EC4307: The Aftermath of Greek Debt Crisis

Final Report

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Introduction

a) Project Focus

Our project focuses on Greece's decade-long battle against soaring (1) unemployment and (2) weak economic growth triggered by the European sovereign debt crisis. This report provides an initial evaluation of Greece's past and current policies and suggests alternative policies that the Greek government could adopt to resolve the above two problems.

b) Background & Analysis of Macroeconomic Problems

(See Appendix C for Systems Dynamic model of Greeks' macroeconomy and its problems)

Greece accumulated debt since the 1990s and its economy went unscathed until the 2008 GFC where capital flows to Eurozone are stifled[1]. This led to a run-up of the 2009 Eurozone Debt crisis, revealing Greece's budget deficit of 12.7%.[2] The Troika bailed Greece out in exchange for strict austerity measures. However, a decade after the first bailout package, Greece's debt-to-GDP ratio remains at an all-time high of 181.1% (Figure.1).

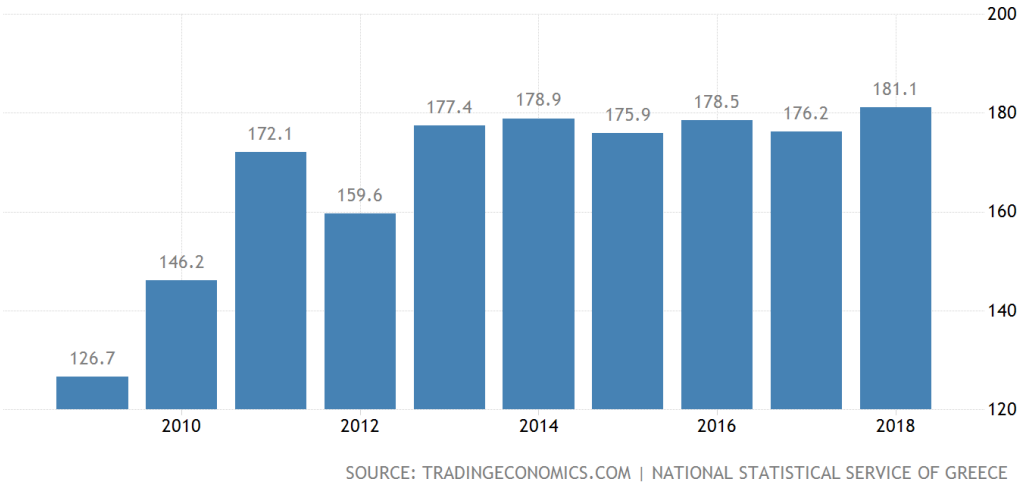

Figure 1: Greece's Debt to GDP (Year 2000-2018)

Austerity crippled Greece's economy, causing a increase in unemployment rate of 27.5% in 2013 and an erosion of citizens' quality of life[3], with a 40% rise in poverty from 2008-2015. [4] The severe economic contraction hindered Greece's ability to pay off its debt, spiralling its economy downwards. Though the economy has enjoyed a slight recovery, the crisis is far from over; IMF forecasted Greek economy to regain its pre-crisis economic levels in 2030s.[5] Moreover, unemployment remains high at double-digits (Figure.2).

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[1] Melvin, Don. (2015). "Greece debt crisis: How did it get into such a fix?" Central News Network.

[2] BBC (2012). "Timeline: The unfolding eurozone crisis."

[3] BBC (2018). "Greek bailout crisis in 300 words."

[4] Chrysopoulos, P. C. (2018)

[5] Wolf, M. (2019, May 20). "Greek economy shows promising signs of growth."

Figure 2: Greece Unemployment (Year 2000-2018)

Current Policies

Greece's policies thus far have been lacklustre; while the austerity measures were somewhat successful in lowering government spending.[6] Greek economy is depressed more than intended.[7] Consequently, EU and IMF resumed negotiations for assistance packages to prevent Greece from defaulting. However, the bailout packages were used to repay creditors instead of boosting the economy, contracting it rapidly. 2018 hailed Greece's bailout programme exit. Coupled with the proposal of a new Holistic Growth Strategy [8], and the inauguration of the new Greek Prime Minister this year, allows Greece to reshape its current growth strategy, growing at a new trajectory. However, since these are recent developments and sound too promising to be true, we have decided to propose alternative suggestions aimed at refining Greece's soaring unemployment rates and weak economic growth (Figure 3).

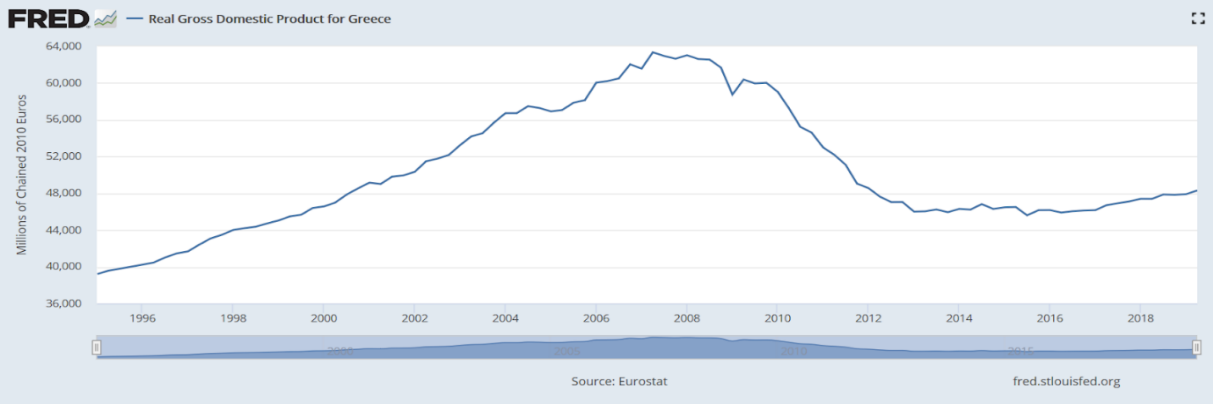


Figure 3: Greece's GDP (1996-2018)

[6] Maisonneuve, C.de.la. "How to boost export performance in Greece."

[7] Nelson, R. M., Belkin, P., & Mix, D. E. (2011). "Greece's debt crisis: Overview, policy responses and implications."

[8] Greek News Agency, (2018, June 18). "A Holistic Growth Strategy for Greece."

Suggested Policies

a) Greece's Policy position

Being part of the EU, Greece is bounded by a common currency. Based on Impossible Trinity (Figure.4), with a stable exchange rate and capital mobility, Greece's use of monetary policy is out of the question. Hence, a strong candidate for policy implementations is fiscal measure. However, Greece's high debt level and obligation to creditors prevent its government from borrowing extravagantly to finance economic expansion. Fortunately, this is partially mitigated recently; Greece is running a budget surplus for the past 3 years (Figure.5) and as of 2018, no longer faces austerity constraints from the bailout.[9]

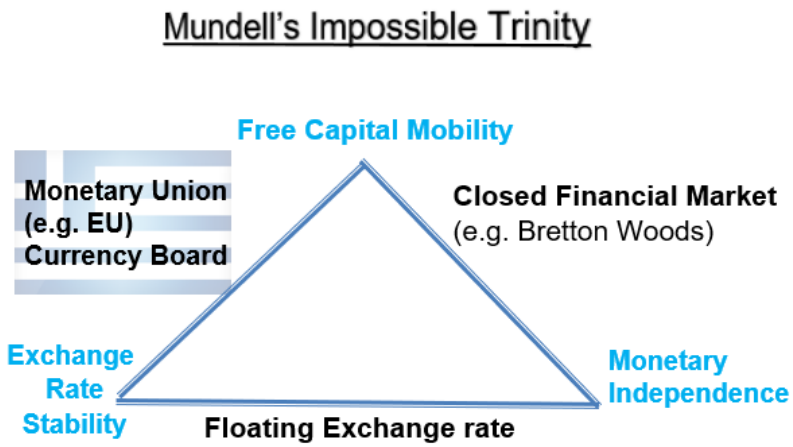


Figure 4: Mundell's Impossible Trinity

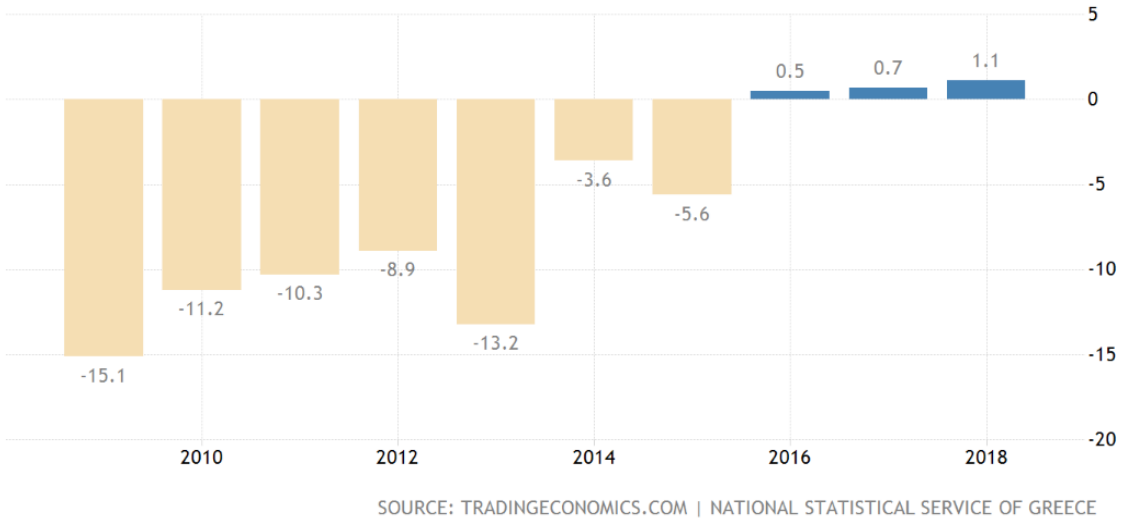


Figure 5: Greek's Budget Balance (% of GDP, Year 2010-2018)

[9] Baynes, C. (2018, August 19). Greece bailout programme finally comes to an end but country faces decades of austerity.

b) Taxation regime changes

i) Lowering of Taxes

Greece has an inefficient tax system and is ranked as one of the lowest in Tax Competitiveness Index among OECD countries[10]; it has one of the highest corporate tax (29%) and VAT (24%) in Europe (Figure.6,7). Moreover, Greece is ranked 32nd in FDI and its investment is only 0.27% of entire Europe. 70% of the investors have optimistic views towards Greece and view tax cuts as their top priorities. [11]This shows that a cut in corporate tax could potentially bring in an influx of foreign investment. Moreover, in consideration of its low consumption (Figure.8), there is also potential effects in cutting VAT taxes to stimulate consumption.

Before proceeding with tax policy suggestions, we must first consider if Ricardian equivalence exists. Empirical studies by Tagkalakis[12], uses SVAR for tax shocks shows that both indirect and direct tax shocks on Greece produce positive effects on GDP growth and negative shocks (improvement) in unemployment which last for up to 6-7 quarters and 3 quarters respectively. Hence, we think that the lowering of both VAT and corporate taxes has strong potential to boost short-term growth.

