Political Forces behind Growth and Debt

A Descriptive Analysis

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May 2014

Preface

It has been a year of learning and overcoming difficulties that one usually doesn't meet in the classroom. Having a devoted supervisor provides a huge help when getting stuck during that process. I am deeply grateful to Alessia Russo who devoted substantial time to her role being my supervisor. I would like to stress the period while I was studying abroad; without Alessia's guidance and persistent suggestion of relevant articles at this early stage this thesis would not have existed in the form it does now. Advice and comments given by her through regular meetings the past couple of months have been a great help in the progress of actual writing the thesis.

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Introduction

Following the theories applied in macroeconomic debt crisis models is equal to assume that the movement between one period lagged levels of budget deficits and current growth are strongly correlated, which is disproved by the post-war period as most of the developed countries show high levels of debt, low risk premiums and positive growth rates. In order to be able to break down a purely direct effect of debt on growth, it is helpful to look for alternative explanations for why debt stocks vary over time and across economically similar countries. Political economy seems being a promising field of research. As to my knowledge, recent articles focus on the empirical investigation on how political surroundings influence economic activity or investment behaviour. The novel contribution to that field of analysis is is to thoroughly check relations between debt, growth and political factors separately and simultaneously in the descriptive analysis. A better understanding of how those variables do interact improves the model choice for technical analysis, or may even enable the process of modelling macroeconomics into a political economy framework.

If we are able to find some political factor that has explanatory power in predicting the variation in the paths of debt and growth over time (or across countries), we can luckily conclude that there is no one-way or two-way correlation between debt and growth, but rather another underlying factor that causes both to either move along or to diverge. If such a behaviour can be shown, policy-makers should revise current use of an uniform public spending policy exclusively aiming at reducing the stock of debt on the one hand, and stimulating growth on the other hand, and rather look at what lies behind – what really determines economic activity. Specifically, I try to explore whether strategic use of debt by governments, political competition or a mixture of both can explain the variations in debt and growth between 1950 and 2010 for a sample of 16 European countries.

The main strategy is to conduct thorough analysis of the panel data to convey the idea that accumulation of debt to some degree is due to political forces within a country or region, and thus predetermined to be heterogeneous across countries. Following that claim, it is obvious that debt thresholds merely lie at the same level for all countries, suggesting that any consolidation policy has to be tailored to each and single country, given the surrounding economical situation. The first step is to look naively at differences of average growth rates and debt shares across time and countries which helps arguing against Reinhart and Rogoff (2010) who state that debt levels above 90 percent of GDP are always harmful. To be able to test the impact of the political environment, the pure economic panel data is merged with a set of political variables. To start with only two factors are

further investigated, the political index of conservatism and the degree of political competition, as they are building on the findings of two influential papers by Besley et al. (2010) and Pettersson-Lidbom (2001). The political index provides information about the ideological position of governments which enables to investigate how instability of political platforms induces incumbent governments to use debt strategically today in order to constrain opposing parties in the future; this idea and two model-versions have been put forward by Alesina and Tabellini (1990) and Persson and Svensson (1989). The former puts emphasis on the idea that heterogeneity in political views lead to that no agreement over the allocation of public spending on different types of goods is reached, while the latter highlight disagreement over the level of public expenditures. In order to decide which of the two models fits better to data that includes several countries some exercise regarding the shrinking government effect (Battaglini and Barseghyan, 2012) is included. This is done in order to check the well-known crowding out effect of debt on public good provision - "higher debt implies higher [future] tax distortions; each party is less willing to spend on public goods if if it inherits a higher public debt" (Persson and Tabelini, 2002 p.352). The other variable is political competition which refers to the distance of the vote share of a governing coalition to the share implied by an equal probability of winning the election, i.e. perfect competition; Besley et al. (2010) find empirically for US states that political competition can be seen in the sense of market competition which has a positive impact on growth. As they do not concern debt, much of the thoughts, arguments, conclusions and revisions throughout the paper concerning that side of the picture within their framework are elaborated purely out of my own views on how economic mechanisms work. As a last step more variables are included to further characterize the political environment.

Having set out main simple correlations between the political variables, debt and growth using OLS estimation leaves plenty of room to criticize the validity of the results. Hence it is important to check their robustness by testing several model specifications against each other, so that one is left with the most appropriate choice available. The last stage is to connect all the empirical results plausibly to a political model. This is done by specifying that heterogeneity in public spending and the tax-debt schedule is due to the fact that the society is made up by taxpayers and pensioners who have different preferences what regards the tax rate, the amount of debt issued and the type of public good that is provided. Spending on R&D is the only source of growth.

If one assumes that debt is issued in order to finance some non-trivial share of all governmental spending, then it seems rather odd to not incorporate a measure for how strong this incentive is. Further, the decision to take up debt then is determined within each period, while of course past choices are affecting the outcome today, and therefore the lag of expenditure is not

added. The contingency on prior decisions is captured by the lag of GDP per capita instead, being one of the explanatory factors for why debt has been growing since then.

The main software used to conduct statistical calculations and to plot graphs is Stata 12.0 Special Edition. Prior to the data analysis I relied on the spreadsheet in Open Office in order to collect and manage the data series. This program has also been used to depict histograms in order to make a direct connection to Reinhart and Rogoff (2010), the paper that mostly motivated me to write a thesis within the scope of macroeconomic heterogeneity within Europe.

The first strong conclusion is that the relationship between debt and growth appears not being linear over the whole range of debt levels. This is especially true for levels between 30 and 90 percent of GDP. Further, the evolution of debt is clearly distinct for different parts of Europe, though the pattern of business cycles is not. For the South, which includes countries like Greece and Italy, a 10 percentage point increase in the debt-to-GDP ratio reduces growth rates by 0.4 percent, which amounts to the double size of the average effect regarding the whole sample. This suggests that any theory that is able to plausibly link heterogeneity in the evolution of debt to some underlying factor that differs across countries, but possibly also effects growth, has something to add to the understanding on how political economics and economic aggregates interact. I found two candidates that have this feature, and hopefully future research, with better data resources available, will either confirm or reject my thoughts.

As it is true for debt, both the degree of conservatism and the environment of political competition are quite distinct across European regions. Scandinavian countries are those with the most liberal governments and display the highest degree of competition. The heterogeneity is even more obvious when looking at the interaction of the political index with debt: For all regions except the South more liberal governments are associated with a reduction in the stock of debt. A change from a right-centre to a left-centre complexion causes the debt-to-GDP ratio to decline between 9 to 11 percent, depending on the region and when no other controls are included. Regarding the South, the same shift indicates an accumulation of debt by 17 percent. Investigating the strategical debt hypothesis for the whole sample of countries leads to the conclusion that a one point decrease in conservatism is assumed to lower debt shares on average by 2.9 percent. Growth rates are not affected on average, though economic performance is stimulated in Scandinavia by 1.8 percent and dampened in the South by 1.6 percent when switching from a right-centre to a left-centre coalition. This may suggest that liberal and conservative parties may have different preferences over government spending and public finance. In the final regression though, that includes all political

variables, lagged values of debt and growth and fixed effects, the political index no longer has explanatory power to forecast debt. That no significant effect on debt is found has not be interpreted as being an evidence against the idea elaborated in the thesis. In my opinion, since debt stocks have been growing over time, are highly determined by lagged values and possibly many other country-specific factors, it still is in line with Alesina and Tabellini's (1990) assumption that debt is used strategically on the provision of different public goods, which in reality implies that overspending always always present. On the other side, an ideological shift of the same size as above is associated with growth rates that are 0.9 percent higher, a much more realistic estimate of the impact than without any controls.

Competition, the other candidate, leads to no clear conclusion using simple OLS regression. On average debt stocks seem to grow by 2.2 percent for a 0.1 change in the value of the competition measurement, though the estimate is mainly driven by a sub-set of countries. On its own, this finding supports the reasoning that more competition reflects a more unstable environment in terms of which party will be in power the next period. The impact on growth is not statistically significant, indicating that also the estimated impact on debt is flawed. Indeed, including more explanatory variables leads to developments that are in line with a simple probabilistic voting model and competitive market theory: policy converges towards the social optimum, having a low stock of debt in a growth-enhancing environment. The effect on debt is, as it was for the political index, not significant. Growth rates however are stimulated by about 0.7 percent per decimal change in the degree of competition. Though some of the other political variables show significant coefficients, they neither do change the stories that are told by the political index and political competition, nor do they add anything new.

In the last regression, that uses expenditure and the lag of GDP per capita instead of lagged values of debt and growth. the coefficient on the lag of GDP per capita is precisely estimated close to zero; this finding confirms that this measure of citizens' welfare is not driving macroeconomic performance when country and time fixed effects are controlled for. This results also reinforces the idea of political variables as being determinants of those macroeconomic variables the government can control (debt) or influence (growth through governmental investment and consumption).

The degree of conservatism as well as political competition play a role in explaining growth. An anticipated change from a left-centred to a right-centred government is associated with a rise in growth rates by 1.2 percentage points. This is in line with theoretical predictions that more liberal parties do engage more in growth-enhancing activities than conservative governments. Competition however has a negative impact on growth, a 0.1 percent movement towards zero leads to a 0.9

decline in growth. The coefficient on the interaction term is negative as well, which implies that a change to a more liberal government or a reduction of overall competition are substitutes, or as interpreted above, more liberal governments are less responsive to competition, and can be labelled as being more strong in terms of ideology.

Debt is increasing with the political index, though the size of the coefficient is not credible. A change from a left-centre to a right-centre complexion is associated with an increase of about 29 percent. Hence, from this result one should not draw the conclusion that the strategic debt hypothesis is not valid. More conform with the argumentation made along the thesis is to recognize that collinearity between conservative preferences and their main policy instrument, expenditure, is causing the significant switch in sign and size. In the sense that the coefficient on CPG_01 expresses the fact that more conservative governments prefer higher public spending that is not related to growth-enhancing investments, clearly debt is increasing more whenever such a government is in place. Through the strong identification of conservative parties with higher expenditure and debt levels clearly one effect incorporates the other, leading to a strange estimate for the other.

Overall, the analysis gives empirical evidence that heterogeneous preferences across parties do matter for why and how much debt is accumulated, as well as how growth-oriented public policy is conducted. Behaviour is affected by political uncertainty, as put forward by probabilistic voting models. The other dimension, political competition shows more inconclusive impacts on debt, though the findings are all justified by economic considerations; this may simply reflect that political competition has not so clear cut implications as market competition has – in the latter prices do incorporate preferences, and it is easy for individuals to base decisions on the information prices reveal. What regards politics, many other dimensions then just relative vote shares do determine outcomes; ideology, popularity, some sort of "market" power that cannot be eliminated through subsidies, and of course the feedback from politics to the economy and the other way around are setting constraints on behaviour, compared to the idea of free markets and an invisible director that coordinates beneficial trade decisions.

1 Review of existing literature

Starting with the Financial Crisis in 2007, the world economy, and especially Europe's activity level have been trapped in decline. Many economists have been struck by the intensity that even solid economies had been hit with, mostly due to discretionary policy to stimulate growth and to avoid the threat of sudden stops.

The almost unquestioned view that developed countries today are so well advanced what regards stability of the political and institutional systems, so that the probability of Western governments to default could be neglected, was evidently prominent after the switch to independent central banks following a Taylor rule – as a result fiscal policy got pushed into the background, while monetary policy has been assumed to be able to smooth business cycles all alone. If that was true, then debt, accumulated up to that day, would mostly be constant as share of GDP or even decline over time; and since governments were able to handle high debt until now, the reasoning goes, there would also be no problem in the future, holding the political and institutional environment stable. Unfortunately, the role of financial markets in nowadays economic transactions has merely been captured fully. Especially the Euro-crisis has been – and probably still is – another example of how expectations and other factors than economic fundamentals do determine the destiny of countries.

Upon the huge discrepancy between what theory predicts and how reality turned out to be, economists are trying to get back on track. But when and where did the field of economics left the path? Some, like Reinhart and Rogoff (2010) pledge for the need of governments to commit to a fixed ceiling of debt levels. Others oppose the idea of well-defined thresholds of debt that do determine growth. The rest of this Section presents first several papers that deal with thresholds theoretically and empirically and highlights the disagreement on this topic among economists. The second part looks at explanations for changes in debt beyond a macroeconomic perspective and introduces the role of policy incentives.

1.1 Opinions on debt thresholds

„Growth in a Time of Debt“ by Reinhart and Rogoff (2010) is at the core of the recent debate on austerity policies. They suggest that average growth rates drop significantly when the debt to GDP ratio does exceed 90%.

Overall, the exercise of Reinhart and Rogoff (2010) does emphasize some kind of correlation between debt and growth. Regarding the poor data however – it is not possible to

distinct foreign hold from public debt for the advanced countries – the identified thresholds may be hiding other underlying structural causes.

Moreover, nothing can be said about causality due to the purely descriptive nature of the analysis, and hence policy recommendations should be done carefully. Without controlling for country-specific characteristics inferences on average growth rates have to be expected to be plagued by omitted variable bias, as some countries never had higher debt levels than 70%, while other countries solely are found in the high-debt category. Surely those countries must be different from each other in some aspect that led to different behaviour in accumulating debt over time.

„The impact of high government debt on economic growth and its channels: An empirical investigation for the Euro area“ by Checerita-Westphal and Rother (2012) does reinforce the findings by Reinhart and Rogoff (2010) for 12 European countries, over a time span of 40 years. „It unveils a concave (inverted U-shape) relationship between the public debt ratio and the economic growth rate with the debt turning point at about 90–100% of GDP“ (Checerita-Westphal and Rother, 2012, p.1403). Due to reverse causation issues they apply instrumental variables in the estimation process, using either lagged values of debt or the average of the other countries' debt levels.

Despite that Checerita-Westphal and Rother (2012) do identify some of the channels through which debt affects growth in a non-linear manner (public investment, private saving and total factor productivity), their results may be flawed by the fact that those variables do enter the regression separately, without interaction terms.

It took only a few months for opposing views to come up. In „Government Debt and Economic Growth: Overreaching Claims of Debt “Threshold“ Suffer from Theoretical and Empirical Flaws“ Irons and Bivens (2010) do warn explicitly on drawing quick political decisions based on the results reported in „Growth in Time of Debt“, especially because they are purely statistical, and not grounded in economic theory: „There is no compelling theoretical reason why the stock of debt at a given point in time should harm *contemporaneous* economic growth“ (Irons and Bivens, 2010, p.2). The way of causality that Reinhart and Rogoff (2010) appeared to claim, from debt to growth, seems totally misjudged in the eyes of Irons and Bivens (2010): what they found for the U.S. in recent decades is rather a relationship of debt and growth that is running from lower activity to debt accumulation than the other way around, supported by the data applied in „Growth in a Time of Debt“ (Reinhart and Rogoff, 2010). Though, the data on gross debt (opposed to debt held by the public) itself is criticized as being the wrong „measure“.
The lack of use of relevant economic theory in “Growth in a Time of Debt” (Reinhart and Rogoff,

2010) is captured by a discussion on what actually is related to growth – levels of total debt or the change in debt, i.e. budget deficits? „Most studies that claimed to have found a link between rising government borrowing and rising interest rates find only a link between deficits and interest rates, not interest rates and debt“ (Irons and Bivens, 2010, p.3).

Another harsh critic of Reinhart and Rogoff's (2010) results, especially the notion on underlying causality, was formulated by Herndon, Ash and Pollin (2013). He and his co-authors point out in „Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff“ that a „necessary condition for a stylized fact is accuracy. We replicate RR and find that coding errors, selective exclusion of available data, and unconventional weighting of summary statistics lead to serious errors“ (Herndon, Ash and Pollin, 2013, p.2 f.).

Using corrected average growth rates, they do find a significant drop in average growth within the first category, where debt is lower than 30% of GDP; however, discontinuity around the 90% level is not evident. The clear cut conclusion is that austerity politics should be revised. Further, some thoughts around the strength of the relationship between growth and debt are raised. In my opinion, such considerations have to be made in order to identify areas that are prone for omitted variable bias in empirical tests.

In order to draw a more complete picture of the relationship between debt and growth, and on the ongoing debate on thresholds and causality, that have been suggested by the papers listed above, it seems worthwhile to sum up the theoretical framework used, and assumptions made by the authors to be able to evaluate their results.

As an early theorem, the Ricardian equivalence (Barro, 1974) states that higher government spending or lower taxes today have to be followed by contractionary policies in the future. Having this in mind, rational agents will not alter their optimal consumption path. However, one of the following unrealistic assumptions has to hold: Either the agents are assumed to live forever in order to experience both the tax cut and the raise in tax rates, or every legislature period is seen as being in a new state of the world, so that governments always have to hand over neutral budgets at the end of each period. Moreover, taxes are assumed to be of a lump-sum type, which in reality do not exist, and growth is absent – thus, even though it introduces the notion of a binding inter-temporal budget constraint, Ricardian equivalence is not suited to reveal causality between debt and growth. Nevertheless, the assumption still is incorporated in growth models used today, and thus one has to be careful in neglecting the flaws it might bring into the design of an empirical test.
Another problem of macro models is the simplifying assumption that public expenditures often are

considered to have no influence on welfare. The reason why is that economists are interested in impacts of public debt per se, and not in the interaction with other variables. In reality however, public money may both go to utility-enhancing or -reducing activities, implying that the composition of public investments does matter when evaluating the effect on growth.

Lysandrou (2013, p.4) and Holland (2007) connect Reinhart, Rogoff and Savastano's (2003) theory of debt intolerance to the standard debt sustainability analysis (Holland, 2007, p.7 f.):

> (1) $D(t+1) = [1+ r(t)]D(t) - TB(t)$
> where $D(t)$ is the country's external debt at time t, TB is its current account, and r is the interest paid by the country on its external debt. In steady-sate one can express the following relationship:
> (2) $TB/Y = (r - g)(D/Y)$
> where TB/Y is the steady-state ratio of the current account to output needed to stabilize the external debt ratio at D/Y.

In this model, both the interest rate paid on debt, determined by expectations on the probability of defaulting, and growth depend crucially on the current fiscal performance of governments: Lower growth provokes higher interest rates. But higher interest rates mean the existing debt stock being a higher burden, which calls for even higher expenditures, and an even larger current deficit. If borrowing cannot be done easily, repayments of debt have to be financed through taxes, which have an adverse effect on economic activity – this may be the start of a self-fulfilling debt crisis.
It is worth mentioning explicitly that not the size of total debt is the reason for crises to occur, but the fact that current deficits do crowd-out private investment (Bivens and Irons, 2010, p.2 f.)

On the conflict of causality, I make use of Afonso and Furceri's (2010, p.518) words to describe the main tension in theory:

> One of the frequently quoted stylised facts of public sector economics is that of "Wagner's Law" about the long-run tendency for public expenditure to grow relative to some national income aggregate such as GDP.5 This implies that public expenditure can be treated as an outcome, or an endogenous factor, rather than a cause of growth in national income. On the other hand, Keynesian propositions treat public expenditure as an exogenous factor, which could be utilised as a policy instrument. In the former approach, the causality runs from national income to public expenditure whereas in the latter proposition, causality runs from public expenditure via domestic demand to national income. Evidence concerning this topic is not conclusive.6 Additionally, Lucas (1988) argues that public investment in education increases the level of human capital and this can be seen as a main source of long-run economic growth. Moreover, Barro (1990) mentions the importance of government expenditure in public infrastructure for economic growth and Romer (1990) stresses the relevance of research and development expenditure. Therefore, composition of public spending is also a relevant issue, and if the aim is to promote growth, the focus should be put on the more productive items of the budget.

As a last area of issues related to the prevailing uncertainty regarding if historical inferences can be made on the relationship between debt and growth is yet mentioned by Afonso and Furceri (2010)

in their paper on „Government size, composition, volatility and economic growth“. They dislike the almost homogeneous use of long time-series, despite the fact that countries did not share common trends over the last century (Afonso and Furceri, 2010, p.520):

> In particular, regarding fiscal policy, over long time spans the level of government spending and income are likely to be influenced by demographics, in particular an increasing share of elderly people. Thus, errors in the growth variable will affect GDP, demographics, and taxes or government spending. As a result, the independent variables government revenue or government spending as a share of GDP, are correlated with the error term in the growth regression, and this will produce biased estimates.

Having those recent adjustments in the field of economics in mind, students graduating in this turbulent time should be aware of that a cure still not is found, and that the solution might not be identified by using the tool-kit available to economists today. Clearly, many attempts in improving models, as to capture endogenous decisions to repay debt or self-fulfilling expectations, did emerge the recent years, and show that our discipline is not standing still.

The baseline however is that we cannot state anything about in which direction the causality goes: Do higher levels of debt cause lower growth rates, as many economists and politicians claim in the vein of the Euro-crisis, or is low economic activity the reason for governmental debt, which clearly would emphasize that cuts in public expenditures is harmful to reduce the burden of debt? To find an answer to that question one would have to look closer when debt is accumulated; another problem might be that the reasons for taking up loans did change a lot during the last century – from warfare to welfare - and so did probably also the countries – from economical strong to weak nations.

