

CAPE VERDE: THE CASE FOR EUROIZATION

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PRELIMINARY

Abstract

After 10 years of a fixed exchange rate against the Euro and a deepening integration with the European Union (EU), the authorities of Cape Verde maintain a strong commitment to nominal stability and are now considering the official euroization of the country.

Compared to the current pegging, euroization could be costly if the structural and/or cyclical conditions of Cape Verde were to require control over the interest rates and the exchange rate. Given the strong economic and financial integration between Cape Verde and Europe, and the fact that Cape Verde records inflation rates at levels that are similar to those of the Euro Area (EA), the relevant issue is whether the ECB monetary policy fits the needs of Cape Verde. In order to answer this question, we empirically assess the synchronization between the business cycle of Cape Verde and the business cycle of the EA. For that purpose, we compute output gaps and then use conventional correlation measures as well as other techniques recently suggested in the literature. Replicating the methodology for each of the 27 EU member-states, our results show that Cape Verde ranks better than several EU countries and even some EA countries.

We thus conclude that there is a strong case for the euroization of Cape Verde. Euroization would secure the benefits already attained with the pegging to the Euro and would warrant additional benefits, most likely with no costs stemming from inappropriate ECB monetary policies.

Keywords: Cape Verde, Euro Area, euroization, business cycles.

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1. Introduction

Following an exchange agreement (*Acordo de Cooperação Cambial*, ACC) established in March 1998 between Cape Verde and Portugal, the Cape-verdean escudo (CVE) has been anchored to the Portuguese escudo (PTE) as of April 1998. With the adoption of the Euro by Portugal, the ACC has been recognized by the European authorities and the CVE was anchored to the Euro.¹ Since 1 January 1999 the exchange rate has been pegged at 110.265 CVE per Euro.

Pegging the CVE to the Euro (previously to the PTE) was the natural choice. In fact, economic and financial relations between Cape Verde and Portugal, as well as Europe, were already profound back in 1998, as a result of historical ties, cultural proximity – including a common language – and even geographical proximity.

The adoption of a conventional peg for the CVE had two main purposes. On one hand, further stimulate trade, investment and the overall economic and financial relations with Europe. On the other hand, ensure an environment of nominal stability and the resulting macroeconomic discipline which, jointly with an emphasis on free markets and private initiative, would promote sustained growth. In fact, pegging to the Euro would imply the loss of monetary autonomy by Cape Verde in favour of the European Central Bank's (ECB) monetary policy. As the ECB is credibly committed to price stability, shadowing the policy of the anchor would warrant low inflation rates.² Later on, the commitment to price stability has been expressed in Law at the 2002 revision of the statutes of the central bank of Cape Verde (BCV), in which the ECB model of priority to price stability has been adopted.

The authorities of Cape Verde are presently considering deepening the link of the CVE to the Euro and official euroization of Cape Verde is one of the alternatives under

¹ The decision has been made by the European Council, following a recommendation of the European Central Bank. See European Council (1998) and ECB (1999).

² As is well-known, anchoring the national currency to that of a large country with a tradition of low inflation is one of the possible strategies for achieving price stability. See, for example, Giavazzi and Pagano (1988).

debate. This intention has been voiced, among others, by the prime-minister.³ It has also been raised the proposal of a full *de jure* liberalization of the international capital movements prior to euroization. Clearly, these steps would mean a strengthened renewal of the two objectives set forth in 1998.

The choice faced by Cape-verdean authorities is between a fixed or a super-fixed exchange rate regime (see LeBaron and McCulloch, 2000). If the latter is chosen, euroization is recommended if Cape Verde actually liberalizes the international capital movements. In fact, as noted by Obstfeld and Rogoff (1995) and shown by several episodes in the last two decades, conventional fixed exchange rate regimes and free international flows of capital is a combination prone to speculative attacks. Neither sound fundamentals nor foreign exchange credit lines seem to effectively prevent speculation. Even harder fixed exchange rate regimes, such as currency boards, are vulnerable to speculative attacks, as shown by the experiences of Hong Kong and Argentina (see Berg and Borensztein, 2000 and Irwin, 2004).

Truly, the elimination of speculative attacks and the other benefits of euroization come at some costs. One main cost is the irreversible loss of two policy instruments traditionally used for macroeconomic management, namely the exchange rate and the interest rate.

In theory, the exchange rate may be a useful instrument for management of external demand. For instance, in case of an external deficit, a depreciation of the exchange rate may spur exports and replace imports by domestic production. While it is true that euroization removes this possibility, it should be noted that given the structural characteristics of Cape Verde – a small economy highly dependent on imports of most final and intermediate goods, including energy – the adjustment of external demand *via* the exchange rate is an illusion. In fact, any depreciation with the purpose of increasing net exports would hardly have any impact. Increasing the price of imports (for instance, of food) does not improve Cape Verde's competitiveness in the production of such goods, which is structurally limited by a number of natural constraints – such as

³ See, *inter alia*, the speech given at the celebration of the 10th anniversary of the ACC between Cape Verde and Portugal, Neves (2008).

climate, aridity and relief – that the exchange rate can not modify. Therefore, exchange rate depreciation would not reduce the volume of imports but simply increase the cost of living. Analogously, exchange rate depreciation would not effectively promote exports, as the very high pass-through from import prices to domestic prices would rapidly increase wages as well as other input costs. This would increase the price of exports in CVE without changing significantly the prices in foreign currency. In short, loss of exchange rate management would not be a structural cost for Cape Verde.

In principle, another potential cost of euroization is the loss of monetary policy as an autonomous instrument for anti-cyclical policy, as the ECB policy prevails. To be sure, the absence of realignments of the CVE parity during the last ten years has required the monetary policy of the BCV not to diverge markedly from the ECB's.⁴ Hence, the cost of losing monetary autonomy does not seem to be, either, any novelty regarding the recent experience. This statement does not imply that the monetary policy of the BCV (and of the ECB) has been adequate to smooth the business cycle of Cape-Verde. This adequacy can, however, be checked by studying the synchronization between the business cycles of Cape-Verde and those of the Euro Area (EA).

Alesina and Barro (2002) have shown that the type of country that has more to gain from giving up its own currency is (i) a small open economy, trading heavily with the issuer of the currency to be adopted, (ii) with a history of high inflation, and (iii) with a business cycle highly correlated with the cycle of the currency issuer. This framework has motivated empirical studies of a number of authors, focusing on several countries, and with different purposes. For instance, Alesina, Barro and Tenreyro (2002) used those three criteria in order to identify, on the basis of historical data, three possible currency areas, namely an euro area, a dollar area and a yen area. In the same vein, Furceri and Karras (2006) checked the behaviour of inflation and the synchronization of cycles of the new European Union (EU) members, in order to find out which countries would benefit from joining the European Monetary Union (EMU). These studies assume that countries with higher inflation rates are the ones that gain the most from adopting a currency issued by a foreign independent central bank (such as the ECB),

⁴ The prevalence of some foreign exchange restrictions may have allowed for some independence of BCV's monetary policy.

provided their business cycles are strongly synchronized with that of the issuer. In fact, those countries would obtain the benefit of disinflation *a la* Barro and Gordon (1983), without incurring in the costs of a cyclically misaligned monetary policy.

In the next section, in which we present a brief overview of the economy of Cape Verde, we'll show that Cape Verde has already achieved low levels of inflation through its strategy of anchoring the CVE to the Euro. Thus, the argument that euroization would contribute to disinflation is not relevant in the case of Cape Verde. However, on top of other benefits, euroization would secure the gains achieved as regards price stability. Moreover, on a more practical level, one must bear in mind that if euroization is to be agreed with the EU, the fulfilment of the criterion of low inflation (as stated in the EU Treaty for EMU membership) will be required beforehand. Next section also documents the high degree of openness of the Cape-verdean economy, as well as its strong trade, investment and financial links to Europe.

