[Article]

Current Account Imbalances
in the Euro Area
Focusing on the SEA Countries

Keisuke ORII

As a key component of the eurozone crisis, current account imbalances in the Euro Area and its causes are examined both theoretically and empirically. A theoretical model shows that the deteriorated current account balances with high growths supported by domestic credit and financial inflows in the SEA countries lack sustainability. Empirical analyses find out significant determinants of the current account imbalances: income level and its growth rate, domestic credit, saving rate, inflation rate and labor cost. It is also found that regional idiosyncrasy in the economic union should be taken into consideration.

1. Introduction

At the end of 2009, two years after the U.S. subprime mortgage loan problem evolved to a world-wide financial crisis in the middle of 2007, European sovereign debt crisis emerged. Greece disclosed the actual figures of its budget deficit, which impaired the credibility of its sovereign bond. Contagion of discredit towards sovereign bonds spread all over the southern euro area (SEA, hereafter) including Ireland. Yield spreads of long-term bonds between Germany and the peripheral euro area widened to critical levels. The SEA countries sought financial assistance one after another from EU, ECB, or other IFIs (international financial institutions) like IMF. A series of discredited sovereign debts cast

doubt on the viability of the single currency itself.

Along with providing financial aid to Greece in May 2010[1], the European Union decided to establish a special fund: the European Financial Stability Fund (EFSF). The European Central Bank (ECB) also embarked on a set of sizable financial assistance. It provided liquidity to financial market by name of the Long-term Refinance Operations (LTRO) in December 2011 and February 2012 by obtaining eligible collateral from banks. Outright Monetary Transactions (OMT) inaugurated in September 2012, through which the ECB purchased directly the SEA bonds from markets. The euro area decided to establish another financial safety net, European Stability Mechanism (ESM) by absorbing EFSF. Although the LTRO repayments started in January 2013, the eurozone economy has yet to recover[2].

Causes of the European sovereign bond crisis have been studied from various points of view. Some researchers emphasized the lack of banking union or fiscal union, and others revisited a classical query of whether the eurozone had been an optimum currency area. There is, however, another important direction of analysis: current account imbalances. This paper aims at addressing current account imbalance problems as the nucleus of the eurozone crisis. It will contribute much to interrogate whether there are drawbacks in forming a currency union among a mixture of countries in terms of economic development, specifically when current account imbalance problems have been underestimated.

The remainder of this paper is structured as follows. The next section surveys main literature concerning the current account imbalances as a cause of the eurozone crisis. Section 3 documents the stylized facts of the crisis by choosing relevant economic indicators. Section 4 employs a theoretical approach to the intertemporal budget constraint of a capital importing economy to draw implications of the current account problems. Section 5 attempts an empirical research to find significant determinants of the current account imbalances in the euro area for considering crisis mecha-

nism. The final section concludes.

2. Literature survey

This section briefs relevant papers about current account imbalances and the eurozone crisis. Concentrating on studies after 2000, I classify them into the following three groups: the pre-crisis (2.1), post-crisis (2.2), and global standpoint (2.3) studies.

2.1 Pre-crisis studies

In spite of widespread concerns beforehand, especially from the U.S. commentators, the launch of the euro received an unexpected appraisal at the beginning of this century. At that time, Blanchard and Giavazzi (2002), revisiting the Feldstein-Horioka puzzle[3], found that the high cross-country correlation between saving and investment had substantially declined in the euro area. They argued that the current attitude of benign neglect vis-à-vis the current account in the euro area countries was appropriate, and that countries with sizable current account deficits such as Portugal and Greece should not worry and need not take measures to reduce their external deficits.

In the first half of the last decade, however, "current account imbalances" or "global imbalances" primarily meant the colossal current account deficits recorded by the U.S. A massive amount of the U.S. current account deficits was, then, recognized as one of the main disturbances in the global financial architecture. Among a number of researches[4], Caballero, Fahri and Gourinchas (2008) provided a theoretical model to explain the global imbalances by employing a global framework.

Lane and Milesi-Ferretti (2006) examined potential differences across European economies in their vulnerability to a shift in global imbalances. They assessed the potential impact on Europe of an unwinding of global imbalances, concluding that a substantial real dollar depreciation entailed by a reduction in the U.S. trade deficit would convey a limited effect on European economies. This indicates that the underlying problems in the

euro area were, then, scarcely noticed. The main concern was directed to the adverse effect of the looming dollar's real depreciation on the European economies.

2.2 Pre-crisis studies

After sovereign bonds issued by the SEA countries began to lose their credibility, academic interests returned to the external balance problems in this region[5].

Among them, Jaumotte and Sodsriwiboon (2010), focusing on the SEA countries, found that the decline in the current accounts coincided with a large decline in private savings and a much more moderate increase in investment rates. Arguing that lower savings explain most of the abnormal deterioration in current accounts in the SEA, however, they noted that the situations varied substantially across countries, and that the current account deficits were expected to remain high in the medium run.

Giavazzi and Spaventa (2010) also focused on the SEA countries. Concluding that the growth driven by domestic demand and financed with foreign borrowing was unsustainable, they found that an extraordinary expansion of domestic credit primarily led to a construction boom in the SEA countries and that the credit growth was fed by foreign borrowing. They also emphasized that the credit was expended mainly in the domestic construction sector, which was a less competitive industry.