But what if we don't have to take a stand on causality? This is simply done by abandoning a macroeconomic view and rather checking if preferences of politicians and government composition can tell a part of the story – thus we move towards political economy.

During the recent years attention in the discipline of macroeconomics upon the relationship between government debt and economic growth was directed towards debt levels, rather than the current account deficit – which, in a Keynesian view, has been identified to cause the economy to slow down through the channel of rising risk premiums on bonds. However, the chain of effects lying behind is not altered: higher accumulation of debt influences growth rates negatively in the long run, which will feedback in resulting even higher debt levels. Following the theories applied in debt crisis models is equal to assume that the correlation between one period lagged levels of budget deficits and current growth are almost perfectly correlated, which is disproved by the post-war period, as most of the developed countries show high levels of debt, low risk premiums and positive growth rates.

In order to be able to break down a purely direct effect of debt on growth, it is helpful to look for alternative explanations for why debt stocks vary over time and across economically similar countries. Political economy seems being a promising field of research: If we are able to find some political factor that not only does influence public spending behaviour and growth related fundamentals – like unemployment or inflation targets – but also has explanatory power in predicting the variation in the paths of debt and growth over time (or across countries), we can luckily conclude there is no one-way or two-way correlation between debt and growth, but rather an underlying factor that causes both to either move along or to diverge. If such a behaviour can be shown, policy-makers should revise current use of public spending policy exclusively aiming at reducing the stock of debt on the one hand, and stimulating growth on the other hand, and rather look at what is behind – what really determines economic activity – so that it is thinkable that austerity policies are gainful for some countries, but disastrous for other countries, and that the success of any measurement is not totally founded in economic fundamentals, geographical features, cultural attitudes – think of the argument that Southern Europeans are lazy – but also the political environment just around the election date – which can be very different for Portugal and Italy for instance.

1.2 Approaches from Political Economics

"Why a stubborn conservative would run a deficit policy with time-inconsistent preferences" (Persson and Svensson, 1989) takes as given that the party 1 in power will be replaced by its opponent 2, which favours higher levels of public spending. They then ask, how this will affect the governments decisions on taxes and borrowing. More precisely, Persson and Svensson (1989) model decision making in an environment of time-inconsistent preferences, i.e. the government cares more about how the other party may behave in the period just before the replacement, but with time-consistent constraints, i.e. the tax base remains constant. This implies that, if 1 would stay in power the next period, there is no need to alter behaviour, and preferences will be time-consistent. Or, conversely, inherited debt (from party 1) potentially influences the successors optimal choice regarding taxes and borrowing after the change of governments.

Their main conclusion is that in threat of being not re-elected, parties that would restrain from accumulating high levels of debt stock if they were re-elected eventually will choose to issue more debt in order to force the successor towards less expansive government spending. A liberal government reasons in a similar strategic way, however, it will keep the stock of debt smaller than its own preferred level to induce a conservative successor to not cut down government spending

excessively. Thus, in equilibrium, the realized debt stock will lie in between the preferred levels of the two parties, of which one or the other would occur in the case of having a singe eternal-living social planner. This rests on forward-looking governments, that use debt strategically, and that inherited debt does influence a succeeding government.

"A positive theory of fiscal deficits and government debt" by Alesina and Tabellini (1990) focuses on the motivation of debt accumulation in order to minimize distortive effects of taxes when providing public goods. The conceptual difference to Persson and Svensson (1989) lies in the modelling of choices over the composition of government spending rather than the amount of spending. Parties are different with respect to preferences over two goods.

Analysing voting behaviour leads to the conclusion that a democratic process, in which voters exhibit different preferences over the composition of public goods, yields positive levels of debt, in comparison to a benevolent social planner who assigns equal weights to each individual in the population. More accurately, the greater the discrepancy between the parties' preferences over public goods, i.e. the higher party polarization, the larger the negative effect on budget deficits caused by not entirely internalized costs of leaving debt to the future.

To state in short the difference between the two papers, notice that in Persson and Svensson (1989) one is able to differentiate between more and less expansionary regimes, while in Alesina and Tabellini (1990) a government shift induces both parties in the same way to run deficits.

The empirical work that can be seen as a source of inspiration is a paper by Pettersson-Lidbom from 2001. He conducts "An Empirical Investigation of the Strategic Use of Debt" in order to test if one, none or a mixture of the two hypotheses stated above do occur in reality using a single regression equation. The conceptual framework is to use a political variable, i.e. electoral outcome in Swedish municipality elections, as a proxy to check how variability in debt reacts to changes in the political environment.

Advantages of using within-country data is the fact that elections are held simultaneously, the equal constitutional setting under which all local governments act and the possibility to clearly identify each party's political standpoint. Those aspects cannot be fully met when using cross-country data and any attempt of comparing unequalized election cycles, election systems and the political index of sister-parties in different nations must be seen as an approximation of real qualitatively differences between democracies, and hence, researchers should be aware of measurement issues even before setting out an empirical approach that tries to compare causal

effects of political factors on the real economy.
Pettersson-Lidbom (2001) is aware of the fact that "the probability of defeat might be endogenous" (p.574). In order to handle this problem, he uses ex-ante expectations to explain ex-post election outcomes, and uses the fitted value of this regression as the instrumental variable in the second stage regression of debt on election results. This approach depends crucially on identifying all relevant variables that do form expectations by forehand.

As a main conclusion, he does find support for Persson and Svensson's (1989) explanation in the data: "a right-wing government [conservative] increases its level of debt by 15 percent, whereas a left-wing government [liberal] decreases its debt by 11 percent if they are both certain of being replaced" (Pettersson-Lidbom, 2001, p.582). In general, around 65 percent of the variation in debt is explained in his model, in which existing debt stocks is identified as the main factor of the path of debt evolution.
As an alternative proxy for the probability of a government change he used the vote share of the party in power. The results are not altered, which also is true when comparing stable municipalities with those that experience numerous changes of the party in power. In my opinion, designing political change with the help of vote shares or frequency is easier to conduct in a panel data like mine, where observations on ex-ante expectations may suffer from different handling of that kind of information across countries.

There are several problems that may occur when adopting a similar approach as Pettersson-Lidbom (2001). I seek to state anything concerning the relationship between debt and growth. Thus, I have to take a stand on the possibility of leaving out important variables that in fact do determine debt and the political variable, introducing another form for endogeneity. All these concerns will be dealt with later on.

An elegant way has been chosen by Besley et al. (2010) which is elaborated thoroughly in their paper on "Political Competition, Policy and Growth: Theory and Evidence from the US".
In line with the accepted view in economics that monopolistic market power hinders growth, Besley et al. (2010) set out the thought that concentrated political power suppresses economic activity in a similar manner. They suppose that swing voters first are important for determining the equilibrium policy when a certain degree of competition between two organized parties is reached – the degree of decisiveness associated with these voters then leads politicians to announce growth-enhancing i.e. low-tax policies instead of platforms that solely is targeted towards their devoted electorate. This implies that political competition and not preferences over policies actually determine which program will be implemented.

This way of thinking of policy outcomes is quite interesting as it captures well the concept of a competitive market, just transferred to the realm of politics. Moreover, we do find quite a few papers that elaborate that issue empirically, and thus it seems worthwhile and promising to follow the theory of political competition and to test it for other data than that on the US. To sum up the findings, Besley et al. (2010) basically do find strong evidence for the theory they set out, i.e. political competition induces policy-makers to implement pro-growth programs.

2 Growth and public debt

In order to gain some overview the natural way to start is to dwell a bit on the summary statistics found in Table 1 Column 1 and 2. Average growth since 1950 was close to 3.3 percent, and the distance to that level for different regions, as will be specified below, ranges between -0.5 and +0.6, so the deviations seem quite symmetric. Such differences in growth rates may be well explained with the idea of accelerated growth the father away the economy is from steady state. The fact that expenditure on R&D is the lowest for Southern countries like Greece and Italy , which grouped together had the highest average growth over the sample period, conforms the notion of a technology inventor and a (poorer) technology copier, as elaborated by Weil (2009, Chapter 8 and 9). Average debt levels are more volatile, however, below 50 percent of GDP. This may be surprising when we are in a time where debt almost has become a too high burden to bear for some of the European countries. One should not forget that much of the current debt stocks have been accumulated the last two decades, a time when frontiers opened, global trade speeded up, monetary policy regimes shifted, less fiscal stabilization policy was conducted and a uniform currency that insured access to cheap credit was introduced.

2.1 Examining the relationship between growth rates and debt shares

The starting point of the analysis makes use of the data on debt that has been constructed by Reinhart and Rogoff (2010), which is available online as four xls-files called “Debt to GDP Ratios Country X-X”. To be more specific, I picked their series on total government debt as share of GDP to represent the evolution of debt between 1950 and 2010. The choice against alternative measures of debt, like for instance external debt, simply follows from the fact that these data are not available for many countries or a long period[1]. Moreover, there are several reasons for why I considered only

[1]

20 OECD countries as an appropriate sample[2]. First, the data set is quite flawed what regards the completeness of time series, i.e. for some countries information dates back to the 18th century, while for some countries, like the former Soviet Union countries, we do merely not dispose of any data prior to the 1990s. A second consideration regards the nature of the data – nominal values, though, it is more appropriate to include real values. Coherent data on historical rates of inflation already is hard enough to find for developed countries, and in my opinion it is better to be more accurate than to include a lot of data that only blurs possible correlation, or even worse, leads to wrong conclusions. Data on historic inflation, except Australia[3], are taken from "Worldwide Inflation Data". Inflation is measured as the CPI of December between two subsequent years. For my purpose of looking at growth rates, I find it more appropriate to consider a change in inflation at a given point of a year more appropriate than comparing average inflation rate for a given year with another time period. Constructing real value of GDP however implies loss of data, as the series on inflation often not start in 1950, but at 1956 or later. Throughout the analysis, I will check whether findings change upon moving from nominal to real values; if this is not the case, represented results are conducted using the longer data set with nominal variables.

As growth has not been collected by Reinhart and Rogoff (2010), I use growth rates calculated from nominal GDP levels that are taken from the "Conference Board Total Economy Database" by simply subtracting GDP in period t from GDP in period t+1 and dividing the difference by the value at time t. Real growth for a given year is obtained by multiplying the nominal growth rate by the inflation rate, which in turn has been added to 1.

2.1.1 Investigating different debt thresholds

The main result of "Growth in a Time of Debt" (Reinhart and Rogoff, 2010) is simply presented by histograms created in Excel[4]. I replicated their exercise in Figure 1A by using the data set I created; both in nominal terms and once more when corrected for inflation. The pattern seems not being altered, though the negative tendency on growth rates above a debt threshold of 90 percent of GDP is a bit stronger for real values. Average nominal growth for observations below 30 percent debt share is 1.36% higher than for those over 90 percent and 1.49% higher for real values. Interestingly, the most prominent decline in growth rates takes place at the 30 percent level, dropping by about

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More on the nature of the data can be found following the link to Reinhart and Rogoff's main page on Debt-to-GDP Ratios

2 In section 2.1.2 I will further limit the analysis to 16 European countries; an argument is found there

3 http://www.rateinflation.com/inflation-rate/australia-historical-inflation-rate?start-year=1950&end-year=2012

4 Figures are found in the Appendix

1%, which weakens the importance of the 90 percent threshold[5].

When it comes to European countries[6], the relationship between debt level and growth appears being more negative. Average nominal growth for observations below 30 percent debt share is 1.68% higher than for those over 90 percent and 1.80% higher for real values. It reappears that the most prominent drop happens at the 30 percent level.

Running regressions[7] of the form

```
reg Growth Debt if Debt > 30 & Debt <= 60 , robust
```

for the European sample in Stata reported in Table 2 strengthens the critique that the relationship between growth and debt is much more complex than what Reinhart and Rogoff (2010) assume it to be: the adjusted R^2 of 0.045 clearly suggest that a linear model, at least without any control variables, does not capture well the economic relationship of interest. The coefficient on debt is statistically significant at the 1%-level, so we cannot reject the hypothesis that debt has no negative impact on economic growth, though the model-specifications may be chosen poorly. The regression suggests that a 10 percentage point increase in the share of debt is associated with a decline in economic growth by 0.2 percent.

A closer investigation of the relation between debt and growth for different ranges of debt as specified by Reinhart and Rogoff (2010) partially confirms their findings and partially disproves the existence of a 90 percent threshold: considering the effect of debt on growth, observations with debt shares over 90 percent do have a negative impact, though the observation from looking at the histograms is confirmed: the decline in growth rates below the 30 percent threshold is twice that large – a rise of debt by 10 percent induces growth to go down by 0.5 percent. More accurate, there is no significant effect at levels above the value of 30. A quick look at the adjusted R^2s indicates further that a linear model is better suited for debt shares below 30 and above 90 percent, but not in between.

Displaying the correlation between growth in GDP and debt share in Figure 1B points out that the mass of observations is situated in the range where debt-to-GDP ratio is below 100 percent, with a higher degree of growth rate dispersion the lower the debt share. This implies that the slope of the regression line outside the 0 to 100 percent window is driven by the variation of a small number of observations that possibly are coming from the same country or successive years.

[5] Examining the distribution of countries, Canada does appear as an outlier, as all its observations are situated between debt levels of 100 and 450 percent of GDP, including both low and high growth rates. Clearly, the theory of Reinhart and Rogoff is not applicable in that case, and it already can be regarded as evidence that there has to be some other factor that has great influence on economic performance, besides debt levels.

[6] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

[7] See Appendix for regression results

2.1.2 General correlation analysis for European countries

For a more complete picture, I conducted further simple exercises on correlation. What is new is the thought that lies behind: In order to follow Besley et al. (2010) it is important to gain insight into a possibly existing division of the European countries into regional or cultural distinct areas. Adopting the authors' approach implies dropping Non-European countries: I am interested in finding a relationship between sovereign states that still are tightly connected geographically. Reducing the sample from 20 OECD to 16 European countries also helps getting rid of several issues: The distinct debt-growth pairs for Canada highly complicated clear-cut correlation analysis. Furthermore, the political data as presented by the University of Amsterdam is not available for the US.

I consider four groups[8]:

Southern European countries: Greece, Italy, Portugal, Spain

Middle-Western European countries: Austria, Belgium, France, Germany, Ireland, Netherlands

Scandinavian countries: Denmark, Finland, Sweden

Non-EU countries: Norway, Switzerland, United Kingdom

The first two groups are quite intuitive, and I don't think there is much to argue about their specification. Excluding Norway from the Scandinavian countries and adding the UK to the Non-EU countries deserves an explanation. First, though Norway shares cultural and geographical features with Sweden or Denmark, and also is affected a lot by European laws, Norway is not directly underlaid the regulations of the Maastricht Treaty, while the others are. On the other hand, though the United Kingdom is part of the European Union, the Britain government sets national interests at the top of the political agenda, leading. Overall, I think that Norway, Switzerland and the UK are distinct with respect to the other countries, and hence make up the control group within Europe in the sense that the Maastricht Treaty is assumed to have limited impact on these countries.[9]

2.1.2.1 Examining the distribution of debt shares across regions and time

From Figure 2 one reads that the negative relationship is most distinct for the Southern European countries, while the slope coefficient for the sample of Non-EU countries is close to zero. The former group also stands out when it comes to the intercept: the growth rate associated with zero debt is above 5 percentage points, while the other three regions all lie close but below that value.

[8] Not necessarily correctly specified in terms of geographical, socio-cultural, institutional affiliation

[9] Nevertheless, in order to reduce wrong conclusions due to misspecification, I also consider Scandinavian and Non-EU countries as one group in several following regressions.

For the Scandinavian countries, no observations for debt over 80 percent do exist, which confirms that the group is well chosen. Another observation form Panel C and Panel D is that the data points for Scandinavia are smoothed over the whole range of debt while the Non-EU observations are clustered at low debt levels below 50 percent. This may suggest that the Scandinavian countries may flexibly adapt to a change in the stock of debt over time since growth rates do not show that large volatility relative to Southern and Middle-Western European countries. To put flesh on the bones, regressions of the form

```
reg Growth Debt if region == 1, robust
```

are run to report the significance of the negative impact debt has on growth separately for each region. Except for Non-EU countries, the coefficients in Table 3 are statistically significant at the 1 percent level. In comparison to the overall sample, Scandinavia together with Central Europe correspond to the average group with a respectively 0.22 and 0.18 percent decline of economic activity along a 10 percent raise in debt-to-GDP ratio. The impact on the South of Europe is twice as large, while Non-European countries perform best, the coefficient is just -0.001. So, even if one divides Europe into distinct areas, there is a negative impact of debt on growth. Interestingly, the intercepts for the four regions are the bigger the more negative the coefficient estimate is, i.e. economic activity associated with zero debt would be 5.7 percent for Southern countries, 2.5 percent above the mean growth rate and 2.9 percent higher than for the Non-EU sample. Whether this can be interpreted as heterogeneity in potential growth is difficult to tell as the scenario of no governmental debt seems rather utopic.

How good is the linear specification? Figure 3A and 3B are the graphically representation of Figure 3 in Panizza and Presbitero (2013). It gives further evidence that debt share and economic growth in general are not linearly related to each other. Though it has to be mentioned that the average for the Southern European countries and Greece do show a linear relation. For all other countries a U-shape fit with bliss points not equal to a 90 percent debt level is more appropriate. As I do focus on investigating how debt and growth are influenced by a third dimension, a set of political variables, I go on by checking the simplest possible relation, namely a linear one. As this process amounts to the whole thesis, quadratic or other degrees of polynomial regression functions may be well investigated in the future.

The evolution of debt over time is displayed in Figure 4A. The first thing to notice is that the trend in the level of debt was never increasing for the Non-EU sample until the Financial Crisis, and that this group started out from a historically high value of above 80 percent of GDP. All other regions

show decreasing levels in the beginning, but start having increasing debt shares around 1980. Secondly, both the stock of debt and the rate of debt accumulation was low for Southern European countries until 1980, but then started to increase at a high pace the following 20 years to 80 percent of GDP in 2000, the highest level of all regions. Scandinavia's stock of debt was quite similar in size in 1950 and actually fluctuated around the level of the Southern countries until 2000, when it started to plumb below 40 percent close to the level of Non-EU countries. This is interesting, since nowadays Scandinavia is put forwarded as examples, while Southern countries are depicted as ailing economies.

So what went wrong for the South, i.e. what can explain that these two regions drifted apart at that point in time? To evaluate the impact of institutional changes, I group together Middle-Western Europe, Scandinavia and Southern Europe graphing them against the Non-EU sample. Behind this decision lies the assumption that the behaviour of Non-EU governments did not alter in response to the Maastricht Treaty (1992) and the introduction of the Euro as currency (2001). If the assumption is somehow true, one consequently expects to see a different development around these dates. The time series until the Maastricht Treaty in Figure 4B shows clearly that the Non-EU countries debt share was above the rest of Europe´s just until 1990, where it turned down after having peaked in the mid 1980s, while the other European countries debt accumulation accelerated since 1980. In Figure 4C one recognizes that between 1990 and 2002 the paths of the two groups continue to diverge. The introduction of the Euro seems to have no further impact on government behaviour This is plausible if we take into account that government bonds already have been traded in prices pegged to the Euro during that period, and thus the introduction of coins and paper money was more symbolic for governments than for the people living in Europe.

The Middle-Western economies have a flatter development than the South or Scandinavia throughout the 1980s, but started off at an almost 20 percentage point higher level than the two other regions. Central Europe however is passed by the South in 1990, again around the data of the Maastricht Treaty. Important to notice is the fact that only Southern European countries actually cross the 90 percent debt level, and they do not do it until the mid-2000s.

To summarize, the debt shares European countries are facing since 2010 are not only larger in terms of level, but also larger in degree of divergence, which should be even more visible in the years to come.

2.1.2.2 Examining the distribution of growth rates across regions and time

I performed the same analysis for average growth rates. Yearly averages for the above specified four regions considering the whole data set from 1950 to 2010 show in Figure 5A that economic performance is quite distinct. It is not as clear as with debt to group together several regions over a longer time span. This reflects that an economy is influenced through many channels other than fiscal policy – exchange rates and exchange rate regimes, shocks to particular sectors that play a different role in different regions, openness, internal political factors et al. – and hence one may observe an unequal economic performance despite a similar evolution of debt. What is similar is the decreasing trend for Southern Europe (due to increasing debt) and a relative stable trend for the Non-EU sample. What should be mentioned is that the mean of growth rates has moved during the sample period[10]. 1950 to 1970 it is 4.84, while it is 2.72 between 1970 and 2008 and since the Financial Crisis it is yet difficult to state if or when Western economies will stabilize at the previous level. Moreover, for the time span between 1970 and 2008 one may conclude that growth fluctuates around the average growth rate corresponding to having a debt-to-GDP ratio of around 90 percent. This contradicts what has been described in Section 2.1.2, namely that average debt shares always have been lower than 80 percent until the outbreak of the Financial Crisis. This may be an indication for that something else than debt levels do have an impact on historical changes of natural growth rates. Further, since the early 1990s the regions moved closely together which suggests both convergence and integration between European countries[11]. As with debt, the South performed extremely well until the end of the 1980s, but witnessed a fall by about 6 percentage points to a growth rate below zero in the early 1990s from which it never recovered fully if compared to the Central and Scandinavian countries.

