

Trabajo Fin de Máster

The Spanish Current Account Revisited:
Descriptive and Empirical Research from 1993 to 2018

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Summary

The current account in general and the trade balance in particular can be useful indicators of competitiveness. Capital investments are undertaken to increase productive capacity and enhance competitive position, but if competitors also invest wisely or our own investments generate a misallocation of resources the competitive position may remain unchanged or even get worse. Empirical research regarding the sustainability of persistent current account deficits for the Spanish economy aims to provide evidence about the predictability of future financial crises. In addition, further analysis is performed concerning the recent current account adjustment in order to answer the inquiries relating its continuity.

Key words: current account, trade balance, capital expenditure, unit labor cost, competitive position.

1. A brief look into the Balance of Payments

The Balance of payments (BoP), as defined by the IMF¹, is a double-entry bookkeeping information system that summarizes a country's economic transactions with the rest of the world that, in the case of Spain, is mostly measured on a quarterly basis. Every transaction involves both debit and credit, then the sum of all debit entries should equal the credit ones, and BoP statement should equal zero but that is rarely true because, as every information system with limitations, data recorded come from different sources. Debit entries reflect purchases of imported goods and services, payments received for exports, purchases of foreign financial assets and payments (interest and principal) received from debtors or borrowers. Credit entries reflect payments for imported goods and services, payments for purchased foreign financial assets and payments to creditors or lenders. In a different way, a debit represents an increase in a country's assets (purchase of foreign assets or cash received from foreigners) or a decrease in its liabilities (amount owed to foreigners); a credit represents right the opposite. The BoP is composed of the current account that measures primarily the flow of goods and services, the capital account that records transfers of capital and the financial account that measures investment flows. However, practitioners usually think of the current account as roughly synonymous with the trade balance (because is the dominant component) and lump all the financing flows (capital and financial accounts) into one category consisting of two types of flows (portfolio investment and FDI). Although not completely accurate, that way of thinking about the BoP focuses the attention on trade, portfolio flows and FDI, which are the most sensitive components to market conditions, prices of goods and services, asset prices and exchange rates. Besides, this perspective fits well with the role that the BoP plays in macroeconomics. Summarizing, BoP analysis is important for assessing a country's macroeconomic environment, economic policies or determining long-term growth potential. Trade and capital flows data are crucial for evaluate a country's overall level of capital expenditure, profitability and risk.

¹ IMF, Balance of Payments Handbook.

For the purpose of this study, the Spanish current account, three sub-accounts compose it:

1. **Merchandise trade and services** which comprise commodities, manufactured goods (intermediate or finished), tourism, patent fees...
2. **Income receipts or primary income** include three components, the dominant component is investment income, which includes income received from ownership of assets, such as dividends and interest payments, including reinvested benefits of mutual funds and the other way round for the case of expenses. Work income (wages, social security contributions) are the second component. Finally, the third component is “other primary income”, which includes taxes over production, imports and subsidies.
3. **Unilateral transfers or secondary income** are one-way transfers of assets such as worker remittances from abroad to their home country or foreign direct aid as received by the European Social Fund.

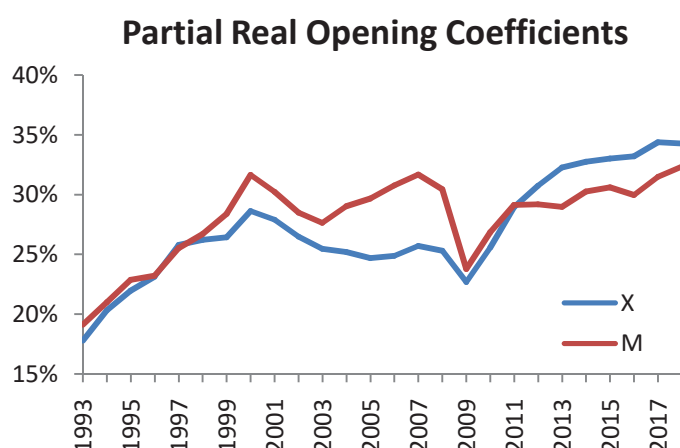
Two more topics are also normally evaluated when assessing the international finances of a country, which are namely the Net International Investment Position (NIIP) and the gross external debt (see both in Appendix A1). NIIP is a statistical figure calculated by the Bank of Spain as the difference between foreign financial assets own by Spanish residents (like other countries bonds or ownership claims on foreign firm's net assets; equity) and foreign financial liabilities own by non-Spanish residents (like Spanish public debt or Spanish equities). The improvement in the debtor position since the lowest peak in 2014 when reached a minimum of 98% of GDP improved to 77% in 2018 was mainly due to competitiveness enhancements, which achieved trade balance surpluses that, up to now, are being able to generate financing capacity for the Spanish economy. Although, external financial dependence is still very high, leaving Spain in a vulnerable position where can easily get financing troubles if the confidence of international investors in the Spanish economy weakens and then the sovereign yield spread widens, as happened in 2012 showing a differential higher than 600 basis points (figure 14). That skyrocket in borrowing costs made the current account deficits unsustainable, that is, Spain did not meet its Intertemporal Budget Constraint (IBC), further explain later.

The financing capacity (+) or necessity (-) is the sum of the current and capital accounts and reflects the difference between the resources that the country generates minus those that consumes. For example, if it generates more than consumes then exceed resources are available for the rest of the world; capacity (Appendix A2). In fact, shows a very similar profile than the current account because is the major component.

2. The Trade Balance

The external trade sector in Spain has grown rapidly. The relative size of external trade (sum of both imports and exports of goods and services) in comparison with GDP has augmented from 35% to 65%, approximately², as can be easily found in the following charts:

Figure 1

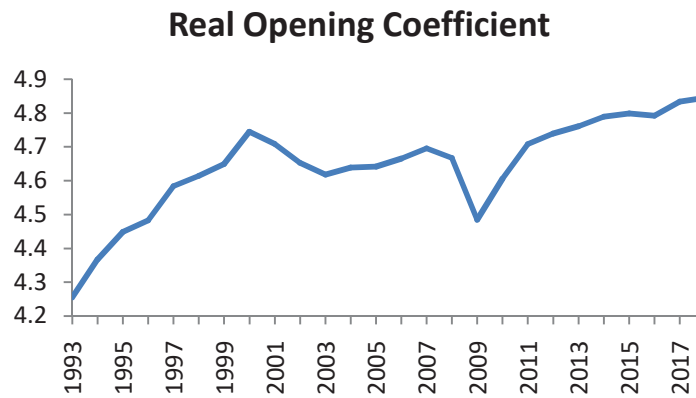


Source: own elaboration from Bank of Spain and WDI database from the World Bank.

The aggregated real opening coefficient is shown in the next below graph in logarithmic (neperian) scale:

² Figures are presented in real terms, with constant prices of year 2010. GDP deflator has been used to transform the nominal numbers. Appendix A3 provides more disclosure.

Figure 2

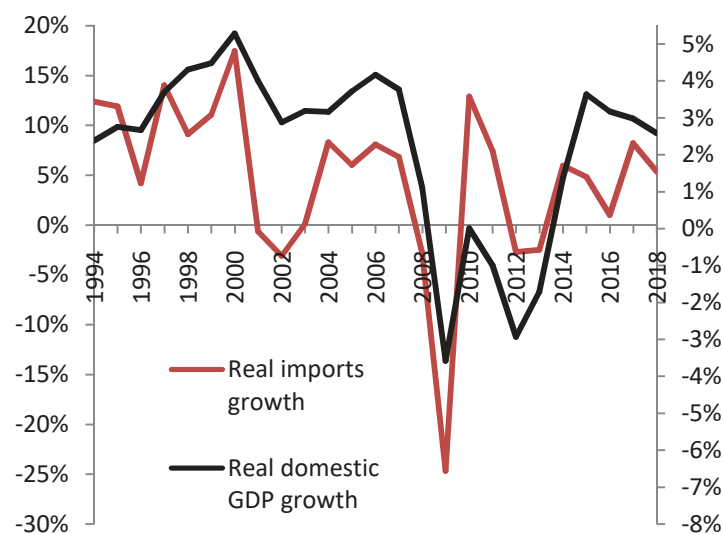


Source: data from Bank of Spain and WDI.

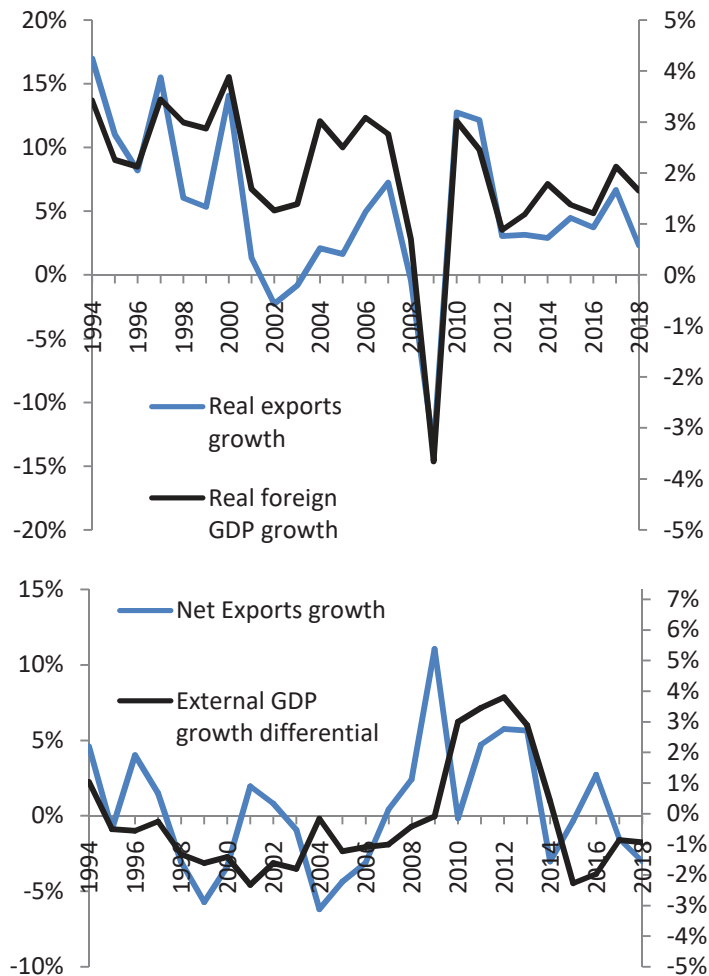
Reminding the concept of globalization, we can see as the trade flows grow more than the domestic product except in crises periods as the economic turbulences suffered at the beginning of the 21st century or the global financial crisis of 2008.