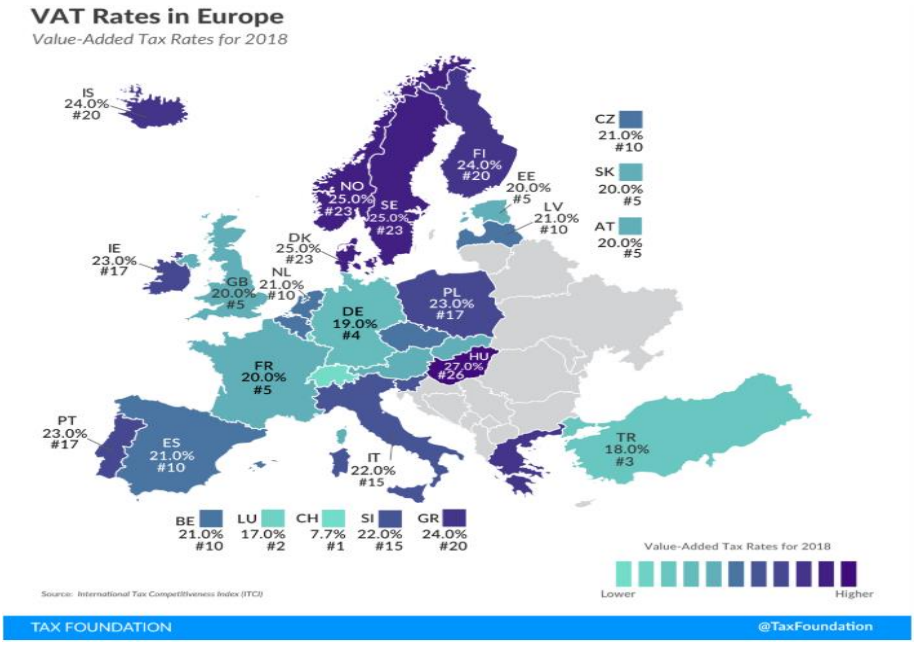


Figure 6:Vat Rates in Europe

[10] Gtp(2019) "Tax Policies Taking Toll on Greece's Competitiveness."
[11] Ernst and Young (2019). ""Ey-Press-Release-Attractiveness-Survey-Greece-2019."
[12] Tagkalakis, Athanasios O. "The Unemployment Effects of Fiscal Policy: Recent Evidence from Greece."

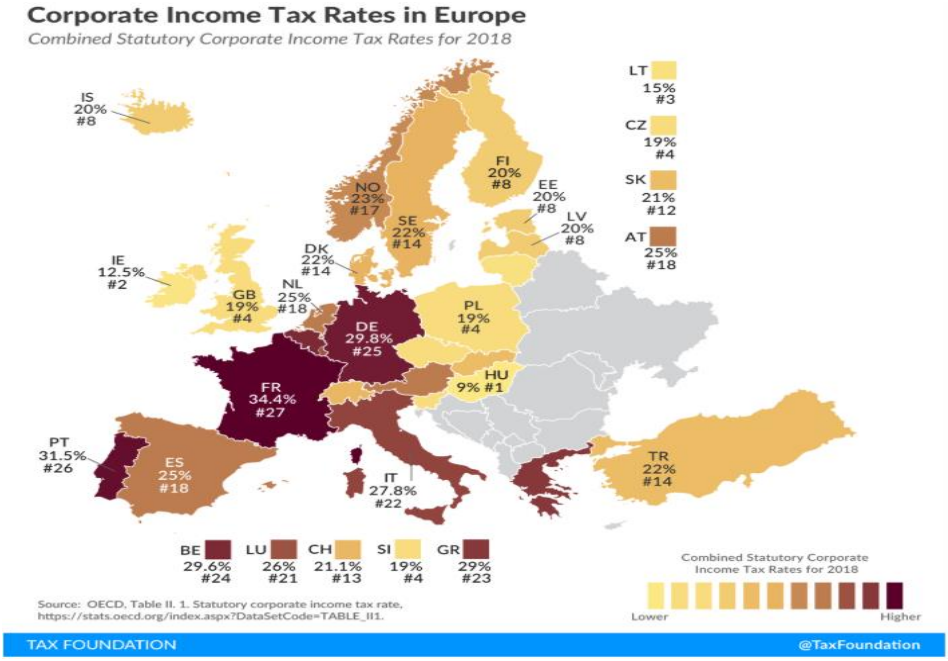


Figure 7: Corporate Tax in Europe

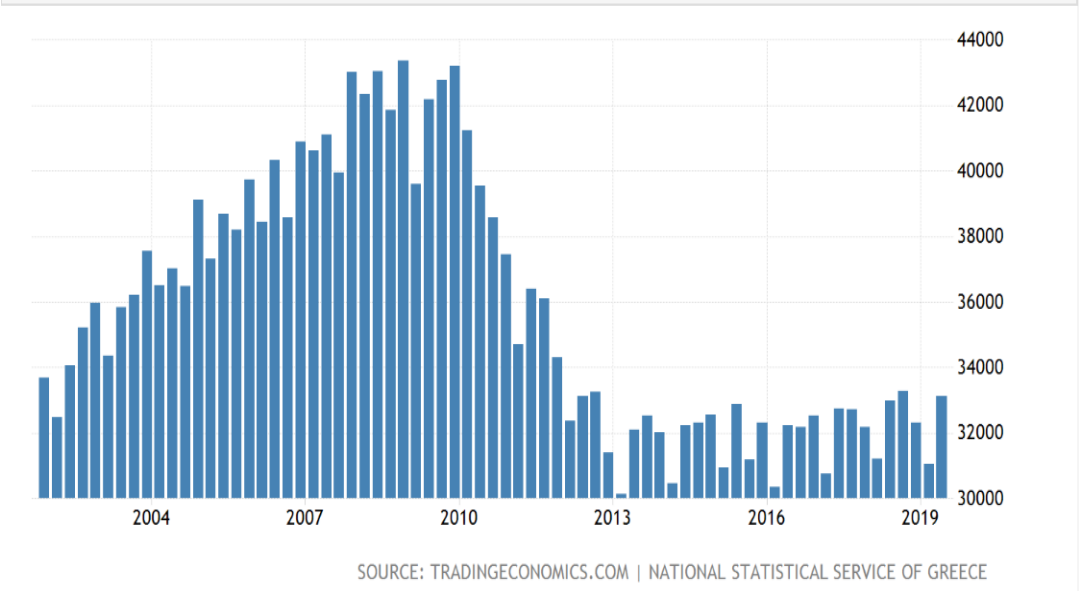


Figure 8: Greece's Consumption Spending

ii) Effective Long Run Tax System

There is currently high tax evasion which is largely due to the wealthy and powerful individuals, and corruption within government.[13] This constitutes about 100billion[14] which is 25% of its national debt (Figure.9). As such, we think that it is fundamental for the Greek government to impose a strict law on tax avoidance and corruption.

However, this may produce a contradicting effect with our VAT tax cut suggested previously. According to a study on OECD countries, MPC is higher for low-middle income group as compared to high-income group[15]. As tax avoiders in Greece are largely high-income group, while VAT would benefit the lower-middle income group, we believe that this will still lead to an overall increase in C. Moreover, tax enforcement could be roll out slowly (e.g. use of tax amnesty). Hence, in the LR, Greece will be able to achieve an efficient tax system.

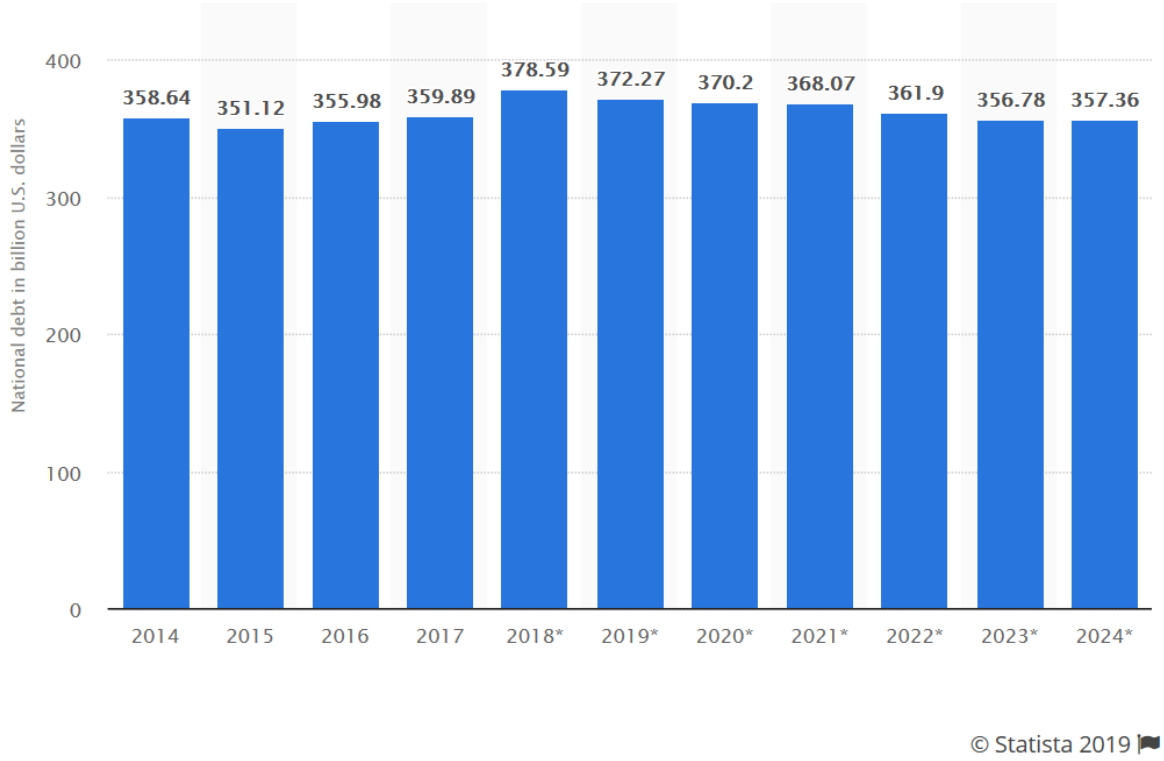


Figure 9: Greece's National Debt Absolute

[13] Artavanis, N., Morse, A., & Tsoutsoura, M. (2016). "Measuring Income Tax Evasion Using Bank Credit: Evidence from Greece*."

[14] Xinhuanet(.n.d.) One in two Greek taxpayers owes to tax office: report. (n.d.).

[15] Godar, Sarah, et al. (2015) "The Scope for Progressive Tax Reform in the OECD Countries."

c) Government spending shifts towards structural reforms

i) Enhancing export competitiveness through infrastructure and logistics improvements

Although Greece is strategically located along Suez-Canal (Mediterranean Sea) and has essential ports such as Piraeus to facilitate its exports.[16] Net exports though improving, are negative (Figure.10). This is attributed to poor infrastructure and logistics quality as reflected by World-Bank-Logistics-Performance-Index and the Quality-of-Infrastructure-Index (Figure.11,12). Moreover, empirical studies show that infrastructure and logistics improvement will improve Greece export competitiveness through reduction in transportation cost, and better efficiency. [17] One potential improvement is to further exploit its geographical position as a gateway to Southeast Europe by connecting the Piraeus port to the rest of Europe by rail[18]. Essentially, if the government improves the overall logistics and infrastructure, and port's connectivity, Greece's export competitiveness will improve; resulting in an increase in Y due to injection in G in SR and increase in X in LR.