Turning to the Maastricht treaty's and the Euro's impact, Figure 5B and 5C indicate that Non-EU countries are not influenced differently, i.e. there growth path is similar to the rest of the sample of Europe. A simple graphical check however is not enough to conclude that there was no impact at all.

[10] Calculations not shown

[11] One reason might be the adoption of the Taylor rule by central banks

3 Political variables

For our approach of using political variables as explanatory variables to state anything about the relationship between debt and growth that does not suffer from endogenous correlation the first task is to check if we can identify any possible candidates. Thus, this section is devoted to check how the set of political variables is related directly to debt and growth. Having analysed the kind and strength of the relationship makes it easier to come up with a plausible story in the final regressions of Section 6.

3.1 Impact of political conservatism

First, the data set is further merged with data that captures political dispersion across countries and over time. The political index together with the type of government capturing the degree of power in parliament, the years of elections, the reason of why each government was replaced, the share of seats in the parliament won by the strongest governmental party are all considered as explanatory variables.

> The Ideological Complexion of Government and Parliament (CPG) is an indicator, which introduces a more qualitative aspect to government composition. It attempts to account for the relative strength of parties in government with reference to the Left-Right dimension […]. It is operationalised as follows:
> 1 = Right-wing dominance (share of seats in Government and supporting parties in Parliament larger than 66.6 per cent)
> 2 = Right-Centre complexion (share of seats of Right and Centre parties in Government and supporting parties between 33.3 and 66.6 per cent each)
> 3 = Balanced situation (share of Centre larger than 50 per cent in Government and in Parliament; or if Left and Right form a government together not dominated by one side or the other)
> 4 = Left-Centre complexion (share of seats of Left and Centre parties in Government and supporting parties between 33.3 and 66.6 per cent each)
> 5 = Left-wing dominance (share of seats in Government and supporting parties in Parliament larger than 66.6 per cent);

This information has been made available by the University of Amsterdam in the "Party Government Data Set" and has been adjusted personally by myself to fit the annual set-up as follows. In years where elections took place, or any of the political indicators is altered, I used Excel to calculate averages according to the number of days that each government in that given year has been in charge. How well this approach actually does describe the conservatism of governments is open for discussion[12]. Furthermore, years in which no election took place are specified by having a zero entry in the frequency variable. What regards Portugal and Spain, that have been dictatorships until the middle of the 1970s, I chose to leave out these observations for the political index as missing values. However, setting type of government, first party seats and total seats all equal to one, which indicates absolute power of a consisting of one parliamentary seat, seems

[12] To get an idea of the effort put into the tedious calculations, and potential flaws, an example is included in the Appendix.

plausible and appropriate enough[13]. As the data on political measures only ranges until 2007, I did some research on elections that came up afterwards, and included the results so as to extend also the political part of the data to 2010[14].

3.1.1 Investigating strategic debt hypothesis

To remember, Persson and Svensson (1989) suggest that more conservative governments will accumulate more debt upon a certain replacement. Evidence for their view is supported if a smaller value of CPG, which corresponds to a more conservative government, is related with debt accumulation, while a large value implies more liberalism, and hence a reduction in debt shares. Only if the responses are equally strong, the effects cancel out, and the overall impact is zero, as the actual realized debt share will lie in between the parties wished levels, leading on average to a smooth debt path over time. This however is unlikely to be true. On the other hand, Alesina and Tabellini (1990) prescribe that it is heterogeneity of voter preference that leads to higher accumulation of debt. To make sure that the successor government cannot fulfil the cravings of their voters, the government in power excessively uses money today on the public good it prefers itself. For this explanation to be true the value of the political index should not matter for the evolution of debt, since debt always is used strategically.

Figure 6 gives an overview of how ideology of governments in the four groups of Europe behaved in the past. Southern Europe witnessed an trend to more liberalism after 1970, which is mainly due to the fact that both Portugal and Spain had been run by a dictator until the mid-1970s, and is together with the Non-EU countries the region with most liberal governments prior to the Financial Crisis. Middle-Western countries have been quite liberal in 1990, but quickly closed up during the following decade, with the CPG dropping to an average of 2.5 during the 2000s. The Non-EU region has been the most conservative during the 1980s, and also shows a relative high degree of volatility in political views of governments. Scandinavia was twice as liberal as the Southern European countries in 1950, being at the top of the CPG distribution until 1990, but decreased to an overall minimum close to a value of 2 since 2005. The recent movements since 2000, especially in Scandinavia, may well have to do with people's preferences for national interests in respond to the entrance of Eastern European countries. This picture alone gives evidence that Persson and Svensson's theory (1989) does not apply in reality, since the rate at which debt is accumulated clearly has an increasing trend over time. One can read from column 1 to column 6 in

[13] This approach may be contested as introducing even more measurement error due to the subjective nature of the choice. It should be noticed, that putting 1s instead of missing values does not alter the qualitative results.

[14] Links to the websites are included in the References under Data Sources

regression Table 4A[15] that a switch from a right-centre to a left-centre complexion (a 2 point increase in CPG_01, from here on either is called a right-to-left switch or a 2-point decrease in conservatism) is associated with a decrease in debt-to-GDP ratios by between 8.5 and 11 percent, except for Southern European countries that experience a 17.2 percentage point increase in debt. The average impact is estimated to be a 5.8 percent decline in debt levels, which is in line with Persson and Svensson (1989). Across time, which refers to column 7 to column 10, a 2-point decrease in conservatism is associated with a 9.8 percent decline in debt before the Maastricht Treaty and a 12.7 percentage reduction after the introduction of the Euro, while the decade in between witnessed a positive growth in debt that amounts to 14.6 percent on average. The latter observation may stem from special interest politics: many countries were preparing to become a strong member state in the Euro-zone, and hence any government (and its voters) was willing to run deficits. Regarding the whole time span since 1992 yields a slightly positive accumulation of debt, though not statistically significant. Overall, the magnitude of the effects seems unreasonably high; empirically, observed variations in debt in the aftermath of a government replacement are rather small, suggesting that OLS estimation is sub-optimal.

From these findings one may not conclude whether debt is used strategically or not, or which explanation of the theory of strategic use of debt is more likely to hold in reality. One may suspect that a mixture of both is true; for instance, Figure 6 suggests that the period between Maastricht and Euro introduction was relatively liberal taking all region together, while column 9 states that debt was growing, going clearly against Persson and Svensson (1989). Hence, together with the fact that there has been witnessed an increase in debt shares on average, the degree of voter preference heterogeneity still appears being the explanation behind strategic use of debt. To get a final confirmation, one has to take a closer look on public spending. To be in line with Alesina and Tabellini (1990), one expects to find that governments of varying CPG have distinct spending patterns across public goods. This is checked in Section 4.

3.1.2 Examining correlation between conservatism and economic growth

It is more difficult to form a clear intuition on what strategic use of debt implies for economic performance. In line with Persson and Svensson (1989) a more conservative government uses more money than it finds optimal, but no assumptions are made on the issue of efficiency. The same holds for Alesina and Tabellini's (1990) approach. Just using more money on a particular good will probably lead to missallocation of resources and hence underprovision of essential public services.

[15] Regressions of the form `reg Debt CPG_01, robust`
`CPG_01` excludes Portugal and Spain before 1974, resulting from the discussion above

From Table 4B one recognizes that the impact on growth is not significantly different from zero for the whole sample. For Scandinavian and Non-EU countries it is significant at the 1 percent level but with opposing signs; while for Southern Europe economic activity is decreasing by 1.6 percent upon a righ-to-left switch, economic activity is stimulated in Scandinavia by 1.8 percent. During he time before the Maastricht Treaty liberalism is associated with a drop in growth rates by 0.56 percent, while the years afterwards do not show any significant relation. Neither does the introduction of the Euro play a role as reflected by Column 10. Still, taking the results from Table 4A and 4B together, one recognizes that for periods in which debt rises growth is negative and it is positive when the stock of debt is reduced. This may be interpreted by a Keynesian point of view that larger public spending does not stimulate the economy in the long run. So for all regions there is support for that the CPG affects debt and growth with opposite signs, and hence is conform with the idea that parties' ideological preferences drives economic real variables.

3.2 Impact of political competition

To test whether political competition drives variation in debt accumulation across countries or over time, this section reproduces and describes the same regressions and graphs as Section 3.1 but with the measure for competition, Comp, as explanatory variable. This variable is computed in the following way, similar to that in Besley et al. (2010, p.1338) but adjusted to the fact that there are more than two competing parties: `Comp = |Seats_share - (1/Parties)|`, where Seats_share corresponds to the number of seats that the strongest party in government wins at a given election and Parties to the number of parties running for office. A value of zero indicates perfect competition, while a value of 1 implies no competition at all.

3.2.1 Examining relationship between debt share and political competition

Besley et al.'s (2010) findings that more competition is associated with low-tax policies does not mean that finding a positive correlation between competition and debt is qualitatively the same. However, the data on European countries confirm that more debt is accumulated in a competitive surrounding. This finding reassures the thought of debt being used strategically when reappointment of a government is unsure, which is true in a competitive environment. Note also that looking at debt and growth as being solely driven by competition among parties, their ideology should not matter; i.e. CPG has no explanatory power in that story, since policy platforms will converge in equilibrium.

Summarizing the constructed competition barometer yields a similar picture as for US states.

The mean value is equal to 0.228, implying that the degree of political competition in Europe is vivid. Averages by region are all in the range between 0.10 and 0.40, with two pairs of regions clearly grouping together. The Non-EU and Scandinavia countries lie most of the time below the other two regions, closer to a situation of perfect competition. The Southern countries witnessed a rapid decline in competition throughout the 1960s and until 1975, well anchored in Spain's, Portugal's and Greece's history. The past decades, the region steadily recovered, but still lies above the other groups. In line with the shift to conservatism observed above, Scandinavia became less competitive during the 1990s.

Regression Table 5A indicates that lower competition is associated with a growing debt-to-GDP ratio. The overall effect of a 0.1 increase in the measure (which reflects a movement away from perfect competition) suggests that debt climbs by 2.3 percent. Put the other way around, more competition decreases the stock of debt. This result however is strongly driven by the Non-EU sample, for which the estimated effect is 7.4 percentage points, and the time before the Maastricht Treaty. This tells us that political competition has different implications between regions in Europe, probably related to historical or cultural features. Nevertheless, from the already suggested negative relation between debt and growth one expects economic activity to increase when competition is tighter. Such developments are in line with a simple probabilistic voting model and competitive market theory: policy converges towards the social optimum, having a low stock of debt in a growth-enhancing environment; The estimated values for perfect competition, i.e. the intercepts, are yet quite heterogeneous for the four regions. Middle-Western Europe is assumed to experience the highest debt share of 53.5 percent of GDP, while Scandinavia and Non-EU countries would show a stock of barely 24.4 percent. How realistic those differences are is yet again questioned, especially since Scandinavia is known for supporting a large public.

Over time the only significant effect is prior to 1992, for which the same decrease in competition as above is associated with 3.1 percent larger values of debt. Though, the intercept changes from a low of 28.6 to a high of 68.2 percent between Maastricht and Euro introduction, for to decline to around 45.3 during the first decade of the 21st century. This may reflect a change of demand after a larger public sector over time.

3.2.2 Correlation between economic activity and political environment

As for the political index, column 1 of Table 5B states that competition has no significant effect on economic activity. This result is not in line with Besley et al.'s (2010) main finding that suggests a growth enhancing effect. This may be due to several reasons, of which one is related to the nature of

the data. Cross-country observations are probably much less comparable than within state-level observations within a single country. Hence, assuming that measurement error or other issues are blurring the regression coefficients, including more variables on the right hand side can shed light on whether political competition can explain economic development. This is done in Section 5. What regards the the coefficients that are significant, the proper signs do not apply; one would like to see negative coefficients, which in reverse implies a positive effect when moving towards zero – all estimates however are positive. Personally I do not believe that these predictions should be taken as carved in stone, but rather reflect that the model is badly specified, as indicated by low values of the adjusted R^2.[16] The alternative is that political competition is mostly associated with uncertainty about who is in power the next period. This may lead to incentive problems as the incumbent party may not internalize future social marginal benefits of public funded investments. Politicians seem to be reluctant to finance welfare programs or investments that have no instant visible effects on citizens. Future benefits may be reaped by a follower-government and could be used tactically to persuade uninformed voters in electoral campaigns later on. Myopic behaviour of governments then creates barriers to growth-enhancing spending decisions, as suggested by Azzimonti (2011).

4 Relation between growth, debt and expenditure variables

In the previous section on investigating the strategic debt hypothesis[17], I mentioned that ideological distinct parties may put different weights on different types of public goods. In my opinion, this is quite a realistic assumption. If public expenditure by preferences varies in the degree of how persistent growth is stimulated, then the degree of conservatism alone would play an important role in explaining movements in growth. Let us assume that public expenditure may be either productive (R&D) or not, and that liberal parties have a preference for investing in research and development. Hence, a higher share of public spending on R&D, all else equal, has a positive effect on growth in the long run. If one further assumes that progressive parties prefer higher taxes in order to finance investments, and that debt is used strategically, the following statement is true:

> Periods with highly conservative governments are associated with accumulating debt, lower taxes and lower growth, while periods led by liberals also would show growing debt but increasing tax shares and non-declining growth, independent of the degree of competition.

The rest of the section tries to find empirical evidence for the intuition on how public finance

[16] It should be mentioned that changes in the estimates while proceeding along the thesis occur, but I hope that all observations are explained plausible on economical grounds.

[17] Section 2.2.1.1

develops in the light of political economics. First, some thoughts on marginal effects are presented in 4.1. The following section picks up the statement made above, testing if political preferences, competition or a combination of both fits the data.

4.1 Evolution of debt, taxes and social spending

Battaglini and Barseghyan (2012) put forward a political economy model of endogenous growth. In their model the evolution of growth „is characterized by [...] the *shrinking government effect:* public debt grows faster than GDP, provision of public goods and infrastructure grows slower than GDP, and the tax rate declines“ (Battaglini and Barseghyan, 2012, p.2 f.) As a quick check, Figure 8[18] confirms a similar development for European countries. Not in line with the notion of a shrinking government is the share of R&D which is growing over the whole observation period[19]. Another thing to mention is that decreasing paths of R&D and total public expenditure are evident until the year 2000, but quickly rising during the following decade. Today, this may of course be seen in light of the Financial crisis, which was preceded by a period of building up unsustainable expenditure levels curbed by easy credit, and hence may be regarded as a prolonged deterioration of historical movements[20]. The fact however, that the data on Europe first starts in 1996 may have substantial impact on my findings on a shrinking public sector, since it suggests an upward trend.

In order to check whether there exists a shrinking government effect for Europe in general, I regress public finance variables on debt, i.e. for instance `reg taxrevenue Debt, robust`, displayed in Table 6A. Debt has a significant effect on all variables, with a 10 percent increase leading to 1.6 percent more spending on total expenditures, a roughly 1 percentage point increase in the share of tax revenues, but 0.1 percent less spending on R&D. So, the first thing to conclude is that a growing debt stock crowds out productive investment. A plausible intuition behind the strong link between debt and total expenditure – the correlation coefficient is 0.6 – may be that debt to a large degree is taken up to finance public good provision. That tax revenue is moving in the same direction as debt and public expenditure can be motivated by a simple Keynesian model: public consumption stimulates growth which widens the tax base, leading to higher tax revenues automatically, at least in the short run. Investigating the data does however not suggest that higher

[18] Corresponds to Figure 1: Fiscal trends in the U.S. economy on page 2 of Barseghyan and Battaglini (2012)

[19] There may be several reasons for that: 1) the data on R&D for European countries includes private spending, which may develop in a distinct matter:; 2) Europe invests a larger share of GDP on R&D than the US; 3) the development for the US is not that different – by looking at Figure 1 (Barseghyan and Battaglini, 2012), one notices that the downward trend for the US mainly is driven by the period before 2000, since then the development is flat, or even slightly rising

[20] Barseghyan and Battaglini's (2012) own estimated path after 2010 leads investments and total expenditures quickly back to trend

spending stimulates growth; the only plausible explanation then is that the data mirrors long-run implications, namely that debt cannot be rolled over for a long time, suggesting that some form for budgetary discipline is present in reality. Moreover, if public spending is short-sighted, i.e. the investment in R&D is low, growth in the long-run is supposed to decline, amplified by the requirement of balanced budgets. The fact that growth and R&D are negatively related can be explained by a simple growth model with technology growth[21]: National production will fall immediately after a switch to more research activity, but eventually will pick up; regarding the small time horizon and the distortive impact of the Financial Crisis on overall growth, it seems possible that the gains from R&D are not yet seen[22]. Overall, the story seems to fit the correlation analysis.[23] Regressing Debt on the lagged values of expenditure, rd and taxrevenue in Table 6B suggests that the existence of reverse causality is substantial. The level of debt is cut by 10 percent for each 1 percentage point increase in the share of R&D; debt rises more than 1-to-1 with an increase of last periods tax income, which at first seems odd. However, if one assumes that taxes had to rise to match the accumulation of debt last period, then this relationship is obvious.

Even though one has to be cautious what regards the direction of impacts, I conclude that the data on European countries confirms that not only the existence of debt matters to growth, but also whether debt is used on productive activities or not. Hence, the notion of strategic debt hypothesis by Alesina and Tabellini (1990) is reinforced.

4.2 Are conservatives more likely to comply with a shrinking government?

From column 1 Table 7C one reads that tax revenues rise with the political index, suggesting that more liberal governments indeed have a preference for higher taxes. Can we then conclude further that a positive correlation between taxes and spending on R&D is due to preferences, i.e. is there evidence that less conservative parties embrace growth oriented spending?

To answer this question, one has to check the relationship between growth, the political index and R&D shares displayed in Table 7A. At first sight, the political index has no significant power in explaining movements in growth. The same is true for the share of R&D, though it almost has a significant negative impact on growth. Although some comment regarding the sign of the effect R&D may have on growth has been made, the overall conclusion that conservatism does not matter for growth is disappointing and contra-intuitive. Given the fact that possibly many different channels influence growth, it is more likely to be the case that, on average, opposing forces cancel

[21] Weil (2009)
[22] Indeed, in Figure 10 Panel E growth picks up for R&D shares larger than 3 percent
[23] Not shown

each other out. To check whether this is the fact, I use economic relationships to go along a line of intuitive statements to show that conservatism not only matters, but actually explains what is observed in the data.

Independently of preferences, if for a given share of R&D total governmental expenditure increases, spending on R&D as a share of public spending (R&D_share) decreases which is confirmed by column 1 in Table 7B. Having tax revenues moving in the same direction as expenditures as evident in Figure 9A, i.e. increasing, while R&D is positively correlated with tax revenues as shown in Table 7B column 3 and 4, then R&D_share will be increasing as well. More precisely, a 10 percentage point increase in expenditures crowds out 0.02 percent of investment in research and development, while an equal tax increase goes in hand with 0.01 percent higher investments. So, with two effects of different sign, but almost equal size, the overall effect of R&D on growth should be close to zero and/or not significant, which confirms the observation made above. Moreover, the fact that R&D as share of expenditures is not influenced by debt, as Column 2 indicates, it is likely that debt is not used to implement growth-enhancing policies, points into the same direction.

To state anything about the role of preferences, one has to take a closer look at how public finance variables interact with the political index. Even though the coefficients on expenditure and R&D are not statistically significant at the 5 percent level[24], Table 7C confirms that higher values of the political index are associated with higher tax revenues, less debt accumulation and overall expenditures, but more spending on R&D, and hence one may conclude that more liberal governments have a preference for growth-enhancing policies, while the opposite must be true for conservatives. A shift from a centre-right to a centre-left government leads to 2.7 percent higher tax revenues and 5.8 percent lower levels of debt. Moreover, since the sample is balanced[25] what regards the political index, the opposing effects on growth, coming directly from the degree of conservatism and indirectly through the share of R&D, most likely do cancel out on average.

Given that, I would like to say one more thing regarding the sign of the coefficient on R&D_share: as mentioned above, the share increases when either expenditures decrease or tax revenues increase; but since liberals have a preference for R&D, it is more likely the case that taxes go up, which by itself reduces growth[26] until technology improvements break through. Additionally, even though not significant, the coefficient on CPG is positive when both effects are included in column 3 of Table 7A, which points in the direction that more liberal governments indeed undertake spending decisions that enhance future growth. So, coming back to the question in the section's title,

[24] Which may be due to the small number of observations
[25] From the codebook 3 refers to a balanced government; the mean of CPG_01 is 3.08, fairly balanced
[26] Refers to Figure 9B

the answer in my opinion is yes, conservative governments behave more in line with the shrinking government effect than liberals do.

4.3 What is the role of competition?

If however political competition is the reason for how public finances do behave over time, as put forward by Besley et al. (2010), more competition will lead to lower taxes, higher spending on R&D and hence to positive effects on growth, no matter what preferences parties do have. In line with that view, public expenditure as total also has to be taken as a growth-enhancing factor.