Hence, this paper empirically focuses on the third criterion referred by Alesina and Barro (2002), *i.e.* the degree of synchronization of business cycles. An empirical assessment of the synchronization between the business cycle of Cape Verde and that of the EA during the last ten years allows for an *ex-post* inference of whether the ECB monetary policy – closely followed by the BCV – has been adequate for the short-term macroeconomic management of the economy of Cape Verde. A high degree of synchronization means that the monetary policy designed by the ECB for the whole EA has met the needs of Cape Verde as regards aggregate demand management. Looking forward, in case the degree of synchronicity is indeed large, one may conclude *ex-ante* that official replacement of the CVE by the Euro, and the corresponding loss of an independent interest rate, will not imply macroeconomic costs for Cape Verde.

Actually, an *ex-ante* high correlation of business cycles may not be a necessary condition for euroization. There is a vast literature, known under the heading of “endogeneity of optimum currency areas”, emphasizing that the adoption of a common

currency sets in motion a virtuous engine that increases the synchronization of cycles.⁵ Still, given the uncertainty about the mechanisms that may lead to endogenous synchronization of cycles, it is advisable to be prudent. And being prudent is, for our purpose, to detect a history of evident synchronization of business cycles ahead of euroization.

The rest of this paper is structured as follows. In section 2 we present a brief overview of the Cape-verdean economy. In section 3 we empirically assess the degree of synchronization between the business cycle of Cape Verde and the EA cycle. To further interpret the results for Cape Verde, we replicate the assessment for each of the 27 EU countries. Some final remarks and conclusions are presented in section 4.

2. A brief overview of the economy of Cape Verde: A tale of a well-succeeded peg to the Euro

In this section we briefly describe the economy of Cape Verde and review how the fixed exchange rate regime between the CVE and the Euro was managed for the last ten years.⁶ In spite of the scarcity of natural resources, the high protection of key-markets and a strong reliance upon tourism-based activities, Cape Verde has been deepening its economic and financial integration with Europe and has already come across some of the underlying costs of relinquishing the control over the national currency.

Cape Verde was a former Portuguese colony, having achieved independence in 1975. Fragmented in 10 islands at the West of Senegal, Cape Verde is a very small economy with approximately 530 thousand people (roughly 0.17 per cent of the EA's) and with a gross domestic product (GDP) that amounts to just 0.01 per cent of the Euro Area GDP.

⁵ The endogeneity of optimum currency area hypothesis was first suggested by Frankel and Rose (1997, 1998). Originally, the reasoning was that sharing a common currency would increase (intra-industry) trade integration and that trade integration, in turn, would increase synchronization of business cycles. The endogeneity of optimum currency area through the trade channel is the most discussed in the literature, very much due to the huge effect of common currencies on trade found by Rose (2000). However, as surveyed by De Grauwe and Mongelli (2005), other channels beyond trade may also trigger endogeneity.

⁶ Hereafter, and throughout this section, we make use of information and data released by public sources, namely the central bank of Cape Verde, the International Monetary Fund, the Statistical Offices of Cape Verde and Portugal and the Portuguese Ministry of Finance. Raw and treated data used in the text are available upon request.

According to the current IMF classification, Cape Verde is among the Sub-Saharan African countries of middle income, a group that also includes Botswana, Lesotho, Maurice Islands, Namibia, Seychelles, Southern Africa and Swaziland. This category is also recognized by the United Nations since the beginning of 2008. From the middle 1990s onwards, Cape Verde has exhibited strong GDP per capita (evaluated at purchasing power parity) growth rates.

Cape Verde is a highly opened economy. This is shown in Table 1, which displays the degree of openness, as measured by the sum of imports and exports of goods and services, divided by two times the GDP. For comparative purposes, the table also presents figures for all EU countries, both EA and non-EA. The first column considers the degree of openness relative to the EU countries (EU27), while the second column reports the total degree of openness. The third column shows the ratio of the trade with the EU27 to each country's total trade.⁷

⁷ The latest reported Eurostat data on the trade in services between the EU and Cape Verde respect to 2006.

Table 1. Degree of integration as measured by trade in goods and services, 2006

| Country | Ratio of openness (%) | | (1)/(2) (%) |
|-------------------------------|-----------------------|-----------|----------------|
| | EU27 (1) | World (2) | |
| Cape Verde | 33.4 | 45.0 | 74.3 |
| EA countries: | | | |
| Austria ⁽¹⁾ | 41.3 | 54.2 | 76.3 |
| Belgium ⁽¹⁾ | 77.4 | 85.7 | 90.3 |
| Cyprus ⁽⁴⁾ | 34.3 | 49.9 | 68.9 |
| Finland ⁽¹⁾ | 25.8 | 42.7 | 60.3 |
| France ⁽¹⁾ | 18.2 | 27.4 | 66.3 |
| Germany ⁽¹⁾ | 26.0 | 42.5 | 61.2 |
| Greece ⁽²⁾ | 14.5 | 28.0 | 51.7 |
| Ireland ⁽¹⁾ | 45.6 | 74.5 | 61.2 |
| Italy ⁽¹⁾ | 17.0 | 28.2 | 60.3 |
| Luxembourg ⁽¹⁾ | 116.8 | 159.7 | 73.1 |
| Malta ⁽⁴⁾ | 56.5 | 95.6 | 59.1 |
| Netherlands ⁽¹⁾ | 50.5 | 69.0 | 73.2 |
| Portugal ⁽¹⁾ | 27.3 | 35.1 | 77.6 |
| Slovakia ⁽⁵⁾ | 69.8 | 86.3 | 80.9 |
| Slovenia ⁽³⁾ | 51.3 | 66.9 | 76.7 |
| Spain ⁽¹⁾ | 19.7 | 29.6 | 66.7 |
| Non-EA countries: | | | |
| Denmark ⁽⁶⁾ | 32.1 | 50.5 | 63.5 |
| Estonia ⁽⁶⁾ | 63.0 | 86.7 | 72.6 |
| Latvia ⁽⁶⁾ | 39.3 | 55.6 | 70.6 |
| Lithuania ⁽⁶⁾ | 40.8 | 64.2 | 63.6 |
| Bulgaria ⁽⁷⁾ | 43.1 | 73.9 | 58.4 |
| Czech Republic ⁽⁸⁾ | 61.2 | 74.8 | 81.8 |
| Romania ⁽⁸⁾ | 26.6 | 38.3 | 69.5 |
| Hungary ⁽⁹⁾ | 58.3 | 77.4 | 75.3 |
| Poland ⁽⁹⁾ | 30.8 | 41.3 | 74.6 |
| Sweden ⁽⁹⁾ | 28.8 | 47.3 | 61.0 |
| United Kingdom ⁽⁹⁾ | 16.8 | 30.1 | 55.8 |

Sources: (a) European countries: AMECO database, available at http://ec.europa.eu/economy_finance/db_indicators/db_indicators8646_en.htm accessed January 2009; and Eurostat, available at http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1090.30070682.1090_33076576&_dad=portal&_schema=PORTAL, accessed January 2009;

(b) Cape Verde: International Financial Statistics and Direction of Trade Statistics (International Monetary Fund), BCV and Eurostat (2008) *European Union international trade in services. Analytical aspects, Data 2003-2006*, Eurostat Statistical Books.

Notes: (1): Euro Area (EA) founding countries (1999); (2): EA country since 2001; (3): EA country since 2007; (4) EA country since 2008; (5): EA country since 2009; (6) countries in the ERM II (Exchange Rate Mechanism launched simultaneously with the outset of the Euro Area), respectively since 1999, 2004, 2005 and 2005; Denmark is committed to the standard +/-2.25% bands; Estonia has had a unilateral commitment to a currency board based in the Euro since 1999, and Lithuania since February 2002; Latvia has a unilateral commitment to an exchange rate band of +/-1%; (7) Bulgaria has a Euro-based currency board; (8) The Czech Republic and Romania have managed floats based on the Euro; (9) Hungary, Poland, Sweden and the UK have independent floating regimes.

