

## **EXCHANGE RATE DEVALUATION VS. INTERNAL DEVALUATION IN GREECE**

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### **Abstract**

As the Greek debt crisis flustered again the financial markets during 2015, discussions about “new drachma” and parallel currencies intensified among the economists. Not surprisingly, as the Greek situation in the aspects of the ATM withdrawal restrictions, bank runs, capital controls and mounting debt reminded Argentina in late 2001. As the negotiations about the third Greek bailout programme were anxiously extending, speculations about (temporary) exit from the Euro Area and new devalued local currency became more vivid. In the theoretical Mundell-Fleming framework currency devaluation is output expansionary. However empirical results are less convincing and paint rather mixed picture, especially for the developing countries struggling with the crisis. Our paper aims to empirically investigate relationship between exchange rate devaluation and Greek output. Furthermore, we attempt to analyze benefits and costs of the theoretical exchange rate devaluation on Greek economy compared to internal devaluation measures, which Greece has agreed to undergo after signing the third bailout.

**Keywords:** parallel currency, exchange rate devaluation, internal devaluation, Greece

**JEL classification:** E520, F310, F430

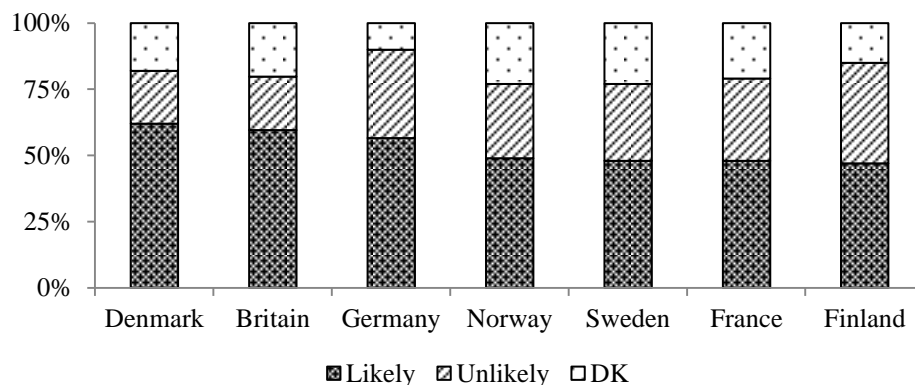
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### **Introduction**

In August 2015 after many months of intensive negotiations and increasing nervousness of the financial markets Greece signed the EUR 86bn financial support under the third bailout programme from the creditors for three years. Before this long-awaited agreement was reached and by the time patience of creditors was running low, possibility of Greek exit from the Euro Area and introduction of “new devalued drachma” were (again) heatedly discussed topics not only in the media but also among the economists. For example M. Feldstein already 6 years ago said that the Greek leave of absence from the Euro Area would be preferable before exit (Feldstein, 2010). N. Roubini warned about massive contagion if Greece left the

Euro Area (Roubini, 2011). Moreover, also population of some European countries (mostly Denmark, the United Kingdom and Germany) expected Grexit to occur last year, as shown in Fig. 1.

Fig. 1: Probability of Greece leaving EU



Source: YouGov

Headlines and covers of international newspapers were overwhelmed with rather unusual Greek referendum, in which the Greek population voted on accepting or rejecting the third bailout conditions offered from the international creditors (in July 2015). This referendum (nicknamed Greferendum) got also into spotlight of the financial markets, which by that time suffered from extremely high market volatility, increased market fear, European stocks tumbled and euro depreciated. On July 5th 2015 all eyes were pinned down on exit poll results, which suggested victory of “NO” camp. Official results confirmed that every single region in Greece voted overwhelmingly “OXI” (no in Greek language) in referendum, which was for the Greek people the first state referendum since 1974. Clear “no” to proposed creditor’s demands increased probability of Greece leaving Euro Area above 50%. Nonetheless, after the Greek Minister of Finance stood down negotiations with creditors resumed, in few months situation around Greece calmed down also on the financial markets. However, the issue of Greek indebtedness is far from being solved and questions like “Will Greece exit from the Euro Area?” and/or “How much should new drachma devalue?” might pop up again. In mid-2015 answer to the latter question differed significantly as some economists suggested (nominal) devaluation of reintroduced drachma from 30 % to almost 60 % in order to restore the Greek competitiveness. According to Mariolis (2013) new drachma should devalue by approximately 60% in order to recover the Greek economy. Additionally, Katsinos and Mariolis (2012) find that drachma devaluation about 50% would not directly or

indirectly evoke large inflationary pressures and might even help restore the Greek competitiveness by almost 40%.