Table 8 makes clear that more lax competition is associated with higher debt and expenditure levels, but less spending on R&D. The fact that spending on R&D increases with competition reinforces the idea by Besley et al. (2010) that diminishing monopolistic power creates an environment for investments to thrive. The coefficient on taxes is negative, but not significant. So, the data does confirm Besley et al.'s (2010) findings in so far total expenditure is assumed being unproductive.

As a next step it then seems natural to check implications for growth. In the long regression from Column 6 in Table 8, `reg Growth Debt expenditure rd taxrevenue CPG_01 Comp,robust`, the coefficients on total expenditure and R&D are negative, which implies that less competition induces both productive and unproductive spending to slow down by 0.01 and 0.08 percent respectively. Interestingly, the coefficients on debt, taxes and both political variables on growth are all not significantly different from zero. As before[27], this may indicate that any direct effect that those variables may have on growth do disappear when the regression specification is widened up. Most likely this is due to the endogeneity problem that gets amplified when including more and more variables that do influence and get influenced by the regressand. Indeed, it is not difficult to find an explanation for why growth seems being unaffected by debt or taxes.

If the relations between debt and growth and taxes and growth are non-linear, which is confirmed by Figure 10 Panel A and B, then on average the opposite effects that debt and taxes have on growth may cancel out. To show why this may be true, let us first define BB = (Debt/taxrevenue) as a measure of whether the budget is balanced or not: a value of 1 means that the current deficit is zero, and the budget is balanced, while a value larger than 1 implies that tax revenues do not cover the issuance of new debt, and hence the deficit is positive; for values smaller than 1 the government earns more tax revenues than necessary, and thus builds up a surplus. To get a better picture, I will use a flow-diagram to describe the effects when fiscal policy is expansionary in terms of taxes.

[27] Referring to the findings regarding R&D share and growth

Assuming that public finances are running a surplus initially, for instance, the tax share is 50 and the debt share 25 percent, so BB is equal to 0.5, lower taxes will increase growth. Further I assume that the budget has to be balanced in every period, and in order for this to hold debt is accumulated, so the public fiscal surplus gets reduced. In my analysis on debt intervals in Section 2.1.1, I found that more debt is more harmful at the lower end than for values above 90 percentage, which suggests that even though expansionary fiscal policy stimulates growth in the short run[28], this is not true for debt issuance[29]. So, initially following movements are plausible in my opinion:

- When debt increases, growth decreases
- Tax revenues decrease, which stimulates growth
- For initial low levels of debt, the positive effect of lower taxes dominates
- The budgetary deficit increases, though tax revenues are still higher than expenditures

Keeping up expansionary policy eventually will lead to a situation in which the effect of lower taxes on growth is as big as the negative effect that debt has on the economy, then there is essentially no change in the growth rate apparent, though the deficit increases further. This should be the case when the budget is balanced, yet the stock of debt is increasing. At this point debt shares overgrow revenue shares, and due to the requirement of a balanced budget the pace at which debt further increases is accelerating, leading to the following scenario:

- When debt increases, the downturn will be more severe
- Tax reductions have a limited effect on growth
- Overall, economic activity will decline
- The budget ratio is now larger than one, i.e. expenditures exceed tax revenues

Even if growth is starting to decline at a lower rate for debt shares of above 100 percent of GDP, this effect should not counteract the downward-pushing effects that high current deficits, interest payments and probably the labour market situation have on economic activity.

Put all together, this leads to an inverse U-shaped relationship between fiscal balance and growth. For high tax revenues, relative to the stock of debt, growth is increasing, while it is decreasing for high public deficits. The change in the growth rate is zero where the opposing marginal effects of lower taxes and higher debt are equal in size. The intuition is confirmed by the data in Figure 10 Panel C. The peak of the deficit to growth relation , where no real change in growth is observed, is

[28] The intuition is confirmed by Figure 10 Panel D, which shows that growth increases with low expenditure-to-GDP ratios, but declines for shares larger than 30 percent

[29] One explanation may be that the obligation to take up debt to balance the current budget constraint in a situation in which the government simply could use up the stock of former surpluses, may be regarded as inefficient. Debt always comes with a cost, though it may be small for low levels: paying interest, loss of market confidence, sanctions in the case of the Euro-zone and so on, which all may have a depressing impact on growth at low levels of debt.

at the value of 1 where the budget is balanced. A current surplus stimulates growth, while a current deficit represses activity. The quadratic relationship between debt and growth is depicted in Figure 10 Panel A, and reproduces a similar curve as that for the Middle-Western countries only in Figure 3A., which shows that debt alone may harm growth more at low levels than at high levels. The fact that increasing taxes always depress growth, i.e. all countries are on the left side of the Laffer-curve, has implications for the degree that impulses from debt to growth differ for different values of debt shares, leading to the shape described above. The stimulating effect a tax reduction has on the economy are the stronger the lower the tax rate. Though, the lower the share of debt the higher the passthrough of lower taxes on growth, and vice versa if the debt-to-GDP ratio is high.

The overall conclusion of this section is that the reduced form effect of competition on public expenditure is as suggested by Besley et al.(2010). However, the result that more competition leads to less spending on R&D which is a growth-enhancing activity goes against his findings, and is more in line with the strategic debt hypothesis, namely that short-sightedness and preferences lead to inefficient resource allocation.

5 Including more explanatory variables

Sections 3 and 4 only focus on the direct effect that the political index or political competition have on debt and growth. This narrow specification most likely suffers strongly from omitted variable bias, however. This part tries to shed light on interactions of these main political variables with other factors that may play an indispensable role in determining governmental power, and thus the development of government spending. First, in 5.1, I quickly present the variables and how they affect debt and competition. Next, by looking at correlation coefficients, I investigate in 5.2 if the intuition was correct, and the connection they have with the political index.

5.1 Overview of political variables

The following variables are taken from the same database as the CPG data, and are calculated the same way[30]. Together with a short presentation some intuition on what one would expect to see in light of the strategical debt hypothesis and competition as a limitation to debt accumulation is included.

- The reason for termination (RfT) ranges from 1 to 7, with low values being associated with

[30] Complete description of those variables is found in the "Codebook Party Government Data Set" belonging to "The Party Government Data Set"

voluntary termination, while higher values above or equal to 5 with loss of confidence or forced resignation: the higher the value of RfT the more abrupt the change of government. If this is anticipated this will, together with rising uncertainty surrounding the survival of the government, cause debt to increase.

- The type of government (ToG) is on a scale from 1 to 6, which stands for single party government and caretaker government respectively. Resting on the results of the strategic debt hypothesis, the more concentrated the power, the closer to 1, the less debt is used strategically, as the probability of replacement is reduced. The same conclusion holds when using the degree of competition as an argument: more competition stimulates growth.
- The yearly change of government (Freq); The strategic debt hypothesis suggests that uncertainty about who will be in power the next period induces governments to spend money excessively today. This however rests on the assumption that the date of the upcoming election is known, which did not hold for the 1950s and 60s. Thus, that a higher frequency of unforeseen governmental shifts within a year is expressed by lower debt accumulation may also be true, since extremely short periods of governing means that only few, if any, political decisions are made by each government before being replaced again. Yet, competition should be high in those periods.
- A measure for government support (Gov_share), constructed as the number of parties in power divided by total number of parties; That governmental support is negatively correlated with competition in a multi party environment seems reasonable: The more parties in power the less parties to compete with exist. How debt is affected is less clear: frictions within a multi party coalition that faces a weak opposition (low overall competition) may lead to higher spending, as every party in government claims its share. Facing a tough opposition, such that the coalition has to align their different preferences, may on the other hand dampen debt accumulation. Yet again, many parties in power imply that the probability for small coalition partners to fall out the next election is high, thus they try to move spending towards their purposes.

For RfT and ToG the effect on debt used strategically and on competition are assumed to go in the same direction, which in turn would have opposing effects on growth; the exercise on expenditures and taxes in the preceding section put forward the idea that public expenditures are not efficient when debt is used strategically, and hence economic activity is low, while Besley et al. (2010) argue that the reduced form effect of competition is to stimulate growth. What regards Freq and Gov_share, as explained above, there are two opposing explanations for how the strategic use of

debt is influenced, and hence no conclusion is made for those factors.

5.2 Has the intuition been right?

Regressing debt on these variables makes it possible to evaluate the significance of the effects. Looking at Table 9, the coefficients on ToG, Freq and Gov_share are all negative and significant, implying that more instability and having to share power moderates the growth in debt, contradicting the strategic debt hypothesis. Quantitative, a 2-point increase in ToG, which for example amounts to a shift from a coalition that barely has more than 50 percent of the votes to a government without majority ruled by a single party, and having one more election in a given year leads to a 5 percentage decline in the level of debt. Quite similar in size, namely 4.5 percent, is the impact of having 10 percent of all existing parties included additionally in the governing coalition, i.e. Gov_share rises by 0.1. Together all three variables indicate that a more unstable and uncertain political situation causes debt to decrease, which can be interpreted in the light of Besley et al. (2010) having more competition.

To be able to include those variables as additional regressors, one has to check the connection with the political index and competition. Column 2 shows that the significance of the degree of conservatism is not affected by electoral uncertainty, captured by the type of government and the frequency of elections, which fits to the story of a more competitive environment. Unfortunately, the direction of how competition by itself affects debt switched and is statistically significant; a 0.1 change towards more concentrated power now decreases debt by 3.7 percent. The effect on growth in Column 4 is as before and, in comparison to Column 5 and 6 of Table 8, became significant at the 1 percent level: the same change of 0.1 towards less competition strangles growth by about 0.5 percent. This finding together with the results on ToG, Freq and Gov_share supports the reasoning that more competition reflects a more unstable environment in terms of which party will be in power the next period, which further strengthens the idea of using debt strategically, and what also explains the sign shift in the regression treating debt as the dependent variable.

Including all variables in the regression on growth in column 4 of Table 9 yields that only debt and competition do have an impact: both decrease economic activity. So, including more political variables to specify the political environment rather destroys than strengthens the results found by Besley et al. (2010). Growth is not enhanced by competition, and neither does the stock of debt diminish. The strategic debt hypothesis appears one more as being the explanation behind the evolution of debt.

6 Estimation results

How is it possible that a highly significant positive effect of competition on debt can be turned into a significant negative effect? It is time to think more sophisticated about the relation between economic variables, between economic and political variables and across countries and time. The intuition behind abandoning OLS, even though clear to readers that belong to the field of economics, is the following: Independently of the issue of endogeneity and reverse causality, macro panel data is especially prone to two types of heterogeneity: the same country is followed over several periods as well as different countries are observed at the same point in time, which means that data points are clustered at the country level. This also implies that the error terms are serially correlated within a country. Further the variance of the error terms may not be constant, so there is heteroskedasticity[31]. Multicollinearity, besides autocorrelation, will be an issue when lagged variables are included, but may also exist independently of lagged variables. The problem of omitted variables can never be neglected. Most importantly, the main assumption for using OLS, namely that the error terms are uncorrelated with the regressors, might not hold in reality, leading to inconsistent estimates. Aggregates like macro data have so far not been able to detect all relevant factors to make sure that the condition holds, so the problem of including endogenous variables on the right hand side of the regression is apparent. What one would like to do when randomized experiments are not possible is to find other ways to ensure that the correlation between explanatory variables and the residual are close to zero. Unfortunately, I cannot identify any of the political variables to be taken as an instrumental variable to get rid of the endogenous correlation between debt and growth[32]. What then is left is to specify the model as robust as possible including panel data implements and political control variables to deal with heterogeneity issues.

The next section gives an overview of tests that help identifying an appropriate model specification, while Section 6.2 uses that specification to review once more the relation between conservatism, competition and public sector variables, as well as the impact on debt and growth of all political variables. The last part of the paper wraps up how and how well the data fits to theoretical assessments.

6.1 Tests for a better specification

As a starting point, I checked whether a random effects model performs better than OLS estimation by performing the Breusch and Pagan Lagrangian multiplier test. The conclusion is that OLS should be abandoned.

[31] This has already been dealt with so far using the `robust` command

[32] ToG, Freq, Gov_share and the interaction of ToG and Freq have been tested

As a next step, I evaluated a fixed against a random effects model. This is done with help of the Hausman test, which sets the random effects model as being the correct one. "It basically tests whether the unique errors (ui) are correlated with the regressors, the null hypothesis is they are not" (Princeton University). The probability of obtaining the chi-square statistic is essentially 1, which means that the difference in coefficients is not systematic and the null hypothesis cannot be rejected. This suggests using a random effects model.

To test whether time fixed effects should be included, I follow the suggestion by Torres-Reyna (Princeton University) and run "a joint test to see if the dummies for all years are equal to 0". One can indeed reject the null hypothesis that all coefficients on the year dummies are zero, which means that time fixed effects do matter and shall be included. Anyway, out of own interest, I include an additionally dummy that specifies whether a country signed the Maastricht Treaty or not; this will make it easier to rule out that results are driven by the fact whether countries did or did not sign it. Another problem with macro data may be contemporaneous correlation. The "Pasaran CD (cross-sectional dependence) test is used to test whether the residuals are correlated across entities. The null hypothesis is that residuals are not correlated" (Princeton University). The result is that the data set indeed suffers from cross-sectional dependence. Moreover, I suspect that the error terms are serially correlated with each other, as well as clustered by country, to take out those effects I construct region and country dummies, and use cluster robust error specifications.

Having identified that my macro panel-data most likely suffers from heteroskedastic error terms which also are correlated across countries and time, I chose to run regressions of the following syntax: reg dep_var vector_expl_var yy* i.region ctrydum2-ctrydum16, cluster(Country)[33]; when turning to the debt and growth regressions displayed in Table 11, also Maastricht dummies in interaction with CPG_01 and Comp are included.

6.2 Robustness of linear correlations

Table 10A once more investigates the impact of the political index. Including fixed effects makes all coefficients being insignificant, which basically means that conservatism is no explanatory force when heterogeneity between countries is removed. Table 10B looks at competition, which neither has explanatory power in explaining variations in public finance variables and growth alone.

The last examination checks whether the coefficients get significant when more political variables, as well as the lags of public expenditure variables are included in the long regressions of debt and growth. If this is observed, it seems obvious that the findings in Table 10A and 10B are

[33] Before adopting that syntax I checked that using the `xtreg` command together with the option `re`, i.e. specifying expicitly the model to be a random effects one did not alter the results

due to omitted variable bias that drives the estimates towards zero.

Indeed, the effects on growth in Column 3 and 4 of Table 11A have yet again become significant: more liberal governments and higher degree of competition both improve growth, while the negative coefficient on CPG_comp indicates that more left-oriented coalitions are less responsive to a shift towards a more competitive surrounding. None of the other political variables are significant by themselves. What regards debt, the most important factors are debt as share of GDP and the growth rate from the preceding period. Additionally, the type of government and the share of parties in government are significant at the 5 and 2 percent significance level respectively. However their signs are opposite, which means that there is no clear support for the idea that more parties in power are associated with less debt accumulation.

Though the specifications used in Column 1 to 4 get rid of fixed effects and omitted variable bias what regards the political dimension, including lagged values of growth and debt probably severs the endogeneity problem. A neater way to capture growth is to look at how GDP per capita evolves over time. This idea leans on Besley et al. (2010) who exactly used the lag as measure in their growth regression. The possibilities of specifying a regression have become quite large now, so in Table 11 Column 5 to 7 the preferred ones are shown. The choice is based on the correlation analysis from Table 11B. Comparing the lagged, current and forwarded value of GDP per capita reveals that the lagged value is the most correlated with growth and the least with debt. What regards expenditure, the lag of GDP per capita is strongest correlated with the lag of expenditure, though the coefficient is almost half of that for debt (-0.262 and -0.486 respectively). As the correlation between the lag of GDP per capita and current expenditure is even lower, it seems a good idea to use this variable instead of debt in the growth regression. The fact that expenditure has a pretty similar relationship to growth and the lagged value of GDP per capita can be interpreted as having identified a good proxy for last period growth, and which may imply some sort of a constant growth in the share of expenditures due to demographic changes. Moreover, the fact that past and current values of expenditure are almost perfectly correlated suggests that expenditure has to be regarded as being determined out of the need to provide public services, which changes over time, but not drastically between two periods. Similar conclusions can be drawn when deciding whether to use the lagged or the current value of expenditure as explanatory variable – the former seems to be more prone to endogeneity. Another reason why not to use the lagged value of expenditure is due to the finding that the correlation with growth is positive, and hence may simply capture the short-term effect of expansionary fiscal policy[34].

[34] As mentioned above, all the possibilities have been tested by running regressions; also the lagged value of R&D has been tested, but discarded due to too little precision; also changes in the R^2 from specification to specification have been taken into consideration

But why to include any form of a spending variable when this strategy is prone to endogeneity issues? It can be justified in the following way: If one assumes that debt is issued in order to finance some non-trivial share of all governmental spending, then it seems rather odd to not incorporate a measure for how strong this incentive is, here in terms of size. Further, the decision to take up debt then is determined within each period, while of course past choices are affecting the outcome today, and therefore the lag of expenditure is not added. The contingency on prior decisions is captured by the lag of GDP per capita instead, which from Figure 11 seems to have been growing at a constant rate since 1950, and hence can be considered as not being driven by debt, but rather being one of the explanatory factors for why debt has been growing since then. Interestingly, for all regressions, both debt and growth, the coefficient on the lag of GDP per capita is precisely estimated close to zero; this finding confirms that this measure of citizens' welfare is not driving macroeconomic performance when country and time fixed effects are controlled for, and hence is a good proxy for economic prosperity. This results also reinforces the idea of political variables as being determinants of those macroeconomic variables the government can control (debt) or influence (growth through governmental investment and consumption). GDP per capita instead is the aggregate of individual production weighted by the population, a much less volatile measure of economic activity.

For growth, excluding expenditure can be motivated by concerns regarding the multiplier effect public spending has on growth, though the adjusted R^2 drops below 0.5. Another oddity is that the constant term is as high as 20 in the regression that includes expenditure, which seems quite unrealistically. The degree of conservatism as well as political competition play a role in explaining growth. An anticipated change from a left-centred to a right-centred government is associated with a rise in growth rates by 1.2 percentage points. This is in line with theoretical predictions that more liberal parties do engage more in growth-enhancing activities than conservative governments. Competition however has a negative impact on growth, a 0.1 percent movement towards zero leads to a 0.9 decline in growth. The coefficient on the interaction term is negative as well, which implies that a change to a more liberal government or a reduction of overall competition are substitutes, or as interpreted above, more liberal governments are less responsive to competition, and can be labelled as being more strong in terms of ideology. This means that rightist parties adapt more to changes in voters preferences, or that they basically move towards the centre position when faced with electoral uncertainty. So, if conservative parties behave more in line with the predictions of a probabilistic voting model, i.e. convergence on a weighted social optimum when the parties' optimization problems are symmetric, competition would yield a lower stock of debt and thus higher growth. That competition actually dampens growth then has to do with how the more liberal

governments respond to uncertainty. If they are policy motivated rather than office-seeking, more uncertainty does not change their preferences for pro-growth policies. However, they could be more inclined to use debt strategically in order to either boost the probability of re-election, or to guide a more conservative successor towards more public spending by leaving a lower stock of inherited debt. The former explanation seems to be the case when looking at Column 5 of Table 11.

Debt is increasing with the political index, though the size of the coefficient is not credible. A change from a left-centre to a right-centre complexion is associated with an increase of about 29 percent. Hence, from this result one should not draw the conclusion that the strategic debt hypothesis is not valid. One explanation rests on how incentives of re-election may be incorporated in the debt hypothesis (Persson and Tabellini, 2002, Ch.13 p.360): "The empirical implication is that governments are more likely to issue debt if their *natural constituency* is small and has a strong ideological attachment. In this case it is better to appeal to the more mobile swing voters in the opposition party's constituency". So, though the size of the effect plausibly seems to be estimated too high, the direction may well be in line with the theory. Against that thought speaks the type of the data – a panel; for such a theory to hold in reality, conservative parties would have to have a larger electorate base in most of the countries, and more precisely, at any point in time. This seems a too ambitious assumption to be true in reality. More conform with the argumentation made along the thesis[35] is to recognize that collinearity between conservative preferences and their main policy instrument, expenditure, is causing the significant switch in sign and size. In the sense that the coefficient on CPG_01 expresses the fact that more conservative governments prefer higher public spending that is not related to growth-enhancing investments, clearly debt is increasing more whenever such a government is in place. Through the strong identification of conservative parties with higher expenditure and debt levels clearly one effect incorporates the other, leading to a strange estimate for the other. Here this preference effect is caught by the coefficient on expenditure while the coefficient on the political index is fed into the error term.

