

## Is Deflation a Risk for Greece?

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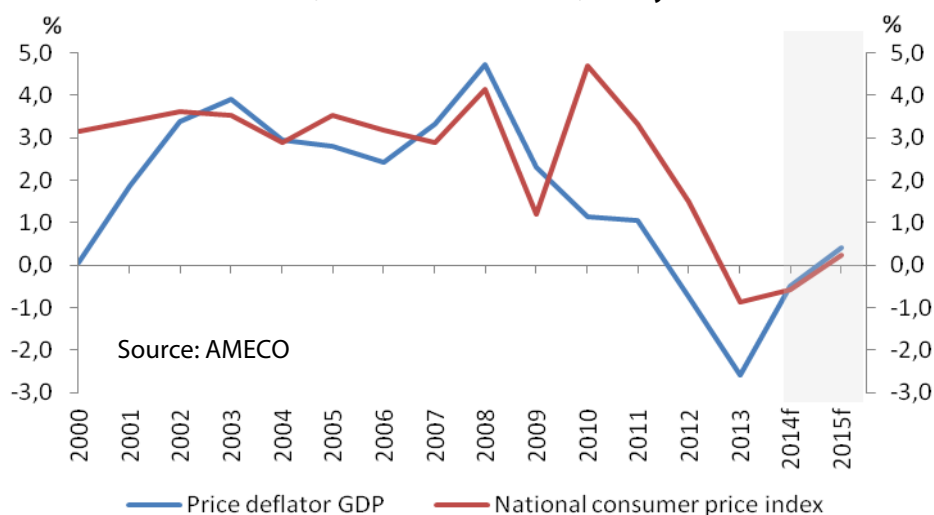
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- **Deflation is the occurrence of negative inflation, i.e. the situation in which prices of goods and services are falling in an economy. By contrast, disinflation is a slow-down in the inflation rate.**
- **Disinflation expectations increased for the Eurozone since the market expects inflation to be substantially below the respective ECB target of 2% for the 2016-18 period. This causes concerns since it implies:**
  - **An increase in real debt and real interest rates for the Eurozone as a whole and not only for the crisis countries.**
  - **An increase in Eurozone unemployment given that nominal wages are sticky.**
- **Timely intervention by the ECB to prevent deflation should be based to targeted LTROs and QE.**
- **Greece is already in deflation – at -2.1% of GDP for 2013 – as a result of the fiscal consolidation and the internal devaluation process aiming to improve price competitiveness. Persistence of deflation well into 2014 a serious source of concern:**
  - **The real economy risks to be dragged in a deflationary spiral.**
  - **Public debt sustainability at risk despite the debt relief measures expected in fall 2014.**

Greece, GDP Deflator and CPI, Yearly



## 1. Introduction<sup>1</sup>

Deflation is the occurrence of negative inflation, i.e. the situation in which prices of goods and services are falling in an economy. By contrast, disinflation is a slow-down in the inflation rate. In technical terms, deflation is considered to have occurred when CPI or the GDP deflator has recorded one or two quarters of negative readings. The decline in prices of assets is often referred to as Asset Deflation.

This study explains what are the causes and effects of deflation and, in relation to those, policy options to deal with the phenomenon. Consequently, the nature of deflationary pressures in Greece is analyzed and juxtaposed to explanations proposed in the literature. The situation in Greece is viewed in conjunction with disinflationary trends in the rest of the Eurozone. Vulnerability to longer lasting deflation is questioned. Implications for competitiveness and debt sustainability are explained. The study concludes that, while longer lasting deflation is not established in Greece, evidence is yet inconclusive. Hence, alertness should be maintained. In case deflationary expectations set in, policymakers should act promptly to prevent deflation rather than try to cure it, with monetary policy having a prominent role to play in this.

## 2. Causes, Effects of Deflation, and Policy Responses

In the context of monetarist thought, deflation can be understood by invoking the quantity equation:

$$M * V = P * Y$$

Where,  $M$  is the money supply,  $V$  the velocity (the rate at which money circulates),  $P$  the price of output (the GDP deflator), and  $Y$  the quantity of output (real GDP). If real output is assumed to be given in the short run, deflation can be caused by a reduction in the velocity of money and/or the amount of money supply. Hence, an obvious cause of deflation is the implementation of contractionary monetary policy. This can include an outright reduction in the supply of money in circulation or hikes in interest rates. In modern credit-based economies, contraction in credit (and not narrow money) is the most usual form of monetary contraction; the more credit based an economy is, the larger the contraction in credit caused by a given increase in the interest rate. A decrease in the bank credit supply can also happen due to bank failures or increased perceived risk of defaults by private entities, without necessarily a contraction of the money supply by the Central Bank. Similarly, deflation can occur from the collapse of speculative asset classes.

Deflation is more likely in hard currency economies. Monetary policy is constrained by the so-called impossible trinity<sup>2</sup>: no

country can have a fixed exchange rate, full capital mobility and independent monetary policy at the same time. The implication is that maintaining a peg to a hard currency or participation in a currency union, which follows inflation-averse policies (such as the Eurozone), puts limits on a country's ability to increase its money supply.<sup>3</sup> Then, if the rate of increase in the supply of money falls short of the sum of population growth plus the rate of real economic growth, the per capita money supply declines. Consequently, the purchasing power of each unit of currency increases, since money becomes scarcer, i.e. deflation occurs. In theory, continued deflation and economic development can co-exist under these conditions.

On the other hand, deflation can mean that even assets of the highest quality can have negative risk-adjusted real return. To understand this, one should consider that, in the long-term, the Fischer effect should hold in the money market:

$$i = r + \pi^e$$

where  $i$  is the nominal interest rate,  $r$  the real interest rate and  $\pi^e$  the expected inflation rate. So, if a sudden fall in expected inflation occurs while the nominal rate,  $i$ , stays put in the short-term, the ex-ante real interest rate,  $r$ , rises; this could discourage the investment expenditure and prolong a depression.<sup>4</sup> Then, it is preferable to investors and buyers to hoard currency rather than to invest it, thereby causing the perpetuation of a recession.

More generally, deflation increases the real value of all nominal debts. This refers to the notion of debt deflation, proposed by Fisher (1933). According to this, the credit cycle is the cause of the economic cycle and depressions are due to the overall level of debt shrinking (deflating). If over-indebtedness has accumulated in an economy, the eventual burst of the debt bubble will lead to debt liquidation and distress selling of collateral. This, in turn causes a contraction of deposits, as bank loans are paid off, and to a slowing down of velocity,  $V$ . Deflation ensues, which further reduces the value of firms, collateral and profits, leading to bankruptcies, reduction in output, trade and employment; pessimism prevails. Hoarding and slowing down further reduce the velocity and so on. This process causes serious disturbances in the financial intermediation process via the fall in nominal interest rates and the rise in the real interest rates. Resource allocation is distorted, harming growth further. Distribution of income is also affected as the fall in prices transfers purchasing power from borrowers to lenders. Then, if borrowers' propensity to spend is larger than lenders', aggregate spending falls and output declines.