Eichengreen (2010) pointed out that members of the euro-area periphery had run persistent deficits against both the rest of euroland and the rest of the world, while the surpluses of the countries of the euro-area's core have been offset, in part, by deficits vis-à-vis the rest of the world. Therefore, he stressed that an adequate analysis of imbalances in the euro area should be consistent with both patterns.

Meanwhile, Chen, Milesi-Ferretti and Tressel (2012), minutely analyzing trade statistics in the euro area, found that the term of trade shock was associated with higher oil prices. They argued that the oil price hike raised the demand for machinery in oil producing countries, which stimulated demand for Germany's

export goods produced mainly in the emerging European countries. In addition, the SEA countries had to confront the rise of China as a rival in exporting markets. In sum, rising oil prices, the integration of CEE, and the rise of China constituted factors in rising net foreign liabilities of the SEA countries. Their current account deficits were financed mainly by the euro area's surplus countries.

2.3 Global standpoint studies

There is another group of research studying about external imbalances from a global point of view.

Lane and Milesi-Ferretti (2011) examined the external adjustment process following the financial crisis[6]. They calculated that average net external liabilities in Greece, Portugal, and Spain expanded from around 36% of GDP in 2000 to 87% in 2007. In a painful process of currency account adjustment in deficit countries, they found that external adjustment was achieved primarily through demand compression and that changes in other investment flows[7] were the main channel of financial account adjustment.

Admitting that two-way financial flows often dwarf the net flows measured in the current accounts, Obstfeld (2012) warned that large current account imbalances can also signal elevated macroeconomic and financial stresses. After investigating the relationship between current accounts and changes in the net international investment position (NIIP)[8] for more than 80 countries, he concluded that, although the balance sheet mismatches of leveraged entities provided most direct indicators of potential instability, the imbalances might well be a symptom that deeper financial threats were arising.

Taylor (2012) pointed out that there were two competing views of the global financial crisis. The first one stresses the external factors: massive and growing international financial flows caused by an unprecedented mix pattern of current account surpluses and deficits lead to the global financial crisis. And the second one underlines the domestic factors: risks derive from excessive credit booms in local banks. Through historical

examination, he finds that global imbalances are not as important as if often perceived.

Overall, the literature suggests that, for investigating crisis causes and mechanisms in a particular region like the SEA countries, it seems necessary to analyze both from global and regional point of views.

3. Stylized facts

From the literature concerning the crisis in the SEA countries, a triad of crisis elements can be observed. First, financial integration in the euro area made cross-border lending and borrowing easier and at lower cost. Second, domestic financial institutions in the SEA economies benefited much from intermediating resources with lower interest rates than before. Third, domestic credit was mainly directed towards the housing sector (non-tradable goods sector), instead of being invested in the tradable goods producing sector to improve its competitiveness.

In this section, a dozen of relevant data are to be explored to endorse this outline. External balance, individual income, credit and liabilities, savings and investment, and prices and labor costs are examined.

3.1 External indicator: Current account balance

Table 1. A demonstrates the progress of current account balance/GDP ratios country by country in the euro area. Of the 11 original members of the euro Luxembourg is excluded[9], replaced by Greece, which adopted the euro in 2001. In the upper part are the core and northern euro area countries. The SEA countries including Ireland are placed in the lower part. Four year averages are computed for each period.

It is obvious that since the launch of the euro in 1999, the current account balances of the SEA countries continued aggravating during the pre-crisis period. Greece, Portugal, and Spain display a typical pattern of deterioration. Italy, though its deficit size is marginal, also shares a common pattern. In contrast, the

Table 1　Selected Economic Indicators

A. Current account balance/GDP（%）

	1996–99	2000–03	2004–07	2008–11
AUT	−2.2	0.7	2.7	2.9
BEL	5.2	3.8	2.3	−0.6
FIN	4.9	7.4	4.5	1.1
FRA	2.4	1.1	−0.4	−1.7
GER	−0.8	0.6	5.9	6.0
NED	4.8	3.2	7.8	6.7
(Avg.)	2.4	2.8	3.8	2.4
GRE	−3.3	−7.0	−9.9	−11.5
IRL	1.5	−0.5	−3.3	−1.5
ITA	2.2	−0.3	−1.0	−2.9
POR	−6.5	−8.8	−9.9	−10.3
SPA	−1.1	−3.7	−7.9	−5.6
(Avg.)	−1.4	−4.1	−6.4	−6.3

B. GDP per capita（PPS based: euro）

	1996–99	2000–03	2004–07	2008–11
AUT	23,236	26,021	28,730	33,916
BEL	21,397	24,648	27,963	32,347
FIN	19,734	25,539	29,124	34,944
FRA	20,795	23,707	26,493	30,143
GER	23,450	24,912	26,614	30,124
NED	21,211	26,250	30,179	36,160
(Avg.)	21,637	25,180	28,184	32,939
GRE	10,247	12,634	16,748	20,752
IRL	16,121	27,805	36,927	40,261
ITA	17,542	21,044	24,026	26,326
POR	9,491	12,451	14,218	16,191
SPA	12,424	15,644	19,706	23,858
(Avg.)	13,165	17,916	22,325	25,478