If expenditure is included only the type of government and the share of parties in government are influencing growth. If for instance the type changes from a single party to a coalition that just reached absolute power, growth is predicted to pick up by 1.04 percent. Growth is also increasing with the number of parties in power. This could be interpreted as a sole within-coalition mechanism of checks and balances. Also, even if competition as an overall measure has explanatory power, the sign of the coefficient has switched, which is more in line with the story of Besley et al. (2010). Expenditure itself reduces growth by 0,22 percent per 1 percentage point increase, while for debt the same change induces the stock of debt to increase by more than 1

[35] The coefficient on CPG_01, if significant, has broadly been negative around a value of 5 throughout the paper

percent. To wrap up the analysis, one should mention that, beside the coefficient on CPG_01 in Column 5 and the constant term in Column 6, the predicted effects and interceptions are all at decent meaningful values. Average growth, absent of all fiscal and political frictions and heterogeneity between countries, would be 2.188 and the natural level of debt would be 80 percent of GDP. To draw the connection back to the starting point of the analysis, a 90 percent level should then not pose any threat to the solvency of countries, and hence, Reinhart and Rogoff's (2010) claim is yet again weakened by more thoroughly consideration of mechanisms behind the evolution of growth and debt.

Conclusion

It proves extremely difficult to take a stand on causality or even to conclude which model or which theory do best fit a panel data of 16 distinct European countries. The final regression results do show that a linear relationship between debt, growth and political factors may work fine in making predictions on movements in those variables. Concerns regarding non-symmetric behaviour of voters, economic agents and politicians still have to be taken seriously. As space and time are limited, this investigation has to be left to later work or other authors. Nevertheless, the overall conclusion of the mostly descriptive analysis has to be that there are strong political forces in play when governments do decide upon fiscal policy. Strategic considerations feed into decisions on investment, tax rates and debt issuance. Having disentangled the channels through which different political variables influence macroeconomic determinants, should help to a better understanding of why similar countries have shown so distinct developments. Even though the analysis does not include any hardcore econometric strategy, it is a starting point for future attempts to dig deeper into the material on which dimensions politics do determine growth an debt, or the other way around – reverse causation always has to be taken into consideration.

Probably some more data on public investment should be gathered and also other forms for the index of political polarization and competition should be constructed. Incorporating for instance election results in order to determine how close or far a party has been from winning the election creates a forcing variable, which then can be used in a regression discontinuity design around a 50 percent vote share. This has been done by Pettersson-Lidbom (2008) and Folke (2014) for a single country, Swedish municipalities and Norway respectively. The largest obstacle to succeed in following such attempt clearly is limited access to required data. So, focusing on a single country might be the most naturally way to go, at least in the beginning. Yet another dimension is the

difference between electoral systems. Maybe it is more appropriate to compare countries within each system. The most interestingly extension, in my opinion, is to include measures of labour market organization. Unemployment always has been, and now is the macroeconomic indicator that individuals most care about. Clearly, the design of the size and duration of unemployment benefits should interact with growth and debt. But, voting decisions are based as well on labour market prospects and what parties promise to do about it. Hence, parties can tailor their policy platforms to please the electorate. These are just a few thoughts on how more or other data can be added. Another way of proceeding may be to pick a political model or a theory and try to check with more sophisticated econometric procedures whether or not it does fit to panel data.

Evidently, the idea that growth solely is determined by debt has to be strongly repealed by the findings along the thesis, which proves to be good news for a future recovery in the Euro zone.

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Data Sources

Main Databases

Reinhart and Rogoff database [visited 18.04.2013]: Debt-to-GDP Ratios
Available online at http://www.reinhartandrogoff.com/data/browse-by-topic/topics/9/

Total Economy Database [visited 05.07.2013]: Output, Labor, and Labor Productivity, 1950 – 2012
Available online at http://www.conference-board.org/data/economydatabase/

The World Bank DataBank [visited 02.04.2014]: World Development Indicators
Expense (% of GDP)
Available online at http://data.worldbank.org/indicator/GC.XPN.TOTL.GD.ZS/countries/AT-BE-DK-FI-FR?page=4&display=default
Tax revenue (% of GDP)
Available online at http://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS/countries/AT-BE-DK-FI-FR?display=default
Research and development expenditure (% of GDP)
Available online at http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS/countries?display=default

Worldwide Inflation Data [visited 11.07.2013]:
inflation by country - quick links
Available online at http://www.inflation.eu/inflation-rates/austria/historic-inflation/cpi-inflation-austria.aspx

Party Government Data Set [visited 03.10.2013]: Woldendorp, J., H. Keman and I. Budge. 2011. Party Government in 40 Democracies 1945-2008. Composition-Duration-Personnel. University of Amsterdam, Faculty of Social Science.
Available online at http://www.fsw.vu.nl/en/departments/political-science/staff/woldendorp/party-government-data-set/index.asp

Supplementary material

Information on election results after 2007

European election database [visited 2013]:
Available online at http://eed.nsd.uib.no/webview/
Austria 2008: http://de.wikipedia.org/wiki/Nationalratswahl_in_Österreich_2008
Belgium 2010: http://en.wikipedia.org/wiki/Belgian_federal_election,_2010
Denmark 2011: http://en.wikipedia.org/wiki/Danish_general_election,_2011
Germany 2009: http://de.wikipedia.org/wiki/Bundestagswahl_2009
Greece 2009: http://en.wikipedia.org/wiki/Greek_legislative_election,_2009
Italy 2008: http://en.wikipedia.org/wiki/Italian_general_election,_2008
Portugal 2009: http://en.wikipedia.org/wiki/Portuguese_legislative_election,_2009
Spain 2008: http://en.wikipedia.org/wiki/Spanish_general_election,_2008
Sweden 2010: http://en.wikipedia.org/wiki/Swedish_general_election,_2010

Historical information on Greece and Portugal

http://en.wikipedia.org/wiki/Metapolitefsi
http://en.wikipedia.org/wiki/Carnation_Revolution

Example of calculating the political variables

The section http://www.fsw.vu.nl/en/Images/Austria%20protec_tcm31-255226.xls, taken from the PGDS, represents the first eight governments in Austria after World War II, where RfT is reason for termination, ToG type of government and Py1Seats the number of seats won by the strongest party in power. The main exercise was to generate a yearly-based sequence of those variables. Let's consider 1954 to 1956:

Austria

Gov	Begin	Dur	RfT	ToG	Py1Name	Py1Seats	Py2Name	Py2Seats
1	18.12.45	1420	1	3	ÖVP	85	SPÖ	76
2	7.11.49	1242	4	2	ÖVP	77	SPÖ	67
3	2.04.53	1178	1	2	ÖVP	82	SPÖ	74
4	23.06.56	1117	1	2	ÖVP	74	SPÖ	73
5	15.07.59	478	4	2	ÖVP	79	SPÖ	78
6	4.11.60	159	3	2	ÖVP	79	SPÖ	78
7	12.04.61	711	1	2	ÖVP	79	SPÖ	78
8	24.03.63	376	2	2	ÖVP	81	SPÖ	76

In 1954 and 1955 no election took place, so I copied the values for 1953. In 1956 however two different governments were in power during the course of the year, so I computed averages according to the days each government had been in power; for Py1Seats the calculation is [(174*82) + (191*74)]/365 = 77,81 which leads to an Excel-sheet similar to the one below.

1950	Austria	0,00	2,00	77,00
1951	Austria	0,00	2,00	77,00
1952	Austria	0,00	2,00	77,00
1953	Austria	1,00	2,00	80,74
1954	Austria	0,00	2,00	82,00
1955	Austria	1,00	2,00	82,00
1956	Austria	0,00	2,00	77,81
1957	Austria	0,00	2,00	74,00
1958	Austria	0,00	2,00	74,00
1959	Austria	4,00	2,00	76,37
1960	Austria	3,00	2,00	79,00
1961	Austria	1,00	2,00	79,00
1962	Austria	0,00	2,00	79,00
1963	Austria	2,00	2,00	80,55

Appendices

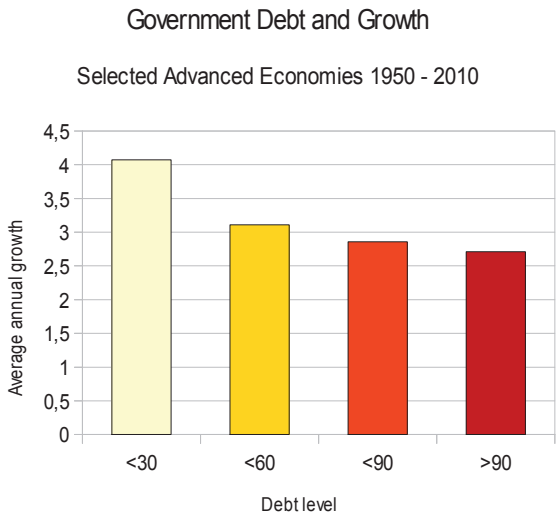
Figures

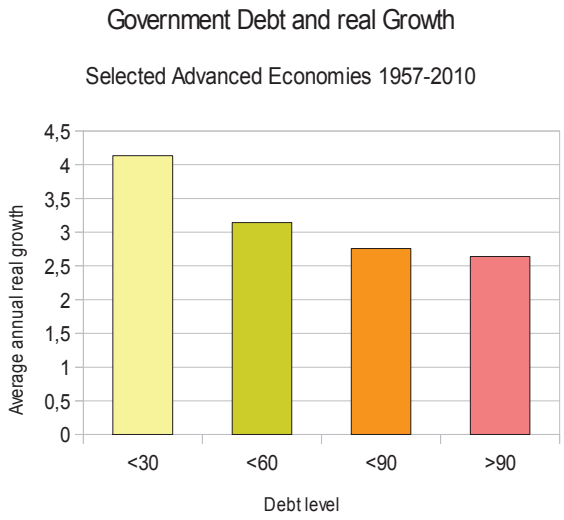
Figure 1A: Average Growth Rates by Debt Levels