<sup>2</sup> For example, see Obstfeld, Shambaugh and Taylor (2004).

<sup>3</sup> The same is true for gold-standard regimes.

<sup>4</sup> The above proposition also implies that the possibility of a longer lasting deflation is related to the question of what happens to inflation expectations.

<sup>1</sup> The authors wish to thank Maria Prandeka and Vasilis Zarkos for valuable help with the data. Any remaining mistakes are our own responsibility.

It has to be noted that the notion of debt deflation also concerns public debt. Given that capital repayments and coupons are agreed in nominal terms, deflation, which reduces the value of nominal GDP, increases indebtedness as a percentage of GDP. Hence, debt repayment becomes more onerous and perceptions of debt sustainability are undermined.

Hoarding by consumers can have the same recessionary effect as investors' hoarding. Collective attempts by individual consumers to save more by reducing consumption, lead to a decrease in the velocity of money and disinvestment, as declining demand renders productive capacity idle. Consequently, a decrease in the supply of goods and output emerges. This is known as the *paradox of thrift*.

In the context of Keynesian thought, the monetarist assumption for a given level of output in the short-run is lifted. Instead, deflation is deemed to be caused by any impact that reduces aggregate demand in the economy, bringing about an economic depression. Hence, deflation, if persisting, is associated with increased unemployment, falling profits and incomes, closing firms and defaults on loans, whose real value increases by deflation. Such a contractionary impact can be fiscal consolidation, which constrains government consumption and/or investment.

The central Keynesian idea is the possibility of a liquidity trap. A liquidity trap is a situation suggested by Keynes (1936) in which provisions of liquidity into private banks by the Central Bank fail to lower interest rates, thereby rendering monetary policy ineffective, i.e. they fail to stimulate the economy. In modern macroeconomics a liquidity trap refers to a situation in which the nominal interest rate is zero. This is considered to be a lower bound, given that no one would normally be willing to lend an amount unless they expect to get at least this amount back. Once this limit has been reached, monetary policy cannot affect the economy anymore and increases in the money supply are offset by declines in monetary velocity without affecting price levels. Hence, a liquidity trap is also known as the Zero Lower Bound Problem.

It prevails that the Keynesian economic policy advice for combating the adverse effects of deflation is to avoid monetary or fiscal contraction during a recession. On the contrary, automatic stabilizers should be allowed to work, making fiscal policy counter-cyclical, and fiscal stimuli utilized to revive the economy and cause reflation. In addition, widespread bank failures should be fended off, e.g. via deposit insurance schemes.

Monetarists discredited the possibility of a liquidity trap by the articulation of the so called *Pigou effect*. The argument goes that the increase of real money balances increases consumers' wealth and thus consumption (wealth effect on consumption). If so, deflation can have stabilizing effects.

Also in contrast to the Keynesian narrative, other researchers suggest that deflation can have a supply-side cause. For example, the Austrian School rejects a liquidity trap can exist, arguing that low investment during periods of low interest rates is the result of previous malinvestment and time preference rather than liquidity preference. *Hence, they believe that government intervention is ineffective, as malinvestments just need to be worked out of the system.*<sup>5</sup>

Another case of supply-side driven deflation is technological progress that improves productivity, thereby decreasing ULCs. If there is some degree of competition in product markets, producers pass, at least partly, these cost savings into the asking prices. In this case, deflation is associated with significant economic growth. Another case is the liberalization of labour and product markets. While liberalization initially can cause declining prices and wages, in the longer run, the elimination of oligopolistic rigidities can improve the responsiveness of the economy to external shocks and reduce dead-weight losses, thereby benefiting growth.

A representation of different explanations of deflation in an IS-LM framework is given in Box 1. It should be noted that the several causes of deflation can feedback to each other. For example, a fall in demand and an ensuing supply glut can lead to closure of businesses, which see prices not covering their costs and the real value of their debts increasing. Then, any attempt by banks to sell liquidated businesses exacerbates the supply glut. Withholding collection of on non-performing loans in order to slow the deflationary spiral means credit restriction for healthy businesses, which further reduces demand, and so on. In summary, the effects of deflation can differ greatly according to the cause of the phenomenon. Furthermore, they depend on its duration. If deflation is supply-side driven and viewed as a temporary situation, it can cause an increase at the level of sales and economic activity. As deflation increases the purchasing power of a given disposable income, products and services become more affordable and consumption increases, especially for those products and services whose demand is inelastic with respect to income. In this case, deflation can reduce the severity and duration of a recession. Hence, deflation will be self-corrected without policy intervention. On the other hand, if deflation persists, consumers may decide to postpone consumption, especially of luxury or big-ticket products and services, as they believe that prices in period (t+2) will be even lower than in period (t+1). Accordingly, investment also falls as productive capacity becomes idle. In this case, deflation can drag an economy in a vicious circle of ever-decreasing prices and aggregate demand, and thus ever-deepening recession, the

<sup>5</sup> By contrast, Minsky (1974), in tune with Keynesian suggestions, argued that debts assumed in times of *rising* asset prices cannot be repaid in a deflationary environment and thus debt forgiveness or engineering inflation (to reduce debt burden) is necessary.

so-called deflationary spiral. The same can happen in the case of debt deflation.

Accordingly, policy responses to deal with deflation depend on the cause of the phenomenon. Supply-side driven deflation can be self-correcting. Demand-side driven deflation, according to the Keynesian narrative, calls for fiscal stimuli in order to overturn it, especially if the economy is, or endangers to be, in a liquidity trap, in which case monetary policy is ineffective. Other schools of thought believe deflation can always be fought by expansionary monetary policy in the form of a direct increase in the supply of money (Quantitative Easing-QE). This is done via Open Market Operations (OMOs), in particular purchase of several types of financial assets (including treasury bonds or mortgage-backed securities).

It can also be achieved by a reduction in reserve requirements which commercial banks keep with the Central Bank. The reduction of interest rates has come to be considered as potentially inadequate means of fighting deflation after failing to deal with the recession in Japan in the 1990s and the US in 2000 – 2002 respectively, both following stock market shocks. The reason is that if deflation is severe enough, even zero short-term interest rates may result in a real interest rate which is too high to attract credit-worthy borrowers. In addition, sustained low real rates can cause asset price bubbles and excessive debt accumulation. Hence, they should only be used as temporary soothing; else, they can lead to the enlargement of an eventual future debt deflation crisis.