A higher exposure to other countries means that the business cycle can be more easily transmitted to other economies and vice versa, becoming the Spanish economy more sensitive to external factors and shocks from outside. In fact, imports are more dependent on the domestic cycle or current GDP growth and exports respond more to the cycles from the rest of the world, so that if real domestic GDP is growing at a higher pace than its major trading partners³ it is probable that imports growth outstrips exports growth:

Figure 3



³ To compute real foreign GDP growth the next countries have been taken into account: France, Germany, United Kingdom, North America and Latin America and Caribbean excluding high income.



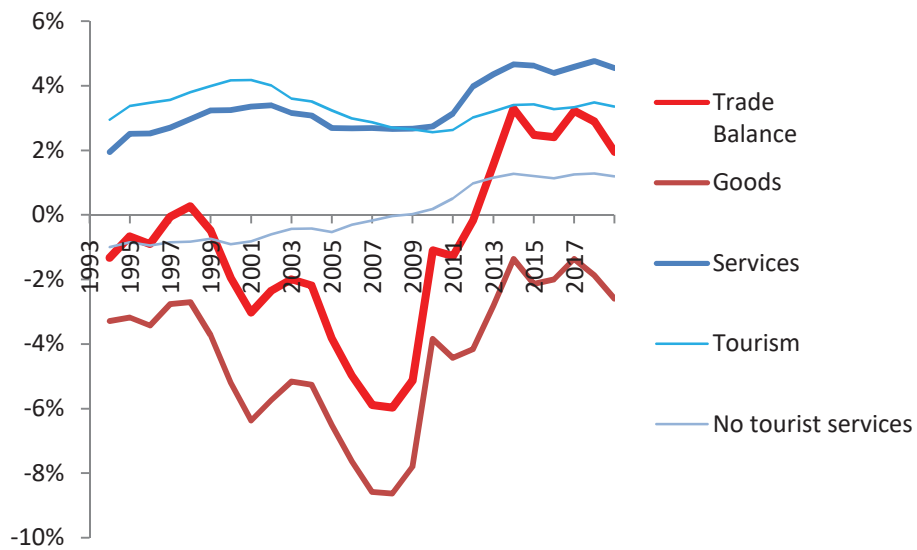
Source: data from Bank of Spain and WDI database.
(Trade flows are shown in the left axis and GDPs in the right axis).

In a similar vein, the last chart reflects the aggregate outcome, where a normal situation would reflect a positive trade balance when our trading partners growth more than us.

Differences in business cycles between countries can explain why the pattern of external trade balances is completely different from the rest of the domestic economic cycle. In the European Union, where the business cycles of country members are relatively well synchronized (Soares, 2011), and regarding that Spanish major trading partners are also European countries, the difference between the external sector trend with the rest of the components of GDP is not as big as it can be, for example, with a country that trades with other economies running very different business cycles.

A decomposition of the trade balance is presented in the next graph:

Figure 4



Source: data from Bank of Spain.

The dominant component of international commerce are goods, which represent the bulk of the deficit, showing the same profile than the trade balance, this latter partially offset by the surplus performed by service activities, reflected in the upward shift. A persistent deterioration until 2007 showed a deficit amount nine times higher than the start, followed by a sharp correction until a relative equal deficit at the end than at the beginning. Services have always experienced a surplus throughout the entire series, due to the great results performed by tourist exports, which performed a continued steady growth, quadrupling at the end. No tourist services were slightly negative till the internal devaluation (Appendix A4.) started in 2009, experimenting right after a great improvement. The upward sloping profile developed by services, which almost sextuple at the end, contrasts with the huge volatility experimented by the goods balance plunging, soaring even faster and conforming peaks and valleys to finish at practically the same deficit level than at the start of the series.

The alarming trailing path developed by the goods balance reached an unsustainable level in 2007 in the outset of the global financial crisis, representing almost a 9% deficit of GDP. An internal devaluation and other structural changes led to an enhanced competitive position which raised exports. In addition, the lowering investment expenditure and internal consumption was traduced as a lower level of imports. Those facts suddenly corrected the trade balance to more acceptable levels.

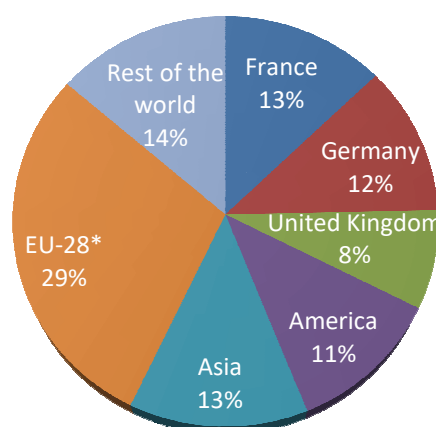
Despite these measures, the goods balance has never accounted for a net positive flow in the whole series.

Regarding services there is a surplus even in the no tourist sector since the balance adjustment in the aftermath of the Great Recession. In particular, for the tourist sector there is a surplus for any country in the world, but the amendments of economic and political issues in competitor nations, getting them safer can rapidly damage the Spanish tourist balance.

Spanish major trading partners for year 2018 are shown in the next graph as percentage of total trade relationships:

Figure 5

Trade flows

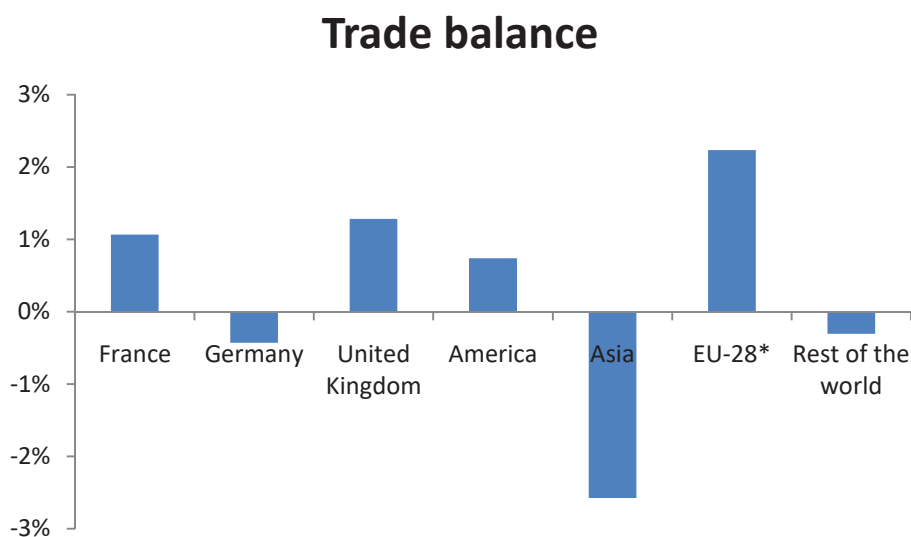


Source: data from Bank of Spain.
*Excluded: France, Germany and UK.

In 2018 Spain accounted for a total of 804,798 million of Euros in transactions with the rest of the world, in current terms. For a current GDP of 1,208,248 accounts for a 66.6% of opening coefficient (which remains equal if calculated for constant figures, of 2010, as both numbers would be deflated by the same amount as shown before). There are three major individual partners, which together with the rest of the EU conform the 62% of total trade flows.

The next graph provides more information about the outcome, showing the net flows:

Figure 6



Source: data from Bank of Spain.
*Excluded: France, Germany and UK.

Some deficit arise from Germany and the rest of the world, but the major deficit comes from Asia, more than 2% of GDP, where cheap labour costs, low statutory corporate income tax rates and undersized state and government services are the main factors who place Chinese and firms from other Asian countries in a very competitive position. On the other hand, a positive net flow from America is achieved thanks to North and Central America, because with South America is practically balanced. Great net export surpluses come from France and the UK. Regarding the remaining EU-28 the surplus is mainly due to Portugal, Italy, Belgium and finally the Netherlands almost balanced, in order of contribution.

To sum up, Spain got a trade balance surplus of 1.95% of GDP in 2018 that keeps in line with the surpluses recorded since 2012.

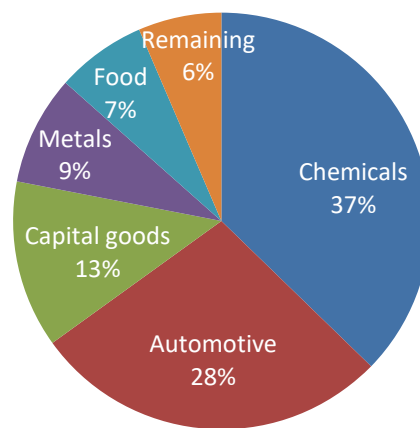
Currency also has an important effect for the composition and volume of trade flows, which can completely differ from the internal cycle. In the ongoing process of the UK leaving the EU, discrepancies between parties and uncertainty relative to a mess outcome, has led the sterling pound to depreciate strongly against the Euro (Appendix A5), but regarding that the Euro has also suffered downward pressures. The accumulated depreciation since the referendum, around 9%, can seriously damage the purchasing power of British imports. This can have important consequences for the Spanish economy, which has a great exposition to the British economy, potentially

damaging that Spanish source of income. On the other side, Spanish imports from the UK seem cheaper. Anyway, disruptions that could arise if Brexit process finally happens (above all if no deal is agreed) and current uncertainty are already damaging capital investments and thus jeopardizing economic growth for both parties, with great implications for Spain due to the huge trade relationships with the UK⁴.