From Table 1, we conclude that Cape Verde is more open than many EU countries (45 per cent), that it trades more with the EU than many EU countries do (33.4 per cent),

and that, among the 28 countries in the table, Cape Verde has the 9th highest degree of concentration of trade with the EU (74.3 per cent). Portugal, Spain, the Netherlands and France are the most representative trading partners as they account for roughly 80 per cent of the Cape-verdean merchandise trade.

Cape Verde has had a systematic deficit in its merchandise trade balance, which amounted to nearly 40 per cent of the GDP on average in the last ten years. This deficit is due to a high dependence from abroad on energy, equipment and food.

This deficit has been partially financed by tourism services, which has boomed from 4.7 per cent of GDP in 1999 to around 20 per cent of GDP in recent years. Tourism currently accounts for almost 50 per cent of the exports of Cape Verde and is highly concentrated in the EU, particularly in the EA countries. In recent years, on average, 90 per cent of tourists are from European countries.⁸

The path of foreign direct investment has also been giving an increased contribution to external inflows to Cape Verde. In the last ten years, foreign direct investment has jumped from around 5 per cent of GDP to more than 11 per cent. Tourism has attracted the majority of these inflows, mainly on real estate and construction and broadly promoted by EA countries. On average, in recent years, investment from Portugal, Spain and Italy together represented more than half of total foreign direct investment inflows.

Another quite relevant source of external inflows is emigrants' remittances. In spite of its descending relative importance (resulting, among others, from the reduction in emigration flows and the decrease in altruism-motivated transfers), remittances still represent nearly 10 per cent of GDP. Roughly 80 per cent of the remittances come from EU countries.

In regard to the economic policy regime, since April 1998 the Cape-verdean economy has functioned under the umbrella of the ACC agreement. The ACC includes three

⁸ World Tourism Organization, available at <http://www.unwto.org/index.php>, accessed January 2009.

essential features: 1) a fixed exchange rate between the CVE and the Euro; 2) a lending facility endorsed by the Portuguese Treasury; 3) the commitment by the Cape-verdean government to adopt the macroeconomic reference criteria established in the EU Treaty.

The balance of the overall functioning of the ACC is positive throughout. The agreement has worked, *de facto*, as a fixed exchange rate arrangement with no realignments occurring since its inception. The successful exchange rate stability was progressively achieved through a more sound external balance while the interest rates kept on converging downward and the capital mobility restrictions were being gradually abolished.

After the institution of the ACC, Cape Verde has gradually abolished the restrictions on international capital mobility, in line with the requirements made by the IMF. Some restrictions, involving specific authorizations from the BCV are still in place. However, as the IMF (2008) notes, Cape Verde is *de facto* characterized by a situation close to perfect capital mobility.

With the gradual promotion of capital mobility, interest rate management revealed crucial to sustain the peg with the Euro. Yet, only recently, in 2006, the BCV reference interest rates became a central policy instrument. Prior to that, when risks of foreign reserve depletion were in place, upward movements were applied, instead, to the coefficient of bank reserves. Data from the BCV and the ECB shows that market deposit rates have converged towards Euro levels. However, significant differentials still apply to the lending rates.

The behaviour of the stock of official foreign reserves is outstanding. By the time of the ACC inception, foreign reserves were no high than 2 per cent of GDP (6.6 per cent of the monetary base) while, in mid 2008, they represented 35 per cent of the Cape-verdean GDP (114 per cent of the monetary base).

This undoubtedly successful evolution was not straight cut. In 1999 and 2000, and in spite of the commitment to disciplined fiscal policy, government deficits represented,

respectively, 12.5 per cent and 19.5 per cent of the GDP. Loose fiscal policy, stemmed, among others, from political cycle pressures, transfer compensation for bad crop years and from financial transfers to public firms, especially those providing basic services. Such high pressure on domestic demand, with strong negative impacts on the balance of payments, led Cape-verdean authorities to use the ACC lending facility for several times during this period.

After 2001, and with the exception of the first half of 2003, the effort of fiscal consolidation became clear: current expenditure was permanently reduced, tax reforms were implemented and tax effectiveness enhanced. Aware of the pervasive effects of fiscal disruption, Cape-verdean authorities have anchored the government deficit below 3 per cent of the GDP.

The ACC lending facility has not been used since 2004. This very much reflects fiscal discipline, together with the above mentioned large foreign reserve inflows mainly resulting from tourism receipts and foreign direct investment.

In balance, the current exchange rate regime appears to be rather credible. Having remained fixed for the last ten years, the exchange rate exhibits alignment with the fundamentals and is, now, truly embedded in the behavior of the economic agents. Evidence on this comes also from the functioning of the parallel foreign exchange market, where the amounts involved are small and the rates very close to the official rate. Additionally, despite the convergence of the interest rates with the Euro Area, the stock of deposits from non-residents keeps increasing. Furthermore, the Euro and the CVE are already interchangeably used in most of Cape Verde, especially in the islands with more visitors.

The exchange rate stability has also delivered the intended price stability. Although Cape Verde was already displaying relatively low inflation rates in the past, the ACC has undoubtedly driven Cape Verde's inflation rates closer to those of the EA. This is shown in Table 2, where averages and standard deviations of the inflation rates are

reported for the period 1999-2008. For comparison, the table also reports figures for the aggregate EA and for each EU country.

Table 2. Average and standard deviation of inflation rates, 1999-2008

| Country | Inflation rate (%) | | Inflation differential vs EA ⁽¹⁾ (pp) | |
|-------------------|--------------------|--------------------|--|--------------------|
| | Average | Standard deviation | Average (abs value) | Standard deviation |
| Cape Verde | 2.03 | 2.69 | 0.17 | 2.76 |
| EA ⁽¹⁾ | 2.20 | 0.56 | - | - |
| EA countries: | | | | |
| Austria | 1.91 | 0.74 | 0.29 | 0.29 |
| Belgium | 2.26 | 1.00 | 0.06 | 0.59 |
| Cyprus | 2.76 | 1.25 | 0.56 | 1.03 |
| Finland | 1.82 | 1.17 | 0.38 | 0.93 |
| France | 1.93 | 0.68 | 0.27 | 0.26 |
| Germany | 1.71 | 0.65 | 0.49 | 0.34 |
| Greece | 3.33 | 0.62 | 1.13 | 0.28 |
| Ireland | 3.38 | 1.07 | 1.18 | 1.10 |
| Italy | 2.43 | 0.53 | 0.23 | 0.28 |
| Luxembourg | 2.88 | 0.98 | 0.68 | 0.66 |
| Malta | 2.53 | 0.92 | 0.33 | 0.74 |
| Netherlands | 2.42 | 1.19 | 0.22 | 1.21 |
| Portugal | 2.94 | 0.71 | 0.74 | 0.74 |
| Slovakia | 6.21 | 3.46 | 4.01 | 3.74 |
| Slovenia | 5.53 | 2.37 | 3.33 | 2.39 |
| Spain | 3.23 | 0.54 | 1.03 | 0.31 |
| Non-EA countries: | | | | |
| Denmark | 2.14 | 0.77 | 0.06 | 0.63 |
| Estonia | 4.65 | 2.54 | 2.45 | 2.15 |
| Latvia | 5.77 | 4.42 | 3.57 | 4.05 |
| Lithuania | 2.87 | 3.69 | 0.67 | 3.33 |
| Bulgaria | 6.79 | 3.06 | 4.59 | 2.65 |
| Czech Republic | 2.74 | 1.88 | 0.54 | 1.57 |
| Romania | 20.41 | 15.99 | 18.21 | 16.28 |
| Hungary | 6.75 | 2.41 | 4.55 | 2.64 |
| Poland | 3.92 | 2.92 | 1.72 | 3.08 |
| Sweden | 1.68 | 0.80 | 0.52 | 0.53 |
| United Kingdom | 1.77 | 0.84 | 0.43 | 0.63 |

Sources: (a) European countries: harmonized consumer price index, AMECO database, available at http://ec.europa.eu/economy_finance/db_indicators/db_indicators8646_en.htm accessed January 2009;

(b) Cape Verde: consumer price index, IFS-IMF - international financial statistics data-base of the International Monetary Fund; available online at <http://www.imfstatistics.org/imf/>; accessed January 2009.