### 3. Disinflation in the Eurozone

The discussion as to where the Eurozone as a whole runs a danger of deflation is yet inconclusive. The ECB has stated it remains vigilant as to not permitting monetary contraction. Still, money supply-related deflation can occur via a breakdown in the monetary policy transmission mechanism. In fact, after the eruption of the Euro crisis, countries of the Euro periphery have experienced higher nominal and real interest rates than countries of the core of the Eurozone, due to country risk and collapse of interbank confidence. The ECB has responded by measures to boost liquidity in certain segments of money markets and normalise the monetary transmission mechanism, in particular the SMP, OMT and LTRO programmes. While these helped in this direction, divergences in interest rates and rates of financial intermediation remain. Asset purchases interventions were sterilised. The narrow money supply does not fall but the broader money supply does, in many Periphery countries, due to the negative credit creation. As a result, fiscal consolidation in crisis-hit countries had to be implemented

amid an environment of de facto contractionary monetary policy, despite low policy rates. This increased the cost of fiscal consolidation in terms of lost output and unemployment. The combined effect of fiscal consolidation and high interest rates is that a number of countries are already experiencing deflationary trends; in March 2014 Greece, Spain, Portugal, Slovakia and Cyprus recorded negative inflation rates. This, in turn, complicates efforts to stabilize public debt dynamics as it weakens nominal GDP. This is not a problem specific to Greece. Barclays (2014) estimates that many Eurozone countries will struggle to stabilize, let alone reduce, their debt-to-GDP ratio if low inflation takes hold, even if they do not face deflation. They find Spain to be the most challenging case, followed by Italy, with France at a somehow better position. Hence, in the absence of further fiscal and political integration, they argue the need for a sovereign debt restructuring mechanism may arise.

In any case, given that fiscal consolidation has to continue in the medium term, the only tool to reflate the Eurozone economy is monetary policy. As ECB rates are already close to the zero bound, an increasing number of analysts suggest that, if deflationary trends become more pronounced, initiatives should be undertaken to revert to positive rates of credit creation via direct liquidity provision to the economy.

Inflation in the Eurozone in March 2014 slide at 0.5%, further away from the ECB target of close to 2%. Recently, the ECB strengthened its rhetoric that it stands ready to defend price stability by using unconventional means if necessary.<sup>6</sup> However, Mario Draghi has described deflation in the Eurozone as a situation where price level declines occur (1) across a significant number of countries; (2) across a significant number of goods; and (3) in a self-fulfilling way. In this definition, the ECB does not, at this point, foresee deflation in the Eurozone as a whole, only a prolonged period of low inflation, followed by a gradual increase in the rate of inflation. Hence, the Bank has so far abstained from a clean Quantitative Easing, as it continues to sterilize its interventions in the bond market, despite the fact that troubled countries are already experiencing deflation. However, as June 2014 data on the Eurozone's GDP disappointed and disinflationary expectations strengthened, Mr Draghi moved one step ahead in May 26 to state that the risk of a deflationary spiral is present and the ECB is ready to adopt a laxer stance in monetary policy.

<sup>6</sup> See Mario Draghi's statement in 12/5/2014 on the difficulties low inflation is bringing to countries trying to improve their competitiveness and reduce their indebtedness. He also argued for the role a strong Euro is playing in this.

As a rule of thumb, many analysts believe that as far as longer-term expectations remain anchored to the 2% target (as e.g. evident from the 5-year/5-year forward inflation contracts), the ECB will not embark on QE. However, data show that, while longer-term market based expectations of inflation remain anchored around ECB's 2% target for inflation, medium-term expectations are already sliding. This is evident on the par coupon of the EA inflation swap. The par coupon is equal to the inflation rate which breaks even the derivative, therefore it constitutes the consensus market expectation of inflation. While the 5Y/5Y fw par coupon in 14/4/2014 was at 2,07%, the 2Y/2Y fw par coupon at the same date was at 1,34%. This means the market expects inflation in the 2016-2018 period to be substantially below the 2% ECB target.

The fact that longer-term expectations still hover around 2% is not enough. Given the experience of Japan in the 1990s, medium term inflation swaps have more predictive power of incipient disinflation / deflation than longer-term swaps. As the 2-4 year horizon is relevant for most spending decisions and wage setting, declining medium inflation expectations could be affecting current inflation.

**Figure 1: 10-year Implied Market Expectations of Inflation**



Sources: Bloomberg, Eurobank Research

Figure 1 shows another measure of the 10-year implied market expectations of inflation. We extracted those by subtracting the real (inflation-linked) yields of 10-year bonds from the equivalent nominal 10-year bond yields. Hence, the difference represents the consensus bond market expectation of inflation in France, Germany and Italy respectively. It can be seen that since early 2013, inflation expectations are slowly but steadily sliding below 2% and towards 1%. The up tick in recent days can be attributed to the change in the tone of ECB statements, in

which its alertness against the risk of deflation was re-iterated, hinting, more aggressively than before, the possibility to use unconventional measures (i.e. QE) if necessary.

IMF (2014) noted that, in March 2014, "no sign of a classic deflation, i.e. of widespread, self-feeding, price declines" was established. However, they argue, even low inflation is a serious problem for the Eurozone as a whole, and crisis countries in particular, since it implies an increase in real debt and real interest rates. At the same time, it decreases the amount of relative price adjustment vis-à-vis Eurozone partners as all of them face low inflation. To the extent that nominal wages are sticky, deflation also increases unemployment. Importantly, the IMF (2014) believes that the situation justifies a more pre-emptive approach by the ECB. Given limited room for further cuts in the policy rate, they suggest a substantial increase in its balance sheet, through either targeted LTROs or QE. Latest data on GDP and inflation expectations lend support to this view. Bruegel (2014) concludes that rate cuts and LTRO will likely prove inadequate to change substantially inflation expectations. Given that bond purchases are politically difficult, they recommend a purchase programme of €35 billion of EFSF/ESM/EU/EIB bonds, corporate bonds and asset-backed securities per month, with cumulative amounts reaching at least €490 billion, €900 billion and €330 billion respectively; bonds of sound banks could be considered after the completion of the ECB's assessment of bank balance sheets. In any case, intervention should be timely to prevent deflation; if deflation sets in, there is a risk ECB will have to resort to long-term and ever-increasing stimulus.<sup>7</sup>

#### 4. Deflation in Greece

In Greece, the question of deflation has idiosyncratic features attached to it, which are not shared by the majority of Eurozone countries. Greece has already suffered six years of negative GDP growth and a cumulative contraction of GDP of ca 26.3% between the end-of-2007 (the last year of positive GDP growth) and the end-of-2013, which is expected to be the last year with negative GDP growth; the unemployment rate also skyrocketed to 27% (compared to 7% pre-crisis). Hence, it is no surprise that the country is already in deflation, not disinflation.