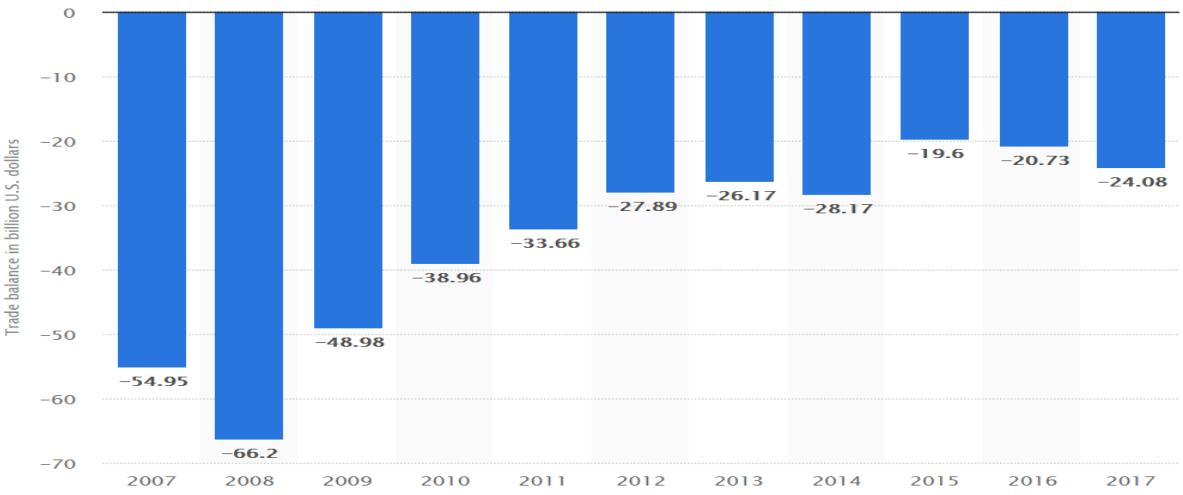
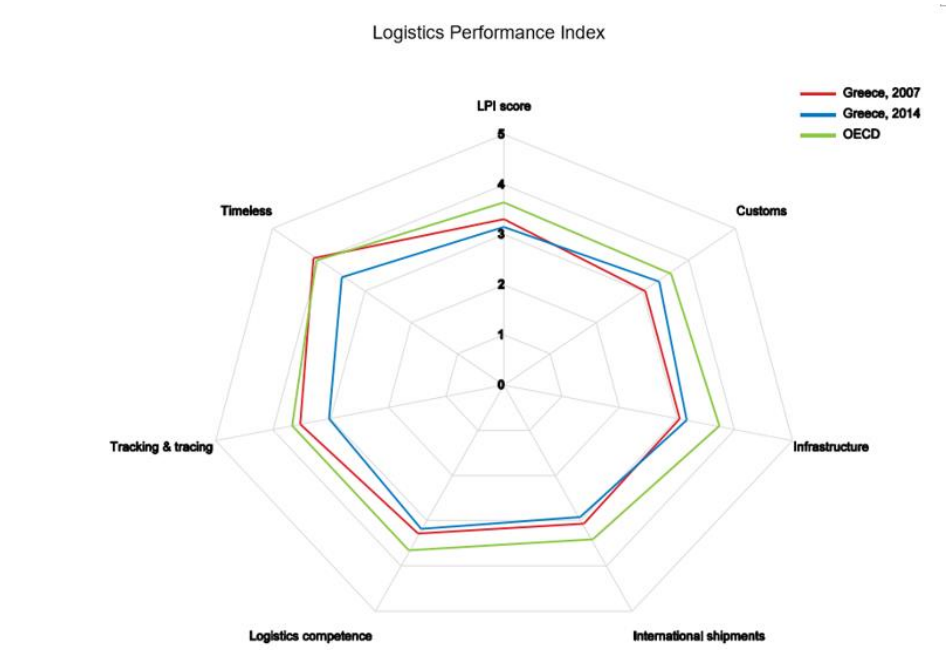


Figure 10: Trade Balance

[16] Böwer, Uwe; Michou, Vasiliki; Ungerer. Christoph. (2014). "The Puzzle of the Missing Greek Reports."

[17] Malkoutniz, N. The Greek Crisis and the Politics of Uncertainty. (2011, November). Retrieved from http://library.fes.de/pdf-files/id/ipa/08570.pdf.

[18] Yannis Pierros (n.d). Re-positioning Greece as a global maritime capital. doi: https://www.ey.com/Publication/vwLUAssets/ey-shipping-survey-en-long/$FILE/Shipping_Survey_en_long.pdf



Source: World bank database.

Figure 11: Logistics Performance Index

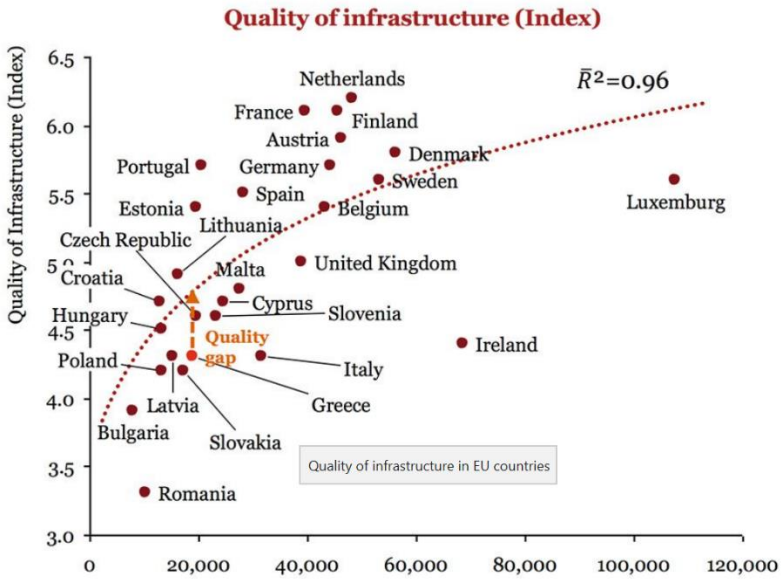


Figure 12: Quality of Infrastructure index

ii) Labour Structural Reforms (lowly skilled and highly skilled)

One major issue with Greece is skills mismatch (Palgrave Macmillan, 2015). People are mostly over-qualified or underskilled for existing jobs that require medium-level qualifications. This resulted in low productivity and high unemployment rate (Figure.13). Coupled with 36% cuts in education since financial crisis[19], fundamental weaknesses in the education system compromised teaching quality and students' skills. As a result, students lacked necessary soft-skills such as communication and teamwork for middle-class jobs. [20]. Other than closing such gaps, improving its education system is paramount to attract enrolment, improve labour productivity, and reduce skills mismatch. Hence, by lifting the productivity of the lowly-skilled labor, they will be better equipped to take on existing jobs, reducing unemployment.

Greece also failed to produce enough high-value jobs for its increasingly educated population. Therefore, the government can emulate Singapore's footsteps by providing financial and technical support to the higher-educated masses, encouraging businesses start-ups in high-value sectors such as ICT and health [21]. This is essential as existing companies, due to structural weakness, only creates 20% of necessary jobs. We believe that by spurring start-ups' growth, the effect is likely to be multiplied. [22] The first few successful start-ups will inspire others to create more, eventually generating sufficient high-value jobs for the highly-educated masses. This could potentially help Greece retains its talents and leverage on its expertise to foster innovation, reducing unemployment in the LR.

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[19] (OECD, n.d.) Greece can turn its education system into a source of inclusive and sustainable growth. Retrieved from https://www.oecd.org/newsroom/greece-can-turn-its-education-system-into-a-source-of-inclusive-and-sustainable-growth.htm.

[20] Algan, Yann, Pierre Cahuc, and Andrei Shleifer. 2013. "Teaching Practices and Social Capital." American Economic Journal: Applied Economics 5(3):189-210.

[21]

Cassis, Y., & Wójcik Dariusz. (2018). *International financial centres after the Global Financial Crisis and Brexit*. Oxford, United Kingdom: Oxford University Press.

[22] Vassilis Anyoniades.(April,2018). Greece's startup ecosystem: *A prime opportunity for economic growth*. Retrieved from http://image-src.bcg.com/Images/BCG-Greeces-Startup-Ecosystem_tcm9-190625.PDF

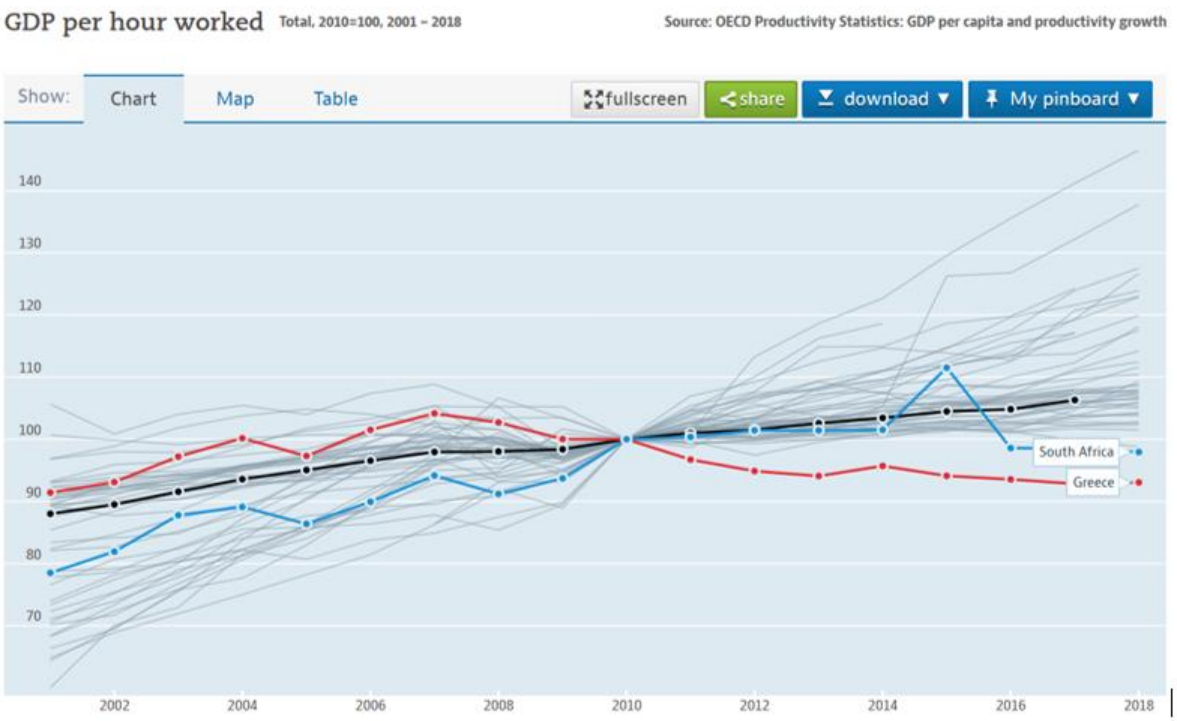

Figure 13: Unemployment Rate

d. Analysing policies effects using models

(Detailed explanations in Appendix A & B)

Our first suggested tax policy seeks to increase C and I in SR. While our second policy on government's structural reform seeks to (1) increase G in SR, and (2) increase X and total labour productivity in LR. Considering Greece's open economy, we attempted to use the Mundell-Fleming model to explain the policies effects. Our result analysis shows how an increase in C,I,G,X will help Greece to achieve BOP surplus in the SR and increase in Y in the LR, achieving our policy objective of economic growth.

To model the effect of total labour productivity (TLP), SVAR is used to analyse its effect on Greece's unemployment and RGDP. Impulse response shows a positive shock in TLP leads to significant responses of positive shocks in RGDP, and negative shocks in unemployment rate for more than 10 quarters. Hence, this is evident to how the increase in TLP helps to achieve our economic objectives directly, with a more pronounced effect on unemployment.

5) Evaluation and Conclusion

Escaping the self-fulfilling prophecy and downward spiral

While the proposed tax changes and government spending shifts pose a threat to existing debt levels, we believe that this may be a necessary evil for Greece to boost its poor economic outlook. To justify this, we first consider the effects of the self-fulfilling prophecy which played a significant role in Greece's economic downfall. In 2009, Greece's Debt-GDP ratio was around 126%, which, although high, was still within Greece's ability at repayment. However, investors' pessimism rose, largely contributed by credit-rating agencies' lowering of Greek bond ratings. The increase in bond spread rendered Greece from rolling over their debt, forcing them to risk defaulting their debts. As a result, investors' negative expectations kicked off a harmful downward debt spiral (refer to Appendix C)

Currently, the ideal scenario here would be for Greece to run a budget deficit first and to pump all their borrowings into projects and policies that would help spur economic growth. However, because the self-fulfilling prophecy could potentially relapse should investors' confidence spiral downhill again, Greece must work towards reassuring its creditors so that leeway could be granted in the meantime (refer to Appendix C). This eventually allows Greece's economy to grow and enables debt repayment. Of course, there are significant political ramifications to this suggestion, and we understand that things are more complex in reality. However, for Greece's economy to recover to its original levels, this route seems to have one of the largest potentials, if only Greece's government could achieve the much required short-term international clemency.