Notes: (1) EA comprises the 11 founding countries plus Greece.

From Table 2, we conclude that the average inflation rate in Cape Verde is very close to the one observed in the EA. Smaller deviations relative to the EA average occur only in

Belgium (an EA country) and in Denmark (a non-EA country).⁹ Such nominal convergence prevented competitiveness depletion of the Cape-verdean economy. However, Cape-verdean inflation rates display substantial volatility. Higher standard deviations are only recorded in some non-EA countries, mainly eastern European countries, as well as to the most recent EA member, Slovakia. The inflation rate volatility in Cape Verde tends to be strongly associated with striking climate variations and their effects on crops and the supply of primary goods.

The analysis provided throughout this section made clear that Cape Verde is indeed highly integrated with Europe and with the EA, in particular. Moreover, nominal convergence with the EA provides indirect evidence that monetary policy has been conducted alongside that of the ECB's. So, what is still left to prove is how suitable the ECB policy is for the Cape-verdean economy. In this context, the next section provides evidence on the synchronization of cycles between Cape Verde and the EA.

3. Business cycles' synchronization and similarity

In this section we study the correlation, synchronicity and co-movement of the national business cycles of Cape Verde and of each of the current 27 EU countries with regard to the EA business cycle. The goal is to establish rankings of proximity between the business cycles of each of the countries under analysis and that of the EA. On that basis we assess the relative performance of Cape Verde during its conventional peg to the Euro and thus infer the appropriateness of the ECB monetary policy for the Cape-verdean economy.

Data are annual time series of real GDP, in national currency. With some few exceptions, detailed in Table A.1 in the Annex, the data source is AMECO and covers the period from 1980 to 2008. An explanation regarding data frequency is in order. Instead of the higher frequency data (quarterly) that would be more adequate for studying exchange rate and monetary policies, we have chosen to use annual time series. Our choice follows from the unavailability or unreliability of quarterly real GDP

⁹ Sharing a common currency does not imply sharing a common inflation rate. Inflation rate differentials observed within the EA are analyzed, among others, by Honohan and Lane (2003) and ECB (2005).

data for some countries in most of the sample period. This is a cost that researchers aiming at the study of economies such as that of Cape Verde and those of most EU central and eastern countries must face for the time being.

We measure the business cycle filtering the log of each real GDP time series with the Hodrick-Prescott (HP) filter (Hodrick and Prescott, 1997). The smoothing parameter λ is set at 6.25, the value that mimics with annual data the results obtained with the HP filter on quarterly data (Ravn and Uhlig, 2002). Figure A.1 in the Annex shows the resulting output gaps for each country during the period 1999-2008, *i.e.*, the period for which a single monetary policy has been carried out by the ECB for the EA countries. Given our purposes, all the 28 charts in the figure include the EA output gap. Three notes are in order, regarding the identification of the business cycle:

(i) Our approach corresponds to a concept of the business cycle known as a *deviation cycle*, which computes the business cycle at each period as the deviation of the log of real GDP from its trend. This approach differs from two alternatives also popular in recent research (see Artis, Marcellino and Proietti, 2004). They are the *classical cycle*, which studies the turning points (peaks and troughs) of the log of real GDP, and the *growth cycle*, which considers the difference between the growth rate of real GDP and its trend growth rate. The main advantage of the *deviation cycle* approach is that in addition to qualitative information on the cyclical state of the economy (peak, recession, trough, expansion) it quantifies the cyclical component of GDP at each period.

(ii) We use a very simple non-parametric filter, rather than a filter or alternative approach requiring estimation (say, the unobservable components model or the production function approach). On one hand, this is due to the scarcity of data for some countries, and on the other hand it is useful for comparability of results, in view of the popularity of the HP filter.

(iii) As the HP filter is a high-pass filter that extracts cycles of duration not larger than 8 years, it includes fluctuations at high frequencies, which could be filtered out with an appropriate band-pass filter (*e.g.* the approximate band-pass filter of Baxter and King, 1999). However, high frequency oscillations are less of a problem in annual data and, moreover, band-pass filters typically involve losing data-points or using more complex approximations at larger sections of the beginning and end of sample.

The output gaps for the individual countries and for the EA are now used to compute a set of co-movement indicators between each business cycle and that of the EA.

As a first simple gauge of the co-movements, we use the linear correlation coefficient between the output gap of each country (g_i) and the gap of the EA (g_{EA}):

$$\rho(g_i, g_{EA}) = \frac{Cov(g_i, g_{EA})}{\sigma(g_i)\sigma(g_{EA})} = \frac{\sum_t (g_{i(t)} - \bar{g}_i)(g_{EA(t)} - \bar{g}_{EA})}{\sqrt{\sum_t (g_{i(t)} - \bar{g}_i)^2 (g_{EA(t)} - \bar{g}_{EA})^2}}$$

where \bar{g}_i and \bar{g}_{EA} are the corresponding average output gaps for the sample period. In spite of its extreme simplicity, correlation coefficients have been extensively used in recent studies of business cycle synchronization, irrespectively of the approach used to measure the cycle – see De Haan, Inklaar and Jong-A-Pin (2008) for a survey.¹⁰

Table 3 presents the contemporaneous linear correlation coefficient between each EU country's output gap and the EA gap for the whole Euro period (1999-2008). The output gap of Cape Verde has a correlation of 72.2 percent with the output gap of the Euro Area. This score puts the country roughly at the middle of the correlations ranking for all the 28 countries. Within the EA, there are three countries with lower correlations than Cape Verde – Slovakia, Greece and Ireland – and another – Slovenia – with the same correlation. Moreover, out of the 11 European non-EA countries only two display higher output gap correlations. Those are Denmark (which, like Cape Verde, has had a fixed exchange rate against the Euro since 1999) and Poland.

The good position of Cape Verde in the correlations-based ranking of Table 3 is noteworthy, given that the standard deviation of Cape Verde's output gap is one of the largest in the sample (which is apparent in figure A.1). Within the EA, only Ireland and Luxembourg have a comparable degree of volatility, while among non-EA members only the output gaps of Estonia and Latvia have higher standard deviations (Romania's

¹⁰ Typically, researchers compare correlations for different sample periods or look at the evolution of rolling correlations, and often look at non-contemporaneous correlations seeking for lags that maximize correlations. Given our purposes, we merely compute the correlations for the Euro period (1999-2008). We choose not to look beyond contemporaneous correlations, as non-contemporaneous correlations would only be relevant if the data had higher frequency (say, quarterly).

gap standard deviation is similar to Cape Verde's). This suggests that the good ranking of Cape Verde derives from a high level of synchronicity and business cycle duration, rather than from a high level of similarity in the amplitude and/or the shape of the business cycle phases.

Table 3. Correlation coefficients with the Euro Area business cycle, 1999-2008

| Country | Correlation coefficient | Ranking |
|-------------------|-------------------------|---------|
| Cape Verde | 0.722 | 15 |
| EA countries: | | |
| Austria | 0.860 | 11 |
| Belgium | 0.894 | 8 |
| Cyprus | 0.923 | 4 |
| Finland | 0.947 | 2 |
| France | 0.949 | 1 |
| Germany | 0.941 | 3 |
| Greece | 0.027 | 25 |
| Ireland | 0.657 | 18 |
| Italy | 0.891 | 9 |
| Luxembourg | 0.908 | 7 |
| Malta | 0.744 | 14 |
| Netherlands | 0.921 | 5 |
| Portugal | 0.921 | 5 |
| Slovakia | -0.060 | 26 |
| Slovenia | 0.722 | 15 |
| Spain | 0.878 | 10 |
| Non-EA countries: | | |
| Denmark | 0.856 | 12 |
| Estonia | 0.246 | 23 |
| Latvia | 0.484 | 22 |
| Lithuania | -0.363 | 27 |
| Bulgaria | 0.506 | 21 |
| Czech Republic | 0.603 | 19 |
| Romania | -0.414 | 28 |
| Hungary | 0.711 | 17 |
| Poland | 0.761 | 13 |
| Sweden | 0.196 | 24 |
| United Kingdom | 0.588 | 20 |

Sources: Authors' calculations.