The next graph provides evidence about the trade flows experimented by goods in 2018, expressed as percentage of total goods traded:

Figure 7

Goods Trade



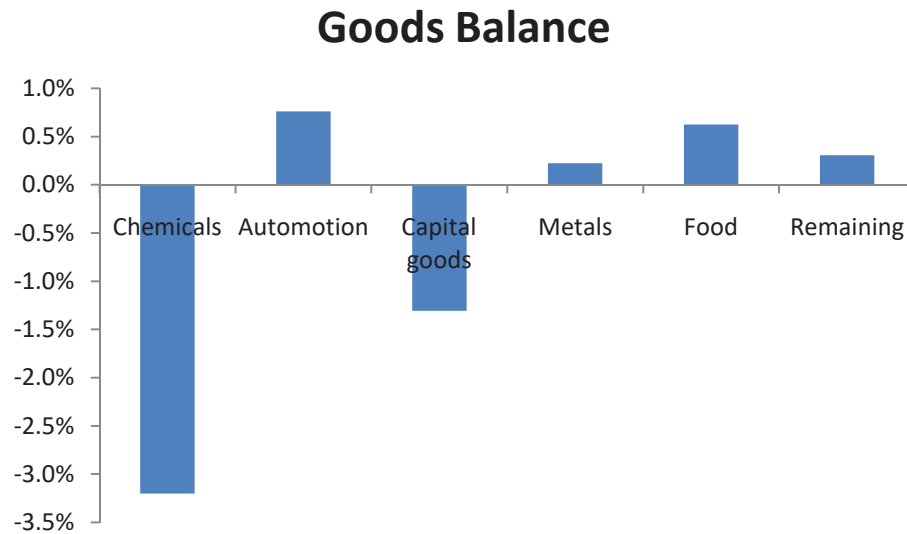
Source: own elaboration from ICEX.es.

Chemicals and automotive represent the bulk of goods exchanged. Chemicals include fuel (oil, gasoline, natural gas...), lubricants, medicines and the like. Automotive is composed by cars and its components and other means of transport.

The next graph goes one step forward and presents the net exports as GDP percentage for the same year, providing more useful information:

⁴ The presence of customs, with more prolonged delivery times, may difficult the Spanish's exports of fruits and vegetables, perishable food which cannot be stored.

Figure 8

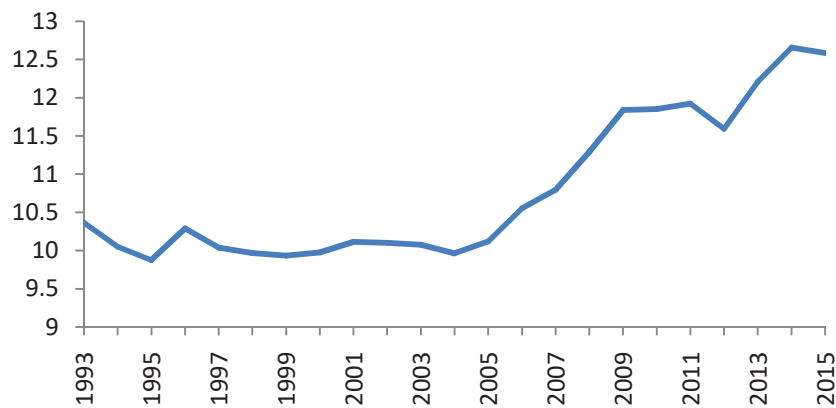


Source: own elaboration from ICEX.es.

This global picture indicates that Spain produce and sells goods of medium and high value added, which is a proper characteristic of industrialized countries. The big trade deficit showed by chemicals products, higher than 3% of GDP, is mainly due to fuel, indicating the need of improvements in energetic efficiency and renewable sources of energy. Automotive industry presents a surplus but there is a deficit in the trading of its components, which is more than offset by the sales of cars. Capital goods present a moderate deficit.

Goods are distinguished between capital and consumption goods. Capital investments are mostly satisfied by German manufacturers, which have a long-term impact in the economy improving the productive capacity and enhancing the Spanish competitive position, leading to higher economic growth. On the other hand, consumption goods are mostly delivered by China and other economies with cheap labour costs and oil exporting countries. In the last matter, Spain has reduced the consumption of energy by unit of GDP produced⁵ as can be seen fairly in the next chart:

⁵ GDP per unit of energy use (PPP \$ per kg of oil equivalent).

Figure 9**GDP per unit of energy used**

Source: own elaboration from International Energy Agency (IEA).

The improvement in efficiency showed by the chart is due to the adoption of new technologies and the development of renewable sources of energy has led to a lower, but still high, dependence of oil (Appendix A6. represents the individual share of each kind of renewable energies). The great volatility of oil prices reflected in international commodity markets due to geopolitical tensions and economic issues in Middle East countries and the rest of the world can lead to higher costs of this energy input, which is translated in a worsen of the trade balance and particularly the goods balance for a typical oil importer country as Spain against the improvement showed by the exporter country.

2.1. Assessing the Trade Balance from a fundamental approach.

A fundamental macro identity can explain the relationship between net exports and expenditure/saving decisions, expressed as:

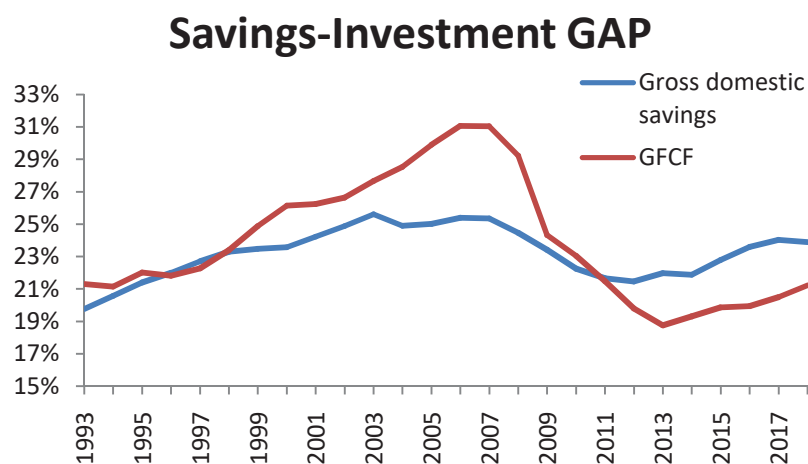
$$X - M = (S - I) + (T - G)$$

Where a trade surplus can be reflected in an excess of private saving over investment or a fiscal surplus (government saving), or both. Summarizing for the Spanish case, the country does not save enough to fund its investment spending. In BoP terms means that the trade deficit must be matched by an offsetting capital inflow reflected in capital or financial account surplus, or both, which show us the type of financial assets that are exchanged. The prolonged accumulation of net claims from the rest of the world can

lead to currency depreciation, which is complex to analyze because Spain becomes part of a monetary union and Germany is a typical trade surplus country focused on capital goods which offsets Euro depreciation due to negative net exports from Spain.

As remarked earlier, Spanish trade balance is historically characterized by continuous deficits. Net exports are very important because it measures the size and direction of international borrowing. In order to balance the BoP, the trade deficit must be offset by an opposite balance in the sum of the capital and financial accounts. The requirement of satisfying this accounting identity means that Spain's accumulated trade deficits year over year has to increase its net foreign debts by the same amount of the deficit. That deficit can be financed by capital imports (e.g., direct investments by foreigners on real assets), loans by foreign banks or the sale of Spanish equities and fixed income securities to foreign investors. In other words, Spain has been issuing liabilities that will eventually have to redeem in the future, decreasing also its foreign wealth. Those international capital flows essentially reflect an inter-temporal trade where Spain has been effectively importing present consumption (borrowing funds for relative excessive current expenditure) and exporting future consumption (repaying debts). Moving forward, Spanish traditional current account deficit⁶ resulted from low private savings, high private investment in wrong sectors and government deficits (negative savings) as can be shown in the next illustrations:

Figure 10



Source: own elaboration with WDI.

⁶ Sometimes trade balance and current account are used interchangeably because the former is the major and dominant component of the latter, but accurately speaking are not the same, above all when defining national product as GDP rather than GNP.