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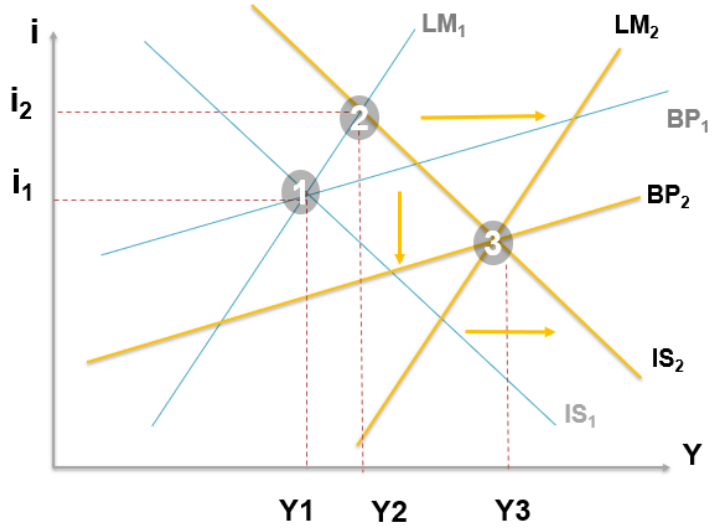
Appendix A: Mundell-Fleming Model.



(i) **IS:** $Y = C + I + G + X - M$

(ii) **LM:** $\frac{M}{P} = L(i, y)$

(iii) **BP/FE** : $X - IM + F((1 + i) - \frac{e*}{e}(1 + i*))$

Appendix B: SVAR for Total Labour Productivity

Data

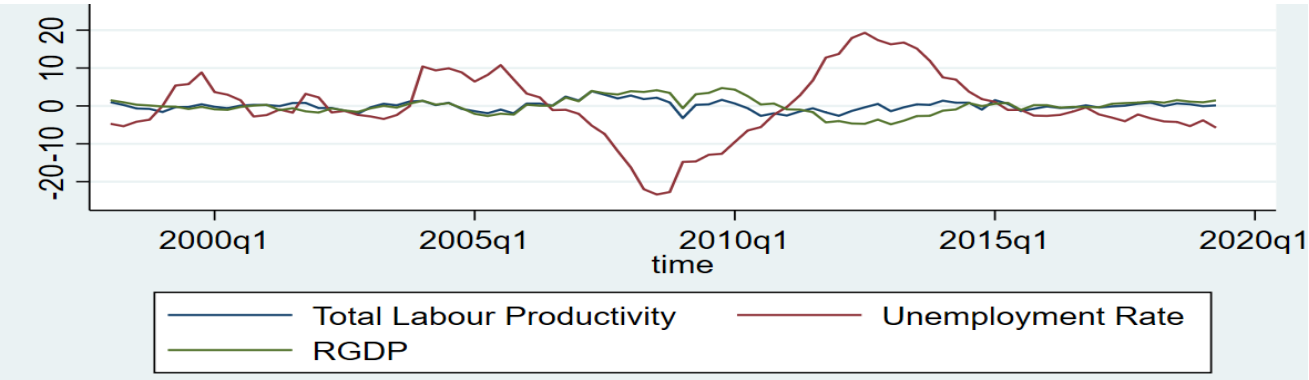
Quarterly data (1998Q1 to 2019Q2)

(1) *Total Labour Productivity, SA (Greece, source:FRED)*

(2) *Real GDP, SA (Greece, Source: FRED*)

(3) Unemployment Rate (Greece, Source:FRED)

Stationary Series



Number of lags

```
varsoc tlp rgdp un, maxlag(7)
```

Selection-order criteria
Sample: 1999q4 - 2019q2 Number of obs = 79

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-515.981				102.016	13.1388	13.1748	13.2287
1	-361.493	308.98	9	0.000	2.5655*	9.45552*	9.59972*	9.81544*
2	-354.135	14.716	9	0.099	2.67745	9.4971	9.74944	10.127
3	-347.817	12.637	9	0.180	2.87325	9.56498	9.92546	10.4648
4	-339.736	16.161	9	0.064	2.95555	9.58826	10.0569	10.758
5	-329.742	19.988*	9	0.018	2.90517	9.56309	10.1399	11.0028
6	-323.857	11.769	9	0.227	3.18087	9.64196	10.3269	11.3516
7	-316.746	14.223	9	0.115	3.39215	9.68977	10.4828	11.6693

Endogenous: tlp rgdp un
Exogenous: _cons

Equations and Cholesky's decomposition

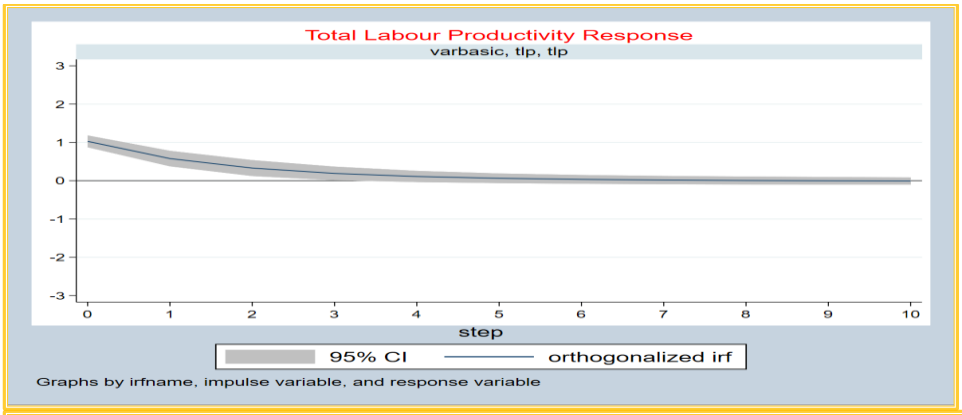
$$Y_t = [TLP, RGDP, UN]$$

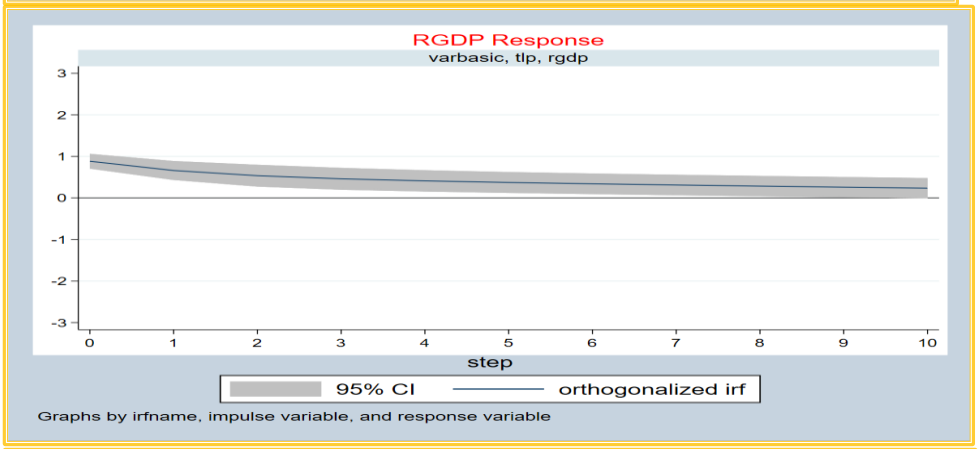
$$\begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} \\ \beta_{21} & \beta_{22} & \beta_{23} \\ \beta_{31} & \beta_{32} & \beta_{33} \end{bmatrix} \begin{bmatrix} y_{1,t} \\ y_{2,t} \\ y_{3,t} \end{bmatrix} = \begin{bmatrix} \kappa_{11} & \kappa_{12} & \kappa_{13} \\ \kappa_{21} & \kappa_{22} & \kappa_{23} \\ \kappa_{31} & \kappa_{32} & \kappa_{33} \end{bmatrix} \begin{bmatrix} y_{1,t-1} \\ y_{2,t-2} \\ y_{3,t-3} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \\ \varepsilon_{3,t} \end{bmatrix}$$

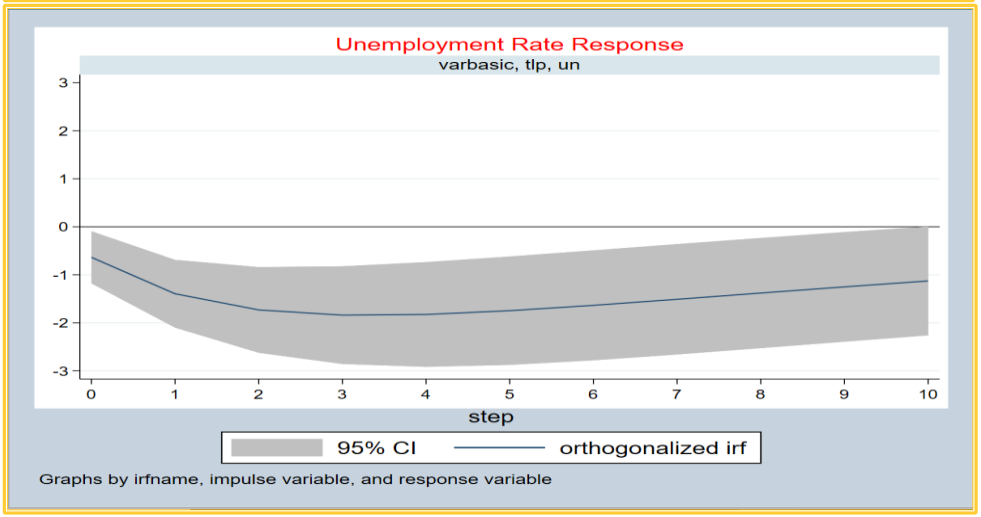
$$B.Y_t = \begin{bmatrix} \beta_{11} & 0 & 0 \\ \beta_{21} & \beta_{22} & 0 \\ \beta_{31} & \beta_{32} & \beta_{33} \end{bmatrix} \begin{bmatrix} TLP_t \\ UN_t \\ RGDP_t \end{bmatrix}$$

We arrange our variables as such, with the most exogenous variable (TLP) ranked at the top.

