: unit roots and nonlinearities*

2008/14 **Further evidence on the real interest rate parity hypothesis in Central and Eastern European Countries: unit roots and nonlinearities**
Simeon Coleman, *Inflation persistence in the Franc Zone: evidence from disaggregated prices*
Juan Carlos Cuestas and Paulo Regis, *Nonlinearities and the order of integration of order prices*
Peter Dawson and Stephen Dobson, *The influence of social pressure and nationality on individual decisions: evidence from the behaviour of referees*

2008/13 **Juan Carlos Cuestas and Barry Harrison, Testing for stationarity of inflation in Central and Eastern European Countries**

2008/12 **Juan Carlos Cuestas and Dean Garratt, Is real GDP per capita a stationary process? Smooth transitions, nonlinear trends and unit root testing**

2008/11 **Antonio Rodriguez Andres and Carlyn Ramlogan-Dobson, Corruption, privatisation and the distribution of income in Latin America**

2008/10 **Stephen Dobson and Carlyn Ramlogan, Is there an openness Kuznets curve? Evidence from Latin America**

2008/9 **Stephen Dobson, John Goddard and Frank Stähler, Effort levels in contests: an empirical application of the Tullock model**

2008/8 **Juan Carlos Cuestas and Estefania Mourelle, Nonlinearities in real exchange rate determination: Do African exchange rates follow a random walk?**

2008/7 **Stephen Dobson and John Goddard, Strategic behaviour and risk taking in football**

2008/6 **Joao Ricardo Faria, Juan Carlos Cuestas and Estefania Mourelle, Entrepreneurship and unemployment: A nonlinear bidirectional causality?**

2008/5 **Dan Wheatley, Irene Hardill and Bruce Philp, "Managing" reductions in working hours: A study of work-time and leisure preferences in the UK industry**

2008/4 **Adrian Kay and Robert Ackrill, Institutional change in the international governance of agriculture: a revised account**

2008/3 **Juan Carlos Cuestas and Paulo José Regis, Testing for PPP in Australia: Evidence from unit root test against nonlinear trend stationarity alternatives**
2008/2 João Ricardo Faria, Juan Carlos Cuestas and Luis Gil-Alana, *Unemployment and entrepreneurship: A Cyclical Relation*

2008/1 Zhongmin Wu, Mark Baimbridge and Yu Zhu, *Multiple Job Holding in the United Kingdom: Evidence from the British Household Panel Survey*

**DISCUSSION PAPERS IN POLITICAL ECONOMY**

2006/3 Ioana Negru, *On Homogeneity and Pluralism within Economics Schools of Thought*

2006/2 David Harvie and Bruce Philp, *Learning and Assessment in a Reading Group Format or Reading Capital... For Marks*

2006/1 David Harvie, Bruce Philp and Gary Slater, *Regional Well-Being and ‘Social Productivity’ in Great Britain*

2004/2 Massimo De Angelis and David Harvie, *Globalisation? No Question: Foreign Direct Investment and Labour Commanded*

2004/1 David Harvie, *Value-Production and Struggle in the Classroom, or, Educators Within, Against and Beyond Capital*

**DISCUSSION PAPERS IN APPLIED ECONOMICS AND POLICY**

2007/2 Juan Carlos Cuestas, *Purchasing Power Parity in Central and Eastern European Countries: An Analysis of Unit Roots and Non-linearities*

2007/1 Juan Carlos Cuestas and Javier Ordóñez, *Testing for Price Convergence among Mercosur Countries*

2006/2 Rahmi Cetin and Robert Ackrill, *Foreign Investment and the Export of Foreign and Local Firms: An Analysis of Turkish Manufacturing*

2006/1 Robert Ackrill and Adrian Kay, *The EU Financial Perspective 2007-2013 and the Forces that Shaped the Final Agreement*

2004/5 Michael A. Smith, David Paton and Leighton Vaughan-Williams, *Costs, Biases and Betting markets: New evidence*

2004/4 Chris Forde and Gary Slater, *Agency Working in Britain: Character, Consequences and Regulation*

2004/3 Barry Harrison and David Paton, *Do ‘Fat Tails’ Matter in GARCH Estimation? Stock market efficiency in Romania and the Czech Republic*
2004/2 Dean Garratt and Rebecca Taylor, *Issue-based Teaching in Economics*
2004/1 Michael McCann, *Motives for Acquisitions in the UK*
2003/6 Chris Forde and Gary Slater, *The Nature and Experience of Agency Working in Britain*
2003/5 Eugen Mihaita, *Generating Hypothetical Rates of Return for the Romanian Fully Funded Pension Funds*
2003/4 Eugen Mihaita, *The Romanian Pension Reform*
2003/3 Joshy Easaw and Dean Garratt, *Impact of the UK General Election on Total Government Expenditure Cycles: Theory and Evidence*
2003/2 Dean Garratt, *Rates of Return to Owner-Occupation in the UK Housing Market*