Given the above considerations, we now focus on refined measures of the co-movement of business cycles, in order to assess both the synchronicity and the similarity between the business cycles of each country in comparison to the EA cycle.

A number of measures for synchronicity and similarity of business cycles have been suggested in recent literature. A large part of these measures have been used in the context of the *classical cycle* approach, which has recently been revived by Harding and Pagan (2002, 2003). Such measures essentially use a binary variable for describing whether an economy is in a recession or in an expansion in order to build indicators of co-movement. Within this approach, popular measures of synchronicity include, *inter alia*, the concordance index and Pearson's contingency index (see Artis, Krolzig and Toro, 2004). More recently, Harding and Pagan (2005, 2006) have suggested formal statistical tests for synchronization within the classical approach. As regards similarity of business cycles, following Harding and Pagan (2002) the *classical cycle* literature has focused on measures of features of the cycle such as amplitude and steepness. In the case of these measures, the cyclical binary variable may be used jointly with the original times series values (see e.g. Altavilla, 2004 and Camacho, Quirós and Saiz, 2007).

Even though there is some correspondence between *classical cycles* and *deviation cycles*, they are essentially different methods for measuring the business cycle. For instance, *deviation cycles'* recessions typically encompass *classical cycles'* recessions (see Artis, Marcellino and Proietti 2004, pages 16-19). Moreover, there seems to be no point in assessing co-movements with methods that rely on a binary variable (even if complemented in some indicators with the original real activity time-series) if one has the additional information given by the value of the output gap at each moment of time. Hence we follow measures of synchronicity and similarity recently suggested by Mink, Jacobs and de Haan (2007) – henceforth MJH – for the specific context of *deviation cycles*.

In order to assess synchronicity in period t , MJH suggest the following index (which is analogous to a concordance index):

$$\varphi_{iEA}(t) = \frac{g_i(t)g_{EA}(t)}{|g_i(t)g_{EA}(t)|}$$

where $g_{EA}(t)$ denotes the reference business cycle (which in our case is the EA output gap) and $g_i(t)$ is the output gap of country i . Index $\varphi_{iEA}(t)$ may either take on a value of -1 or 1. Averaging $\varphi_{iEA}(t)$ over a period indicates the fraction of time in which both

gaps had the same sign, subtracted by the fraction of time in which they have had opposite signs. Average $\varphi_{iEA}(t)$ may then range from -1 (null synchronicity) to 1 (full synchronicity), and comparing this average of the index across countries for some period allows for ranking business cycles synchronicity.

Table 4 presents the synchronicity of the EU members' and Cape Verde's output gap with the EA output gap, measured as the average of the $\varphi_{iEA}(t)$ index for the period 1999-2008. Cape Verde ranks quite well, holding the seventh position among the 28 countries, as its output gap had the same sign of the EA's gap (net from periods with opposite signs) in 60 percent of the time. Among the current sixteen countries of the EA, five countries display less synchronization with the EA business cycle – Greece, Malta, the Netherlands, Slovakia and Slovenia. Cape Verde has an average degree of synchronization at the same level of those of other six EA countries – Belgium, Cyprus, Finland, France, Portugal and Spain. Within the group of eleven EU countries still not in the EA, only four have average degrees of output gap synchronization higher than that of Cape Verde, with Denmark once again performing quite well.

Table 4. Synchronization with the Euro Area business cycle, 1999-2008

| Country | Synchronization | Ranking |
|-------------------|-----------------|---------|
| Cape Verde | 0.60 | 7 |
| EA-countries: | | |
| Austria | 0.80 | 2 |
| Belgium | 0.60 | 7 |
| Cyprus | 0.60 | 7 |
| Finland | 0.60 | 7 |
| France | 0.60 | 7 |
| Germany | 0.80 | 2 |
| Greece | 0.40 | 17 |
| Ireland | 0.80 | 2 |
| Italy | 1.00 | 1 |
| Luxembourg | 0.80 | 2 |
| Malta | 0.40 | 17 |
| Netherlands | 0.20 | 23 |
| Portugal | 0.60 | 7 |
| Slovakia | 0.00 | 24 |
| Slovenia | 0.40 | 17 |
| Spain | 0.60 | 7 |
| Non-EA countries: | | |
| Denmark | 0.60 | 7 |
| Estonia | 0.40 | 17 |
| Latvia | 0.60 | 7 |
| Lithuania | -0.20 | 28 |
| Bulgaria | 0.40 | 17 |
| Czech Republic | 0.80 | 2 |
| Romania | 0.00 | 24 |
| Hungary | 0.60 | 7 |
| Poland | 0.40 | 17 |
| Sweden | 0.00 | 24 |
| United Kingdom | 0.00 | 24 |

Sources: Authors' calculations.

Yet, as MJH correctly argue, in order to examine similarity between business cycles one needs to go beyond synchronicity and also assess differences between cycle amplitudes. In fact, $\varphi_{iEA}(t)$ is completely invariant to the amplitude of the business cycle. Hence, MJH suggest an additional measure, devised to capture the pattern of the co-movement between the business cycle of a country i and the cycle of a reference area. In our case, the similarity between the output gap of country i and the gap of the EA in period t is given by

$$\gamma_{iEA(t)} = - \frac{n|g_i(t) - g_{EA}(t)|}{\sum_{i=1}^n |g_i(t) - g_{EA}(t)|}$$

where n is the total number of countries in the sample ($n = 28$). Averaging $\gamma_{iEA}(t)$ across the sample period yields an index of the similarity between the output gap of country i and the EA output gap during 1999-2008. The minus sign guarantees that co-movement and similarity move in the same direction, with an increase in the measure signaling an increase in similarity. In case of complete similarity the index equals 0.¹¹

The similarity index above has a clear-cut interpretation: for each period t , $\gamma_{iEA}(t)$ compares the absolute value of the deviation of country i output gap from the EA output gap with the average absolute deviation of all countries' gaps from the EA gap. Averaging $\gamma_{iEA}(t)$ from 1999 to 2008 gives the mean distance of country's i output gap to the EA's output gap during the Euro period, relative to the mean distance of all countries on average during the Euro period.

As Table 5 shows, Cape Verde ranks less favorably when the amplitude and the shape of the business cycle is considered. This is a somehow expected result, in view of the relatively large standard deviation of Cape Verde's output gap. However, Cape Verde is far from the bottom of the ranking. Its output gap is more similar to the EA's output gap than the gaps of two EA countries – Ireland and Slovakia –and of four non-EA countries – Estonia, Latvia, Lithuania and Romania. Furthermore, there are four other EU economies with a degree of output gap similarity with the EA close to Cape Verde's – Luxembourg and Greece, in the EA, and Sweden and the UK. The cases of Greece, Sweden and the UK are noteworthy since these countries perform rather worse than Cape Verde as regards synchronicity, as seen in Table 4.

¹¹ Note that our similarity index $\gamma_{iEA}(t)$ differs from the original MJH's index in two details. First, they consider in the denominator the sum of the absolute values of all countries' output gaps, and not their deviation from the reference gap. Second, they compute the reference gap as the gap that minimizes the distance to all the individual gaps in their sample. Our version is justified on two grounds: (i) in this paper, differently from MJH's, only a fraction of the countries considered is part of the reference region; (ii) we compute the reference cycle directly from aggregate EA data. As MJH state, the denominator of their index is meant to prevent the measure from being affected by an overall change in cyclical activity in the region. In our case what is relevant is to prevent the measure from being affected by an overall change in the dispersion of all the business cycles around the EA cycle.