Results:







Appendix C: Causal Loop Diagram Explanation

System Dynamics Overview of the Greek Macroecnomy

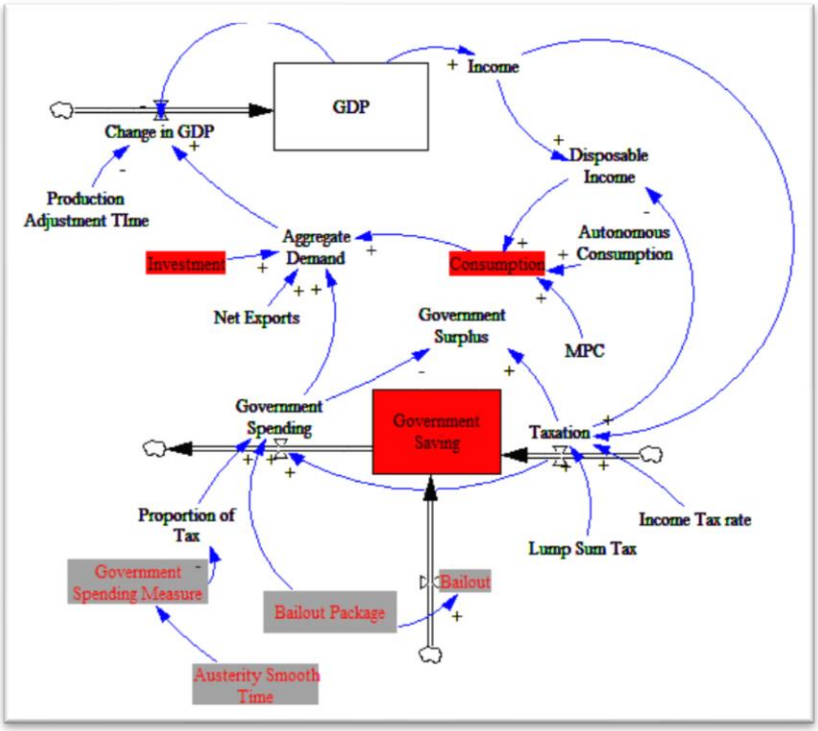
Brief explanation on System Dynamics models

- Causal links are represented by arrows
- Variables in boxes are stocks
- All clouds + double arrows indicate flows int
- All other variables are either auxiliary (functions of other variables) or constants
- Plus signs indicate positive relationships between variables
- Minus signs indicate negative relationships between variables

Assumptions made:

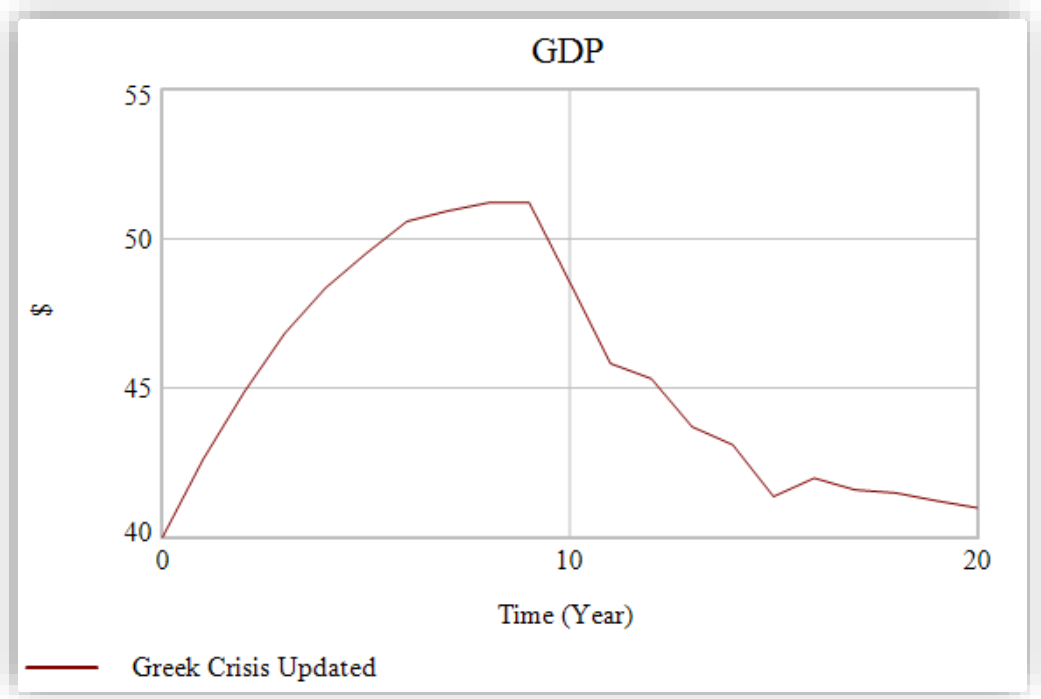
1) Assumed government spending as a function of taxation (G = kT | If k >1, deficit and if k<1, surplus)
2) VAT assumed as lump sum tax
3) "Change in GDP" variable (Flow) account for the dynamic adjustments of AD to GDP in the Keynesian model

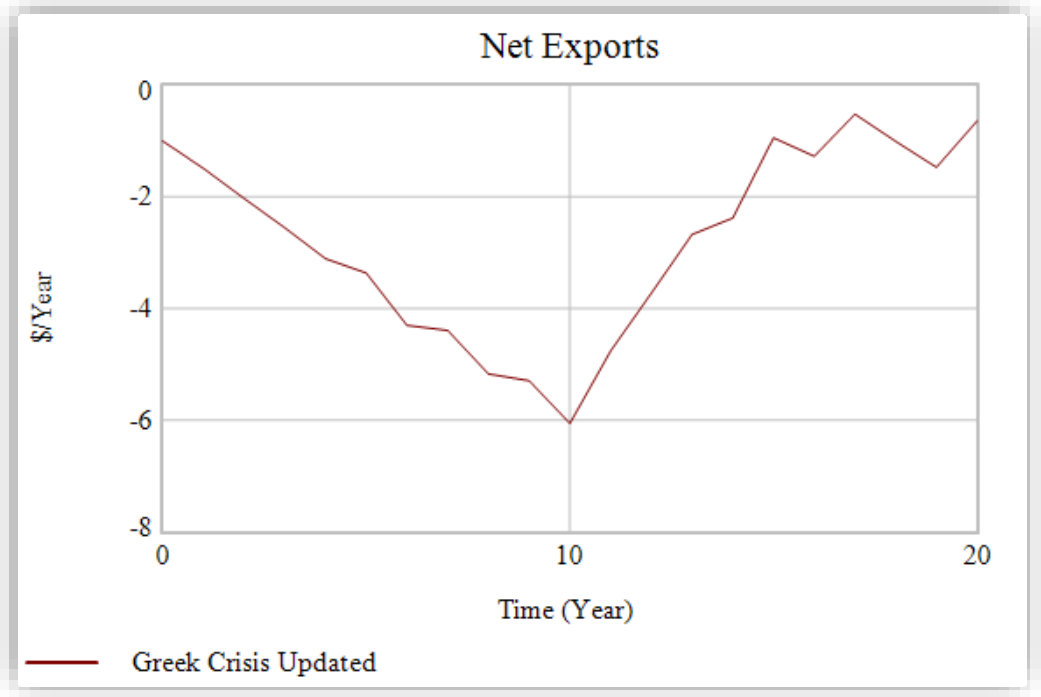
<u>Greek Economy, from crisis to measures imposed by Greek government</u>

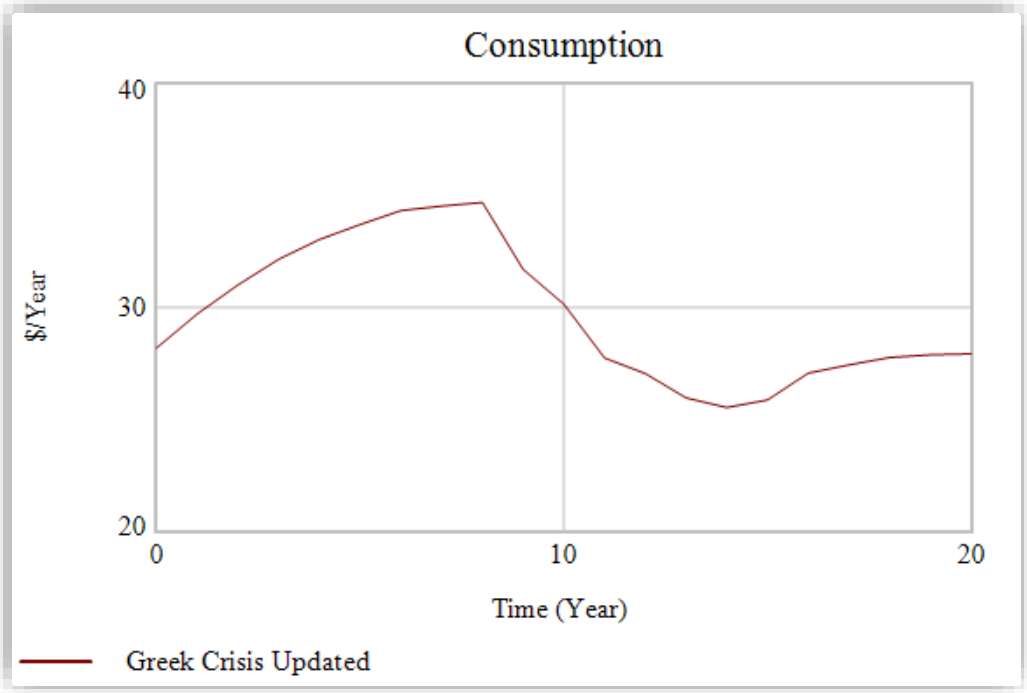


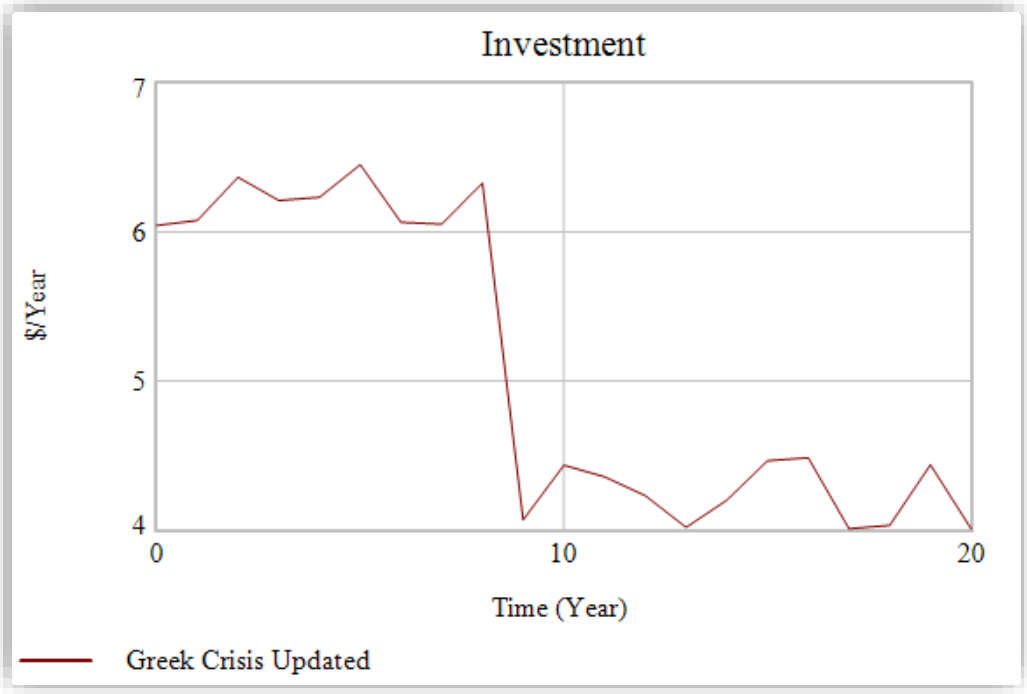
- The red boxes represent the severe macroeconomic problems faced by the Greek economy after the Eurozone debt crisis
- The grey boxes represent the respective government measures imposed by the Greek government to combat the economic problems generated in the crisis

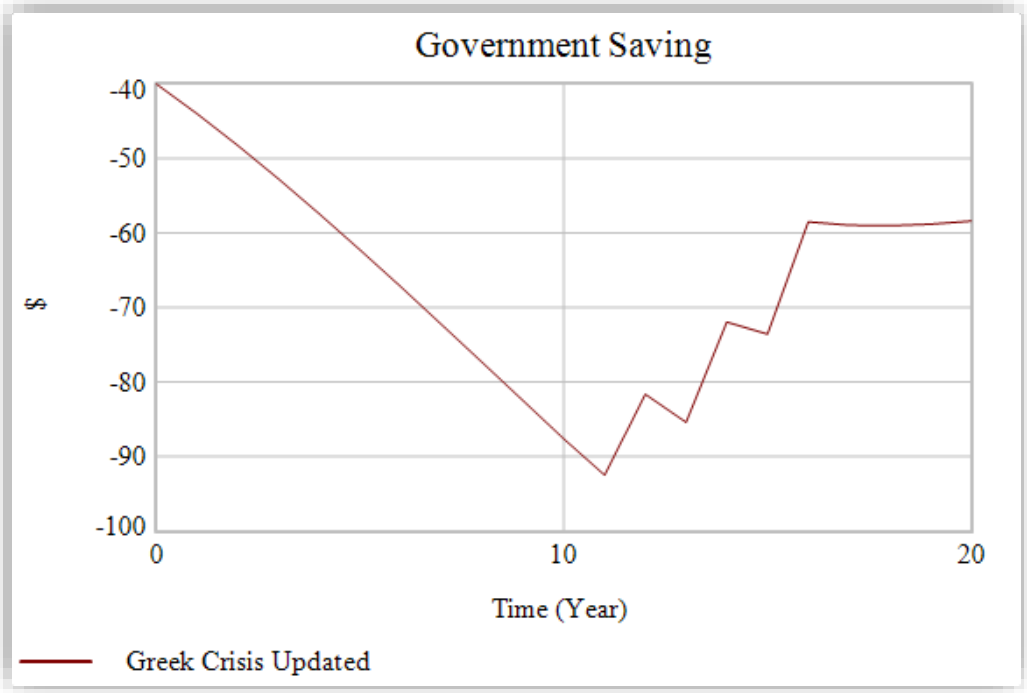
Pre-2019 Greek economy dynamics (As simulated by the program)