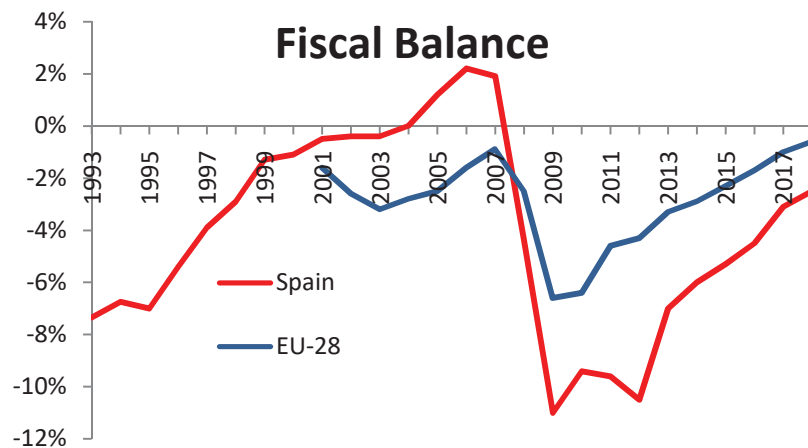
The above chart shows the gross domestic savings⁷ as percentage of GDP along with Gross Fixed Capital Formation⁸ (GFCF) in the same scale measure. The purpose of this graph is to show that a negative gap, understood when the red line surpasses the blue one, have wrong consequences for the trade balance, which is mainly due to convergence factors, but in this case that reason was not applicable for Spain as already was a developed industrialized country in the 90's. that overinvestment was produced in the construction sector (a sector with low perspectives of increasing the production capacity and productivity over the long term). We can appreciate how during the investment boom the differential savings-investment becomes increasingly negative, 9,02% in 2005. A positive outcome arises since 2012, just exactly when the trade balance becomes positive and remains until now, showing a positive differential. Appendix A7 presents those same figures for the EU-28 as comparison purposes, showing during the whole series a positive differential.

The below chart provides the general government budget balance as percentage of GDP⁹. A bad public finance year is reflected in a negative fiscal balance where expenditures surpass the income achieved, net borrowing, where the deficit must be financed with financial resources from other sectors of the economy. EU-28 profile has been added for comparison purposes, but data is only available since 2001. The better balance achieved by Spain at the beginning of the millennium can signal an overheated economy, where due to excessive economic activity the government is able to collect more revenue through income taxes, but since the Great Recession Spain has always underperformed, reflecting structural problems.

⁷ Gross domestic savings are calculated as GDP less final consumption expenditure (total consumption).

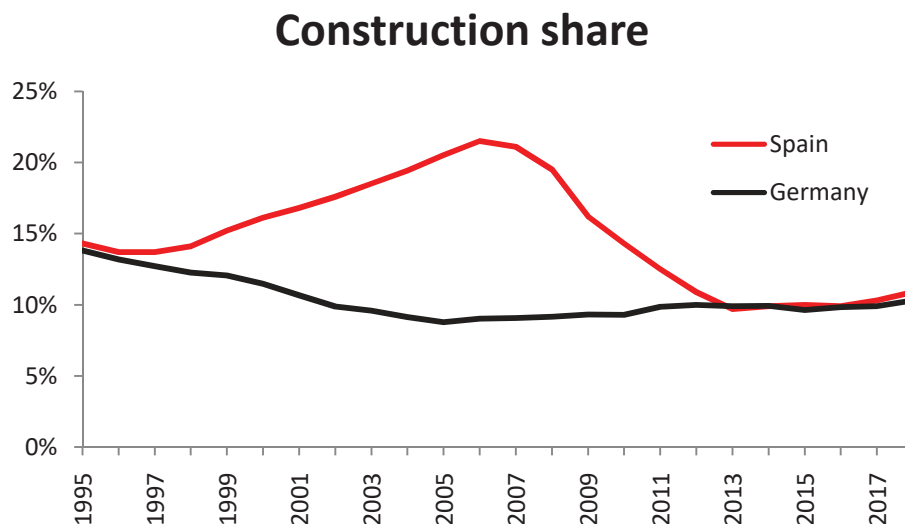
⁸ Gross fixed capital includes land improvements, plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.

⁹ The general government deficit/surplus comprises the central government, the state government, the local government and the social security funds, and is defined in the Maastricht Treaty as the general government net lending (+)/net borrowing (-) according to the European System of Accounts.

Figure 11

Source: own elaboration from Eurostat data.

The next graph is intended to show the overinvestment happened for the Spanish economy from 1998 to 2011, approximately, in the construction sector, measured as GDP percentage. The inclusion of Germany aims to provide a comparison perspective, where the differential was as big as 12.5% from their respective GDPs, just before the burst of the real estate bubble and a gradually come back to sustainable levels as those of the German path.

Figure 12

Source: own elaboration from national statistics bureaus (INE & Destatis).

A distinction must be done at this point, in order to explain that is not the same having trade deficits triggered by high private or government consumption than deficits triggered by strong investments, because in the latter case the national economy can increase its productive resources and its ability to repay its debts.

For the Spanish's case, the current account deficits in the 60's were due to convergence factors, regarding that Spain was a developing country at that time and was necessary to undertake capital investments in new technologies and infrastructure in order to enhance productivity and become a developed nation with improving life standards, growing at higher rates (catching up phase) than those developed countries that provided their technology, which in some cases could have already been suffering diminishing returns on capital.

That convergence process cannot apply any longer to the decade of 90's¹⁰, where Spain was already a developed country with great levels of institutions, human capital, technology and infrastructure. In fact, it was the booming investment in the real estate sector the triggering of misplacement in the Spanish competitive position. The construction industry is a sector without international competence and weak technological base unable to be a source of economic growth in the long-term. In addition, regulatory framework was also not optimal, with the Spanish government approving a ground liberalization that contributed to feed the bubble. The burst of the global financial crisis had severe consequences for Spain due to high indebtedness levels and low saving rates with serious problems for the banking sector¹¹ that had to be restructured.

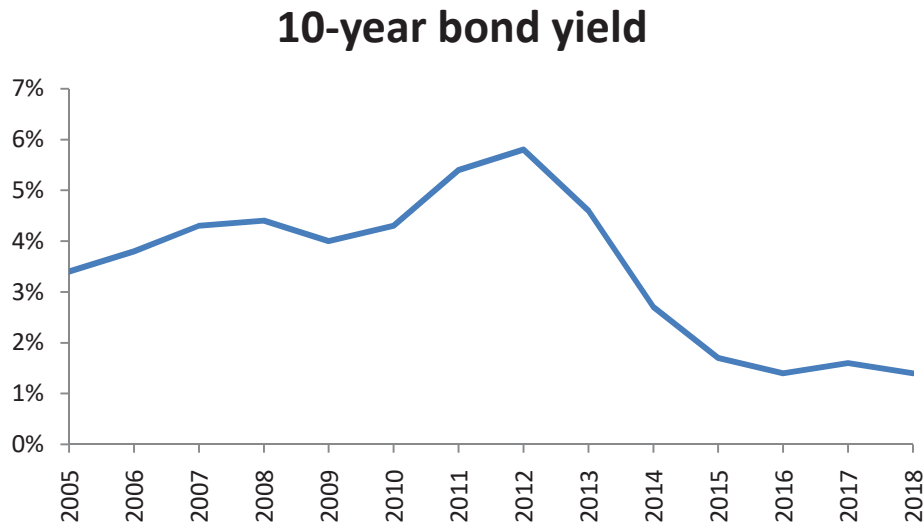
However, it is also important to have in mind that the relative huge indebtedness of the Spanish economy triggered by the weak performance and relative low competitiveness of the domestic economy, which led to a historical past of continuous trade deficits, is another important factor of sensitivity and borrowing costs. These persistent current account deficits led to a permanent increase in claims held by other countries. The accumulation of an excessive debt burden can raise concerns among suppliers of capital about an increase in potential default risk. As a result, foreign investors could require higher risk premiums for such claims, raising the cost of debt.

¹⁰ In the 80's return on investment declined due to enhanced competitive position of Asian tigers.

¹¹ Have in mind that a mortgage is denominated in nominal currency units but the real asset has a market real value which can be very volatile in financial distress situations.

The increase in sovereign borrowing costs can be easily found in the next below graph, causing no minor problems in a highly leveraged economy:

Figure 13



Source: own elaboration from OECD Database.

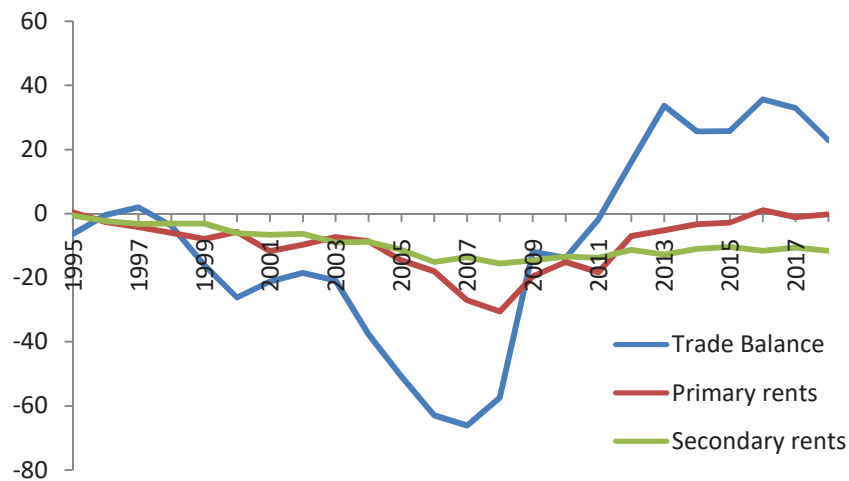
A regular financial indicator to gauge the financial distress within an economy is the sovereign yield spread, which amounts the difference between each European member country and its comparable 10-year German bond, considered, by convention, as the safest by investors. That spread is useful to estimate the country risk.

Firms and nations compete for capital (equity or debt), and the cost of capital is a function of perceived risk. Capital markets are a mechanism to discipline the economic policy decisions of a country. The composition and structure of debt is crucial for assess credit risk, so that an indebtedness in the same currency (no exchange rate risk), long-term maturity and fixed interest rate are characteristics that help to repay liabilities in case of a decrease in confidence among international investors.