In the case of Greece, avoiding monetary and/or fiscal contraction during the recession and allowing automatic

<sup>7</sup> Mayer (2013) is in the same wavelength, showing that M2 and the Marshallian K (ratio of money over real GDP, indicator of money abundance) have increased in the Eurozone, thereby indicating reduced risk of generalized deflation. However, for preventing deflation in crisis countries without causing damage to their debt dynamics, he suggests that correction of the Periphery's competitiveness vis-à-vis the Core should come via inflation in Germany (while still the ECB's 2% target for Eurozone-wide inflation is achieved).

stabilizers to work, as suggested by Keynesian thinking, was not an option. The country has purposefully implemented internal devaluation in order to reclaim price competitiveness losses against trade partners. Even if this was not the case, participation in a Monetary Union (i.e. loss of autonomy in the exercise of monetary policy) implies that the country would be unable to combat deflation via monetary means. In addition, given the huge size of public deficits and the explosive path public debt had embarked on, a fiscal expansion would only enlarge the fiscal crisis and the ensuing collapse of output. Loss of access in international capital markets meant a fiscal expansion was infeasible anyway. Instead, the country had to implement a draconian fiscal consolidation program, which led to a contraction of the General Government deficit from 15.7% of GDP in 2009 to an expected -3.8% of GDP in 2013 or, in terms of the primary balance, from a deficit of -10.5% of GDP in 2009 to an expected surplus of 0.8% of GDP in 2013. It follows that, as for the rest of the Eurozone, for the case of Greece too, it primarily rests with the ECB to combat deflation. It is also a question of whether Greece will be able to improve the productivity of the economy via structural reform.

Despite the fact that greenshots of recovery are at last evident in the Greek economy, deflation is likely to continue, at least for the coming months. This is due to the fact that a large round of structural reforms to fight rigidities in product markets has just been implemented or will be implemented in the following period. Despite substantial productivity gains expected in the longer-term, reforms will likely exercise downward pressures in prices in the coming months. By international experience, the bulk of effect on prices is expected within the next 12-18 months. The question that arises naturally is whether the country runs the risk of falling into a deflationary spiral in this interim period.

**Figure 2: Greece, GDP Deflator and CPI, Yearly**



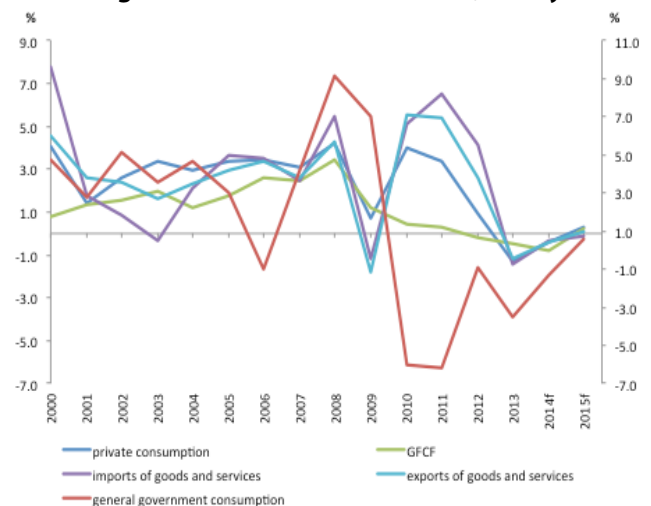
Source: AMECO

Figure 2 shows that the GDP deflator recorded negative readings already in 2012, affected by sharp wage cuts in both

the public and the private sectors. The CPI in the first years of the Adjustment Programme remained positive. In fact, it increased due to indirect tax hikes, but also due to delays in product markets reforms that would contain oligopolistic rigidities. However, since March 2013, the CPI is also in deflationary grounds, with the most negative reading recorded in December 2013, -2.9% yoy, the lowest in decades.

Figure 3 presents sectoral GDP deflators, per component of aggregate demand. It can be seen that deflation started from government consumption, due to Programme-agreed wage cuts in the public sector. The GFCF deflator became negative in 2012, following the collapse of investment. However, private consumption, which still constitutes about 73% of GDP, did not see marked price decreases before 2013 despite the rapid decrease of disposable incomes due to wage cuts in the private sector and skyrocketing of unemployment. Clearly, this is an indication of rigidities in product markets; it is not only harmful to competitiveness but it also entails distributional effects. However, as the impact of indirect tax hikes has faded, recession deepened and product market reform accelerated recently, consumer prices started declining in Q1 2013. Importantly, the same hysteresis was observed in the correction of the export deflator. Hence, the price competitiveness of the Greek economy has adjusted with a lag and only partially. In contrast, ULC-based measures of competitiveness have adjusted much more sharply, reclaiming the totality of competitiveness losses accumulated during 2001-2009, as shown in Anastasatos (2014).

**Figure 3: Sectoral GDP Deflators, Yearly**



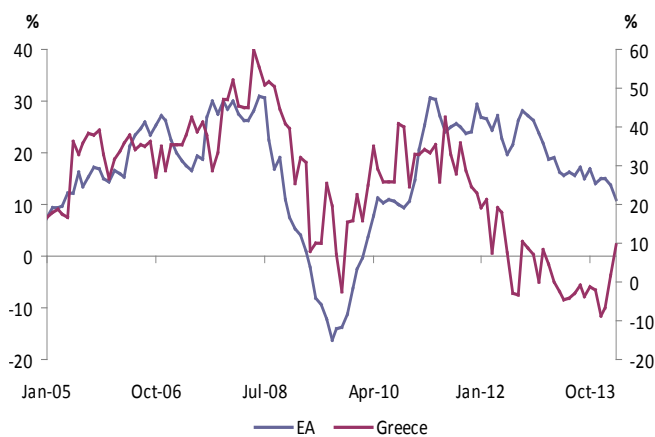
Source: AMECO

The basic question is whether deflation will persist. If negative readings of the CPI and the GDP deflator continue for just a couple of quarters and they then revert to positive grounds, they actually can be beneficial. Firstly, this will help the country to fully restore competitiveness losses vis-à-vis (Eurozone and extra-Eurozone) trading partners. Secondly, it will increase the purchasing power of incomes. This is important for reasons of

social cohesion, taking in mind the sheer size of income losses incurred in the 6 years of recession, which for some groups of the population exceeded 40%. Furthermore, to the extent that longer-term expectations of inflation remain positive, this would mean a positive wealth effect on consumption, which is a prerequisite for achieving economic recovery. All these factors, along with the pro-growth impact of (initially deflationary) structural reform, mean that a short period of deflationary pressure could prove beneficial for Greek growth.