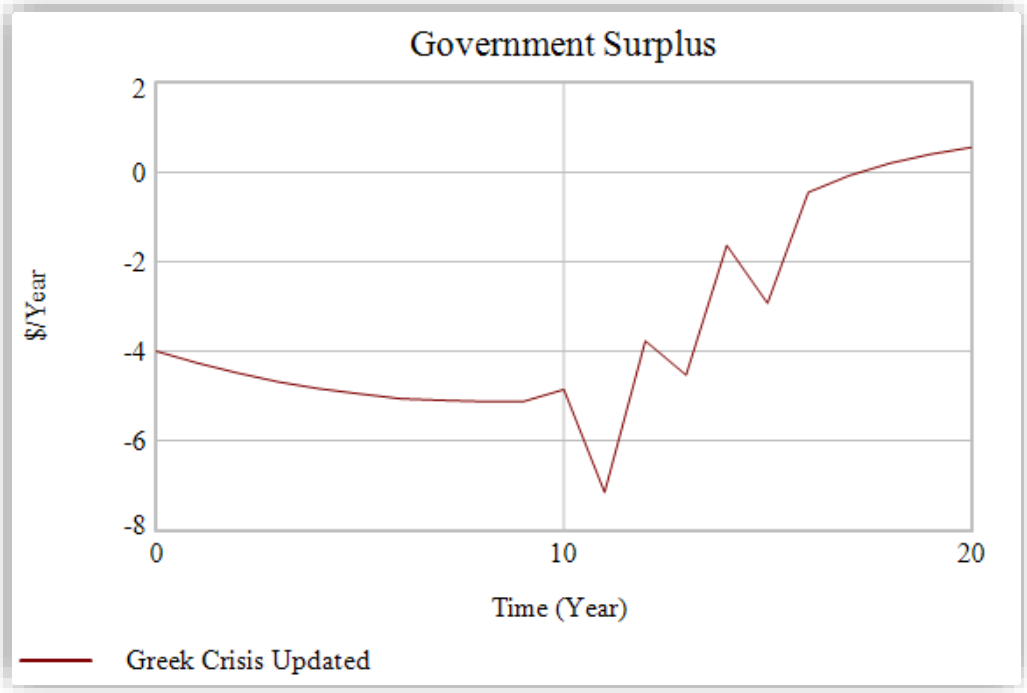


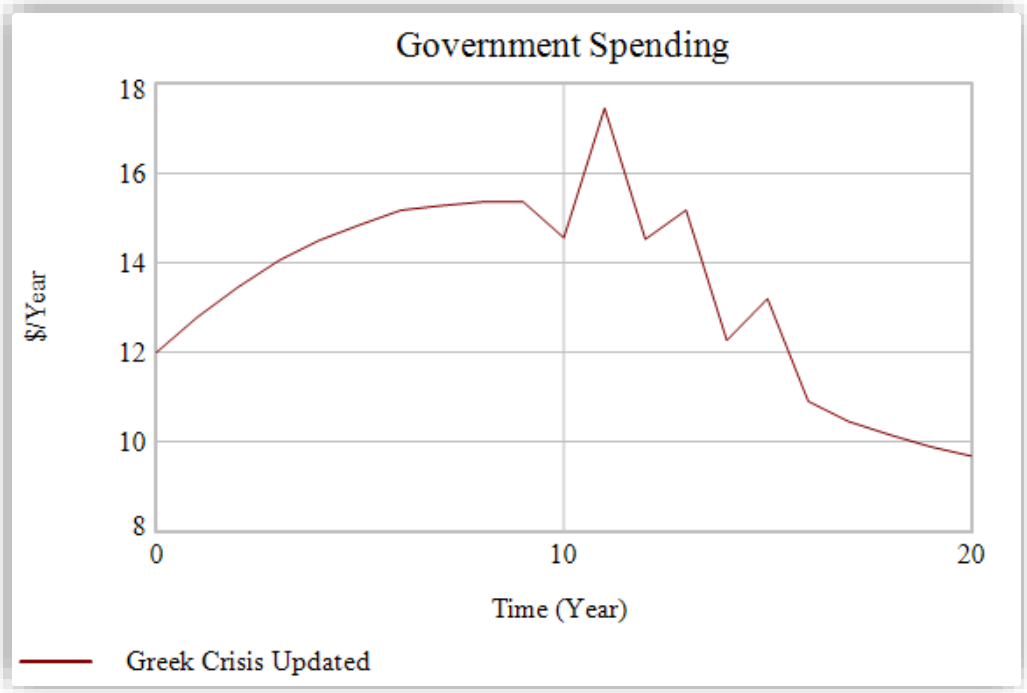


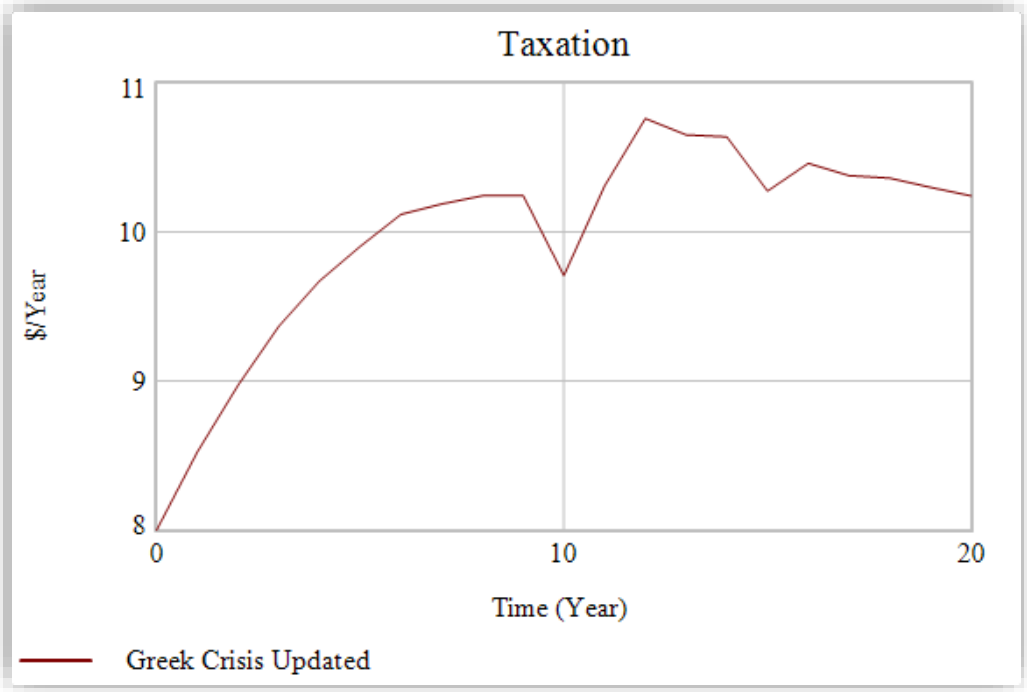

Consumption
40
30
20
$/Year
0
10
20
Time (Year)
Greek Crisis Updated


Investment
7
6
5
4
$/Year
0
10
20
Time (Year)
Greek Crisis Updated

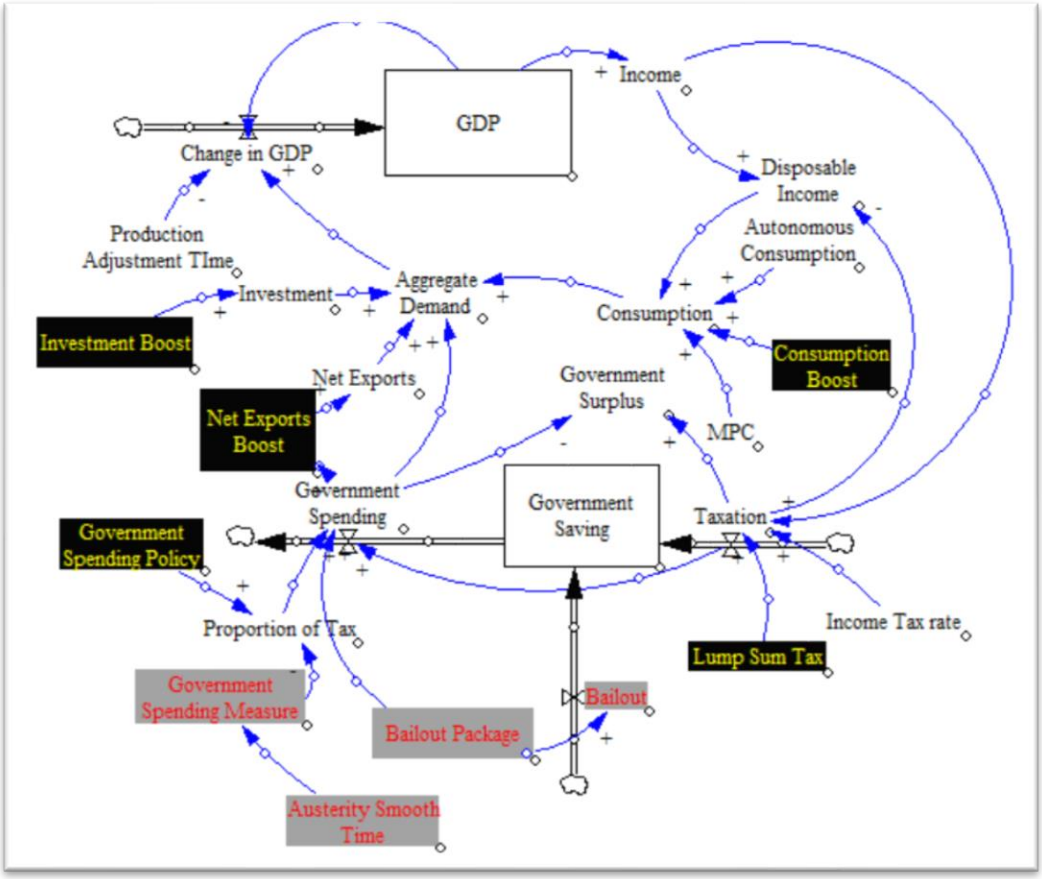

Government Saving
-40
-50
-60
-70
-80
-90
-100
$
0
10
20
Time (Year)
Greek Crisis Updated


Government Surplus
2
0
-2
-4
-6
-8
$/Year
0
10
20
Time (Year)
Greek Crisis Updated


Government Spending
18
16
14
12
10
8
$/Year
0
10
20
Time (Year)
Greek Crisis Updated