Table 5. Similarity with the Euro Area business cycle, 1999-2008

| Country | Similarity | Ranking |
|-------------------|------------|---------|
| Cape Verde | -1.38 | 22 |
| EA-countries: | | |
| Austria | -0.49 | 7 |
| Belgium | -0.38 | 4 |
| Cyprus | -0.39 | 5 |
| Finland | -0.49 | 7 |
| France | -0.29 | 1 |
| Germany | -0.36 | 3 |
| Greece | -1.11 | 18 |
| Ireland | -1.42 | 24 |
| Italy | -0.32 | 2 |
| Luxembourg | -1.23 | 19 |
| Malta | -0.98 | 16 |
| Netherlands | -0.67 | 12 |
| Portugal | -0.51 | 9 |
| Slovakia | -1.41 | 23 |
| Slovenia | -0.64 | 10 |
| Spain | -0.46 | 6 |
| Non-EA countries: | | |
| Denmark | -0.70 | 13 |
| Estonia | -2.51 | 28 |
| Latvia | -2.22 | 27 |
| Lithuania | -2.05 | 26 |
| Bulgaria | -0.84 | 14 |
| Czech Republic | -1.01 | 17 |
| Romania | -1.98 | 25 |
| Hungary | -0.95 | 15 |
| Poland | -0.64 | 10 |
| Sweden | -1.30 | 21 |
| United Kingdom | -1.26 | 20 |

Sources: Authors' calculations.

Overall, our results suggest that the business cycle of Cape Verde is fairly close to the EA business cycle and thus an official euroization of the country is not likely to create problems of inadequacy of monetary policy regarding demand management. In the period 1999-2008 the output gap of Cape Verde has been more correlated with the EA output gap than the output gaps of several EA member-states and almost all of the other EU members. Truly, this high correlation is more due to synchronicity – in which Cape Verde ranks seventh – than to similarity in the amplitude and shape of the business cycle. Yet, even regarding similarity, there are some EA members and several other EU members that perform worse than Cape Verde.

Both synchronicity and similarity matter for the adequacy of monetary policy (see, e.g. Camacho, Quirós and Saiz, 2007). In fact, a single monetary policy can not identically fit countries with different turning points and duration of business cycles, as it can not identically fit countries with different amplitudes and steepness of their output gaps. Yet, one can argue that synchronicity (turning points and duration) is mostly important in the EA case. Synchronicity determines how well *changes* in the ECB monetary policy stance match the cyclical needs of each individual country. In contrast, similarity of business cycles does not guarantee that the *amplitude and pace of the change* in the policy stance matches the needs of each individual country, as one may not take for granted that the monetary policy transmission mechanism is similar across countries. We therefore believe that there is a case for attaching a higher relevance to the correlation and synchronicity results, and hence conclude that differences in the business cycle do not preclude Cape Verde from fully adopting the Euro.

4. Conclusions and final remarks

This paper has empirically assessed the case for euroization recently put forth by the authorities of Cape Verde. This possible regime change follows a decade of a well-succeeded conventional peg to the Euro. The pegging has achieved its goals, namely fostering economic integration with Europe and maintaining a macroeconomic regime of nominal stability. Overall, our results indicate that there is a strong case for the euroization of Cape Verde.

Our study has been developed within the Alesina and Barro (2002) framework, which highlights three criteria for assessing the gains for a country that decides to abandon its currency. The gains are larger (i) the smaller and more open the economy is and the more it trades with the issuer of the third currency, (ii) the higher inflation rates are, and (iii) the larger the correlation between the national business cycle and the cycle of the currency issuer is.

The brief overview of the economy of Cape Verde in section 2 has shown, *inter alia*, that Cape Verde has performed well as regards price stability during the ten years of the

peg to the Euro. It has also shown that Cape Verde has maintained deep and increasing trade, investment and financial links with the EU and, in particular, with some countries of the EA. In both these aspects, Cape Verde ranks very well in comparison with several EU countries. Hence, Cape Verde is very likely to benefit from euroization as far as Alesina-Barro's criteria (i) and (ii) are concerned. In the case of the inflation criteria, the gains would correspond to securing the nominal convergence effectively achieved during the 1999-2008 pegging.

In turn, in section 3 we have assessed the performance of Cape Verde as regards criterion (iii). Our results strongly suggest that Cape Verde has suffered no significant costs due to the loss of monetary autonomy. In fact, the business cycle of Cape Verde has been highly correlated with the EA cycle. Cape Verde scored a degree of synchronicity – and, though to a lesser extent, similarity – higher than some EU countries, both EA and non-EA countries. Hence our conclusion that the achievement of the two goals set forth at the outset of the peg in 1998 did not come at any cost regarding macroeconomic stabilisation.

Looking ahead and considering the goals recently stated by Cape-verdean authorities, our results suggest that there is a strong case for the official euroization of Cape Verde. Such a regime will strengthen the commitment to the two virtuous objectives of 1998, making it less likely any overturn of the regime that has proved to foster growth. Moreover, that would be achieved at no significant costs, given the structural characteristics of the economy of Cape Verde, the nominal convergence already achieved, and that the changes in the stance of ECB's monetary policy are very likely to fit the cyclical needs of Cape Verde.

In the current stage of its economic evolution, euroization of Cape Verde would also be important for a number of additional reasons, such as the following: as the authorities intend to establish a full *de jure* liberalization of the international capital movements, euroization would render Cape Verde immune to speculative attacks; as euroization would eradicate any inflationary and exchange risks, the corresponding risk *premia* would dissipate and, country risk *premia* aside, the domestic interest rates would

converge to the EA interest rates; with euroization, Cape Verde would forgo the current opportunity costs of having highly qualified human resources involved in monetary and exchange rate management tasks, an issue that is relevant given the dimension of the country and its current development stage.

One argument that might be raised against euroization is that Cape Verde's structural trade deficit may result in liquidity constraints if the inflows of emigrant remittances, international aid and foreign investment decelerate markedly. While this could be a problem, structural trade deficits can only be solved through a permanent increase in international competitiveness. This is independent of the exchange rate regime; to overcome a structural trade deficit, exchange rate flexibility has no advantage over euroization. Under euroization, an extreme and highly persistent external deficit would lead to an increase in interest rates and, eventually, to a disruption of international credit. At the limit, the nation could only import – and consume – as much as it exported. Yet this is precisely the adjustment mechanism under devaluation, as the high pass-through would not increase exports and would not thus create any additional room for imports and consumption.

Finally, there are some economic and institutional issues concerning euroization that we have deliberately omitted in this paper, but need to be properly addressed in future research. One is the loss of a lender of last resort and the loss of seignorage. It should be noted, yet, that these issues are typically raised under the assumption of a unilateral euroization (dollarization). Our view is that a proper euroization of Cape Verde should not be unilateral. Instead, we devise some euroization agreement – possibly within the auspices of the recently celebrated strategic partnership between the EU and Cape Verde¹² – in which adequate solutions could guarantee the existence of a lender of last resort and of transfers compensating for the loss of seignorage. This leads us to the issue of the formal model for euroization. While crucial, this *political economy* problem is far beyond the scope of this paper. The EU has already tackled this issue regarding small European countries that are not part of the EU (*e.g.* Monaco, San Marino, Vatican City)

¹² See the “Cap Vert – Communauté Européenne, Document de stratégie pays et Programme indicatif national pour la période 2008-2013”, available at http://ec.europa.eu/development/icenter/repository/scanned_cv_csp10_fr.pdf.

and will increasingly face similar cases in the future. A model for international euroization agreements is an extremely relevant issue that we will look at in subsequent research.

To conclude, it should be noted that the choice of the appropriate timing for euroization is also a relevant issue. Our analysis suggests that the time is ripe for the euroization of Cape Verde. However, given the current international financial crisis, it is advisable to wait for the turbulence to dissipate. Meanwhile, negotiations for an euroization agreement with the EU need not wait.