OECD Countries

Debt	Growth	obs
<30	4,07	494
<60	3,11	358
<90	2,86	179
>90	2,71	169

Debt	real_Growth	obs
<30	4,13	434
<60	3,14	333
<90	2,76	145
>90	2,64	158

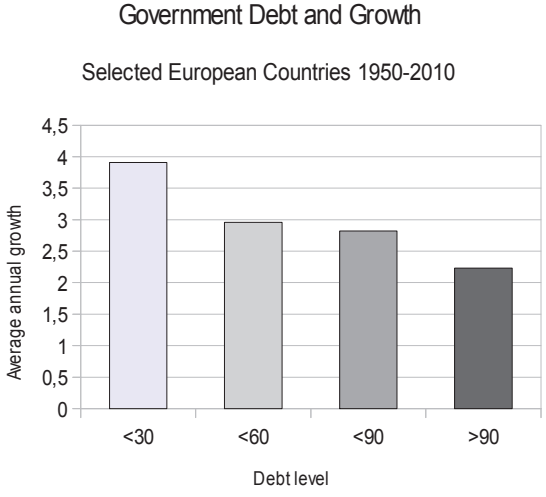




European Countries

Debt	Growth	obs
<30	3,91	432
<60	2,96	291
<90	2,82	143
>90	2,23	94

Debt	real_Growth	obs
<30	3,94	375
<60	2,96	266
<90	2,71	114
>90	2,14	85



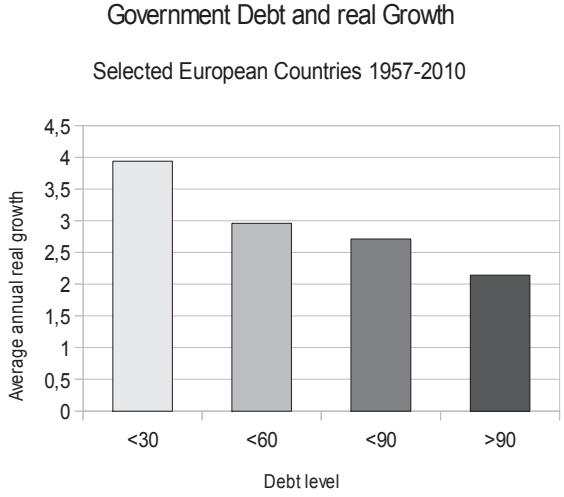


Figure 1B: Correlation of Debt and Nominal Growth

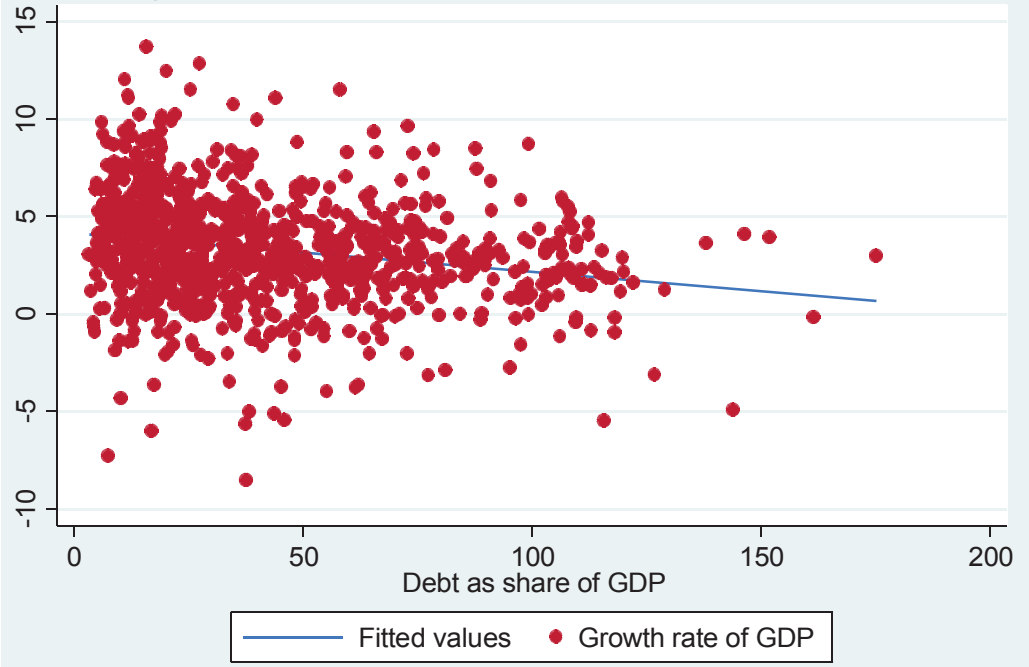


Figure 2: Correlation between Debt and Growth by Regions

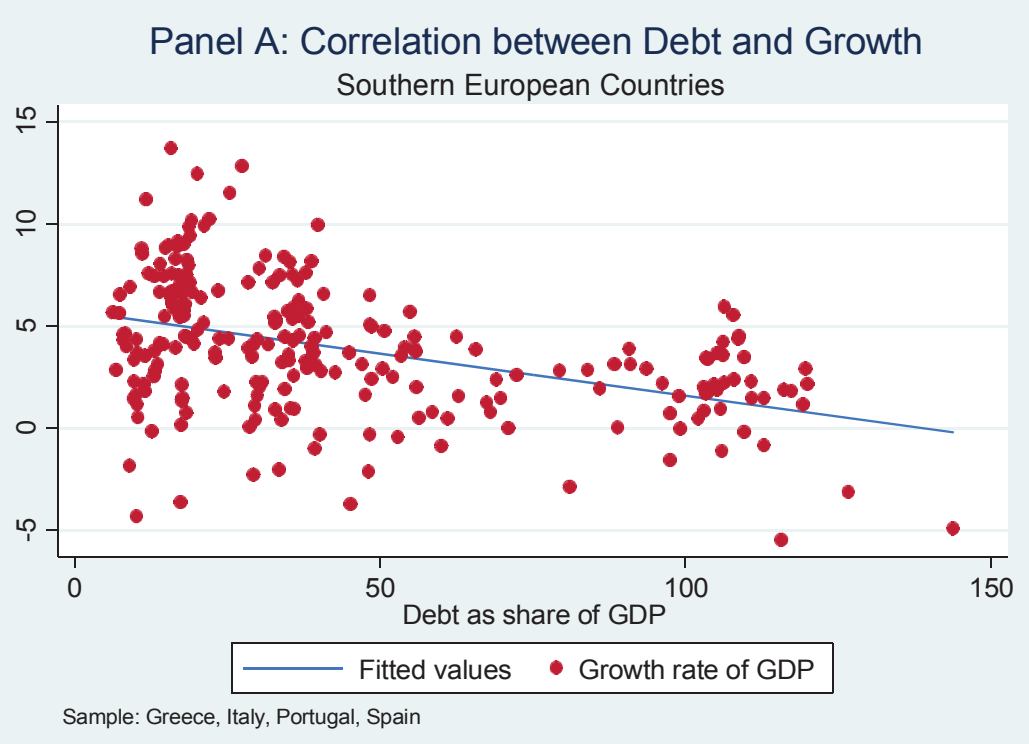


Figure 2: Correlation between Debt and Growth by Regions

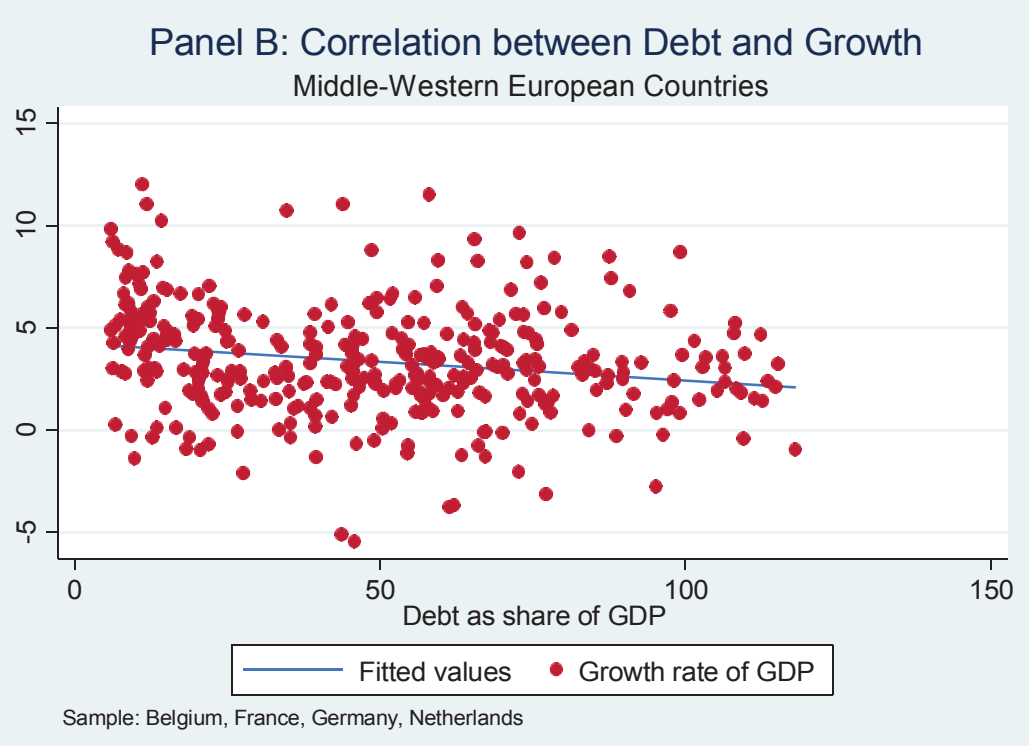


Figure 2: Correlation between Debt and Growth by Regions

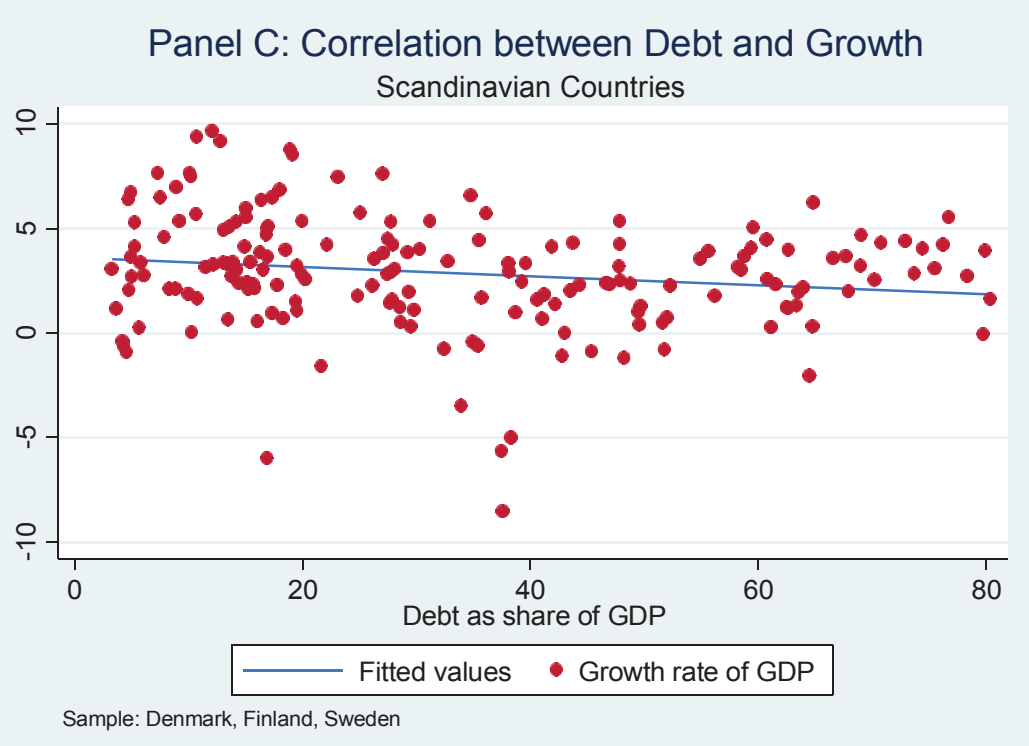


Figure 2: Correlation between Debt and Growth by Regions

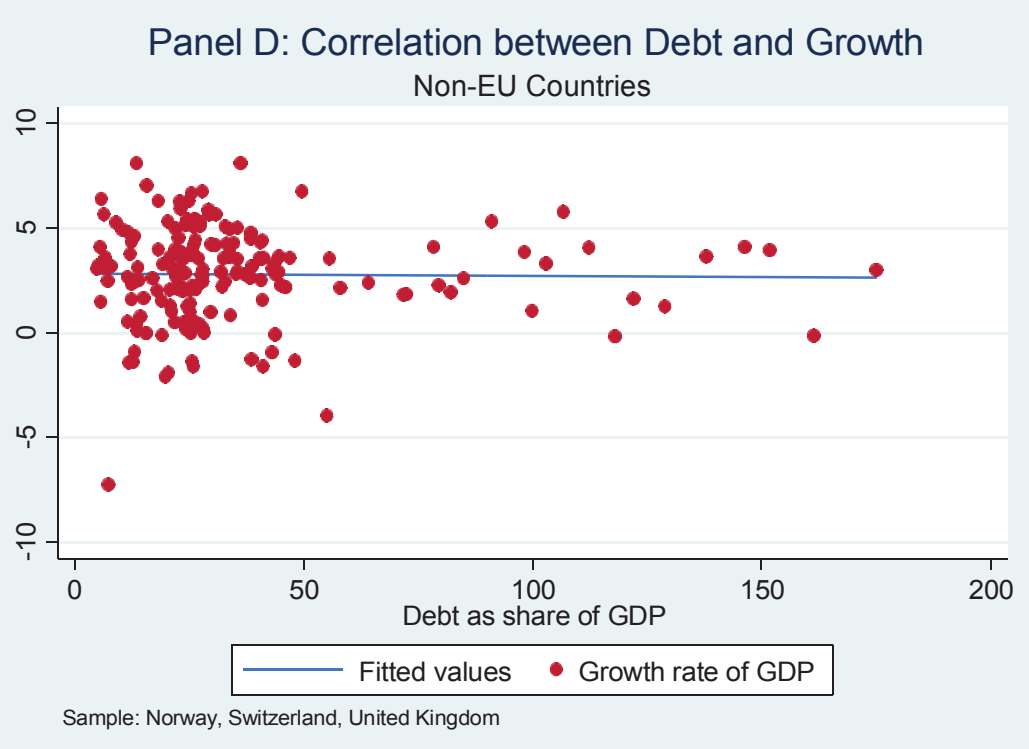


Figure 3A: Quadratic relationship between Debt and Growth by Regions

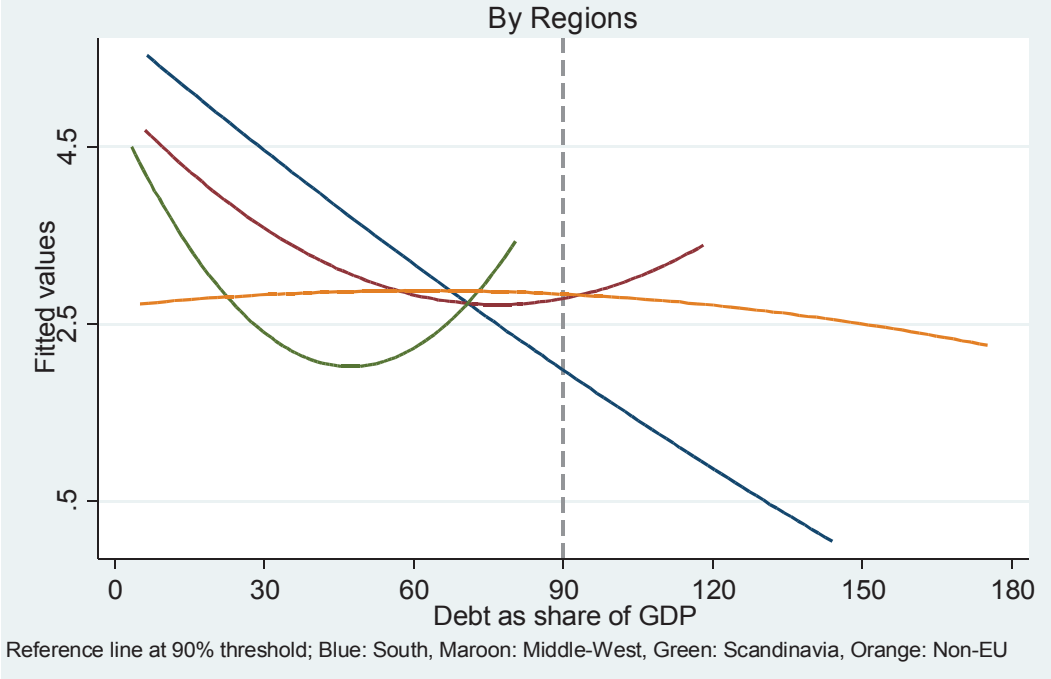


Figure 3B: Quadratic relationship between Debt and Growth by Countries