C. GDP per capita growth rate（%）

	1996–99	2000–03	2004–07	2008–11
AUT	2.1	2.6	4.4	2.0
BEL	2.1	3.3	4.3	1.6
FIN	4.7	4.1	4.9	0.8
FRA	2.8	3.0	3.6	0.9
GER	0.8	1.6	3.2	1.8
NED	4.1	4.6	4.3	0.8
(Avg.)	2.8	3.2	4.1	1.3
GRE	6.2	6.4	6.1	−1.9
IRL	12.9	9.4	5.1	−5.0
ITA	6.7	3.9	2.9	−0.2
POR	6.6	4.1	3.7	0.1
SPA	5.6	6.2	5.8	−0.4
(Avg.)	7.6	6.0	4.7	−1.5

D. Domestic credit to private sectors （growth rate: %）

	1996–99	2000–03	2004–07	2008–11
AUT	1.7	1.3	2.4	0.9
BEL	2.6	−2.2	5.2	0.5
FIN	−3.7	4.6	6.0	4.3
FRA	−1.3	2.1	4.4	2.4
GER	3.7	0.0	−2.5	−0.2
NED	7.4	4.1	6.0	1.3
(Avg.)	1.7	1.7	3.6	1.5
GRE	8.0	11.0	9.3	6.5
IRL	9.4	2.8	14.0	1.1
ITA	5.7	4.3	4.7	4.9
POR	13.6	5.4	4.6	4.2
SPA	5.4	5.8	12.7	2.3
(Avg.)	8.4	5.9	9.1	3.8

E. Banks' external liabilities （growth rate: %）

	1996–99	2000–03	2004–07	2008–11
AUT	18.8	2.1	10.8	−1.7
BEL	4.1	0.8	13.8	−14.7
FIN	21.2	22.4	19.8	27.6
FRA	6.9	7.6	22.5	−8.2
GER	25.8	4.4	4.6	−3.7
NED	17.0	7.4	15.9	1.1
(Avg.)	15.6	7.5	14.6	0.1
GRE	31.7	15.5	32.0	−5.5
IRL	33.4	30.5	22.5	−14.6
ITA	1.5	4.0	7.5	−7.9
POR	16.3	18.8	7.5	−7.1
SPA	18.9	9.6	3.8	3.8
(Avg.)	20.4	15.7	14.7	−6.2

F. Gross savings/GDP ratio（%）

	1996–99	2000–03	2004–07	2008–11
AUT	22.9	24.2	25.8	25.4
BEL	25.6	25.6	25.8	23.0
FIN	23.9	27.4	26.2	21.4
FRA	19.9	20.2	19.9	18.2
GER	20.8	20.1	24.0	23.9
NED	26.8	26.6	28.0	24.1
(Avg.)	23.3	24.0	24.9	22.7
GRE	18.0	14.6	12.7	5.9
IRL	22.8	21.9	22.9	13.1
ITA	21.9	20.7	20.4	17.2
POR	20.1	17.2	13.5	10.1
SPA	22.1	22.7	21.9	18.7
(Avg.)	21.0	19.4	18.3	13.0

G. Gross fixed capital formation/
  GDP ratio（%）

	1996–99	2000–03	2004–07	2008–11
AUT	24.5	23.0	22.5	22.4
BEL	21.3	20.5	22.3	21.3
FIN	19.9	20.1	21.3	20.0
FRA	18.6	19.2	20.8	20.1
GER	21.4	18.4	18.2	17.9
NED	22.2	19.8	19.7	18.3
（Avg.）	21.3	20.2	20.8	20.0
GRE	23.5	24.7	23.4	17.3
IRL	22.9	24.0	23.4	12.1
ITA	20.2	21.0	21.2	19.8
POR	27.6	24.8	22.6	18.8
SPA	24.7	27.7	28.9	22.7
（Avg.）	23.8	24.5	23.9	18.2

H. Inflation rate（HICP based: %）

	1996–99	2000–03	2004–07	2008–11
AUT	0.8	1.8	2.0	2.2
BEL	1.2	2.0	2.1	2.5
FIN	1.3	2.2	0.9	2.6
FRA	0.8	1.9	1.9	1.8
GER	0.9	1.4	1.9	1.6
NED	1.9	3.3	1.5	1.6
（Avg.）	1.2	2.1	1.7	2.1
GRE	3.9	3.4	3.2	3.3
IRL	2.0	4.4	2.5	0.2
ITA	1.8	2.6	2.2	2.2
POR	2.1	3.5	2.5	1.6
SPA	1.9	3.2	3.2	2.2
（Avg.）	2.3	3.4	2.7	1.9

I. Nominal unit labor costs
  （growth rate: %）

	1996–99	2000–03	2004–07	2008–11
AUT	−0.3	0.5	0.2	2.1
BEL	1.0	1.9	1.4	2.5
FIN	0.4	1.6	0.7	4.3
FRA	0.5	2.3	1.5	2.2
GER	0.0	0.3	−1.5	2.0
NED	1.7	3.6	0.6	1.7
（Avg.）	0.6	1.7	0.5	2.5
GRE	6.3	2.9	1.7	1.9
IRL	1.4	4.1	4.8	−2.2
ITA	1.9	2.6	1.9	2.0
POR	3.9	3.7	1.5	1.3
SPA	2.2	2.9	3.3	0.7
（Avg.）	3.1	3.2	2.6	0.8