This paper aims to contribute to the discussion on appropriateness of external devaluation in Greece as a part of debt reduction policy by investigating the relationship between the exchange rate devaluation and the Greek output. Furthermore, it describes option of parallel currency and currency devaluation costs and benefits in comparison with the internal devaluation measures, which Greece has agreed to undergo after signing the third bailout.

## **1 Currency devaluation as a boost for real economy**

Domestic currency devaluation as channel to support real economic growth is a well-known principle in economic theory. Short description of famous Mundell-Fleming model shall provide intuition behind the transmission mechanism through which devaluation of domestic currency can support domestic economic growth. Mundell-Fleming model for open economy incorporates balance of payments analysis into standard IS-LM model and under Mundell's view it assumes perfect capital mobility. Mundell-Fleming model suggests that (if Lerner condition is satisfied then) exchange rate devaluation is output expansionary as weaker domestic currency helps improve trade balance. Improvement in foreign sector increases domestic output and employment. This effect of currency devaluation is not so straightforward in the short-run. However in medium-term, currency devaluation increases foreign demand and decreases domestic demand for foreign goods and thus improves foreign trade balance as net exports increase.

Empirical evidence on direct transmission from exchange rate adjustments into real economy is not as persuasive as theoretical models suggest and it has been subject to interest of the economists since 1980. Edwards (1986) finds some contractionary evidence of exchange rate depreciation on the GDP in the short run in the developing countries. Bahmani-Oskooee and Miteza (2006) find that for the OECD countries effect of currency devaluation on economic output depends on the model specification. However, for the non-OECD countries is devaluation output contractionary. Effect of currency adjustments on economic output has been also subject to verification on the Greek data. Upadhyaya, Mixon and Bhandari (2004) investigated the exchange rate adjustments using a simple error correction model on the Greek and Cyprus panel data ranging from 1969 to 1998. The authors come to conclusion that exchange rate devaluation is output expansionary in the short run and neutral in medium term. Similar economic model is developed by Alawin, Sawaie, Al-Omar and Al-

Hamdi (2013) who investigate effect of real exchange rate adjustment on the Jordan GDP and come to conclusion that real effective exchange rate depreciation results in increase in economic activity. Similarly Bahmani-Oskooee and Miteza (2006) empirically verified impact of exchange rate adjustment on economic output on 42 countries (including Greece in the OECD group of countries). Also Asif, Shah, Zaman and Rashid (2011), who empirically tested output-currency relation for the Pakistan economy, find positive impact of currency devaluation on economic output both in short and long run.

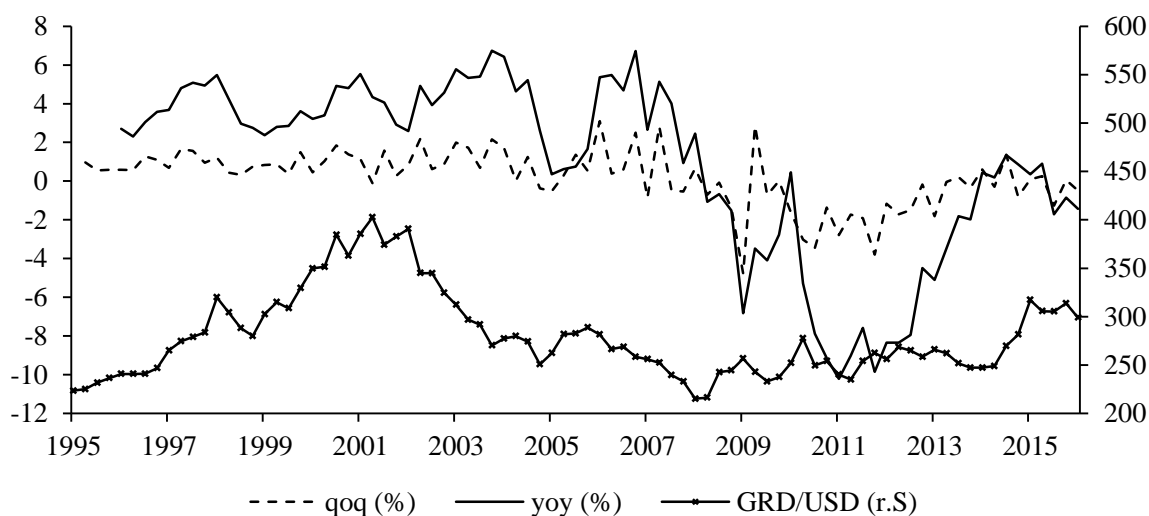
## 2 Effect of the exchange rate devaluation on economic growth