By contrast, if deflationary trends persist beyond the first quarters of 2014, the country risks to be dragged in a deflationary spiral of mutually reinforcing price and wage cuts, decrease in demand, disinvestment, bankruptcies, loss of value in collateral, unemployment and output decline. In addition, this will complicate public debt dynamics (see next section). To this end, the evidence regarding the potential persistence of deflation is yet inconclusive.

**Figure 4: Price trend over next 12 months, Survey Index**



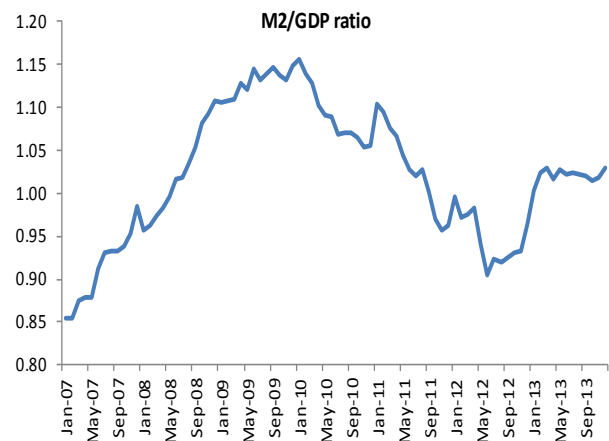
Sources: European Commission, Eurobank Research

Figure 4 shows the expectation on the price trend over the next 12 months as evident in European Commission’s consumer survey. In particular, the Figure plots the evolution of consumers’ answers in the question “By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months?” It can be seen that, in Greece, deflation expectations already set in since April 2013, when the majority of consumers started foreseeing a decline in prices, which actually happened almost simultaneously. By contrast, in the Eurozone as a whole, consumers that foresee price increases still outweigh consumers that foresee price decreases, albeit with a gradually thinner margin; this is compatible with an expectation of disinflation but deflation. However, in February and March 2014, the Index for Greece recorded positive readings again. This is perhaps related to some green shots of recovery evident in the Greek economy in Q1 2014, chiefly an increase in consumer confidence and PMI. Economic sentiment

also improved due to the agreement of the Greek government with the Troika on the disbursement of a loan tranche, accompanied by acceptance of a primary surplus in the 2013 budget and hope for debt relief measures after the European parliament Elections of May 25<sup>th</sup> 2014.. These positive readings make it premature to conclude that expectations of long lasting deflation have consolidated.

A leading indicator used in the literature to indicate vulnerability to deflation is the Marshallian K, which is the ratio of money (M2) over real GDP. This is an indicator of money abundance, i.e. whether the level of money in circulation increases or declines in comparison to the level of economic activity. Figure 5 plots the Marshallian K for the Greek economy. It can be seen that, while money scarcity increased after 2009, the ratio started to recover after the double elections of May and June 2012, albeit remaining below the 2009 peak.