3. The remaining Current Account

To gain an integral perspective of the current account the next graph shows the profile of its three main components from 1995 to 2018 in constant prices of 2010 (vertical axis is presented in thousand of millions of Euros):

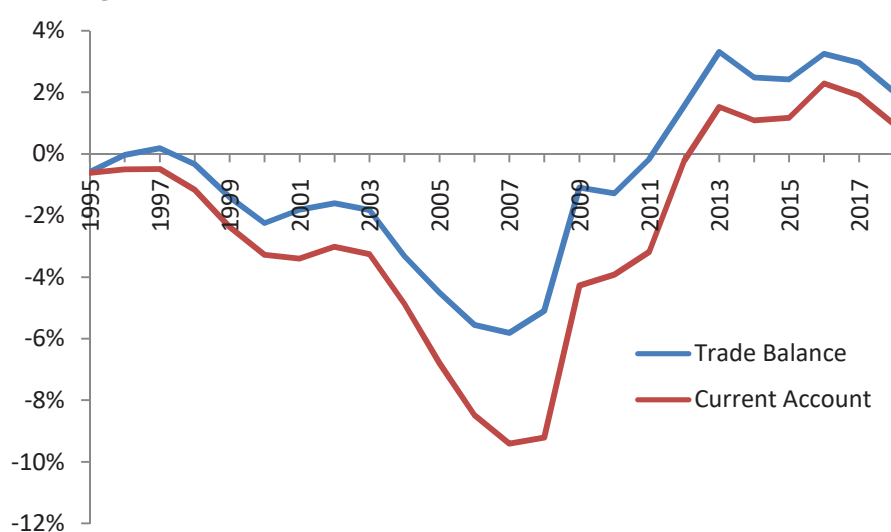
Figure 14



Source: data from Bank of Spain.

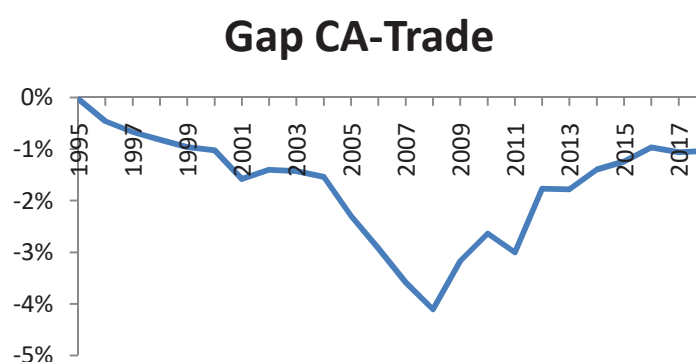
The bulk of this account is composed by trade flows, showing primary rents a high correlation, which is even higher for investment rents as is its dominant component and primarily reflect the financial condition bear by the country. Correlation with secondary rents is quite low, but still representing a similar pattern to the trade balance but with much less volatility; from balanced account toward a deterioration which is slightly improved since the crisis and remaining at very constant levels.

Let first focus on trade flows presenting another perspective for assessing the relevance of the trade balance in the national economy is to express it as a percentage of GDP. Current account measure is also attached in the next graph, as is another important matter of concern for this work:

Figure 15

Source: data from Bank of Spain.

As said before the trade balance is the principal component of the current account, as can be easily appreciated in the above chart with a correlation of 97%. In the case of being a country with prolonged trade deficits, assets need to be sold to finance that deficit with the consequence of receiving fewer dividends, also the burden debt rises with an increase in the interests charged as default risk increases, so the main outcome is that the current account is going to reflect a higher deficit than the trade balance. This diminution on dividends received and the increment on interest paid are reflected in the balance of primary income, specifically in the investment income section. The consequence is that the gap between both profiles in the chart gets bigger as the trade flows get worse, arriving at a 4.11% difference in 2008 as can be easily spot in the previous and in the next graph:

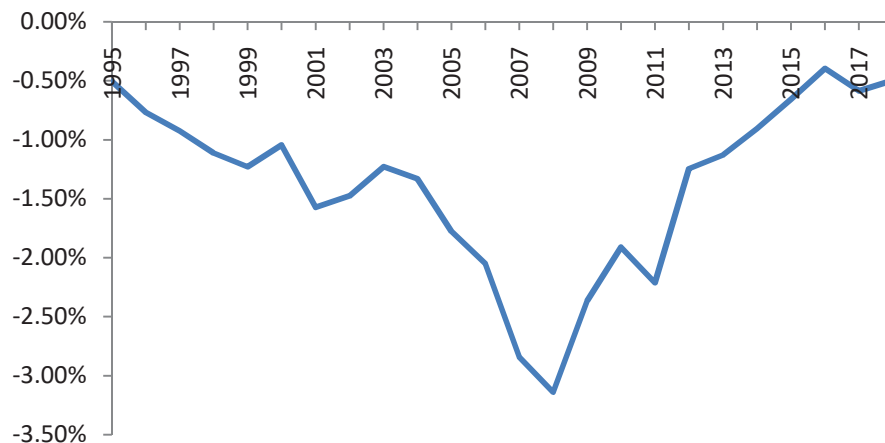
Figure 16

Source: own elaboration.

The chart represents algebraically the difference between the current account and the trade balance as percentage of GDP. This gap measure, although, has the noise produced by the fluctuation of the smaller components of both rent balances. The next chart shows the main component of the primary income, in order to evaluate the creditworthiness of the country and current financial conditions set by suppliers of capital, mostly reflected in the interest burden:

Figure 17

Investment income



Source: data from Bank of Spain.

A downward-sloping profile basically means a sell-off of financial assets and the issuing of new debt capital due to a trade balance deficit¹² triggered by deterioration in the competitive position of Spain. The financial pressure reached in 2007 and 2008 raises concerns about the sustainability of the debt and the willingness of international investors and creditors to continue to provide the same financing terms, not willing to hold more Spanish securities in their portfolios as the default risk of the country exceeds their threshold of risk tolerance. Note that, in spite of having a current account surplus since 2013, in 2018 still a negative investment rent is bearing by the country as there still exist matters of concern for economist surrounding the Spanish economy, as for example demographic factors, low saving rate or high indebtedness levels¹³ that suggest structural reforms which have not been possible to undertake due to the lack of political

¹² The deficit can also be due to a fiscal imbalance. Some academic research evaluates together both the current account and the public or fiscal balance issues, known as twin deficits.

¹³ Public debt is 100% of GDP in 2018, generating an interest burden of 30 thousand million Euros per year or roughly 82 million Euros per day.

consensus and the existence of a stable party with enough high representation in the Parliament.

In conclusion, the trade balance fairly represents the competitive position of a country. For the Spanish case, the fall in private investment, decreasing unit labor costs due to an internal devaluation which together with a high unemployment rate and a higher VAT led to a low internal consumption and thus lower imports, among other different measures, popularly known as austere as the drop experienced by government spending and the need of fiscal consolidation actions, led to a better competitive position which improved the terms of trade and was translated in an almost balanced trade in 2012 which finally got the surplus in the next year that continues until now.

4. Empirical research: may the CA predict future crises?

Empirical research is going to be performed along with modern econometric time-series techniques¹⁴ in order to evaluate the sustainability of the Spanish's persistent current account deficits so that may be used as a leading economic indicator to predict forthcoming financial crises.

Milessi-Ferretti and Razin in 1996 published a working paper¹⁵ where showed Intertemporal solvency as the situation in which a country as a whole obeys its Intertemporal Budget Constraint (IBC). Regarding overall's economy resource constraint, the current account plays a key role, since it measure the change in net foreign asset position. Standard accounting identities help to understand this notion:

$$s_t p_t * F_t - s_t p_{t-1} * F_{t-1} = p_t (Y_t - C_t - G_t - I_t) + i * s_t p_{t-1} * F_{t-1} \quad (1)$$

being s_t , p_t , p_t^* , i , F_t the nominal exchange rate, the domestic GDP deflator, the foreign GDP deflator, the world nominal interest rate and the stock of foreign assets,

¹⁴ Tests are performed through Matlab statistical software.

¹⁵ Milesi-Ferretti, G.M.; Razin, A. (1996). "Sustainability of persistent current account deficits". NBER Working Paper N° 5467.

respectively. It is necessary assume that the domestic economy grows at a slower pace than total indebtedness to avoid the country playing “Ponzi games” indefinitely (borrowing to repay interest on its outstanding debt). Equation (1) shows that current account balance as GDP share is variant to the world inflation rate and domestic budget deficit with domestic inflation.

Rearranging Equation (1) so that the current account balance is also made equal to the savings-investment gap, letting f_t be a ratio equal to $F_{t-1}/q_t Y_t$, defining the real exchange rate q_t as $p_t/s_t p_t^*$ and dividing both sides by nominal GDP ($p_t Y_t$), Milesi-Ferretti and Razin obtained:

$$f_{t+1} - f_t = \frac{1}{(1+\gamma_t)(1+\epsilon_t)} [tb_t + f_t(r^* - \epsilon_t - \gamma_t \epsilon_t)] \quad (2)$$

where ϵ is the rate of real appreciation of the domestic currency. Equation (2) says that changes in the ratio of foreign assets to GDP are driven by trade imbalances and by a “debt dynamics” term proportional to $f(r^* - \gamma - \epsilon)$, ignoring the discrete time residual $\gamma\epsilon$. Thus the latter term rises with the world rate of interest and falls with the rate of real exchange rate appreciation and growth rate of domestic GDP.

From Equation (2) they get:

$$tb = 1 - i - c - g = -f(r^* - \epsilon - \gamma) \quad (3)$$

where tb is the long-run trade balance. Equation (3) would answer to the question about what long-run net resource transfer (trade surplus) that an indebted country like Spain must undertake to keep the debt to output ratio constant. Also highlights that persistent current account deficits are consistent with solvency even when the growth rate is lower than the world interest rate accompanied with enough large trade surpluses. The dynamics of real exchange rate is driven by the Balassa-Samuelson effect (productivity differentials)¹⁶.