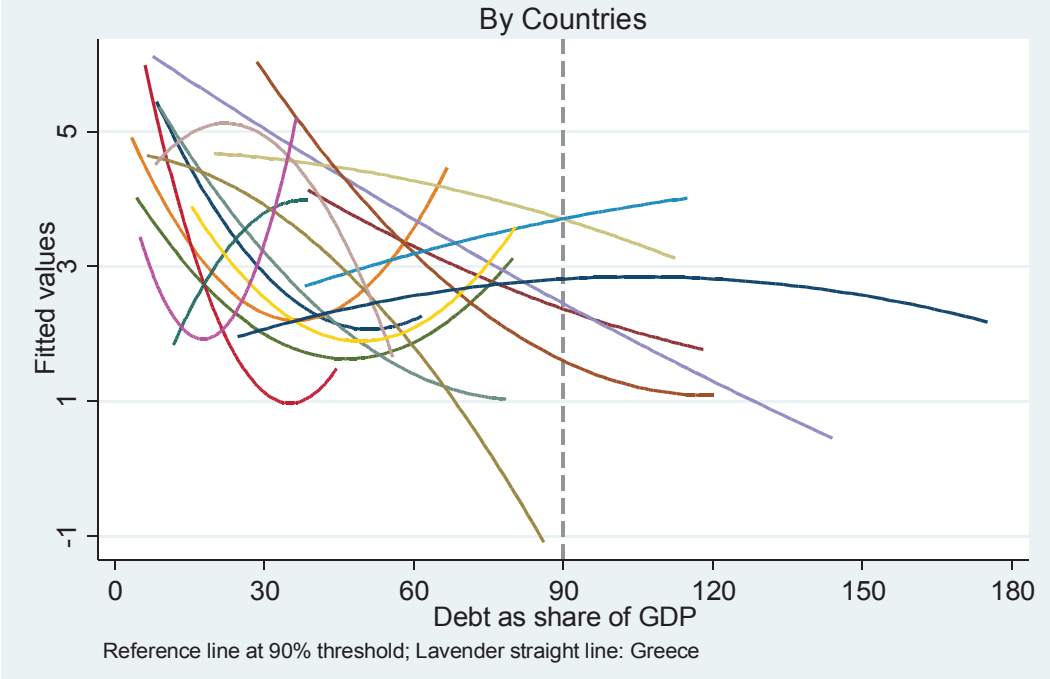


Figure 4A: Average Debt share of GDP by Regions

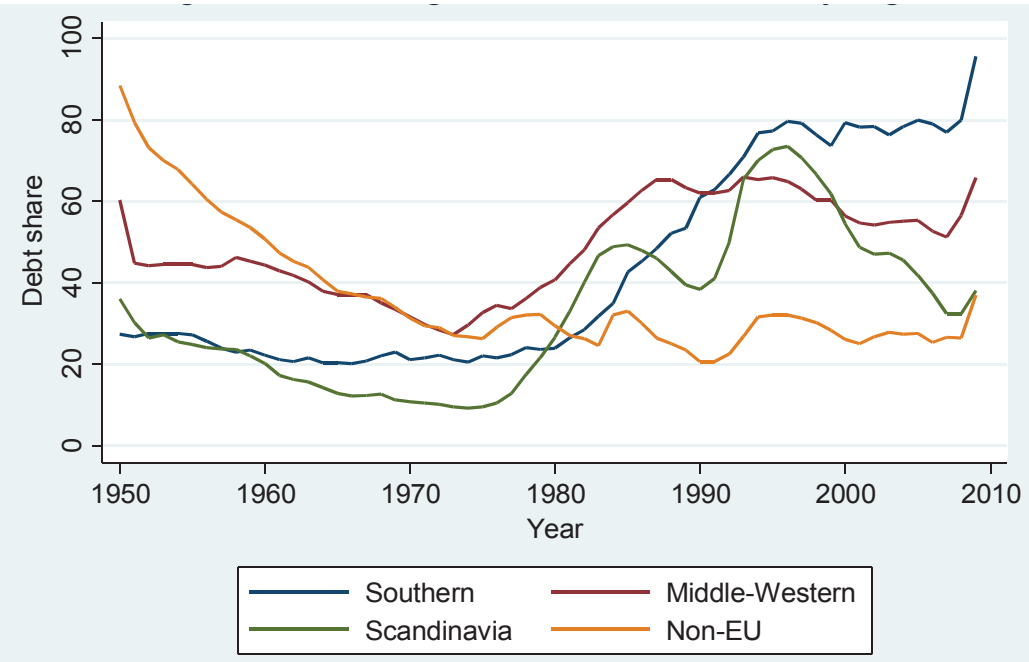


Figure 4B: Average Debt shares before Maastricht Treaty

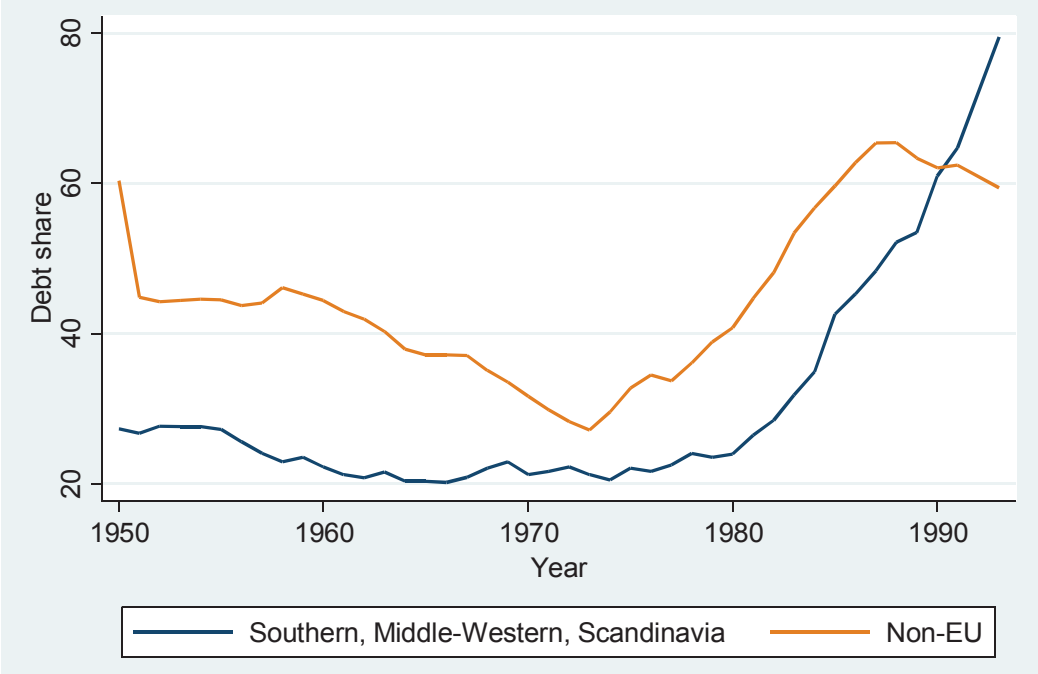


Figure 4C: Average Debt Shares after Maastricht Treaty

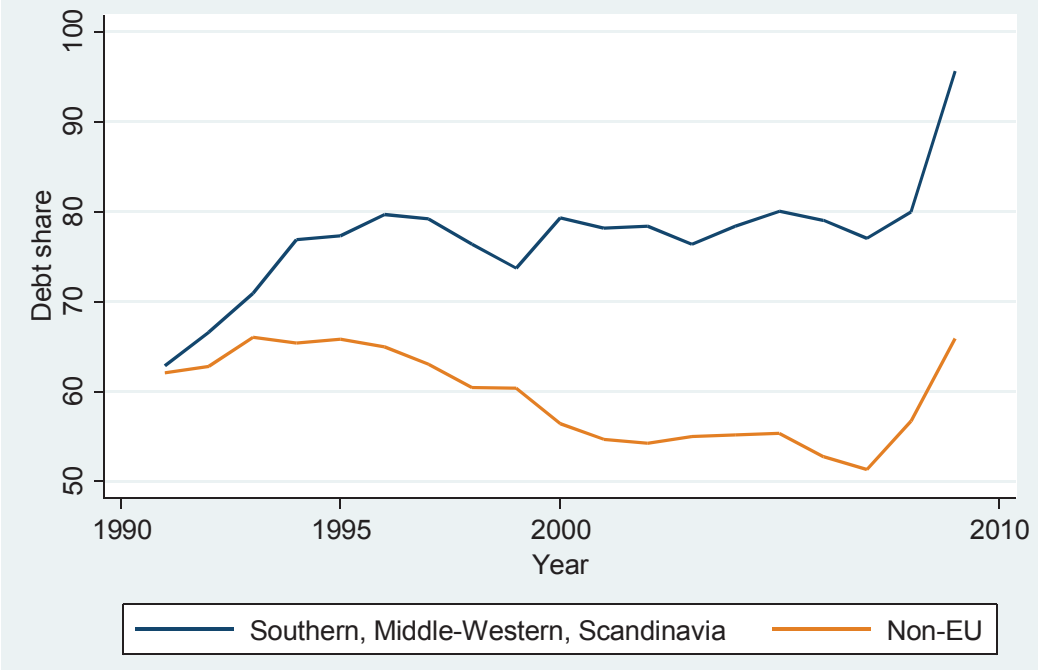


Figure 5A: Average Growth rate by Regions

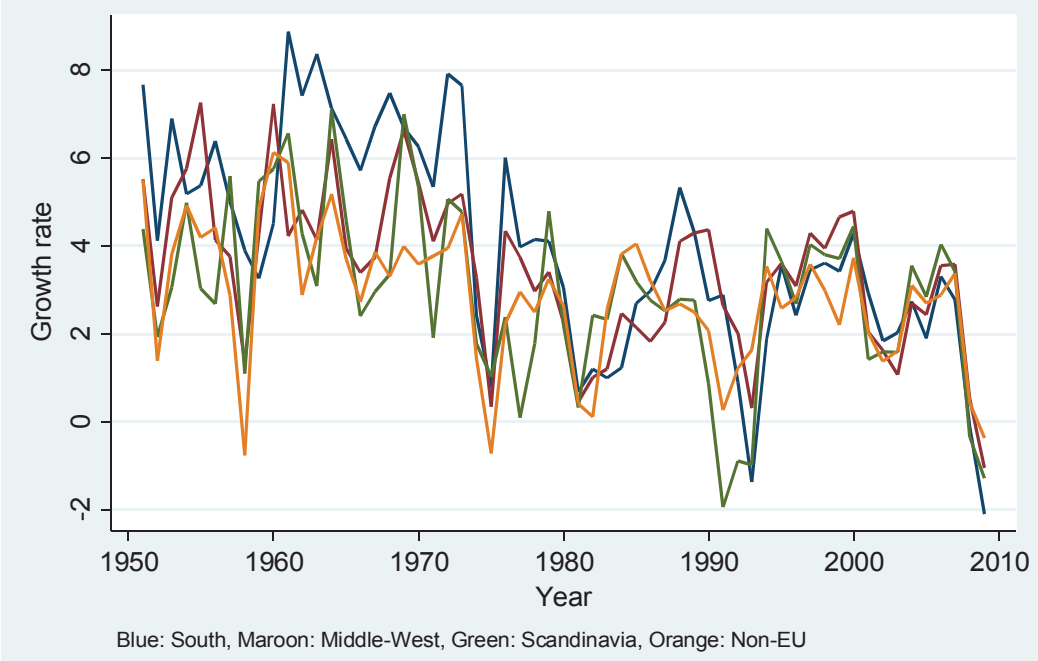


Figure 5B: Average Growth before Maastricht Treaty

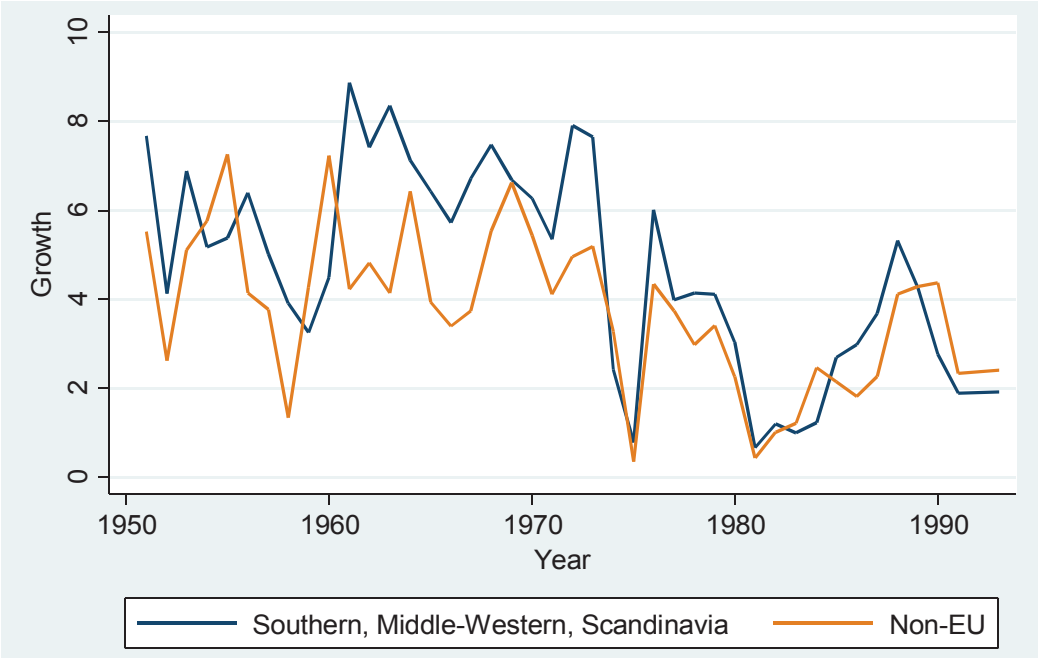


Figure 5C: Average Growth after Maastricht Treaty

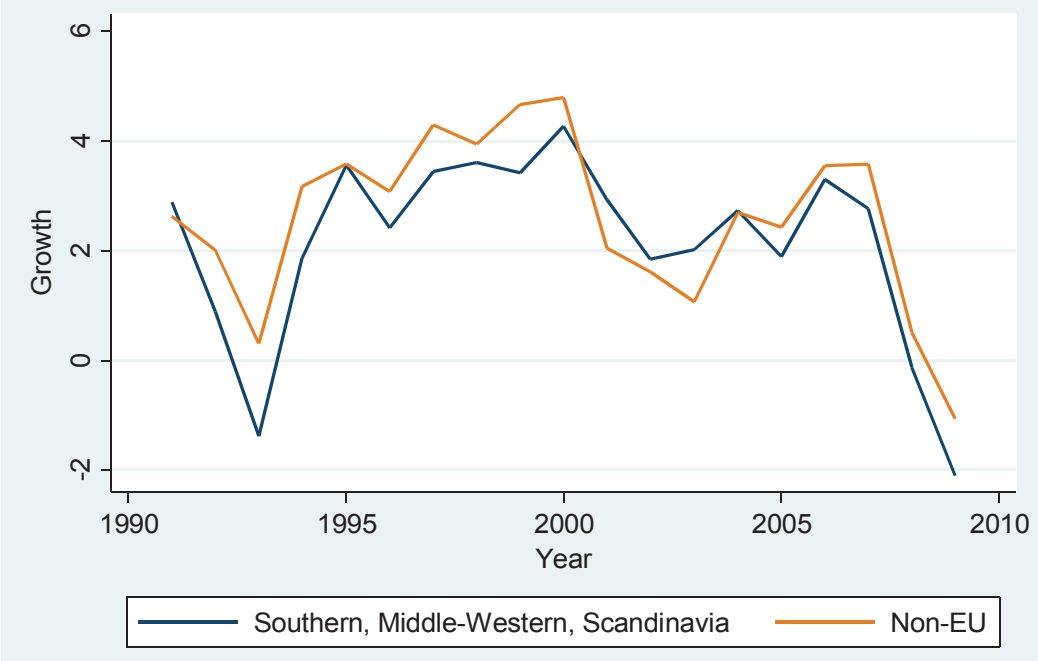


Figure 6: Average Conservatism by Regions

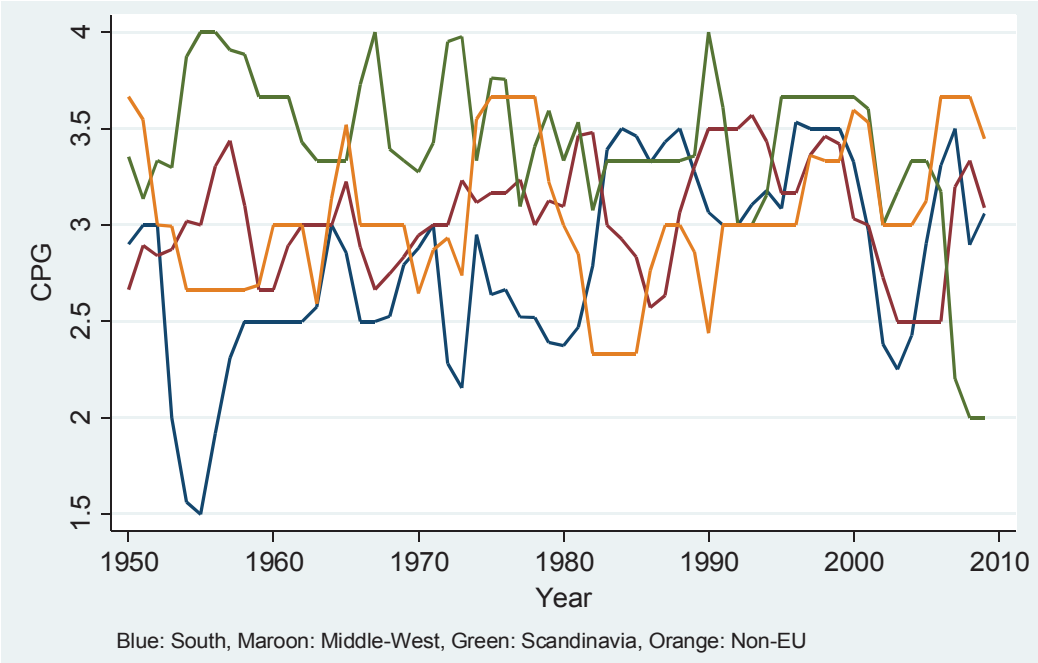


Figure 7: Average Political Competition by Regions

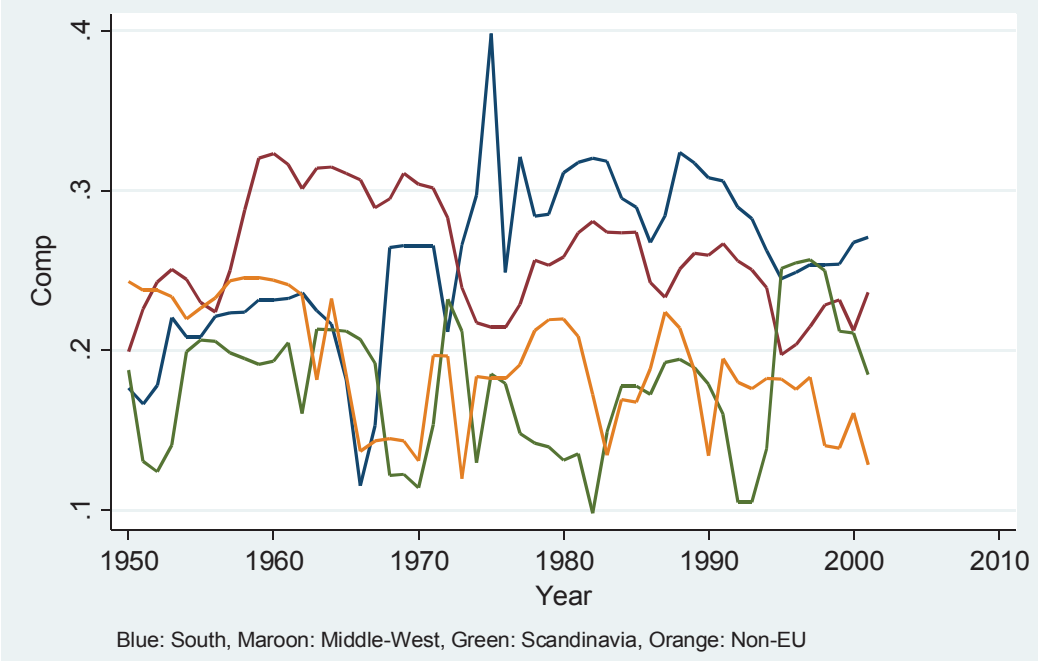
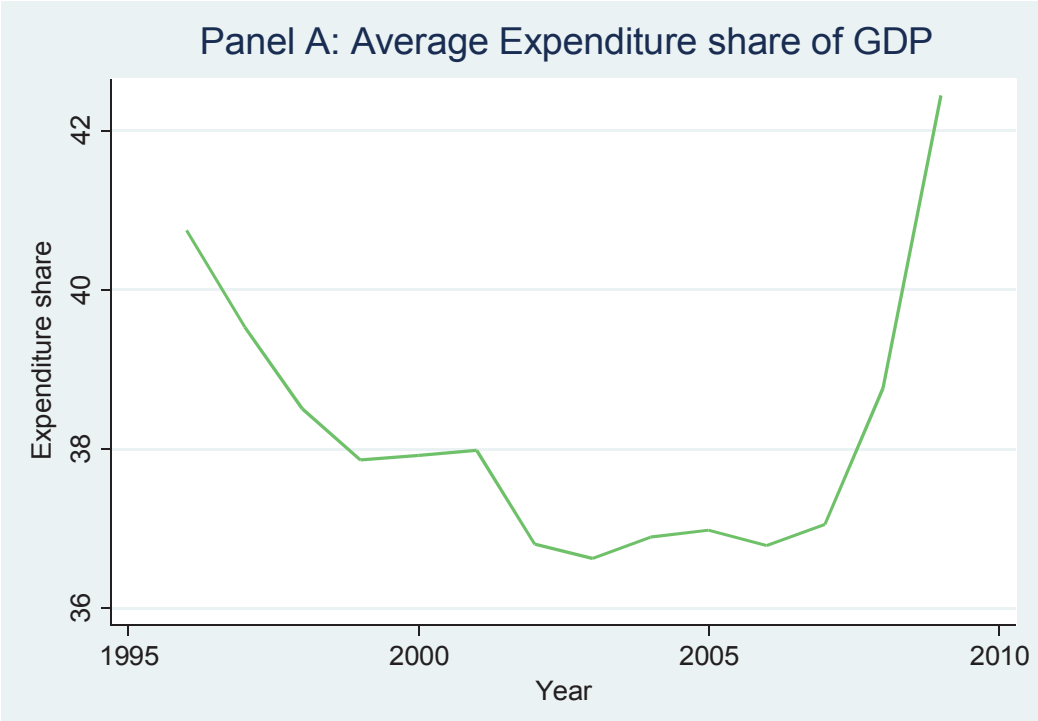


Figure 8: Evolution of Public Finance variables



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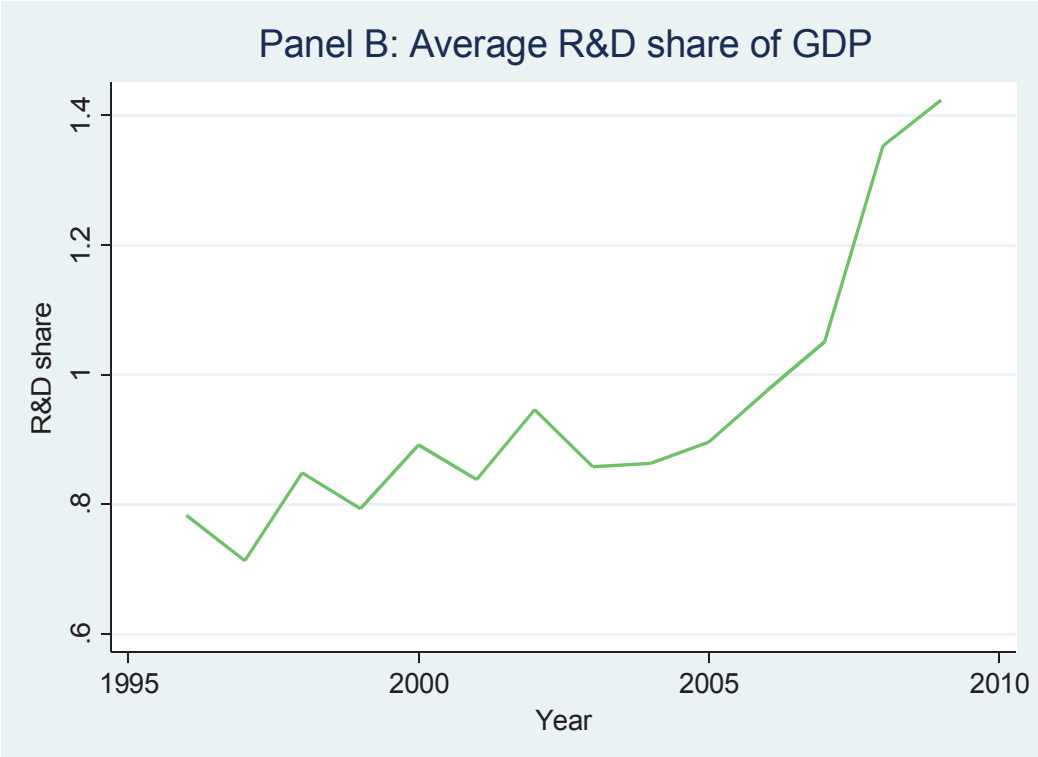

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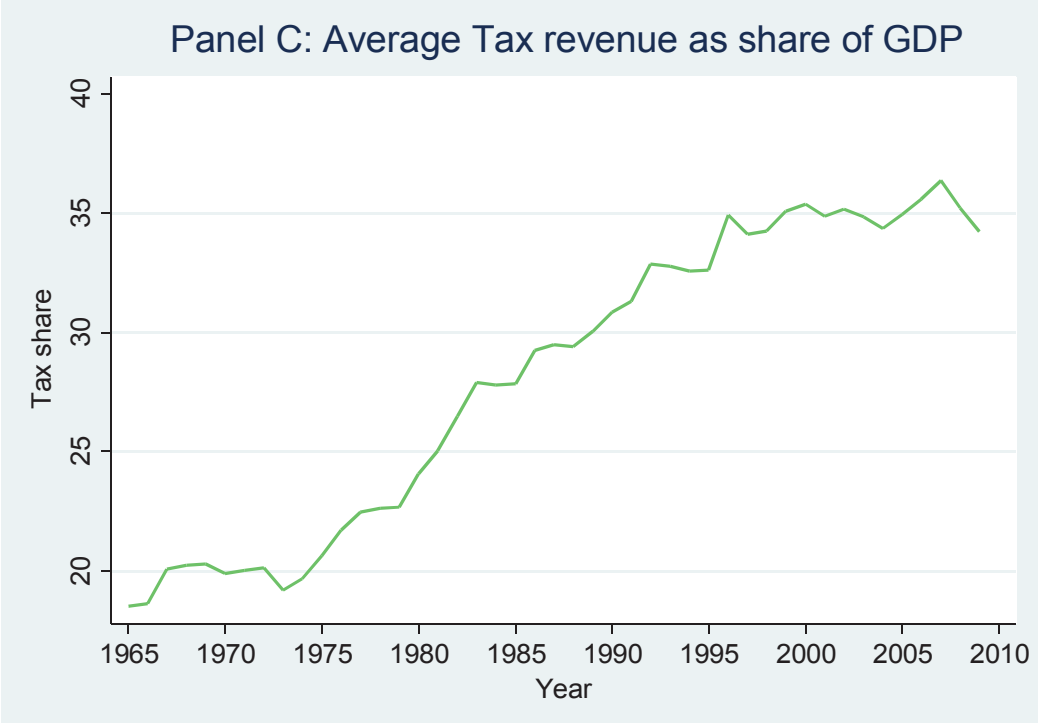