J. Real labor productivity
  （growth rate: %）

	1996–99	2000–03	2004–07	2008–11
AUT	2.1	1.2	1.8	−0.4
BEL	1.6	0.9	1.3	−0.3
FIN	2.3	1.8	2.7	−0.8
FRA	1.2	0.7	1.5	0.1
GER	1.0	0.9	1.6	0.0
NED	1.4	0.5	1.9	−0.1
（Avg.）	1.6	1.0	1.8	−0.3
GRE	3.9	3.5	1.1	2.3
IRL	2.6	3.3	1.7	−2.0
ITA	0.8	−0.3	0.6	−0.7
POR	2.2	0.5	1.5	0.7
SPA	0.3	0.1	−0.1	2.1
（Avg.）	2.0	1.4	1.0	0.5

Notes: AUT（Austria）, BEL（Belgium）, FIN（Finland）, FRA（France）,
    GER（Germany）, NED（the Netherlands）, GRE（Greece）, IRL（Ireland）,
    ITA（Italy）, POR（Portugal）, SPA（Spain）.
  Sources: *Eurostat*, World Bank, IMF, OECD.

core and northern countries follow the opposite trend: the current account balance improved gradually. It is notable that German external position turned positive in the 2000–03 period and its surplus surpassed as much as 5% of GDP immediately before crisis.

3.2 Income indicators: GDP per capita and its growth rate

PPP-based GDP per capita figures are tabulated in Table 1.B[10]. The SEA countries increased its income level from 13,000 euros

to 22,000 euros during the pre-crisis period. Their income divergence vis-à-vis the core countries halved from 8,500 euros in 1996–1999 to less than 4,000 euros in 2004–07.

This is reflected in the growth rates (see Table 1.C). Growth rates of GDP per capita (PPP-based) in the SEA countries were much higher than those of the core countries: the margins were 4.8% points in 1996–99, 2.8% points in 2000–03, and 0.6% points in 2004–07. After the crisis, however, the wedge inverted: the growth rates in the SEA countries turned negative, while those in the core countries remained positive.

Subsections 3.1 and 3.2 synthetically demonstrate that, in the euro area, current account balance diverged according as the SEA countries caught up with the core countries in terms of income level by accelerating growth rates.

3.3 Financial indicators: Domestic credit and banks' external liabilities

Rising income levels were supported by soaring domestic credit. Table 1.D shows that the domestic credit to private sectors expanded with much higher speed in the SEA countries than in the core euro area. Ireland and Spain, specifically, registered more than 12% credit growths per annum in the 2004–07 period.

This credit expansion is estimated to have been, at least partly, financed by cross-border financial inflows. Table 1.E endorses a higher rate expansion of external liabilities in the local financial institutions in the SEA countries. But the wedge between the SEA and core countries was smaller than in the case of domestic credit. In 2004–07, banks in both areas expanded their external liabilities with almost the same growth rate. One reason might be that not only the SEA countries but the core counties had been attracting overseas fund in the run-up stages before crisis.

3.4 Macroeconomic balance indicators: Savings and gross fixed capital formation

Deteriorating external positions in the SEA countries are mirrored in the declining savings rates. Table 1.F demonstrates that,

while the gross savings rates in the core countries edged up during the pre-crisis period, those in the SEA countries on average fell by 2.7% points. Notable declines in the savings rates were found in Greece and Portugal.

Meanwhile, narrower wedge is observed in the gross fixed capital formation/GDP ratios between these two areas (see Table 1.G). The investment/GDP ratio scarcely changed across the periods in both regions. It is noteworthy that Portugal showed a downward trend in this ratio, while Spain experienced ups and downs between 1996 and 2011.

3.5 Competitiveness indicators: Price, labor costs, and productivity

Inflation rates are shown in Table 1.H, where four-year averages of annual growth rates of the HICP (Harmonized indices of consumer prices)[11] are tabled. While the inflation rates seem rather contained in both areas, the SEA countries display moderately higher inflation rates than the core euro economies by the margin of approximately 1% points.

Unit labor costs followed the similar pattern. Seen from Table 1.I, annual increases in the labor costs were contained within 0.5% to 1.7% in the core countries. On the other hand, labor costs in the peripheral economies rose with much higher rates. The SEA countries underwent at least 1.5% more rise in the labor costs than in the core euro area during the pre-crisis period.

Labor productivity data (Table 1. J), however, confirm less umambiguous distinction between the two country groups. The margin obtained by SEA countries in the growth rates of real labor productivity was less than 1% point during the 16 years, with an exception of the 2004–07 period, when the productivity growth in the SEA countries failed to surpass that in the core euro area.