¹⁶ Milesi-Ferretti, G.M.; Razin, A. (1996). “Sustainability of persistent current account deficits”. NBER Working Paper N° 5467.

The IBC model is going to be conducted from the theoretical approach firstly introduced by Hakkio & Rush (1991a). The current period budget constraint of an individual who is able to lend and borrow freely in international capital markets is:

$$C_0 = Y_0 + B_0 + I_0 - (1 + ir_0)B_{-1} \quad (1)$$

where B is international borrowing, positive or negative; and the product with the parenthesis represents the initial external debt with ir being the world interest rate.

Adding up each period we reach the economy's IBC:

$$B_0 = \sum_{t=1}^{\infty} \delta_t TB + \lim_{n \rightarrow \infty} \delta_n B_n \quad \left\{ \begin{array}{l} \delta_t = \prod_{s=1}^t \beta_s \\ \beta_s = \frac{1}{(1 + ir_s)} \end{array} \right. \quad (2)$$

where TB represents the trade balance or net exports. The key element is the last product, if the limit term is nonzero and B_0 is positive the country is bubble-financing its external debt and if B_0 is negative is the economy is making Pareto-inferior decisions (Husted, 1992).

Assuming a stationary world interest rate with unconditional mean, equation (1) may be expressed as¹⁷:

$$Z_t + (1 + ir)B_{t-1} = X_t + B_t \quad (3)$$

where $Z_t = M_t + (ir_t - ir)B_{t-1}$. Solving equation (3) by forward substitution Hakkio and Rush (1991a) and Husted (1992) arrive at the next relationship:

$$M_t + ir_t B_{t-1} = X_t + \sum_{j=0}^{\infty} \phi^j \left[\Delta X_{t+j} - \Delta Z_{t+j} \right] + \lim_{j \rightarrow \infty} \phi^{t+j} B_{t+j} \quad (4)$$

where $\phi = 1/(1 + ir)$ and Δ denotes the first-difference operator. Spending on imports as well as interest payments (receipts) on net foreign debt (assets) is represented on the left-hand of equation (4). If X_t is subtracted from both sides of (4) and each side multiplied by minus one then, then the left-hand side becomes the economy's current account.

Assuming nonstationary processes for X and Z , both with unitary root $I(1)$:

$$X_t = \alpha_1 + X_{t-1} + \varepsilon_{1t} \quad (5)$$

$$Z_t = \alpha_2 + Z_{t-1} + \varepsilon_{2t} \quad (6)$$

¹⁷ Husted (1992).

where α are drift parameters and residuals are stationary processes. In this way (4) can be reexpressed as:

$$X_t = \alpha + M_t - \lim_{J \rightarrow \infty} \phi^{t+J} B_{t+J} + \varepsilon_t \quad (7)$$

Assuming that the limit term in (7) equals zero, then it can be transformed into a linear regression model:

$$X_t = \alpha + \beta^* MM_t + e_t \quad (8)$$

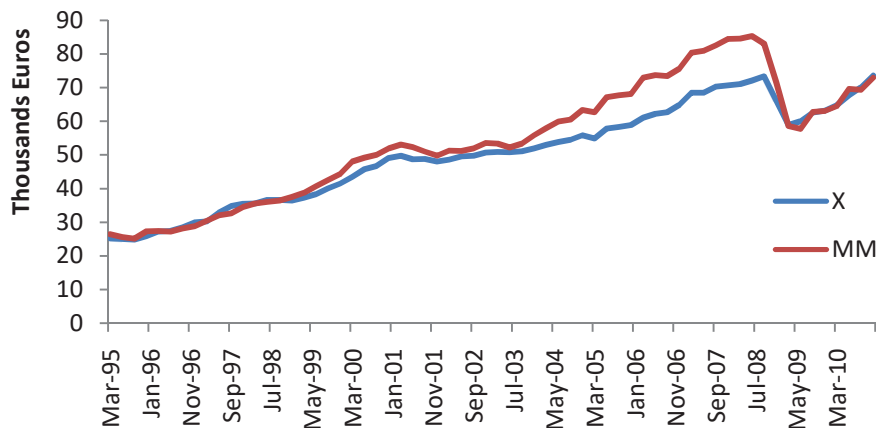
where $MM_t = (MM_t + ir_t B_{t-1})$ measures import plus net interest payments plus net unilateral transfers. Under the null hypothesis the economy is satisfying its IBC.

The Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1981) is going to be performed in order to assess the presence of unit root in both series¹⁸. Later on, the necessary condition (weak form) is going to be checked with the presence of a stationary error structure¹⁹ along with the existence of a cointegrating vector between both series through the Johansen's cointegrating procedure, where a failure to detect comovements would indicate that the economy fails to satisfy its IBC. The sufficient condition (strong form) indicates the existence of a vector $(\alpha, \beta) = (0, 1)$.

The next chart presents both profiles from March 1995 to December 2010 in a quarterly basis²⁰:

Figure 18

Cointegration analysis



Graphically is appreciable how MM goes up at a higher pace than X at the beginning of 2004 and may indicate visually a break in the comovement between the 2 series. Johansen cointegration procedure indicates that cointegration breaks in the last quarter

¹⁸ Both series present unitary root.

¹⁹ e_t should be an $I(0)$ process.

²⁰ Seasonally adjustment has been performed with Eviews.

of 2004 and first quarter of 2005 (Appendix A8 presents test results). Applying a filter rule as for example 2 periods strongly rejection of the null, the first quarter of 2005 would be identified as the period of raising concerns about sustainability of current account deficits.

In conclusion, the answer to the question is affirmative; the current account might be able to predict financial crises for the Spanish case. This empiric approach has been used by other researchers with the same positive results²¹.

5. Is it likely that current CA surplus continues in the future?

To answer this question is convenient regarding those factors that triggered the change in the pattern. There are two types of determinants, namely long-term or structural factors and short-term or cyclical factors. Economic growth expectations for the mid-term, demographics, unit labor costs, structural fiscal deficit, institutional environment, borrowings costs, long-term interest rates and the like are those factors considered to be permanent. On the other hand, output gap, oil prices are mainly considered to be temporary factors affecting the current account balance.

An empiric research is going to be performed in order to assess the relevance and direction of some of these factors to the current account²². Input data is collected on an annually basis from 1995 to 2017. The outcome achieved through Ordinary Least Squares (OLS) technique produce the next linear regression model²³:

$$CA_t = 0.01 + 0.15output_{gap} - 0.05oil - 0.01age_{dep} - 1.03total_{inv} + 0.92savings + 0.12unemploy + 0.27gov_{expenditure} + 0.09gov_{lendborrow} - 0.06gdp_{growth}$$

²¹ Husted, S. (1992). "The Emerging U.S. Current Account Deficit in the 1980s: A Cointegration Analysis". The Review of Economics and Statistics, 14, 159-166.

Fountas, S. et al. (2003). "On the sustainability of current account deficits: evidence from four ASEAN countries". Journal of Asian Economics, 14, 465-487.

²² Gretl econometric software has been used for this quantitative approach.

²³ More information about the model is showed in Table A9.

Slope coefficients are consistent with theoretical expectations, except for the output gap. The first two factors are those mentioned before as temporary. The output gap is measured as the difference between real and potential GDP, so in case of a deflationary or positive gap the economy is forced to raise imports in order to achieve a real output about its potential. For the oil prices input data was collected in absolute US dollars per Brent barrel, that is the reason for having such a huge coefficient because the remaining are measured as percentage of GDP, so that only worth looking at the sign. Again has a negative slope and Spain has to continue making efforts on improving energetic efficiency, develop renewable energy sources and adopt better technology in order to reduce the external energetic dependency.

The remaining factors are considered permanent. The age dependency reflects a demographic phenomenon called “japanization”, where an inverted pyramid will be the main outcome on the fact that elderly people demand other needs. So that the country must try to not only expand its productive base towards the export sectors but to provide the goods and services to this great percentage of total population. Investment as a GDP component is also considered to have a negative sign for the case of Spain because is not a major producer of capital goods. Capital investment decisions are made based on these next three major considerations:

- Interest rates: as a proxy for borrowing costs.
- Technology: must not be too expensive and be well developed²⁴. A trade-off exists in this case for firms trying to arrive first to their clients and then accepting higher prices and probably incipient technology.
- Growth expectations: as a proxy for future profitability of the investment.

Savings reflect the opposite of investment at almost the same magnitude. As said before, the saving-investment gap is crucial to achieve a positive current account balance.

A relatively high unemployment rate compared with the past is positive for the current account in the sense that diminishes available income and the internal consumption falls leading to a lower level of imports.

²⁴ Around 2005 the government set a granting program for investments in the renewable energy sector when still the technology was very incipient and expensive.

Government expenditure and fiscal balance have theoretically an ambiguous sign because a higher spending public level is likely to generate a fiscal deficit for the current year, but the consumers are likely to offset that deficit in a way that they increase domestic savings discounting future fiscal consolidation (Ricardian equivalence).

GDP growth has a sign consistent with theory as explained before with capital investments. Higher growth rates indicate higher future profitability on investments and that is expected to worsen the current account balance with an ambiguous sign over the long-term.

Anyway, only savings, investment and output gap provide empirical evidence as are the only ones which are statistically significant even at 1% significance level. Unemployment rate and oil price provide only statistical significant at 10% significance level.

In conclusion, the actual current account surplus is likely to continue in the future as the Spanish economy continues reallocating resources towards the export base sector, the fiscal consolidation aiming to reduce the high indebtedness level also helps to hold public spending level at more sustainable levels. The current international environment with Brexit, tariff war and political instability has led to multiple organisms to reduce growth prospects for the Spanish economy leading to lower investment levels and it is likely to continue for the foreseeing future. By the other way, Spain is very sensitive to oil prices fluctuations where a soaring can offset the positive caused by structural factors.