References

- Alesina, Alberto and Robert Barro (2002), "Currency Unions", *Quarterly Journal of Economics*, Vol. 107, N. 2, pp. 409-436.
- Alesina, Alberto; Robert Barro; and Silvana Tenreyro (2002), "Optimal Currency Areas", *NBER Macroeconomics Annual*, Vol. 17, pp. 301-345.
- Altavilla, C. (2004), "Do EMU Members Share the Same Business Cycle", *Journal of Common Market Studies*, Vol. 42, N. 5, pp. 869-896.
- Artis, Michael J., Massimiliano Marcellino and Tommaso Proietti (2004), "Dating the Euro Area Business Cycle", in Lucrezia Reichlin (Ed.) *The Euro Area Business Cycle: Stylized facts and Measurement Issues*. London, Centre for Economic Policy Research (CEPR), pp. 7-34.
- Artis, Michael, Hans-Martin Krolzig and Juan Toro (2004), "The European Business Cycle", *Oxford Economic Papers*, Vol. 56, N. 1, pp.1-44.
- Barro, Robert and David Gordon (1983), "Rules, Discretion, and Reputation in a Model of Monetary Policy", *Journal of Monetary Economics*, Vol. 12, N. 1, pp. 101-121.
- Baxter, Marianne and Robert King (1999), "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series," *The Review of Economics and Statistics*, Vol. 81, N. 4, November, pp. 575-593.
- Berg, Andrew and Eduardo Borensztein (2000), "The Pros and Cons of Full Dollarization", *International Monetary Fund Working Paper*, N. WP/00/50, March.
- Camacho, Maximo; Gabriel Perez-Quirós and Lorena Saiz (2007), "Do European Business Cycles Look Like One?", *Journal of Economic Dynamics & Control*, Vol. 32, N. 7, July, pp. 2165-2190.
- De Grauwe, Paul and Francesco Paolo Mongelli (2005), "Endogeneities of Optimum Currency Areas: What Brings Countries Sharing a Single Currency Closer Together?", ECB Working Paper Series, N. 468, European Central Bank.
- De Haan, Jakob, Robert Inklaar and Richard Jong-A-Pin (2008), "Will Business Cycle in the Euro Area Converge? A Critical Survey of Empirical Research", *Journal of Economic Surveys*, Vol. 22, N. 2, pp. 234-273.

- European Central Bank (2005), "Monetary Policy and Inflation differentials in a Heterogeneous Currency Area", *ECB Monthly Bulletin*, May, pp. 61-77.
- European Central Bank (1999), "Opinion of the European Central Bank at the request of the Council of the European Union on a recommendation for a Council Decision concerning exchange rate matters relating to the Cape Verde escudo, (CON/98/57) (1999/C 200/06)", *Official Journal of the European Communities* C 200/7-8, 15.7.1999.
- European Council (1998), "Council Decision of 21 December 1998 concerning exchange rate matters relating to the Cape Verde escudo (98/744/EC)", *Official Journal of the European Communities* L 358/111-2, 31.12.1998.
- Frankel, Jeffrey and Andrew Rose (1997), "Is EMU more justifiable ex post than ex ante?", *European Economic Review*, Vol. 41, N. 3-5, pp. 753-760.
- Frankel, Jeffrey and Andrew Rose (1998), "The Endogeneity of the Optimum Currency Area Criteria", *The Economic Journal*, Vol. 108, N. 449, pp. 1009-1025.
- Furceri, Davide and Gergios Karras (2006), "Are the new EU members ready for the Euro? A comparison of costs and benefits", *Journal of Policy Modeling*, Vol. 28, N. 1, pp. 25-38.
- Harding, Don and Adrian Pagan (2002), "Dissecting the Cycle: A Methodological Investigation", *Journal of Monetary Economics*, Vol. 49, N. 2, March, pp. 365-381.
- Harding, Don and Adrian Pagan (2003), "A Comparison of Two Business Cycle Dating Methods", *Journal of Economic Dynamics & Control*, Vol. 27, N. 9, July, pp. 1681-1690.
- Harding, Don and Adrian Pagan (2005), "A Suggested Framework for Classifying the Modes of Cycle Research", *Journal of Applied Econometrics*, Vol. 20, N. 2, pp. 151-159.
- Harding, Don and Adrian Pagan (2006) "Synchronization of Cycles", *Journal of Econometrics*, Vol. 132, N. 1, pp. 59-79.
- Hodrick, Robert and Edward Prescott (1997), "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit and Banking*, Vol. 29, N. 1, pp. 1-16.

- Honohan, Patrick and Philip Lane (2003), “Divergent inflation rates in EMU”, *Economic Policy*, Vol. 18, N. 37, pp. 357-394.
- International Monetary Fund (2008), “Cape Verde: Third Review under the Policy Support Instrument – Staff Report; Staff Supplement; Press Release on the Executive Board discussion; and Statement by the Executive Director for Cape Verde”, International Monetary Fund Country Report N. 08/37, January.
- Irwin, Gregor (2004), “Currency boards and currency crises”, *Oxford Economic Papers*, Vol. 56, N. 1, pp. 64-87.
- LeBaron, Blake and Rachel McCulloch (2000), “Floating, Fixed, or Super-Fixed? Dollarization Joins the Menu of Exchange-Rate Options”, *AEA Papers and Proceedings, American Economic Review*, Vol. 90, N. 2, pp. 32-37.
- Mink, Mark, Jan Jacobs and Jakob de Haan (2007) “Measuring Synchronicity and Co-Movement of Business Cycles with an Application to the Euro Area”, *CESifo Working Paper Series* N. 2112.
- Neves, José Maria (2008), Speech given by the prime-minister of Cape Verde by the occasion of the 10th anniversary of the exchange rate agreement between Cape Verde and Portugal; 24 March; available at (accessed January 2009):
http://www.governo.cv/index.php?option=com_content&task=view&id=686&Itemid=74.
- Obstfeld, Maurice and Kenneth Rogoff (1995), “The Mirage of Fixed Exchange Rates”, *Journal of Economic Perspectives*, Vol. 9, N. 4, pp. 73-96
- Ravn, Morten and Harald Uhlig (2002), “On Adjusting the Hodrick-Prescott Filter for the Frequency of Observations,” *The Review of Economics and Statistics*, Vol. 84, N. 2, May, pp. 371-376.
- Rose, Andrew (2000), “One money, one market: the effect of common currencies on trade”, *Economic Policy*, Vol. 15, N. 30, pp. 9-45.

Annex

Table A.1. Real GDP Data

| Country | Main source | Subsidiary source (period) | Complete Time-series |
|----------------|-------------|----------------------------|----------------------|
| Euro Area | AMECO | | 1980-2008 |
| Cape Verde | IFS-IMF | | 1980-2008 |
| Austria | AMECO | | 1980-2008 |
| Belgium | AMECO | | 1980-2008 |
| Cyprus | AMECO | IFS-IMF (1980-1990) | 1980-2008 |
| Finland | AMECO | | 1980-2008 |
| France | AMECO | | 1980-2008 |
| Germany | AMECO | | 1980-2008 |
| Greece | AMECO | | 1980-2008 |
| Ireland | AMECO | | 1980-2008 |
| Italy | AMECO | | 1980-2008 |
| Luxembourg | AMECO | | 1980-2008 |
| Malta | AMECO | IFS-IMF (1980-1990) | 1980-2008 |
| Netherlands | AMECO | | 1980-2008 |
| Portugal | AMECO | | 1980-2008 |
| Slovakia | AMECO | | 1992-2008 |
| Slovenia | AMECO | | 1990-2008 |
| Spain | AMECO | | 1980-2008 |
| Denmark | AMECO | | 1980-2008 |
| Estonia | AMECO | | 1993-2008 |
| Latvia | AMECO | | 1990-2008 |
| Lithuania | AMECO | | 1990-2008 |
| Bulgaria | AMECO | | 1991-2008 |
| Czech Republic | AMECO | | 1990-2008 |
| Romania | AMECO | | 1990-2008 |
| Hungary | AMECO | IFS-IMF (1980-1990) | 1980-2008 |
| Poland | AMECO | IFS-IMF (1980-1989) | 1980-2008 |
| Sweden | AMECO | | 1980-2008 |
| United Kingdom | AMECO | | 1980-2008 |

- Notes:
1. AMECO: annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN); available at http://ec.europa.eu/economy_finance/db_indicators/db_indicators8646_en.htm ; last update 23 October 2008; accessed January 2009.
 2. IFS-IMF: international financial statistics data-base of the International Monetary Fund; available online at <http://www.imfstatistics.org/imf/>; accessed January 2009.
 3. Euro Area: 12 countries definition.
 4. Germany before 1991: West Germany growth rates.