Relatively large body of literature with various estimation methods has been advocated to investigation of the relationship between exchange rate and economic output. Investigated model follows-up Upadhyaya, Mixon and Bhandari (2004) and estimated regression takes form:

$$\log GDP_t = \log RER_t + \log M_t + \log G_t + \log RER_{-1} + \log RER_{-2} + e_t \quad (1)$$

where  $RER_t$  is real exchange rate,  $M_t$  is M3 money supply,  $G_t$  are government expenditures in real term and  $GDP_t$  is real output (chained linked volumes seasonally adjusted). Lagged values attempt to measure effect of exchange rate change on output in medium and long run. From 2001Q1 to 2016Q1 the nominal exchange rate is recalculated to drachma vs. dollar using conversion value 340.75 drachmas per one euro. Real exchange rate is calculated using PPP conversion factor for unit of drachma per dollar. Data range from 1995Q1 to 2016Q1.

**Fig.1: Greek GDP growth**



Source: Macrobond

Theoretically, negative and statistically significant coefficient at  $RER_t$  suggests contractionary effect of exchange rate devaluation. Conversely, if coefficient at  $RER_t$  is positive, exchange rate devaluation is supportive for domestic economic activity. Statistical insignificance suggests that impact of exchange rate change is neutral to GDP growth.

Before regression estimation the data stationarity was tested using Augmented Dickey Fuller and Phillips-Perron unit root tests. The unit root tests are reported in Tab 1. Augmented Dickey Fuller tests show that each series is stationary at first difference except M3 and GDP series, which are stationary at second difference. Phillips-Perron tests indicate that each time series is stationary at first differences. Differences in individual unit root tests are considerable challenge, which may jeopardize reliability of estimated results. Johansen's cointegration test (see Table 2) suggests 4 cointegration vectors and null hypothesis of no cointegration being rejected in all four cases.

**Tab. 1: Unit root tests**

	ADF			PP	
	1995q1	2016q1		1995q1	2016q1
Variable	Level	FD	SD	Level	FD
log M3	-2.267555	-1.753678	-11.12502*	-3.273085*	-6.182045*
log GDP	-1.939401	-1.936003	-12.45020*	-1.700918	-6.820823*
log GRD	-1.896366	-8.772741*		-1.982993	-8.771992*
log RGRD	-1.276657	-8.679605*		-1.487906	-8.716440*
log G	-1.684614	-9.858852*		-1.684613	-9.828593*

stationary at \*5% level

Source: Macrobond, Eviews 7, author's calculations

**Tab. 2: Johansen cointegration test**

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Series: log GDP log RGRD log M3 log G

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.270381	59.73559	47.85613	0.0026
At most 1 *	0.171364	33.88648	29.79707	0.0160
At most 2 *	0.129976	18.47260	15.49471	0.0173
At most 3 *	0.082444	7.055383	3.841466	0.0079

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Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

Source: Macrobond, Eviews 7, author's calculations

Variables in regression (1) are transformed into first differences such that:

$$\Delta \log GDP_t = constant + \beta_1 \Delta \log RER_t + \beta_2 \Delta \log M_t + \beta_3 \Delta \log G_t + \beta_4 \Delta \log RER_{-1} + \beta_5 \Delta \log RER_{-2} + \beta_6 AR_{-1} + e_t \quad (2)$$

Results of estimated  $\beta_i$  coefficients are reported in Tab. 3 and suggest that real exchange devaluation is output neutral as coefficients at REER are statistically insignificant. We use also different measure of real exchange rate, where nominal exchange rate is transformed using weights of CPI indices for the US and Greek price levels.<sup>1</sup> Obtained results (see Tab. 4) are very similar to results with real exchange rate calculated using PPP conversion. However, as abovementioned disputable issue of stationarity may argue against the reliability of these results. Moreover, adjusted  $R^2$  in both estimations point to rather small model reliability and thus possibly more relevant variables should be added to model.