6. Conclusions

Capital investments are the main source of economic growth over the long term due to improvements in productivity and competitive position, being able to raise income and improve the current account. Misallocation of scarce resources and overinvestment in non-strategic and internal sectors may trigger a loss in competitiveness. One can argue that if Spain already has a well developed financial system in 90's with informational efficient markets, that is, financial disclosure of material information is readily available to all market participants in order to make investment decisions and provide capital only to those project that are wealth-enhancing, then inefficient allocation could not have been possible. But the bulk of financing was provided by commercial banks, who undervalued their credit risks and did not diversified their sources of income, in form of loans and credit lines with appealing interest rates set indirectly by European Central Bank (ECB), leading borrowers to undertake unjustified investment decisions regarding fundamental values and mostly driven by short-term market signals. In addition, regulatory framework also contributed to feed the real estate bubble liberalizing the ground. The outcome was a loss in competitiveness and a credit downgrade from the highest investment grade in 2010 for the country, with increasing borrowing costs.

To sum up, right when Spain became a developed country, convergence factors went away and diminishing capital returns appeared, it is just the moment when capital investment decisions become even more crucial and more difficult to discern. But the country got stuck in investments in a domestic sector with low technological base without tackle a long-term perspective.

Spain got in 2012 a trade balance surplus and a current account surplus in 2013 which last until now, with financing capacity since 2013 which allows the country debt repayments and indeed unleverage itself. This good news are due to a labor reform in 2012 and holding back wages moderating internal consumption, but indeed temporality does not help to enhance productivity. Restructuration in the private sector lowering costs and improving managerial business organization also contribute to improve the competitive position of companies and thus rise exports. On the other hand, fiscal consolidation in order to comply with the budget deficit rule and low capital

expenditure due to uncertainty and weak growth prospects, regarding the demand side of GDP, help to restrain imports.

An efficient resource allocation towards the export base sector is necessary in order to maintain the external surplus and life standards within the country. Energy efficiency and sustainable energy sources²⁵ are crucial to reduce the chemical goods deficit and oil dependence in particular, not only to improve the trade balance and thus the current account but also aiming to solve environmental issues, above all regarding the importance of health in human capital. This export base sector must also be well diversified, with exposure to countries that are running different business cycles, not only focusing in the European Union. The regulatory framework must also enforce this resource shift and help to enhance the competitiveness of Spanish companies. Consumers represent the demand part and are also influential for the trade balance and current account, prioritizing quality and good practices over cheap substitutes manufactured in countries where human rights are jeopardized is crucial for reduce the trade deficit with Asia.

In conclusion, monitoring current account through an empirical IBC model seems appropriate for the Spanish economy, raising concerns about its sustainability when cointegration fails. Although, recent surpluses should encourage to maintain and even improve the competitive position (but with a more fair redistribution of income), enhancing positive structural factors and reducing exposure to negative cyclical factors in order to unleveraged the Spanish economy.

²⁵ Energetic transition can be adopted with the available technology but is hindered by lack of ethics, efforts in maintaining status quo and lobby pressure.

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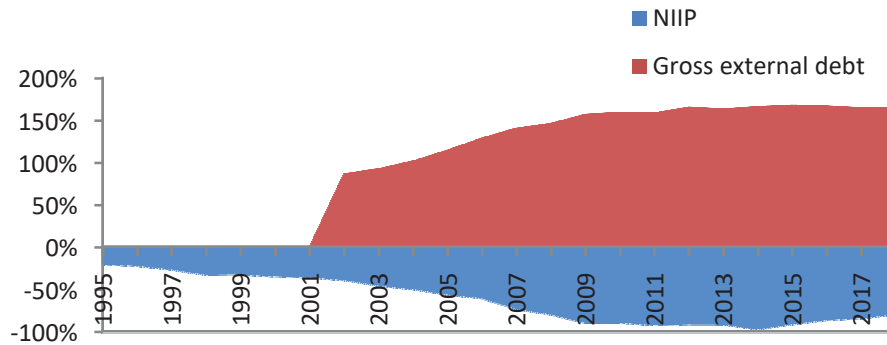
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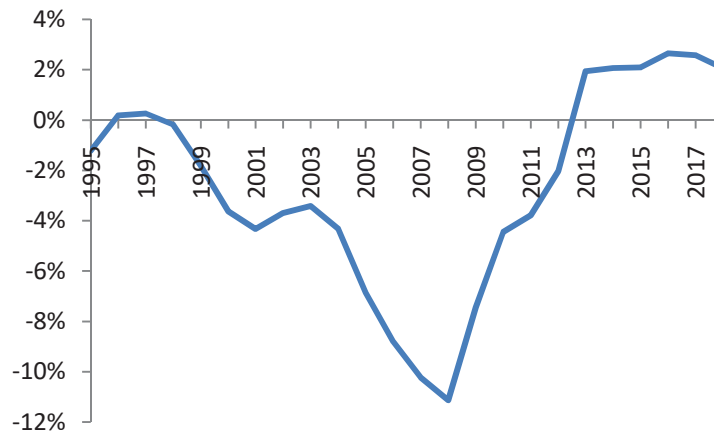
Appendix

A1. NIIP and gross external debt*



Source: data from Bank of Spain.
 *Gross external debt only available since 2001.

A2. Financing Capacity/Necessity as GDP percentage:



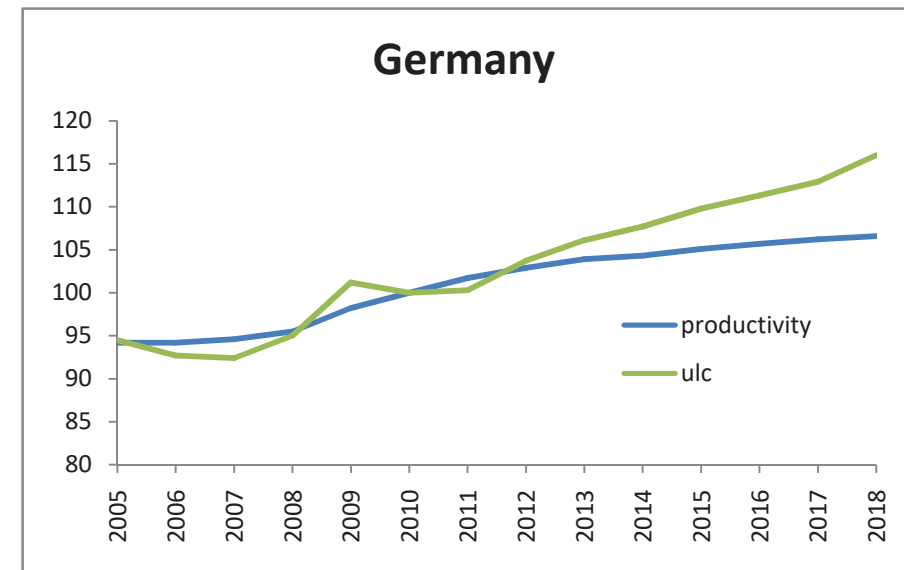
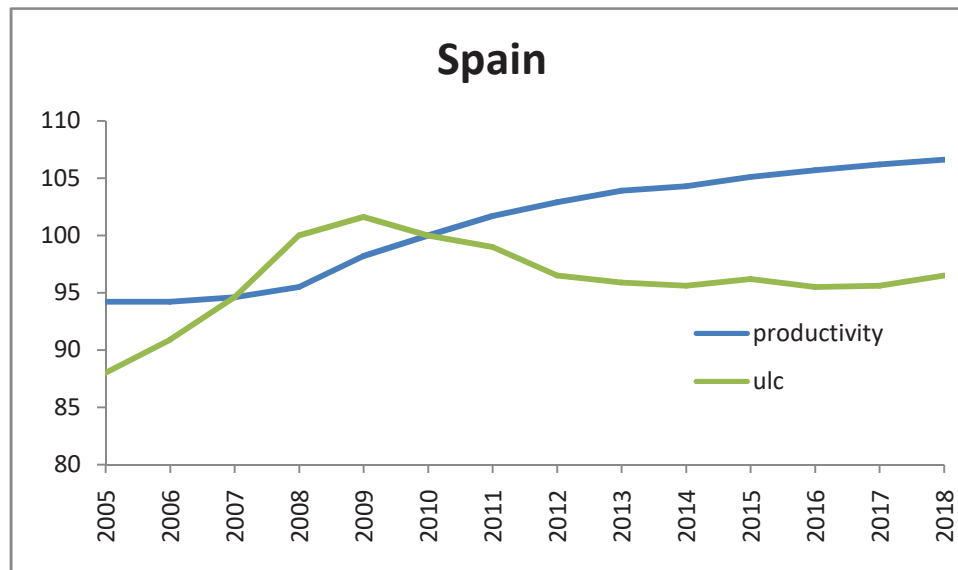
Source: data from Bank of Spain.

A3. Absolute figures are expressed in million of Euros.