Figure A.1. Output gaps, 1999-2008

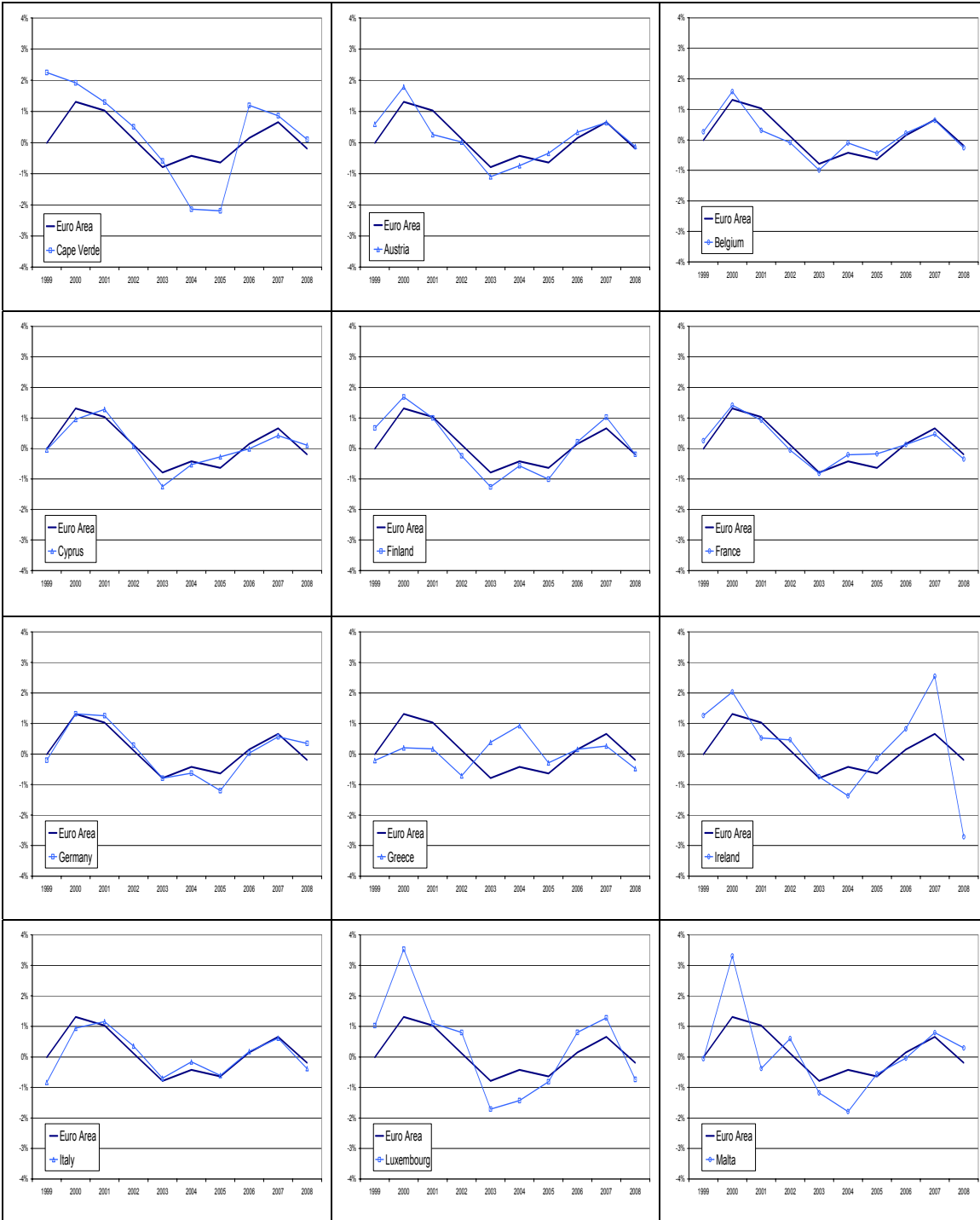


Figure A.1. Output gaps, 1999-2008 (cont.)

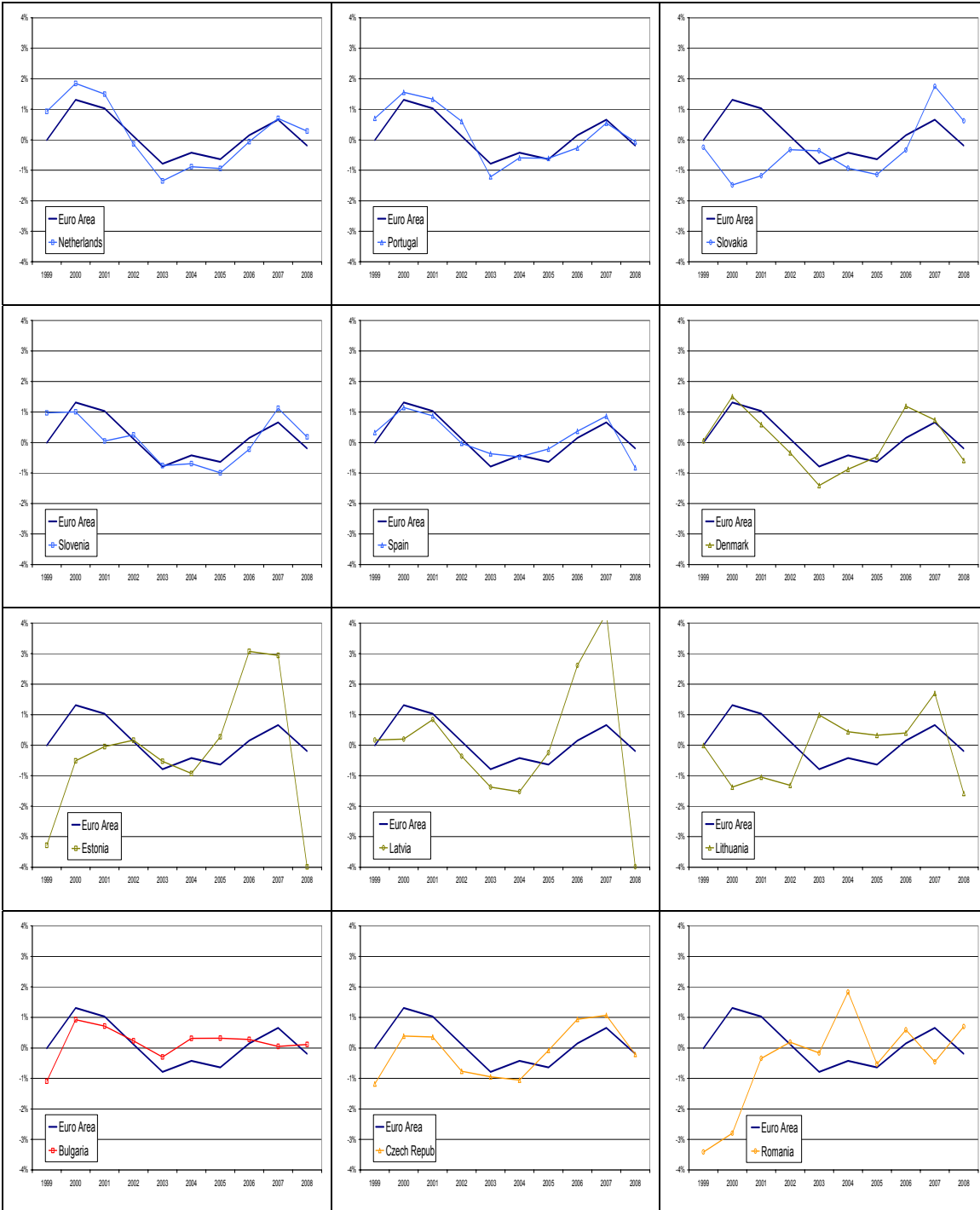


Figure A.1. Output gaps, 1999-2008 (cont.)