3.6 Main findings

During the pre-crisis period, the SEA countries witnessed simultaneous proceeding of deteriorating current account deficits

and catching-up with the core countries by accelerated growth rates in income levels. Ballooning domestic credit financed in part by external liabilities supported this growth mechanism. Notable declines in savings rates were seen in Greece and Portugal, though investment rates were rather stable across the region. Contained but higher inflation rates and unit labor costs than in the core countries gradually impaired the competitiveness of the SEA countries, which could not be fully compensated by rising productivity.

4. Theoretical analysis

Among dozens of models which explains current account behaviors, Giavazzi and Spaventa (2011) provide a compact and relevant model explaining the mechanism of the euro crisis. Based on their model, this section attempts to describe why the high growths financed by capital inflows were not sustainable in the SEA economies.

4.1 Analytical framework

This is a two-period model consisting of periods t and $t+1$. Agents can consume both traded goods T and non-traded goods N. They exchange traded goods with the ROW (rest of the world) in each period, while non-traded goods cannot be traded.

The home country can consume traded goods C_t^T. This can be larger or smaller than Y_t^T, the output of period t, which is assumed exogenously fixed. Meanwhile it can consume non-traded goods produced only in the same period. It is expressed as

$$C_t^N = Y_t^N \qquad\qquad (4.1)$$

Domestic output of traded goods at time $t+1$ is described as

$$Y_{t+1}^T = q^T A^T K_t^T \qquad\qquad (4.2)^{[12]}$$

while domestic output of non-traded goods at time $t+1$ is described as

$$Y^N_{t+1}=q^N A^N K^N_t \tag{4.3}$$

Y denotes output in each sector, A signifies productivity, and q is the relative price between time t and time $t+1$, which is expressed as

$$q^T=\frac{P^T_{t+1}}{P^T_t} \tag{4.4}$$

$$q^N=\frac{P^N_{t+1}}{P^N_t} \tag{4.5}$$

In the meantime, K is the amount invested in each sector. Capital goods are assumed to be imported from abroad as an extreme assumption, and its allocation between the two sectors is decided after capital goods are imported.

$$K_t=K^T_t+K^N_t \tag{4.6}$$

Net import equivalent to current account balance (-) at time t is computed as

$$(C^T_t-Y^T_t)+K_t \tag{4.7}$$

while net export at time $t+1$ is computed as

$$Y^T_{t+1}-C^T_{t+1} \tag{4.8}$$

4.2 Intertemporal budget constraint

Using (4.7) and (4.8), the intertemporal budget constraint for this economy is expressed as

$$Y^T_{t+1}-C^T_{t+1}=\left[(C^T_t-Y^T_t)+K_t\right](1+r) \tag{4.9}$$

where r denotes the real interest rate for borrowing and lend-

ing at the world market. Substituting (4.2) into (4.9) makes the following expression:

$$q^T A^T K_t^T - C_{t+1}^T = K_t(1+r) + (C_t^T - Y_t^T)(1+r) \qquad (4.10)$$

By employing (4.1), (4.3) and (4.6), the expression (4.10) can further be re-written as

$$
\begin{aligned}
q^T A^T (K_t - K_t^N) - C_{t+1}^T &= (K_t - K_t^N)(1+r) + (C_t^T - Y_t^T + K_t^N)(1+r) \\
&= (K_t - K_t^N)(1+r) + (C_t^T - Y_t^T + \frac{Y_{t+1}^N}{q^T A^T})(1+r) \\
&= (K_t - K_t^N)(1+r) + (C_t^T - Y_t^T + \frac{C_{t+1}^N}{q^N A^N})(1+r)
\end{aligned}
$$
$$(4.11)$$

Finally, the intertemporal constraint is re-arranged to the following expression:

$$\left[q^T A^T - (1+r) \right](K_t - K_t^N) - C_{t+1}^T = (C_t^T - Y_t^T)(1+r) + \frac{C_{t+1}^N}{q^N A^N}(1+r) \qquad (4.12)$$

4.3 Implications from theoretical analysis

The left-hand side of the equation (4.12) is the current account surplus at time $t+1$. This should match the right-hand side of (4.12), which is the current account deficit at time t, in order to satisfy the intertemporal constraint.

The first implication concerns productivities of the two sectors. Although the net product of imported capital goods $q^T A^T - (1+r)$ in the left-hand side of (4.12) is normally assumed to be positive, a low productivity in the traded goods sector (A^T) pulls down the net product of imported capital, which makes the intertemporal budget constraint more stringent. Meanwhile, a low productivity in the non-traded goods sector (A^N) reduces the output of non-traded goods at time $t+1$, which indicates that the intertemporal budget constraint should also be stringent. Lower productivities in any sector or both sectors will, therefore, expose this country to the risk

that budget constraint should be violated.

The second implication concerns the allocation of capital goods between the two sectors. If the capital is totally invested into the non-traded goods sector as the extreme case ($K_t = K_t^N$ and $K_t^T = 0$), the expression (4.12) is transformed to

$$-C_{t+1}^T = (C_t^T - Y_t^T)(1+r) + \frac{C_{t+1}^N}{q^N A^N}(1+r) \tag{4.13}$$

The consumption of non-traded goods is supposed to be positive ($C_{t+1}^N > 0$), as the capital used in the non-traded goods sector is assumed positive ($K_t^N > 0$). If the output of traded goods at time t fails to exceed the consumption of traded goods at t, that is $C_t^T - Y_t^T > 0$, it will violate the budget constraint described as in (4.13). In conclusion, a country with a current account deficit at time t may not satisfy the intertemporal budget constraint when many of the capital goods are invested in the non-traded goods sector[13].