**Figure 5: The Marshallian K**

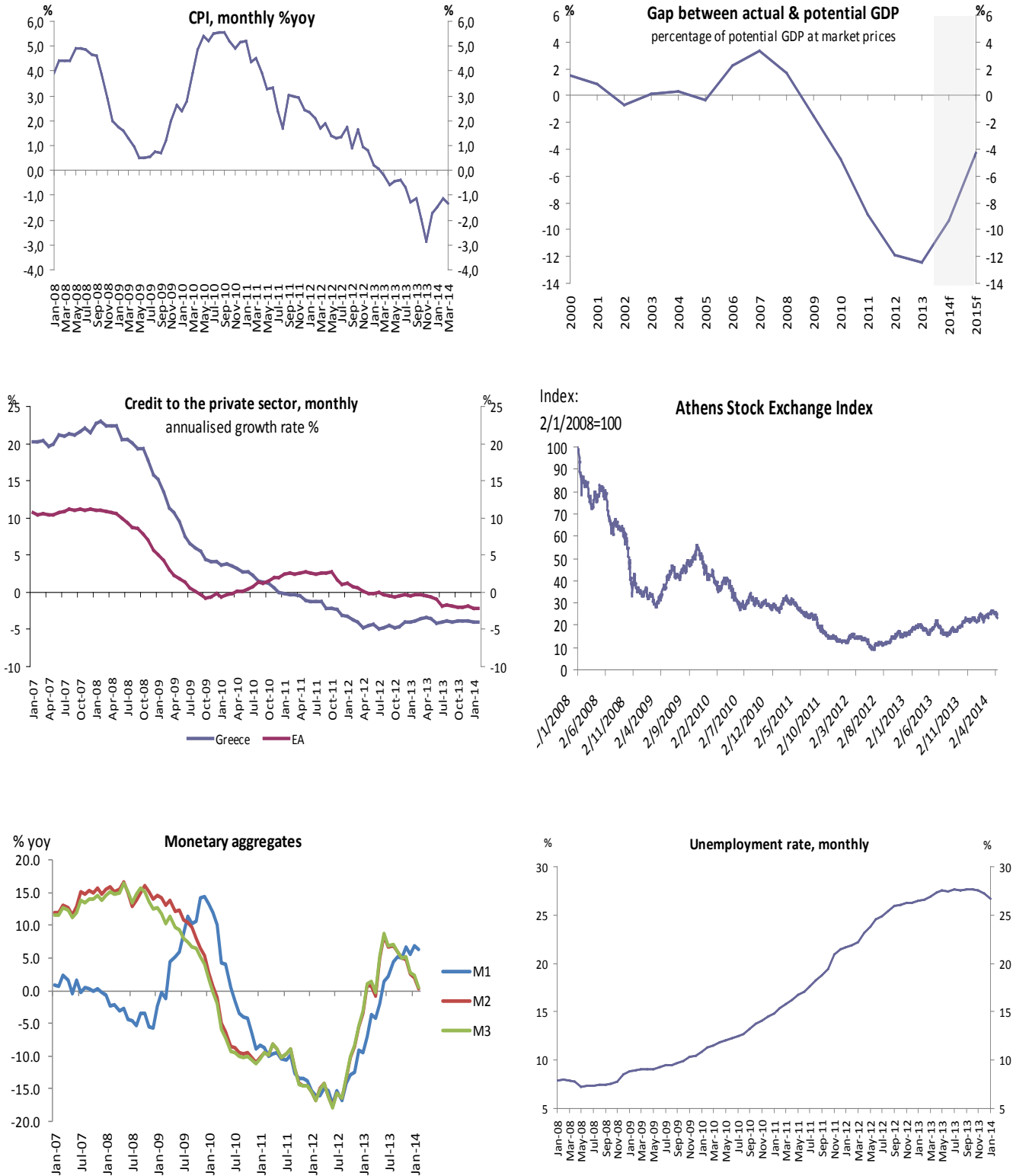


Sources: Bank of Greece, AMECO, Eurobank Research

The literature<sup>8</sup> has suggested a number of other leading indicators of whether deflation is imminent or expected to continue, in accordance with theoretical explanations explained above. Figure 6 presents some of them; again, the picture is mixed.

<sup>8</sup> For example, see IMF (2003).

**Figure 6: Greece, Leading Indicators of Deflation**



Sources: Eurostat, AMECO, Bank of Greece, Econwin, Eurobank Research



High frequency (monthly) CPI readings, while still in negative territory, show a deceleration in deflationary trends since December 2013. The data on output gap are not available in high frequency; annual data show that the output gap continued to enlarge in 2013, albeit at a decelerating rate. The EC expects the output gap to shrink by 3 percentage points in 2014 but this is only compatible with its baseline growth projections (or it could signal incipient deflationary pressures that are supply side-driven). Credit to the private sector continued to shrink in the first months of 2014 by rates close to -4%, about the same as in 2012 and 2013. The finalization of bank recapitalization, in combination with the return of the State and banks to the market, even if partial, is hoped to contribute positively on liquidity provision to the real economy. On the other hand, banks have to cope with NPLs in excess of 30% of their total portfolio (and still rising as the recession has not ended), and exposure to the Eurosystem for liquidity assistance, which remains significant and has to be reduced eventually. These factors put a limit to the improvement that can realistically be expected. The ASE Index, while remaining well below its pre-crisis levels, has more than doubled compared to its 2012 lows. To some extent, this discounts the market's expectation of a recovery in the level of economic activity. The Greek contribution to the Eurozone's monetary aggregates, that is M1 through M3, have returned to positive rates of change since the beginning of 2013, after a period of decline which exceeded 15% in 2012; still, the positive trend in M2 and M3 is decelerating in recent months. Finally, the unemployment rate, while still at unacceptably high levels, has recorded declines since October 2013. This trend is verified by the findings of the Ministry of Labour's ERGANI Index, which shows a positive balance between new hirings and lay offs of wage earners in the economy for the same period. In other, non-reported, indicators, house prices decline since Q3 2008 and continue to do so. The exchange rate of the Euro remains elevated, thereby exercising downward pressure on prices, directly and via dampening activity; however, considerable real depreciation has been achieved via the internal devaluation, as mentioned. Overall, leading indicators remain in levels signaling recession but some of them also show de-escalation trends in recent months. Hence, it cannot be said that the economy has entered a deflationary spiral. However, alertness should be maintained.

## 5. Greece: The Effect of Deflation on Public Debt Sustainability

Deflation complicates debt sustainability as it makes a positive snowball effect difficult to achieve.

Public debt dynamics are given by the following expression:

$$D_{t+1} = D_t [(r - p(1+g) - g + ae(1+r))/(1+g+p+gp)]$$

where  $d$  is the debt to GDP ratio;  $r$  the interest rate;  $p$  the growth rate of GDP deflator;  $g$  the real GDP growth rate;  $a$  the share of foreign-currency denominated debt; and  $e$  the nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar). It is obvious that, all other things equal, a decrease in the GDP deflator deteriorates the debt-to-GDP ratio. If, in addition, deflation has a negative impact on the real growth rate, as suggested by some theoretical explanations, the total deterioration is larger. However, because some explanations, potentially pertinent to the Greek case, suggest a positive supply boost from temporary deflation, we assume no extra impact on real growth.

This section performs a debt sustainability exercise in order to examine the sensitivity of the Greek public debt profile with respect to the GDP deflator for the 2013-2030 period. In the most recent review of the Second Adjustment Programme (July 2013) (SEAP-J) GDP deflator for 2012, 2013 and 2014 was assumed negative at -0.8%, -1.1% and -0.4% respectively. The deflator came already lower for 2013 at -2.1%. If deflationary pressure proves to be persistent, it could hurt the country's already fragile debt sustainability profile for the next decade. In such a case, not only the debt profile will be damaged, but this could also feedback in the real economy via the increased uncertainty it will create. Thus, the need for new debt relief measures will arise once again. These measures would be on top of:

- i. Measures expected in autumn 2014 as a result of the decisions of the November 27<sup>th</sup> 2012 Eurogroup and the estimated achievement of a primary surplus for 2013<sup>9</sup>,
- ii. Debt relief achieved with the implementation of the PSI in March 2012, which led to a nominal reduction of 53.5% in the Greek debt public owned by the private sector – the actual reduction was smaller given the need to recapitalize the Greek banking system - and the implementation of the debt buy back process in December 2012.

<sup>9</sup> The achievement of a significant positive primary surplus for 2013 – together with the agreement with the troika on the current review of the SEAP-J – will permit the beginning of the negotiations for the implementation of additional debt relief measures according to the decision of the November 27<sup>th</sup> 2012 Eurogroup. No results on the debt relief issue are expected before end-of-August 2014. Direct haircut is out of the picture. A more indirect method will be used including the extension of loan maturities and the lowering of interest payments. For the decisions regarding the November 27<sup>th</sup> 2012 refer to: [http://www.eurozone.europa.eu/media/367646/eurogroup\\_statement\\_greece\\_27\\_november\\_2012.pdf](http://www.eurozone.europa.eu/media/367646/eurogroup_statement_greece_27_november_2012.pdf). Official verification of the 2013 general government deficit by Eurostat under the terms of the Excessive Deficit Procedure (EDP) is expected in April 23<sup>rd</sup> 2014. ELSTAT, the Greek Statistical Agency announced in April 14<sup>th</sup> 2014 the fiscal data transmitted to Eurostat under the terms of the EDP procedure: [http://www.statistics.gr/portal/page/portal/ESYE/BUCKET/A0701/PressReleases/A0701\\_SEL03\\_DT\\_AN\\_00\\_2014\\_01\\_P\\_EN.pdf](http://www.statistics.gr/portal/page/portal/ESYE/BUCKET/A0701/PressReleases/A0701_SEL03_DT_AN_00_2014_01_P_EN.pdf)