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<sup>1</sup> CPI converted real exchange rate time series is stationary on first difference. In Johansen cointegration test we obtain results which conclusions are completely in line with the results of the Johansen test when using real exchange rate with the PPP conversion.

**Tab.3: Regression estimates - PPP conversion**

	Estimated coefficient	Standard error	5% stat. significance
$\beta_1$	-0.032657	0.029812	0.2769
$\beta_2$	0.096370	0.048153	0.0490
$\beta_3$	0.133005	0.060717	0.0316
$\beta_4$	-0.002886	0.030946	0.9260
$\beta_5$	-0.041093	0.030534	0.1825
$\beta_6$	0.214479	0.117724	0.0725
$R^2 = 0.25$ $Adj. R^2 = 0.19$ $DW = 2.14$			

Source: Macrobond, Eviews 7, author's calculations

**Tab.4: Regression estimates - CPI conversion**

	Estimated coefficient	Standard error	5% stat. significance
$\beta_1$	-0.024997	0.029738	0.4033
$\beta_2$	0.091549	0.048868	0.0650
$\beta_3$	0.129282	0.061075	0.0376
$\beta_4$	0.003732	0.030736	0.9037
$\beta_5$	-0.035359	0.031478	0.2650
$\beta_6$	0.231821	0.118005	0.0532
$R^2 = 0.25$ $Adj. R^2 = 0.18$ $DW = 2.16$			

Source: Macrobond, Eviews 7, author's calculations

Even though empirical investigation did not confirm expansionary effect of exchange rate devaluation on economic output, it does not necessary imply that abandoning euro and reintroduction of devalued drachma would not reflect in Greek output growth. First, estimated regression may be challenged for disputable stationarity issue and low reliability of overall model. Second, time range 1995q1 to 2016q1 includes several important breaking points for the Greek economy (for example euro adoption, effect of Olympic games, financial crisis in 2008, European economic crisis in 2011-2012 and adoption of bailout programmes), which might have significant and possibly disruptive impact on analyzed time series and thus bias the results. For example the IOBE study about Impact of the 2004 Olympic Games on the

Greek economy (2015) suggests significant impact of Olympic Games on the Greek GDP. According to this study the Olympic Games would lower Greek GDP by 2.5% and employment by 44 thousand jobs in year 2004. Similarly, Kasimati and Dawson (2009) find evidence that the Olympic games boosted Greek economy, especially preparation phase and the year of Olympic games have relatively strong impact. Furthermore, in 2008 financial crisis hit Europe, especially economies on periphery. In 2008 the Greek GDP growth plummeted below zero and it fail to rebound until year 2014. From 2008 to 2013 the Greek economy lost almost 30 % of its momentum. However Greece as a member of the Euro Area could not react to fast worsening economic conditions (e.g. fast deepening fiscal deficits, rising unemployment and worsening trade balance among others) by weakening its domestic currency.

Statistical tests for breaking points suggest that Greek GDP has several breaking points (see Tab. 5). Surprisingly, Chow test suggests that financial crisis in 2008 does not disrupt the Greek GDP time series but euro adoption, the Olympic Games and European economic debt crisis do. Reasonably, GDP could be divided into sub-periods for respective breaking points. However, in our case estimated sub-periods would be very short for any reliable results.