5. Quantitative analysis

This section employs regressional approach to confirm the insights described in the previous sections. After the regression form and data sources are introduced in the next subsection 5.1, a compact sample with 11 countries is applied in the following subsection 5.2. Then the sample is extended to 26 countries including northern and CEE (central and eastern European) countries in the final subsection 5.2.

5.1 Regression model and data sources

Determinants of current account balances in Europe are explored in this section[14]. Several candidate variables are chosen for examining the above mentioned insights. The standard model takes the following form:

$$cagdp_{i,t} = c + \beta_1 gdppc_{i,t} + \beta_2 gdppcgrowth_{i,t} + \beta_3 credit_{i,t} + \beta_4 savings_{i,t} \\ \beta_5 cpi_{i,t} + \beta_6 ulc_{i,t} + u_{i,t,} \tag{5.1}$$

This standard model consists of a constant, six independent variables chosen among major proxies, and the error term (*u*). The coefficient of the gross domestic product per capita (*gdppc*) is expected to be positive: higher income countries such as Germany and the Netherlands will record a favorable current account balance, while lower income economies will continue suffering current account deficits with vigorous import demand. Likewise, countries registering higher growth rates in income per capita (*gdppcgrowth*) are expected to suffer current account deficits in that a higher growth will be realized by steady investment which is supported by imports of both consumption and capital goods from abroad. Ballooning domestic demands will be financed by domestic credit (*credit*) from financial institutions which attract overseas funds. In turn, economies with lower savings rate (*savings*) are expected to experience deteriorating current account balances. Furthermore, a higher inflation rate (*cpi*) will impair international competitiveness, so will rising unit labor costs (*ulc*) in the domestic industries.

Data sources are as follows. *Eurostat* data are applied for current account/GDP ratios (%) with their partners all over the world, GDP per capita standardized by PPP (purchasing power parities), banks' external liabilities, price index (HICP index), and real labor productivity per person employed. *World Bank Open Data* are employed for domestic credit to private sectors, gross savings/GDP ratio[15] (%), and investment/GDP ratio (%) as gross fixed capital formation/GDP. *OECD StatExtracts* data are applied for unit labor costs calculated as the quotient of total labor costs and real output with 2005 as the base year of real output.

Data frequency is annual, and the sample period is 15 years of 1997 to 2011. Balanced panel regression with ordinary least squares is applied for all models below.

5.2 Basic sample regressions

The basic regression undertaken in this subsection employs the sample of 11 countries. It consists of five core countries

Table 2   Determinants of the Current Accounts: Basic Regressions with the Sample of 11Countries

Determinants	Standard model (2.0)	Alternative model (2.1)
Constant	−54.370 (7.169) ***	−54.695 (8.715) ***
GDP p.c.	4.360 (0.774) ***	4.050 (0.928) ***
GDP p.c. growth rate	−23.160 (6.647) ***	−15.044 (7.075) ***
Domestic credit/GDP	−0.027 (0.005) ***	
Savings/GDP	0.735 (0.050) ***	0.764 (0.055) ***
Inflation rate	−0.550 (0.188) ***	−0.571 (0.201) ***
Unit labor cost	−42.937 (8.888) ***	−40.536 (9.515) ***
Banks' external liabilities/GDP		−0.728 (0.341) **
Investment/GDP		
Labor productivity		
Adjusted R-squared	0.804	0.776
Observations	165	165

Notes: Standard errors are in parentheses. ***, **, * are significant at the 1%, 5%, and 10% levels, respectively.

of Germany, France, the Netherlands, Belgium, Austria, plus Finland, and five peripheral countries of Italy, Spain, Portugal, Greece and Ireland.

Regression results are shown in Table 2. The standard model in the first column demonstrates that all the six regressors report high significance at the level of one percent. Signs of the coefficients are also as expected: countries with higher GDP p.c. are likely to record more favorable current account balances, but rapidly growing economies are apt to suffer unfavorable current account balances. Soaring domestic credit in proportion to GDP, in turn, will be likely to deteriorate external balance, while countries with higher saving rates will see favorable results in current account balance. Likewise, economies with higher inflation rates or unit labor costs are apt to suffer unfavorable current account balances.

Regression results using alternative models are shown in the following three columns. Banks' external liability variable is able to replace domestic credit with a favorable significance at the 5% level (model 2.1). An expected sign can be obtained with a limited decline in the degree of fitness of the model. Meanwhile, investment/GDP ratio also succeeds to obtain high significance as a substitute for savings/GDP ratio with an expected sign, while it damages the fitness of the

Alternative model (2.2)	Alternative model (2.3)
−73.467　(10.491)　***	−54.115　(7.496)　***
8.981　(　0.957)　***	4.306　(0.810)　***
44.713　(　9.379)　***	−33.803　(8.881)　***
−0.034　(　0.007)　***	−0.028　(0.005)　***
	0.734　(0.053)
−0.946　(　0.261)　***	−0.700　(0.194)　***
1.523　(13.602)	
−0.615　(　0.112)　***	
	0.408　(0.144)　***
0.612	0.786
165	165

model (model 2.2). Labor productivity is also able to replace the unit labor costs with highest significance, an expected sign and not greatly impairing the model's fitness (model 2.3).