	GDP deflator	real GDP	real X	real M	Opening coefficient
1993	59,3135618	675.292	120.119	129.146	36,9%
1994	61,61483428	691.385	140.518	145.140	41,3%
1995	64,65437399	710.450	155.988	162.422	44,8%
1996	66,89834712	729.453	168.755	169.213	46,3%
1997	68,4917507	756.367	194.914	192.940	51,3%
1998	70,22648225	788.936	206.671	210.516	52,9%
1999	72,09790396	824.318	217.701	233.813	54,8%
2000	74,45988499	867.917	248.346	274.579	60,3%
2001	77,49774828	902.643	251.680	272.887	58,1%
2002	80,68676923	928.638	245.936	264.483	55,0%
2003	83,84881016	958.239	243.943	264.828	53,1%
2004	87,13675317	988.584	249.074	286.799	54,2%
2005	90,75248515	1.025.389	253.175	304.059	54,3%
2006	94,36280063	1.068.190	265.674	328.604	55,6%
2007	97,50615725	1.108.450	284.900	351.041	57,4%
2008	99,58834409	1.120.839	283.693	341.145	55,7%
2009	99,83983834	1.080.783	245.044	256.995	46,5%
2010	100	1.080.935	276.268	290.147	52,4%
2011	100,0289682	1.070.139	309.800	311.687	58,1%
2012	100,096938	1.038.808	319.229	303.245	59,9%
2013	100,4508912	1.021.089	329.302	295.681	61,2%
2014	100,2550281	1.035.180	338.877	313.266	63,0%
2015	100,7694968	1.072.909	354.094	328.367	63,6%
2016	101,0655424	1.106.948	367.311	331.723	63,1%
2017	102,3153257	1.139.926	391.756	358.890	65,9%
2018	103,3259332	1.169.356	400.831	378.063	66,6%

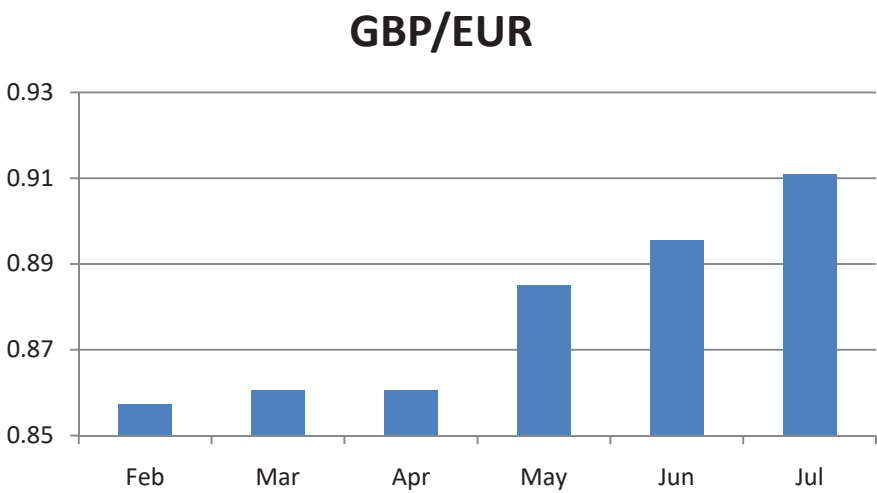
A4. Internal devaluation:

$$ULC = \frac{Wages}{Productivity}$$



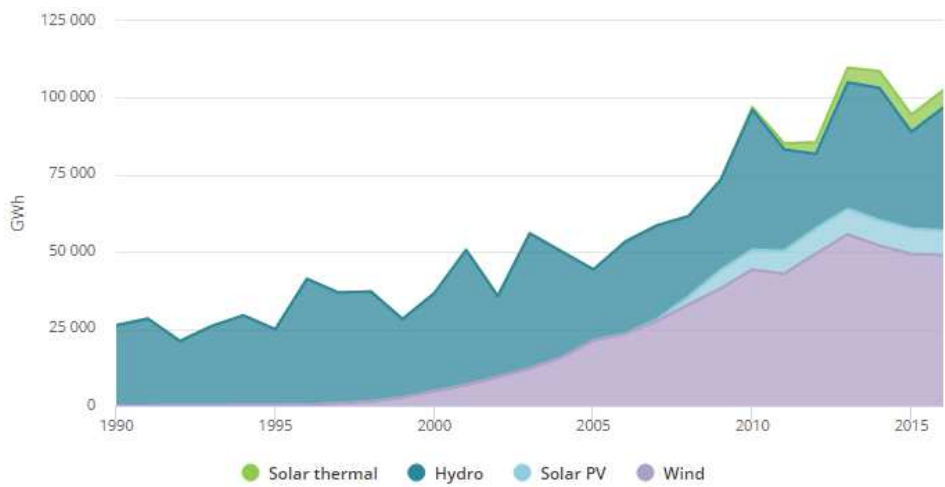
Source: own elaboration from Eurostat.

A5. Foreign exchange rate:



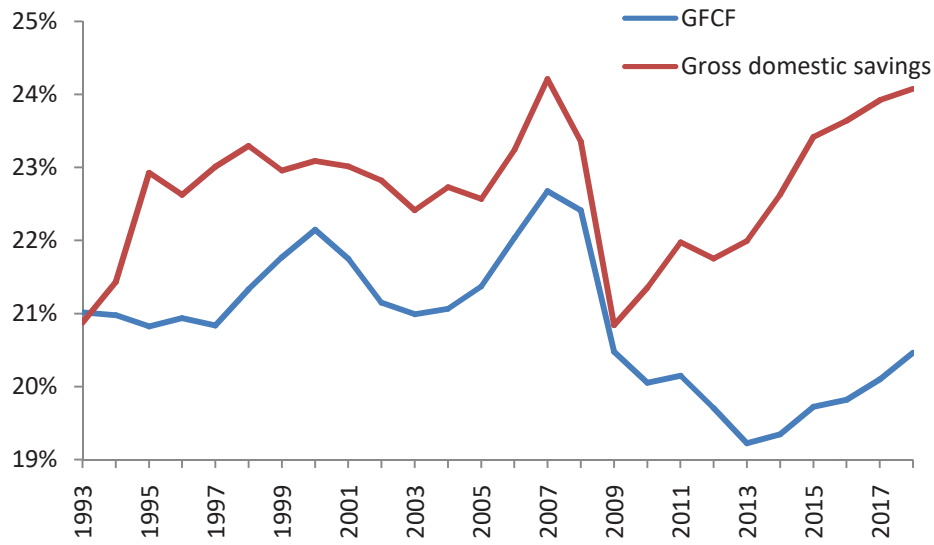
Source: own elaboration from Investing.com.

A6. Renewable energies by source and its contribution:



Source: iea.org.

A7. Saving- investment for the European Union:

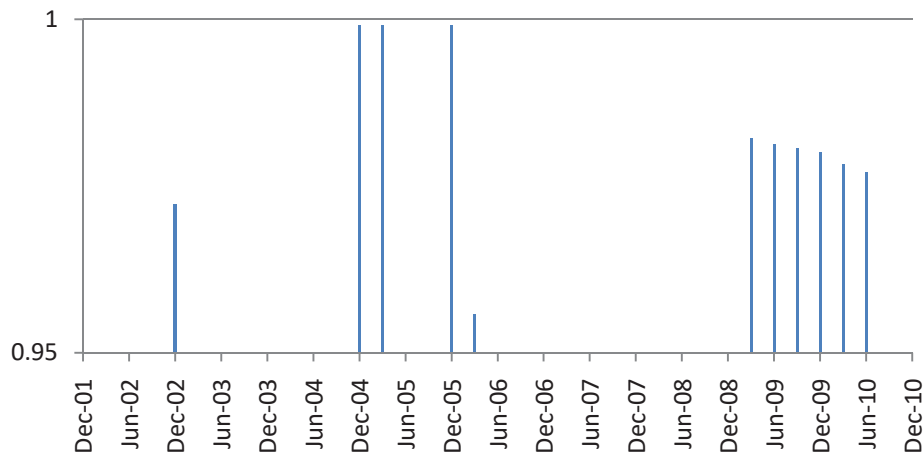


Source: own elaboration from WDI.

A8. Johansen tests:

- Including only secondary rents:

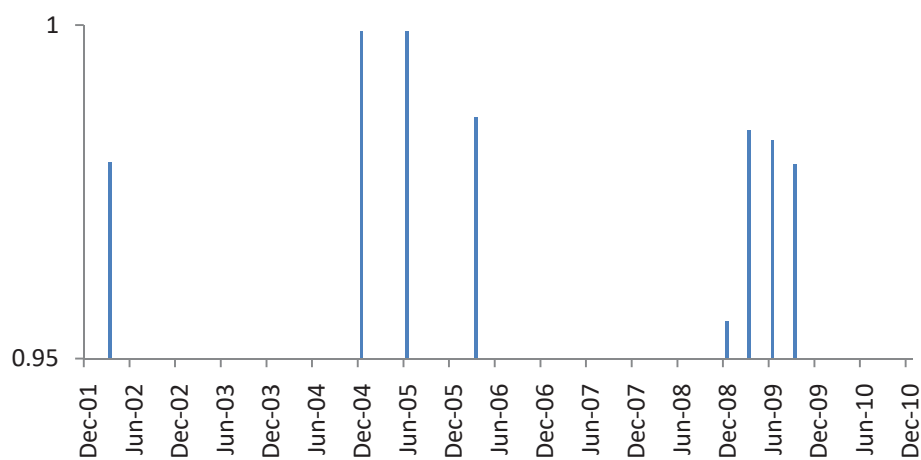
1-Pvalue



Higher than 0.95 means that we reject cointegration according to 5% significance level (α). A filter, for example, may be reject cointegration for 2 periods and α lower than 0.25.

- Including investment rents and secondary rents:

1-Pvalue



A9. CA factors

	coef	Pvalue
const	0.0078	0.8142
output_gap	0.1453	0.0093
age_dep	-0.0086	0.8607
totalinv	-1.0334	0
savings	0.9179	0
unemploy	0.1164	0.0925
govex	0.2657	0.7335
govlend_borrow	0.0941	0.0270
oil	-0.0465	0.0631
gdp_growth	-0.0584	0.2588

$R^2 = 0.99$
 $F(9,13) = 2013$