**Table 1: Selected Basic Assumptions of the Debt Sustainability Exercise, the Baseline and the Alternative Scenarios for Deflation**

Selected Basic Assumptions of the Debt Sustainability Exercise, the Baseline and the Alternative Scenarios for deflation																			
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Real GDP growth (%)	-4,2	0,6	2,9	3,7	2,3	2,4	2,5	2,5	2,6	2,0	1,9	1,9	1,9	1,9	1,9	1,9	1,8	1,8	
Average nominal interest rate on public debt (%)	2,5	2,7	3,0	3,2	3,2	3,2	3,2	3,2	3,6	3,6	3,7	3,9	4,1	4,1	4,1	4,1	4,1	4,1	
Primary balance (surplus) (%GDP)	0,3	1,5	3,0	4,5	4,3	4,3	4,3	4,3	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	
Privatization receipts (%GDP)	0,9	1,9	1,1	1,1	1,8	1,8	1,8	1,5	1,3	0,4	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
<b>Deflation</b>																			
- <b>Baseline scenario</b>	-1,1	-0,4	0,4	1,1	1,8	1,8	1,8	1,8	1,7	1,9	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
- <b>ALT1 Scenario</b>	-2,1	-0,4	0,4	1,1	1,8	1,8	1,8	1,8	1,7	1,9	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
- <b>ALT2 Scenario</b>	-2,1	-2,0	0,4	1,1	1,8	1,8	1,8	1,8	1,7	1,9	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
- <b>ALT3 Scenario</b>	-2,1	-2,0	-1,0	-0,8	1,8	1,8	1,8	1,8	1,7	1,9	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	

Source: Second Adjustment Programme for the Greece (July 2013), Eurobank Research

Note: Under the Baseline Scenario our debt sustainability exercise replicates the respective analysis of the Second Adjustment Programme for Greece (July 2013). In Table 1 above we include those assumptions that are of interest in our analyses. For the complete set of assumption of the DSA analysis the interested reader should refer to the Second Adjustment Programme for Greece (July 2013).

In order to proceed with our deflation debt sensitivity exercise we examine three scenarios:

1. The first one – named the Baseline scenario – is based on the assumptions of the SEAP-J
2. The 1<sup>st</sup> Alternative Scenario accounts for an immediate return of the deflator on Programme assumptions, i.e. replaces the deflator of the Baseline assumption for 2013 with the one that actually occurred (-2.1%) and keeps all the other assumptions of the Baseline Scenario unchanged. The choice of the deflator figure was based on the recent GDP data provided by ELSTAT<sup>10</sup>. Even though this is not the final deflation figure – a new revision is expected in October 2014 together with the completion of the GDP data revision process – we consider it as a good starting point in order to examine the effect of deflation on the debt sustainability path.
3. The 2<sup>nd</sup> Alternative Scenario accounts for a deeper deflation relative to the SEAP-J forecasts for just one more year, as a result of the acceleration of the internal devaluation process due to structural reform in product markets. In particular, it assumes a deflator of -2.1% for 2013 and -2.0% for 2014 and keeps all the other assumptions of the baseline scenario unchanged.
4. The 3<sup>rd</sup> Alternative Scenario assumes that the Greek economy needs more time (and deflation) in order to close the competitiveness gap that was created in the 2001-2009 period. Here we make the assumption that the totality of price competitiveness losses against Eurozone partners will be reclaimed. In particular, we use the ECB real exchange rate vis-à-vis EU-17 based on the CPI.<sup>11</sup> According to this measure, competitiveness losses are estimated at 18.3% for the

2001-2009 period, while the correction achieved during 2010-2012 was only 4.4% (the adjustment in 2013 was larger than recorded in the Index due to the unforeseen deepening of the deflation). In order to close this gap, cumulative adjustment of ca 13.9% needs to be achieved in the following decade. There are many alternative deflation paths that will lead to the same adjustment of 13.9% and the same debt profile. Indicatively, we choose deflation rates of -2.1%, -2.0%, -1.0% and -0.8 for 2013, 2014 2015 and 2016 respectively.

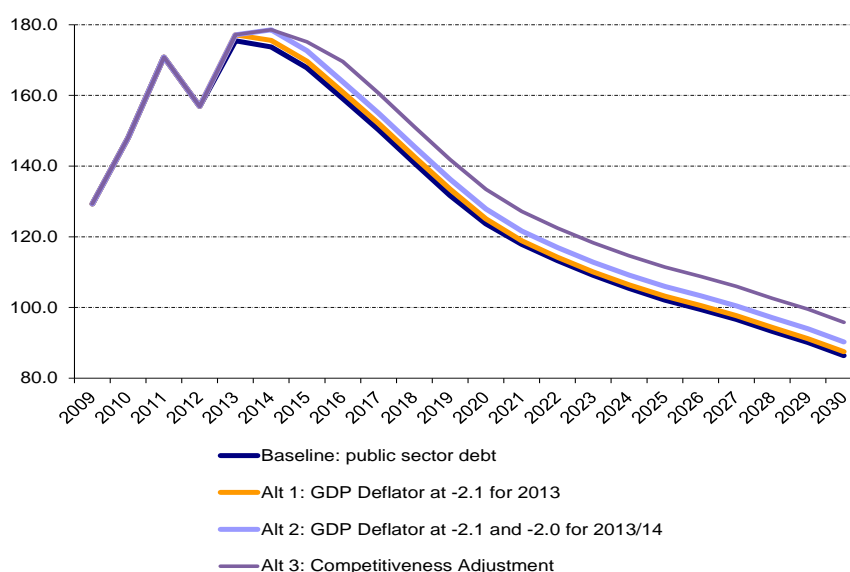
The basic assumptions of the DSA exercise are presented in Table 1 and the paths of debt under the different scenarios are visualized in Figure 7.

From the debt profiles under the three alternative scenarios we can conclude that:

<sup>10</sup> For more information please refer to the respective announcement by ELSTAT:

[http://www.statistics.gr/portal/page/portal/ESYE/BUCKET/A0704/PressReleases/A0704\\_SEL84\\_DT\\_QQ\\_04\\_2013\\_01\\_P\\_EN.pdf](http://www.statistics.gr/portal/page/portal/ESYE/BUCKET/A0704/PressReleases/A0704_SEL84_DT_QQ_04_2013_01_P_EN.pdf)

<sup>11</sup> The real exchange rate based on ULCs has already reclaimed all competitiveness losses of the previous decade, see Anastasatos (2014).