5.3 Extended sample regressions

In this subsection, the sample is enlarged to include the northern and eastern part of Europe. The extended sample involves 26 countries: 11 countries already examined in the previous subsection, joined by the United Kingdom, Switzerland, 3 northern European countries (Denmark, Norway and Sweden), 3 Baltic countries (Estonia, Latvia and Lithuania), and 7 CEE (central and eastern Europe) countries (Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovenia and the Slovak Republic)[16].

The standard model with an enlarged sample takes the following form:

$$cagdp_{i,t} = c + \beta_1 gdppc_{i,t} + \beta_2 gdppcgrowth_{i,t} + \beta_3 credit_{i,t} + \beta_4 savingsrate_{i,t}$$
$$\beta_5 cpi_{i,t} + u_{i,t}$$

(5.2)

Labor cost variable (ulc), which joined the sample in the previous section, is excluded in this regression, since labor

Table 3　Determinants of the Current Accounts: Extended Regressions with the Sample of 26 Countries

Determinants	Standard model (3.0)	Alternative model (3.1)
Constant	−62.400 (3.645) ***	−66.642 (3.302) ***
GDP p.c.	6.659 (0.419) ***	7.355 (0.383) ***
GDP p.c. growth rate	−13.285 (3.858) ***	−17.327 (3.496) ***
Domestic credit/GDP	−0.040 (0.007) ***	−0.032 (0.006) ***
Savings/GDP	0.109 (0.044) **	0.144 (0.040) ***
Inflation/GDP	−1.151 (0.195) ***	−0.363 (0.235)
EU dummy variable		−5.628 (0.603) ***
Euro dummy variable		−0.924 (0.684)
SEA dummy variable		
CEE dummy variable		
Adjusted R-squared	0.506	0.604
Observations	390	390

Notes: Standard errors are in parentheses. ***, **, * are significant at the 1%, 5%, and 10% levels, respectively.

cost data are not available in several countries[17].

The regression results are shown in Table 3. The standard model herein consists of a constant and five independent variables. All the five regressors remain significant at least at the 5% level. The signs of the coefficients are also as expected. But the fitness of the model with this extended sample fails to outperform the basic regression in the previous subsection.

However, when appropriate dummy variables are introduced, it becomes able to improve the fitness. The alternative model (3.1) with the EU dummy variable is more favorable while the EMU dummy is not able to obtain sufficient significance. Other alternative models (3.2 and 3.3) also prove that the EU, SEA and CEE dummy variables are effective. In these alternative models, signs of the dummy variables are all negative: joining EU is likely to deteriorate external balances, at least at the initial stage of the currency union. Likewise, the peripheral locations in Europe, represented by the SEA and CEE dummy variables, were liable to worsen the external balances in the period examined herein.

Alternative model（3.2）	Alternative model（3.3）
−29.246 （5.565）***	−39.916 （5.215）***
3.641 （0.560）***	4.882 （0.529）***
−12.866 （3.530）***	−16.432 （3.256）***
−0.037 （0.007）***	−0.029 （0.006）***
0.064 （0.043）	0.097 （0.039）**
−0.918 （0.250）***	−0.196 （0.274）
	−4.861 （0.571）***
	−0.798 （0.638）
−5.461 （0.803）***	−4.740 （0.736）***
−6.807 （1.069）***	−5.247 （0.989）***
0.587	0.657
390	390

6. Conclusion

As a main cause of the eurozone crisis, current account imbalances in the currency union are now under investigation in the academic field. This paper, focusing on the SEA countries, researches about external imbalance problems both theoretically and empirically.

Theoretical analysis demonstrates the plausibility that the high growths in the SEA countries were not sustainable. The intertemporal budget constraint might be violated when the productivity in the peripheral economies failed to improve sufficiently and the imported capital was invested predominantly in the non-traded goods sector with lower productivity.

Empirical analysis confirms the mechanism how the current account balances in the SEA countries deteriorated. Significant variables are confirmed: per capita income levels, its growth rates, domestic credit booms, savings rates, and hikes in prices and labor costs. It is also proved that the local idiosyncrasy, which can be addressed by introducing appropriate dummy variables, should be effective, particularly in the enlarged pan-European sample.