Taxation
11
10
9
8
$/Year
0
10
20
Time (Year)
Greek Crisis Updated

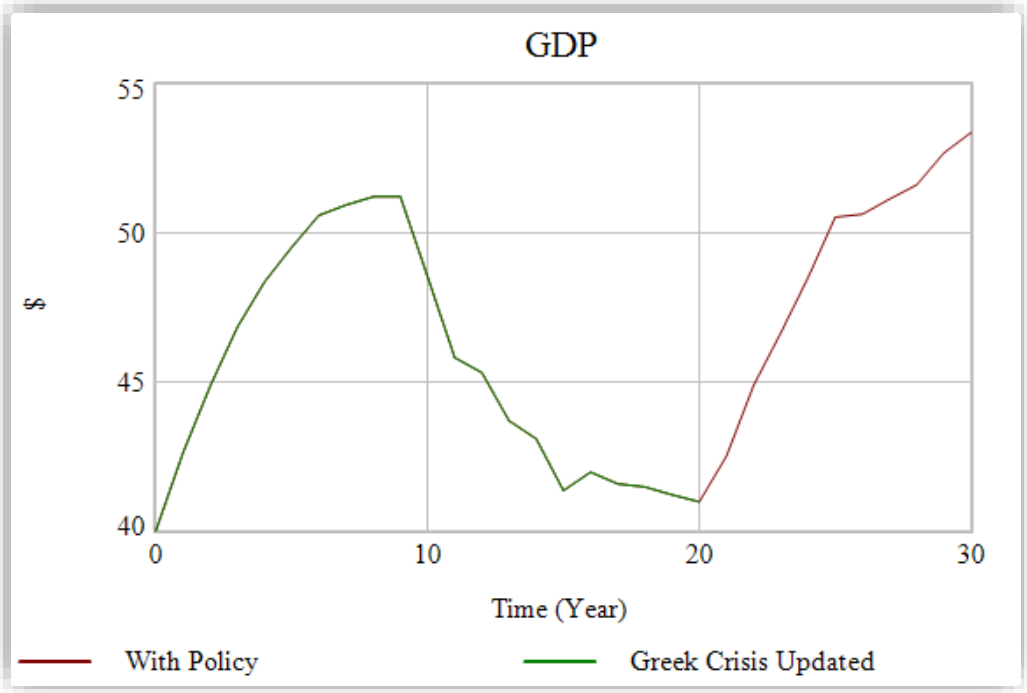
Greek Economy, with our proposed suggestions

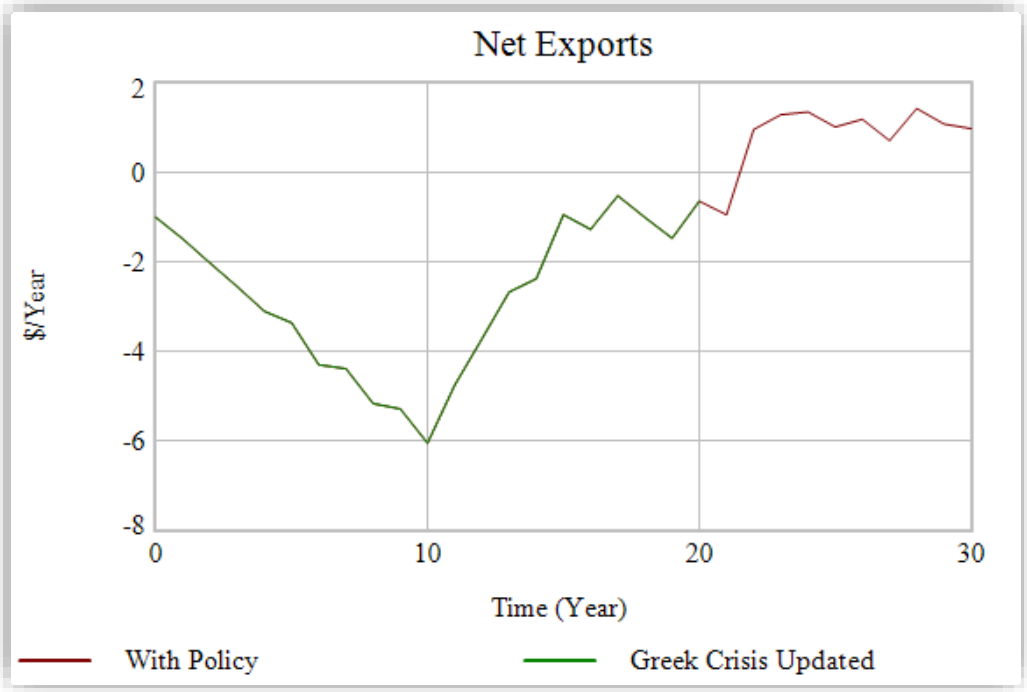


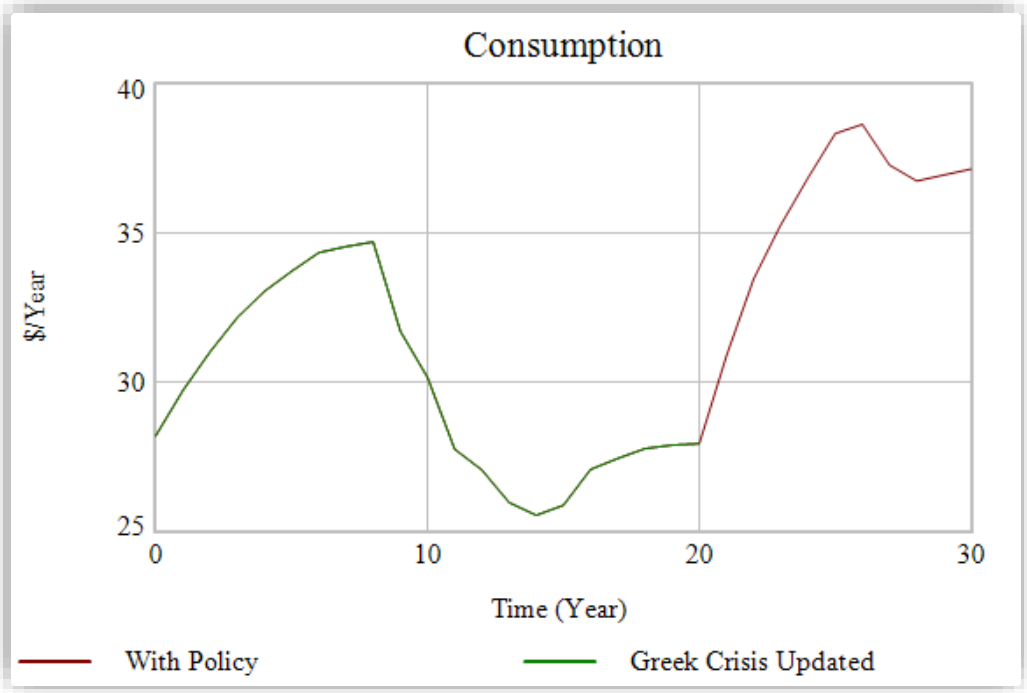
- The black boxes (yellow font) represent the policies that we suggested

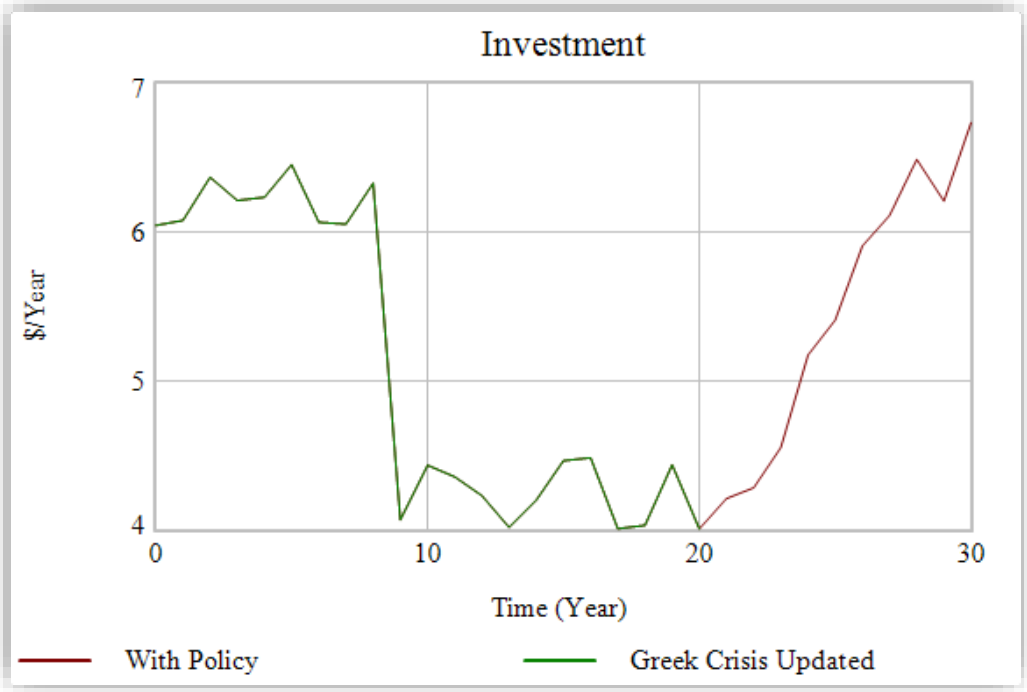
Post-2019 Greek economy dynamics (As simulated by the program)

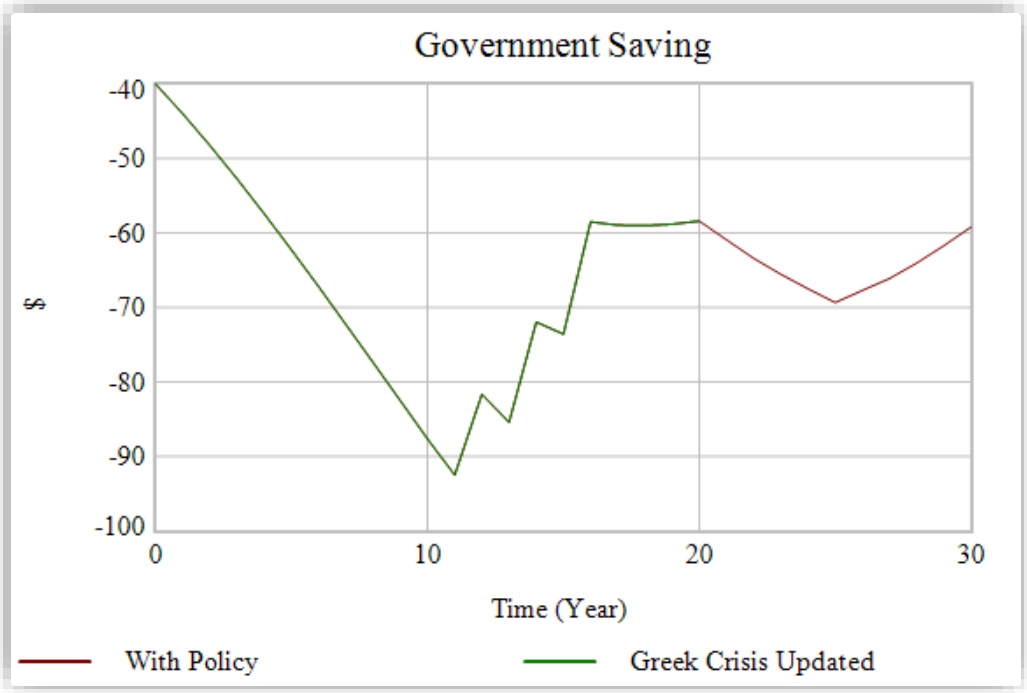
- The diagrams below show the resultant dynamics that were generated from the introduction of our policies. These dynamics are seen after 2019.