**Figure 7: The Effect of Deflation on Greek Public Debt Sustainability**


Source: Eurobank Research

- Under Alt 1, the increased (in absolute terms) deflation for one year (deflation at -2.1% in 2013 instead of -1.1% in the baseline) cancels out the positive effect from the revenues stemming from the implementation of the privatization agenda for 2013 (assumed at 0.9% of GDP for 2013 under the SEAP-J). Moreover, in order to bring public debt at its baseline level (113.3% of GDP from 114.2% of GDP in 2022 under Baseline and Alt 1 respectively) a decrease of ca 0.18pp is required in the average nominal interest rate on public debt for the 2013-2018 period (from 2.98% under the Baseline to 2.78% under the Alt 1 Scenario).
- Under Alt 2, the increased (in absolute terms) deflation for two years (deflation at -2.1% and -2.0% in 2013 and 2014 instead of -1.1% and -0.4% in the baseline) cancels out the positive effect from the revenues stemming from the implementation of the privatization agenda for 2013-14 (assumed at 0.9% of GDP for 2013 and 1.9% for 2014 under the SEAP-J). 12 Moreover, in order to bring public debt at its baseline level (113.3% of GDP from 117.0% of GDP in 2022 under Baseline and Alt 2 respectively) a decrease of ca 0.47pp is required in the average nominal interest rate on public debt for the 2013-2018 period (from 2.98% under the Baseline to 2.51% under the Alt 2 Scenario).
- Under Alt 3, the increased (in absolute terms) deflationary pressure for the 2013-2016 period is equivalent to a need of extra €5.7bn in debt relief in order to bring public debt at its baseline level (113.3% of GDP from 122.5% of GDP in 2022 under Baseline and Alt 3 respectively). This means it cancels out the positive effect from the revenues stemming from the implementation of the privatization agenda for the 2013-2016 period or for more than four years if we take as given that the target in the SEAP-J is already outdated. Alternatively, a decrease of ca 0.95pp is required in the average nominal interest rate on public debt for the 2013-2018 period (from 2.98% under the Baseline to 2.03% under the Alt 2 Scenario) to achieve the baseline path.

Again note in all three cases that the required average nominal interest rate decrease will come on top of the ones expected in autumn 2014 as a result of the decisions of the November 27th 2012 Eurogroup and the expected achievement of a primary surplus for 2013.

## 6. Conclusions and Policy suggestions

This study examined the implications of recorded deflation in Greece and the possibility that the country enters a deflationary spiral; the situation in Greece was juxtaposed to the environment of disinflation which many other Eurozone countries are experiencing. It was explained that whether deflation incurs positive or negative impact on growth and employment depends on the cause of the phenomenon. In the case of Greece, entry into deflation was demand side-driven, i.e. the result of the multi-year recession and a conscious policy

<sup>12</sup> Note here that the assumption of privatization revenues of ca 1.9% of GDP for 2014 is outdated. According to the most recent information, after the recent agreement between the Greek Government and the Troika privatizations revenues for 2014 are expected at ca 1.0% of GDP, i.e. under Alt 2 the negative deviation from the deflation targets for two years cancels out privatization revenues corresponding to more than two years.

effort to achieve internal devaluation. Given green shots of recovery, this might come to an end, to the extent that no extra fiscal measures will be taken that would magnify the fiscal drag in the economy. It is also important that longer-term expectations of deflation do not set in but, instead, expectations remain anchored on economic recovery and positive inflation rates. A continuation of deflation throughout 2014 is possible but, if it happens, it might be partly supply side-driven due to the implementation of product market reform. Again, to the extent that inflation expectations remain anchored, competitiveness gains and structural reforms bear fruit, this may actually have beneficial impact on growth. An analysis of a host of leading indicators showed that all of them continue to signal recession but, some of them, also show de-escalation trends in recent months. Similarly, deflationary expectations of consumers have weakened and turn positive in recent months. Hence, it cannot be concluded to date that the economy has entered a deflationary spiral. However, alertness should be maintained. It was showed that the possibility of deflation could adversely affect the public debt-to-GDP profile; in the more adverse scenario, extra debt relief of ca €5.7bn or a decrease of interest rates on public debt of 1% for a 5-year period would be needed in order to achieve the baseline MoU target of 113.3% debt-to-GDP of GDP in 2022 on top of measures expected in autumn 2014.

In case recovery disappoints and deflation persists, the main tool to combat deflation would be a generous QE programme by the ECB. This would help all crisis countries in the Eurozone to stabilize their debt profiles. If, in addition, countries of the core employ more expansionary policies, it will be more feasible for crisis countries to realize competitiveness gains from their own internal devaluation. This is crucial for the balanced growth and sustainability of the Eurozone as a whole. On the Greek side, structural reforms can help as they benefit the growth potential of the economy. Additional anti-deflationary initiatives include facilitation of resources' reallocation, acceleration of management of bad assets, and augmenting financial intermediation in the economy, also supplementing banking lending with corporate financing via alternative sources.

## Bibliography

Anastasatos, T. (2014), Greece: Reclaim of Competitiveness, Balancing of the Current Account and Switch Towards Tradeables' Sectors (in Greek), *Economy & Markets*, Vol. IX, No 3, Eurobank Research, March.

Barclays (2014), *Deleveraging With Low Inflation*, Economics Research, Euro Themes, 24 March 2014.

Bruegel (2014), *Addressing Weak Inflation: The European Central Bank's Shopping List*, Bruegel Policy Contribution, Issue 2014/05, May 2014.

Fisher, I. (1933), *The Debt-Deflation Theory of Great Depressions*, *Econometrica*.

IMF (2003), *Deflation: Determinants, Risks, and Policy Options- Findings of an Interdepartmental Task Force*, April.

IMF (2014), *Euro Area - "Deflation" Versus "Lowflation"*, Posted on March 4, 2014 by iMFdirect.

Keynes, J.M. (1936), *The General Theory of Employment, Interest and Money*, Macmillan.

Mayer, T. (2013), *The Ghost of Deflation Past*, High-Level Brief, CEPS, December.

Minsky, H. P. (1974), *The Modeling of Financial Instability: An introduction, Modeling and Simulation*, Proceedings of the Fifth Annual Pittsburgh Conference 5.

Obstfeld, M., J.C. Shambaugh and A.M. Taylor (2004), *The Trilemma In History: Tradeoffs Among Exchange Rates, Monetary Policies, And Capital Mobility*, NBER Working Paper 10396, March.

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