Notes

1. The EU decided the assistance to Ireland in November 2010 and to Portugal in May 2011, respectively.
2. According to the latest economic forecast by the European Commission announced in February 2013, the eurozone is expected to contract by 0.3% in 2013, while a recovery is forecast in 2014 with a positive growth rate of 1.4%.
3. Unlike in a closed economy, where saving equals domestic investment, saving and investment can diverge under capital mobility. However, the evidence found by Feldstein and Horioka (1980) claimed that changes in national saving rates ultimately changed domestic investment rates by the same amount, even among industrial countries due partly to limited capital mobility. For details, see Obstfeld and Rogoff (1996), pp. 161–4.
4. Orii (2010) documents the main literature.
5. Lane (2012), in attempting a comprehensive analysis of the European sovereign debt crisis, pointed out the external imbalance problems as one of the major factors, and linked the woes in the SEA countries with the 'sudden stop' problems caused by a large current account deficit.
6. The sample of Lane and Milesi-Ferretti (2011) includes 67 countries worldwide.
7. 'Other investments' in balance of payments denote financial flows other than foreign direct investment (FDI) and portfolio investment, including banks' lending and foreign aid.
8. Net international investment position (NIIP) refers to the difference between a country's gross external financial assets and liabilities, which includes both its government assets/liabilities and private assets/liabilities.
9. Luxembourg is excluded from the analysis here in that this compact country continued registering so sizable current account surpluses of 5.4% to 13.2 % of GDP during this period that it is apprehended to disturb the figures in this table.
10. In *Eurostat*, the PPP is called PPS (the Purchasing Power Standard), which is used as currency conversion rates to convert expenditures expressed in national currencies into an artificial common currency (PPS), eliminating the effect of price level differences across countries.
11. The HICPs, calculated according to a harmonized approach and a single set of definitions, give comparable measures of inflation in the euro-zone, the EU, the European Economic Area (EEA) and for other countries including accession and candidate countries. They provide the official measure of consumer price inflation in the euro-zone for the purposes of monetary policy in the euro area and assessing inflation convergence as required under the Maastricht criteria. The HICPs in the latest data series are calculated with 2005 = 100.
12. It is assumed that there is no labor.
13. A minimum amount of investment in the traded goods sector needed to satisfy the intertemporal budget constraint is obtained from (4.11) as

$$K_t^N = \frac{1+r}{\left[q^T A^T - (1+r) \right]} \left(C_t^T - Y_t^T + \frac{C_{t+1}^N}{q^N A^N} \right) + C_{t+1}^T$$

14. Similar regressions to discover determinants of current account balances are attempted in Jaumotte and Sodsriwiboon (2010), and Eichengreen (2010).
15. Gross savings are calculated as gross national income less total consumption but plus net transfers.
16. Several smaller economies such as Iceland, Luxembourg, Lichtenstein and former Yugoslavian countries other than Slovenia are excluded mainly from data availability problems.
17. A tentative regression using unit labor costs with a limited number of sample countries fails to provide a satisfactory result. Contrary to our expectation, the computed coefficient is positive, although it remains significant at the 5% level.

42

Labor productivity cannot substitute for labor cost, as its calculated coefficient has the opposite sign to our expectation and is not significant at least at the 10% level.

References

Blanchard, Olivier, and Francesco Giavazzi (2002), "Current Account Deficits in the Euro Area. The End of the Feldstein Horioka Puzzle?" *Brookings Papers on Economic Activity*, Vol. 2002, No. 2, pp. 147–209.

Caballero, Ricardo J., Emmanuel Fahri, and Pierre-Olivier Gourinchas (2008a), "An Equilibrium Model of 'Global Imbalances' and Low Interest Rates," *American Economic Review*, Vol.98, No. 1, pp. 358–93.

Chen, Ruo, Gian Maria Milesi-Ferretti, and Thierry Tressel (2012), "External Imbalances in the Euro Area," IMF Working Paper WP/12/236.

Eichengreen, Barry (2010), "Imbalances in the Euro Area," ⟨http://emlab.berkeley.edu/~eichengr/Imbalances_Euro_Area_5-23-11.pdf⟩.

Feldstein, Martin, and Charles Horioka (1980), "Domestic Savings and International Capital Flows," *Economic Journal* 90 (June), pp. 314–29.

Giavazzi, Francesco, and Luigi Spaventa (2011), "Why the Current Account Matters in a Monetary Union," in Miroslav Beblavy, David Coblam, and L'udivit Odor (eds.), *The Euro Area and The Financila Crisis*, Cambridge University Press, pp. 59–80.

Jaumotte, Florence, and Piyaporn Sodsriwiboon (2010), "Current Account Imbalances in the Southern Euro Area," IMF Working Paper WP/10/139.

Lane, Philip R. (2012), "The European Sovereign Debt Crisis," *Journal of Economic Perspectives*, Vol. 26, No. 3 (Summer), pp. 49–68.

Lane, Philip R., and Gian Maria Milesi-Ferretti (2006), "Europe and Global Imbalances," Paper at 7th Jacques Polak Annual Research Conference, Nov. 9–10, 2006 at International Monetary Fund.

Lane, Philip R., and Gian Maria Milesi-Ferretti (2011), "External Adjustment and the Global Crisis," NBER Working Paper 17352.

Obstfeld, Maurice (2012), "Does the Current Account Still Matter?" NBER Working Paper 17877.

Obstfeld, Maurice, and Kenneth Rogoff (1996), *Foundations of International Macroeconomics*, The MIT Press: Cambridge, Mass.

Orii, Keisuke (2010), "The U.S. Economy under Global Imbalances," *The Keiai Journal of International Studies*, No. 23, December, pp. 53–76.

Taylor, Alan. M. (2012), "External Imbalances and Financial Crises," NBER Working Paper 18606.