**Tab.5: Chow breaking point tests**

H0: no breaks at specified breakpoints		
Sample 1995q1:2016q1	Prob. F	Prob. Chi-square
Euro adoption (2001q1)	0.00	0.00
Olympic Games (2004q1)	0.00	0.00
Financial crisis (2008q3)	0.6799	0.6753
Economic crisis (2011q1)	0.0172	0.0156
Economic crisis (2012q4)	0.0099	0.0089

Source: Eviews 7, author's calculations

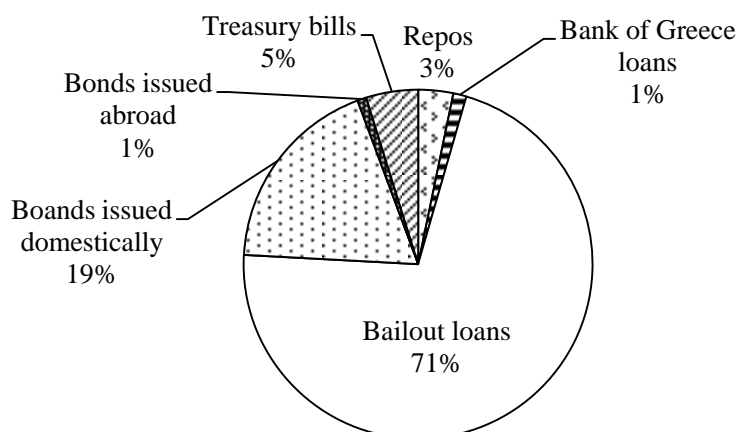
### **3 Parallel, own or common currency as solution to Greek misery?**

Greece has been mounting its debt to astronomic highs for several years. In consequence to rising debt and deepening fiscal deficit rating agencies pushed Greece credit ratings down and in 2011 Standard and Poors downgraded Greece credit rating such that it became the only



country in the world with the lowest credit rating. In 2016 Greek indebtedness reached astronomic size of approx. EUR322bn (cca 180 % GDP) and it ranked Greece (after Japan) as the second most indebted developed country in the world. Bailout loans from the international creditors create almost  $\frac{3}{4}$  of overall Greek debt and Germany, France and Italy are its biggest lending creditors.

**Fig. 3: Structure of Greece debt (mil. EUR)**



Source: Greek Finance Ministry, Bloomberg

Considering the little euro reserves Greece owns, bank liquidity available mostly under ELA programme supervision, capital restrictions and Greek economy (again) falling into recession, ability of the Greek government to repay its debt and regular obligations (pensions, wages) in near future is very limited. Safe-line to this problem could be temporary introduction of parallel currency as it would not necessarily imply automatic exit of Greece from the Euro Area. Discussion about parallel currency for Greece became very vivid after Greek nation voted 61:39 for rejection of creditor demands in referendum. Theoretically, Greece could introduce parallel currency in a form of “IOU” or some securitization on future tax revenues, which in any case would serve primary for sustained payments for public sector. Debt obligations or “I owe you” or “IOUs” are almost equivalent to zero coupon bonds with fixed maturity issued by government and in the official currency. In advance government could agree with private sector at which value IOUs would be acceptable thus to agree on discount of these notes. Discount would reflect Greek credit and currency risk against euro (the official currency). In past California introduced IOUs when it faced sharp budget shortage driven by drop in revenues and did not want to give up dollar. In 2001 Argentina Provinces also issued IOUs. While California repaid its IOUs, Argentina IOUs were first step

towards abandoning peso/dollar peg. At this time Greece is far from being in California's shoes and it is more likely that parallel currency would be for Greece smooth transition from the euro.

Rather more radical option than parallel currency is reintroduction of own domestic currency "new drachma", which would very likely devalue by at least tenths of percent after introduction. Possible exit of Greece from the European currency bloc would probably trigger line of negative reactions for the European economies. European bonds would most likely see immediate spike in risk premia. Investors would largely sell off euro against dollar and European stocks would plummet down. Sudden currency devaluation could trigger abrupt rise in consumer prices in Greece. Looking back to history sudden currency devaluation resulted in inflation spike of 82 % in South Korea and almost 130 % in Russia within two years after. (However, few years later it declined to almost pre-devaluation levels.) Worsened sentiment in Europe and confidence in euro would possibly cause capital shifts towards safe heaven economies and massive capital outflow from the European markets. Consequent decline in foreign direct investments would weigh heavy on trade balances and current accounts. Rating agencies would very likely dampen outlook and credit ratings further to junk territory, Greece could possibly face default and its economy likely face contraction. Furthermore, political instability and anti-EU sentiment would be strengthened. Conversely in an attempt to save common currency Euro Area member might be pushed to stronger economic integration. As the Greek economy would likely fall fast deeper into recession, effort of the Greek government to implement any reforms (which Greek economy desperately needs) would be set aside.