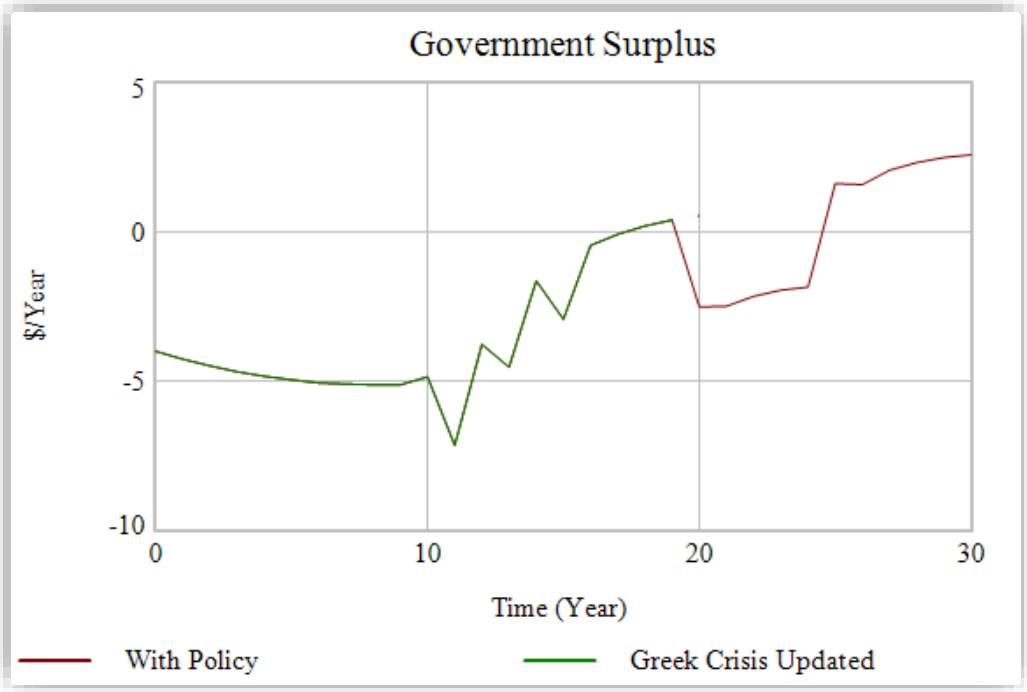

GDP
55
50
45
40
$
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated

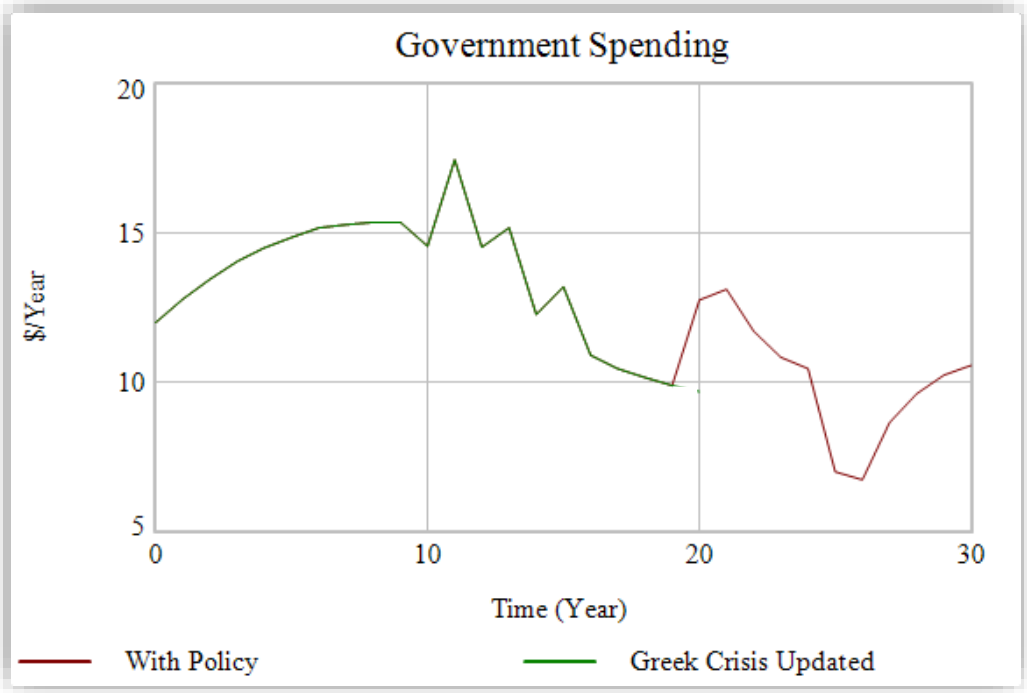

Net Exports
2
0
-2
-4
-6
-8
$/Year
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated

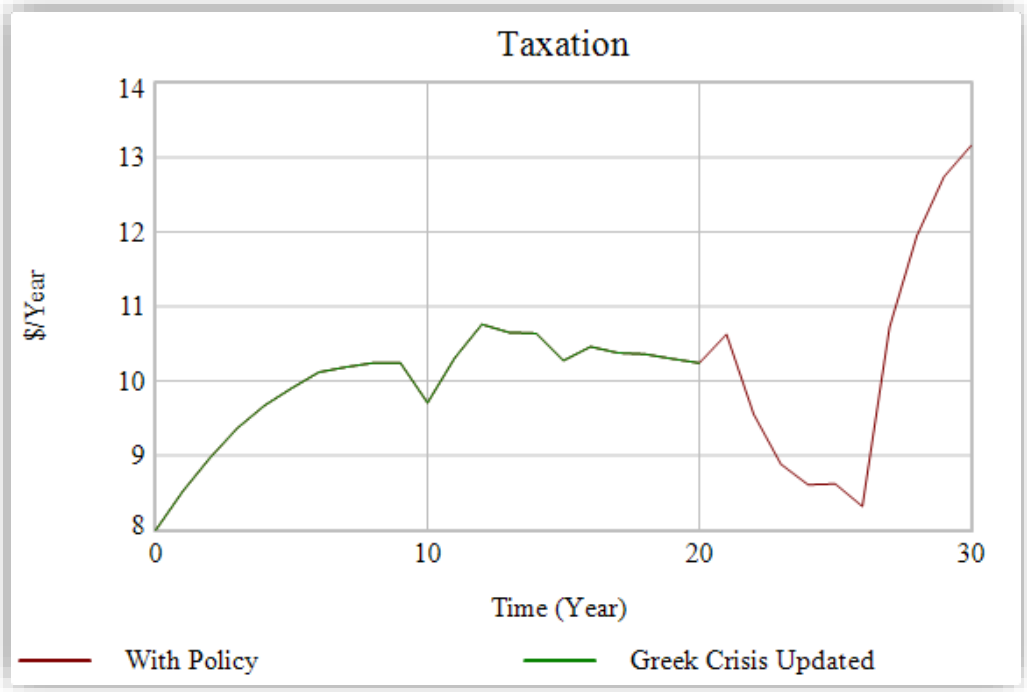

Consumption
40
35
30
25
$/Year
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated


Investment
7
6
5
4
$/Year
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated

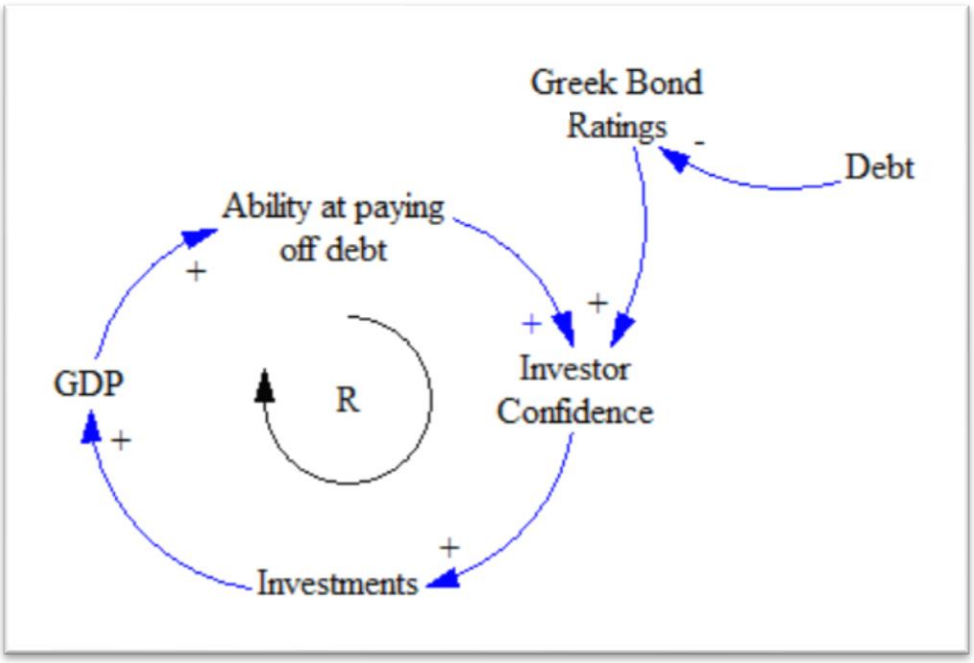

Government Saving
-40
-50
-60
-70
-80
-90
-100
$
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated


Government Surplus
5
0
-5
-10
$/Year
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated

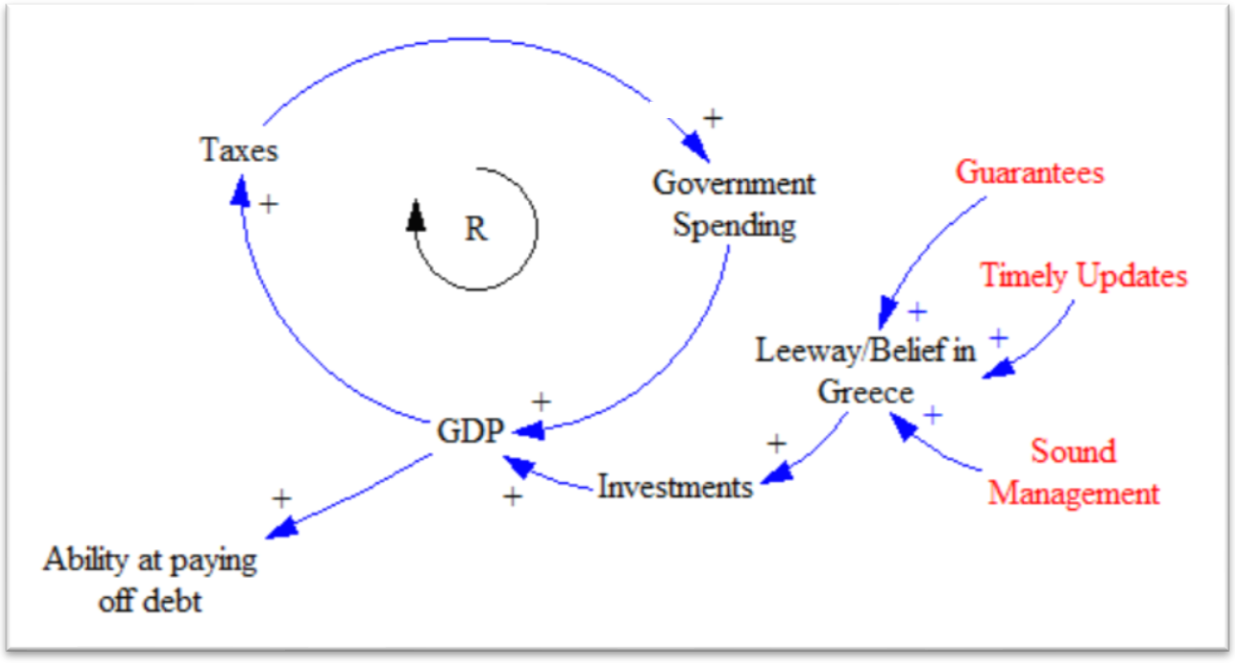

Government Spending
20
15
10
5
$/Year
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated


Taxation
14
13
12
11
10
9
8
$/Year
0
10
20
30
Time (Year)
With Policy
Greek Crisis Updated

CLD X: Self Fulfilling Prophecy



CLD Y: Ideal situation without relapsing into self-fulfilling prophecy



Ideally, to avoid the self-fulfilling prophecy from before, this cycle must be smashed especially since short-term debt could be incurred from our policy suggestions. This means removing investor confidence and speculation from the cycle and replacing it with some leeway towards Greece so that they can tide over their current predicament. Of course, to do so, international confidence must be instilled through guarantees, timely updates and sound management.