Greece has decided to keep the common currency and rather accept reforms (proposed by the creditors), which should significantly affect health of the Greek economy. Appropriate mix of measures focused not only on demand and but rather on supply side of the economy shall help restore the market imbalances faster. Internal devaluation measures are primarily focused on pushing down the wages of workers and simultaneously increase productivity of workers as labor costs decline and labor competitiveness increases. Higher competitiveness attracts foreign investors and consequently stronger investment inflow will support economic growth in the medium term. However, internal devaluation should be accompanied also by deflationary measures (e.g. higher taxes, lower government expenditures). Deflationary policies correspond to restrictive fiscal policy and thus result in decline of aggregate demand. As argued in Horská, Milucká and Marek (2015) Greece decided to implement wide range of

measures including tax increases, wage and benefits cuts, pension reforms and privatisation. However, effectiveness of these measures is incomparable to similar measures which were adopted for example by the Latvian government. There is not one particular reason why the Greek measures have not borne as much fruit (so far) as the Latvian. Possible explanation could be instability of the Greek government (6 government changes from 2008 to mid-2015), declining confidence of the Greek people towards their ruling government or unwillingness of the Greek parliament to implement any radical reforms.

Especially sensitive appears to be tax issues. Despite the tax reforms, which were included already in previous adjustment programme for Greece, effectiveness of tax enforcement remains very low. Similarly to Spain and Italy Greece belongs to the European countries with the VAT revenue ratio (36,3 % in 2014) significantly below the European average (48,1 % in 2014) and its VAT policy gap (50,8 % in 2013) and VAT compliance gap (35 % between 2009 and 2011) are high (European Commission, 2015).

As it appears implementation of internal devaluation and deflationary policy mix is a long run process for Greece. Government inability to introduce radical (even though painful) reforms makes it for the Greek pensioners (who suffer under continuously changing reforms the most) very difficult. Cut in allowances, benefits and extra pension salaries markedly affected their lives. However, as argued in Horska, Milucka and Marek (2015) the Greek pension system is well above the European standards. Speed of implementation and commitment of the government to the reforms are keys for successful reforms, which will bring the economy back to path of economic prosperity. Unfortunately, the Greek government lacks both these features. Surprisingly, the new Minister of Finance seems to be less radical in its opinions compared to its predecessor Y. Varoufakis and thus easily negotiates planned reforms with the international creditors.

## **Conclusion**

This paper aims to contribute to the discussion on appropriateness of external devaluation in Greece as a part of debt reduction policy by investigating the relationship between the exchange rate devaluation and the Greek output. The paper also describes option of parallel currency and currency devaluation costs and benefits in comparison with the internal devaluation measures, which Greece has agreed to undergo after signing the third bailout.

Unfortunately, the investigated model follows-up Upadhyaya, Mixon and Bhandari (2004) did not confirm positive effect of exchange rate devaluation on economic output. However, it is too early to make final conclusion that reintroduction of devalued drachma would not have pro-growth effect. Disputable stationarity of input data and several important breaking points that were identified might be a cause of low reliability of this regression model and possibly any other. To divide the data series into sub-periods for respective breaking points is not viable since they are very short for any reliable results.

The uncertainty surrounding the effect of reintroducing domestic currency including the risk of contagion effect on the European financial markets is a strong argument against such radical solution as the abandoning of euro represents. The next option is the parallel currency that would anyway represent for Greece a smooth transition from the euro as was the case of Argentina that IOUs were first step towards abandoning peso/dollar peg in late 2001. For the time being, Greece has decided to keep the common currency and rather accept reforms. The reforms that have power to restore the Greek economy to health should be focused more and more on supply side. Their mission is to boost the labour and capital productivity and enhance competitiveness of Greek economy, to ensure the sustainability of public finance not only by public expenditure cuts but rather through increasing tax enforcement, privatization revenues, and to support higher effectiveness of local businesses.

The further logical step would be test of alternative models that might discover the positive impact of currency devaluation on Greek economic output or that confirm our skepticisms incurred by the here presented research outcomes.

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