Figure 8: Evolution of Public Finance variables

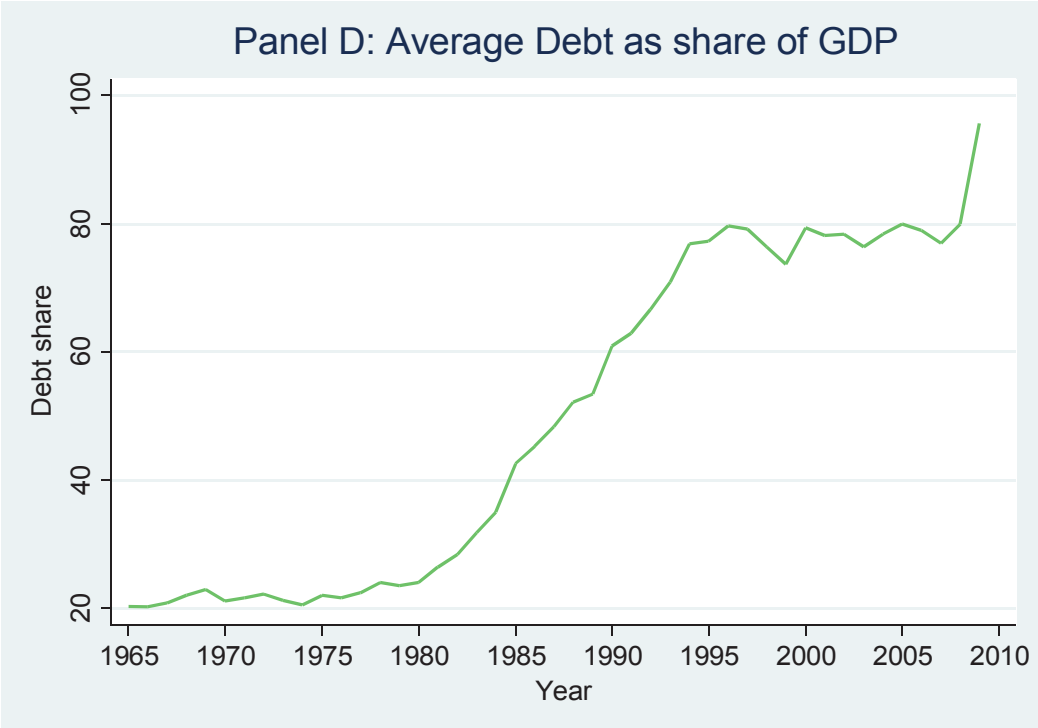


Figure 9A: Correlation between Expenditure and Tax revenue

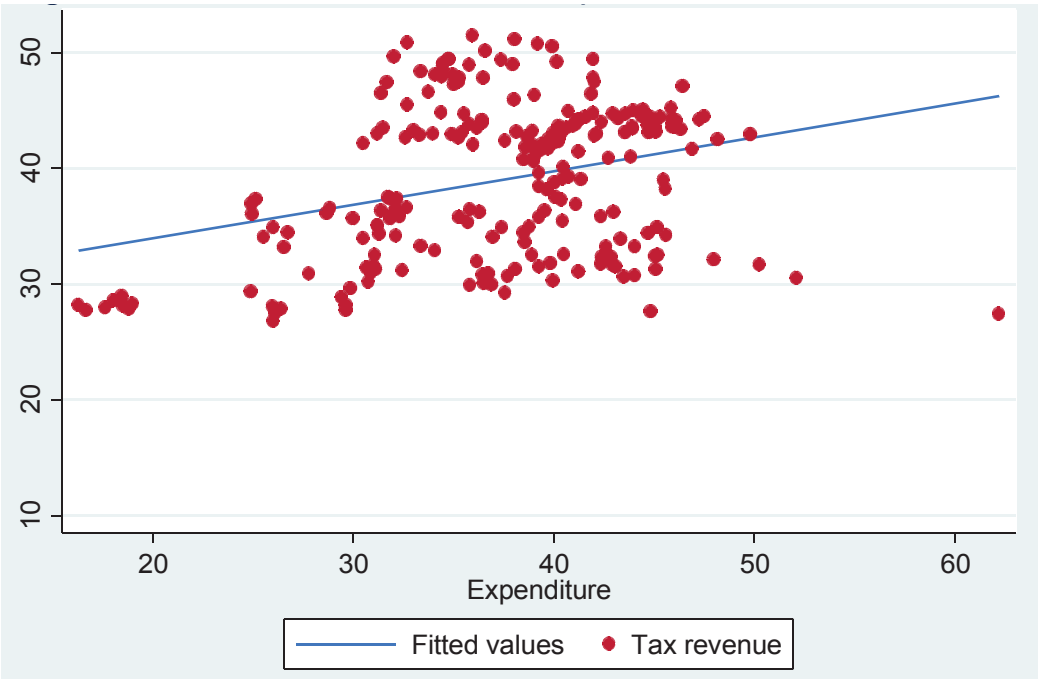


Figure 9B: Correlation between Growth and Tax revenues

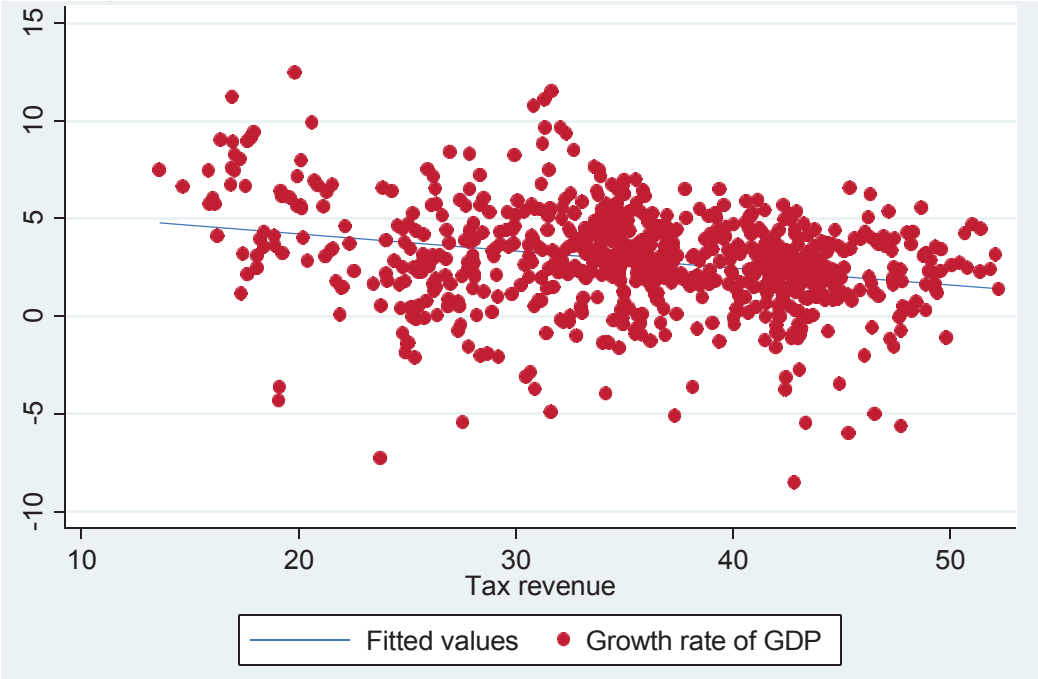


Figure 10: Quadratic relation between Growth and Public Finance variables

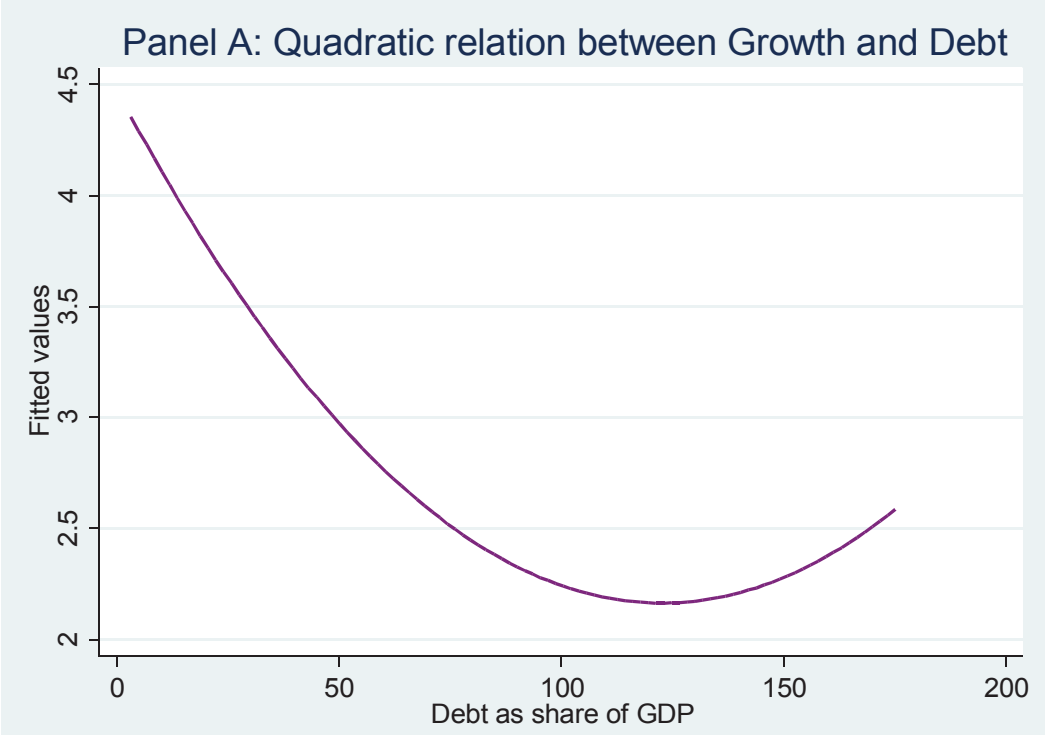


Figure 10: Quadratic relation between Growth and Public finance variables

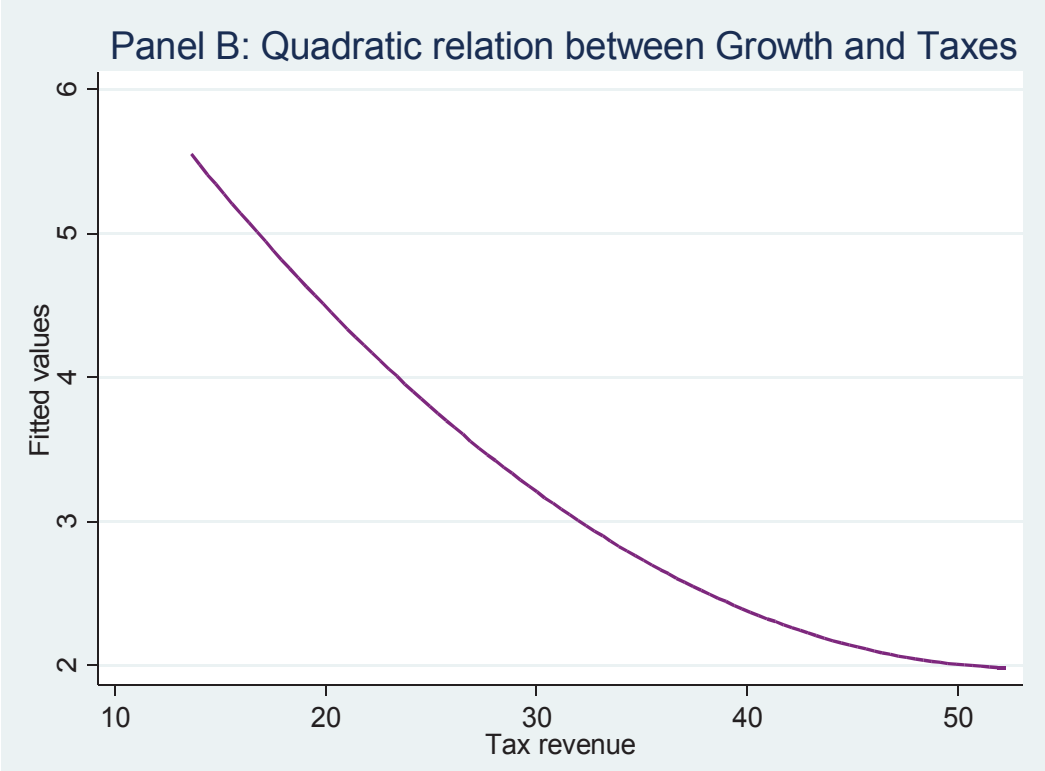


Figure 10: Quadratic relation between Growth and Public finance variables

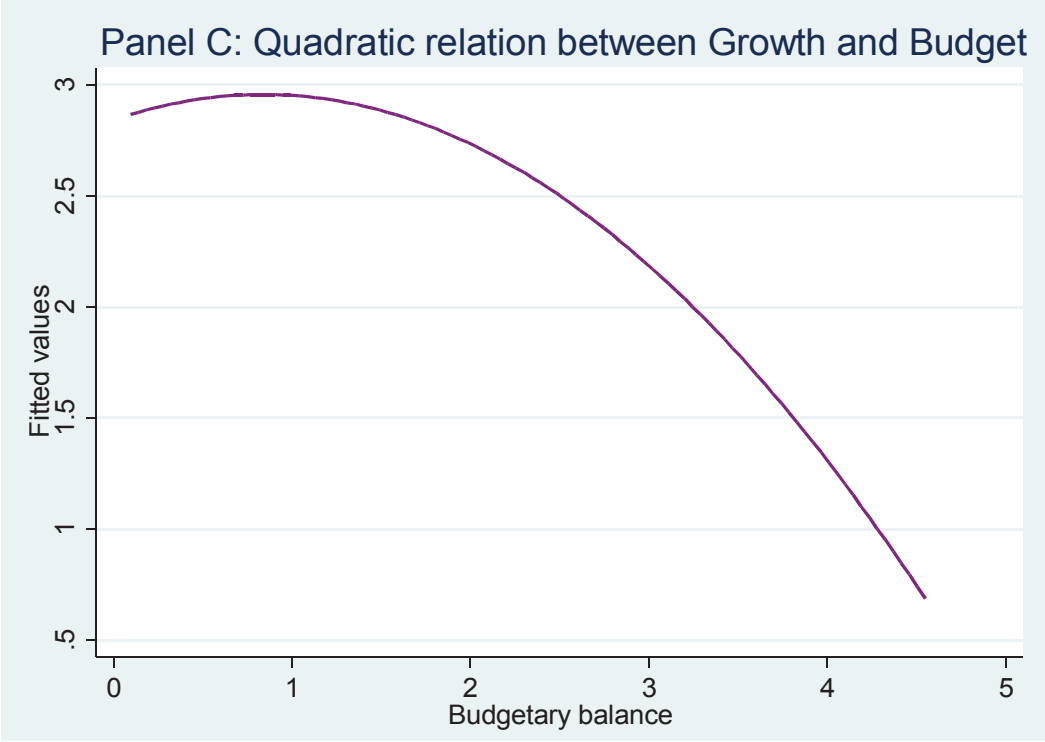


Figure 10: Quadratic relation between Growth and Public finance variables

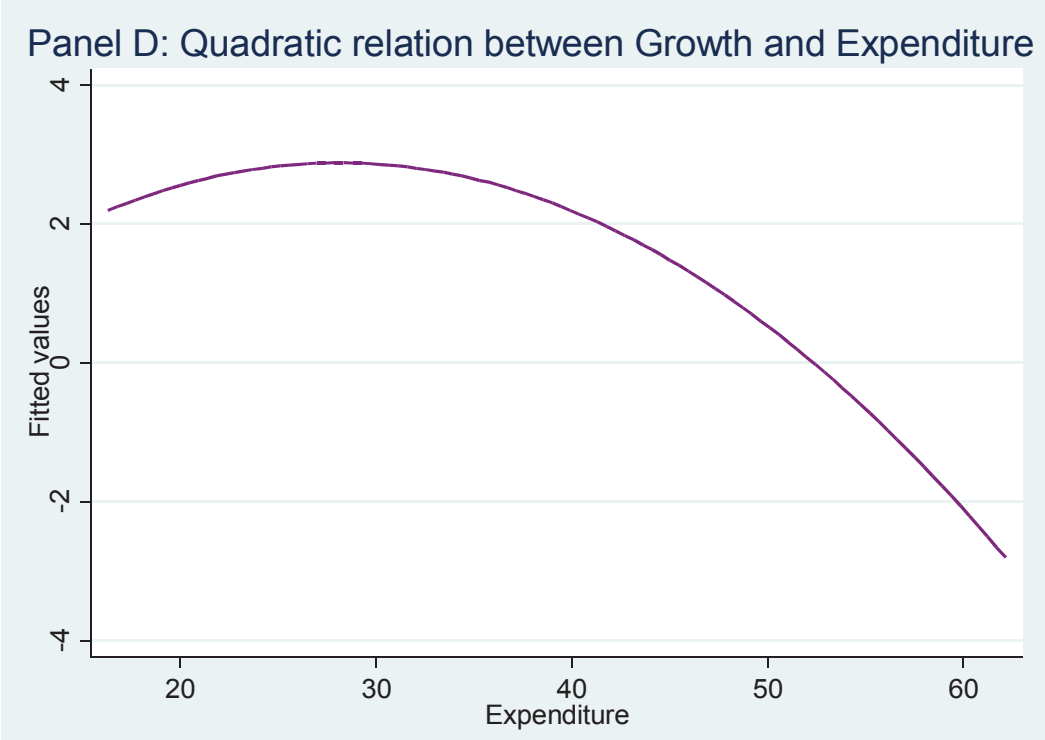


Figure 10: Quadratic relation between Growth and Public finance variables

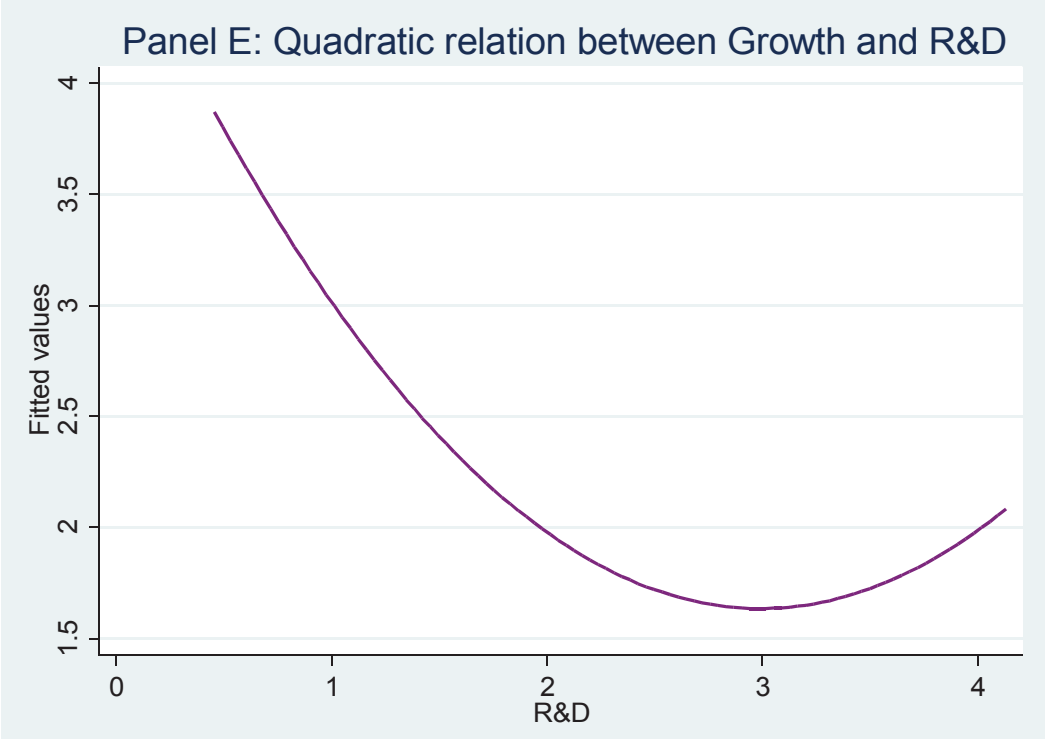
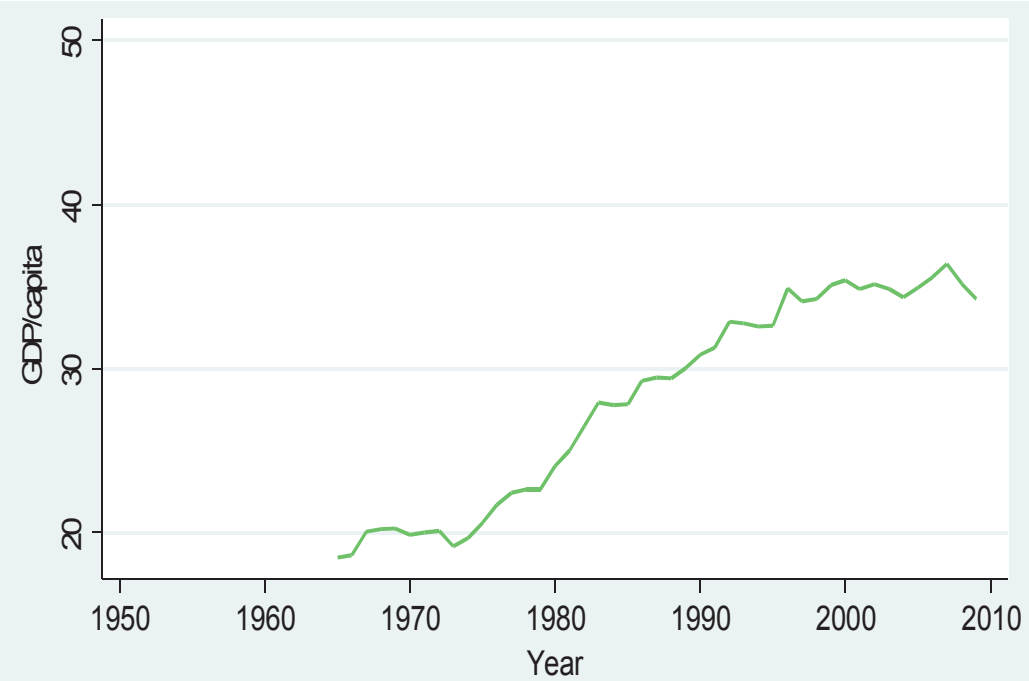


Figure 11: Average GDP per Capita



Tables

Table 1: Summary Statistics

	Growth	Debt	Tax Revenue	Expen-diture	R&D	Political Index	Political Competition	Reason for Termination	Type of Governm.	Frequency	Governm. Share
Southern	3.878	44.304	28.272	38.490	0.962	2.893	0.258	1.037	2.062	0.557	0.390
	[3.244]	[34.041]	[7.396]	[6.451]	[0.292]	[0.877]	[0.172]	[1.684]	[1.436]	[0.871]	[0.355]
N	240	244	184	60	53	193	244	244	244	244	244
Middle-Western	3.362	48.954	37.959	39.736	1.997	3.043	0.256	1.104	2.419	0.505	0.309
	[2.685]	[29.539]	[4.926]	[6.339]	[0.424]	[0.840]	[0.097]	[1.734]	[0.890]	[0.653]	[0.166]
N	360	365	276	90	90	366	366	366	366	366	366
Scandinavia	2.873	33.199	43.396	36.503	3.114	3.396	0.178	1.157	3.716	0.579	0.287
	[2.707]	[21.514]	[5.784]	[3.227]	[0.602]	[0.812]	[0.081]	[1.699]	[0.959]	[0.706]	[0.124]
N	180	183	138	45	40	183	183	183	183	183	183
Non-EU	2.806	36.793	33.390	31.623	1.833	3.058	0.182	0.525	2.370	0.596	0.539
	[2.253]	[32.699]	[7.028]	[8.545]	[0.352]	[0.782]	[0.092]	[0.953]	[1.257]	[0.525]	[0.329]
N	180	183	138	39	31	183	183	183	183	183	183
Total	3.295	42.563	35.700	37.443	1.926	3.085	0.228	0.989	2.564	0.549	0.368
	[2.783]	[30.658]	[8.123]	[6.922]	[0.824]	[0.847]	[0.123]	[1.610]	[1.267]	[0.703]	[0.270]
N	960	973	736	234	214	925	976	976	976	976	976

Table 2: Investigating different Debt Thresholds

	(1) Growth Overall	(2) Growth if Debt<30	(3) Growth if Debt<30 & >60	(4) Growth if Debt<60 & >90	(5) Growth if Debt>90
Debt	-0.020	-0.053	-0.020	0.029	-0.025
	[0.003]***	[0.019]***	[0.017]	[0.025]	[0.020]
_cons	4.134	4.832	3.832	0.690	4.957
	[0.159]***	[0.376]***	[0.787]***	[1.798]	[2.152]*
Adjusted R2	0.0452	0.0138	0.0006	0.0027	0.0151
N	958	432	291	143	92

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; Reported for nominal growth rates only

Table 3: Distribution of Debt Shares across Regions

	(1) Growth Southern	(2) Growth Middle-Western	(3) Growth Scandinavian	(4) Growth Non-EU
Debt	-0.041	-0.018	-0.022	-0.001
	[0.005]***	[0.004]***	[0.008]***	[0.005]
_cons	5.711	4.244	3.601	2.841
	[0.338]***	[0.268]***	[0.365]***	[0.267]***
Adjusted R2	0.1847	0.0368	0.0254	-0.0055
N	240	360	180	178

* $p<0.05$; ** $p<0.02$; *** $p<0.01$

Table 4A: Investigating Strategic Debt Hypothesis

	(1) Debt Overall	(2) Debt Southern	(3) Debt Middle-Western	(4) Debt Scandinavian	(5) Debt Non-EU	(6) Debt Non-EU & Scan	(7) Debt Year<=1991	(8) Debt Year>=1991	(9) Debt Year>1991 & <=2001	(10) Debt Year>2001
CPG_01	-2.920	8.667	-4.249	-4.050	-6.706	-5.556	-4.984	0.745	7.340	-6.354
	[1.229]**	[2.876]***	[1.806]**	[1.887]*	[3.499]	[1.994]***	[1.402]***	[1.968]	[2.870]**	[2.661]**
_cons	52.754	25.332	61.897	46.951	57.304	52.921	52.383	54.605	35.123	73.325
	[4.021]***	[8.891]***	[5.682]***	[6.453]***	[11.637]***	[6.943]***	[4.731]***	[6.386]***	[9.577]***	[8.563]***
Adjusted R2	0.0053	0.0406	0.0119	0.0180	0.0206	0.0242	0.0191	-0.0027	0.0294	0.0285
N	922	193	365	183	181	364	618	320	160	144

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; column (6) sample of Non-EU and Scandinavian countries; column (7) before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between Maastricht and Euro currency; column (10) after introduction of the Euro

Table 4B: Conservatism and Economic Growth

	(1) Growth Overall	(2) Growth Southern	(3) Growth Middle-Western	(4) Growth Scandinavian	(5) Growth Non-EU	(6) Growth Non-EU & Scan	(7) Growth Year<=1991	(8) Growth Year>=1991	(9) Growth Year>1991 & <=2001	(10) Growth Year>2001
CPG_01	-0.143	-0.803	-0.262	0.905	0.047	0.479	-0.281	0.218	0.136	-0.052
	[0.104]	[0.238]***	[0.147]	[0.258]***	[0.206]	[0.161]***	[0.120]*	[0.161]	[0.208]	[0.265]
_cons	3.585	5.621	4.160	-0.199	2.663	1.296	4.496	1.437	2.354	1.589
	[0.349]***	[0.782]***	[0.469]***	[0.959]	[0.665]***	[0.563]*	[0.398]***	[0.554]***	[0.780]***	[0.827]
Adjusted R2	0.0010	0.0497	0.0041	0.0688	-0.0054	0.0220	0.0069	0.0018	-0.0043	-0.0068
N	911	191	360	180	180	360	607	320	160	144

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; column (6) sample of Non-EU and Scandinavian countries; column (7) before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between Maastricht and Euro currency; column (10) after introduction of the Euro

Table 5A: Relation between Debt Share and Political Competition

	(1) Debt Overall	(2) Debt Southern	(3) Debt Middle-Western	(4) Debt Scandinavian	(5) Debt Non-EU	(6) Debt Non-EU & Scan	(7) Debt Year<=1991	(8) Debt Year>=1991	(9) Debt Year>1991 & <=2001	(10) Debt Year>2001
Comp	22.727	3.041	-17.865	39.031	73.513	59.049	31.315	10.359	-40.017	44.243
	[7.119]***	[10.803]	[15.002]	[21.736]	[14.539]***	[12.305]***	[6.866]***	[17.780]	[29.426]	[22.940]
_cons	37.374	43.519	53.533	26.257	23.391	24.353	28.569	54.675	68.206	45.344
	[1.895]***	[3.768]***	[4.246]***	[4.119]***	[2.802]***	[2.341]***	[1.820]***	[4.431]***	[7.397]***	[5.716]***
Adjusted R2	0.0073	-0.0039	0.0007	0.0161	0.0382	0.0317	0.0191	-0.0020	0.0063	0.0214
N	973	244	365	183	181	364	669	320	160	144

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; column (6) sample of Non-EU and Scandinavian countries; column (7) before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between Maastricht and Euro currency; column (10) after introduction of the Euro

Table 5B: Competition and Economic Growth

	(1) Growth Overall	(2) Growth Southern	(3) Growth Middle-Western	(4) Growth Scandinavian	(5) Growth Non-EU	(6) Growth Non-EU & Scan	(7) Growth Year<=1991	(8) Growth Year>=1991	(9) Growth Year>1991 & <=2001	(10) Growth Year>2001
Comp	1.401	-1.502	2.688	3.084	3.341	3.220	0.645	2.757	5.162	0.632
	[0.937]	[1.587]	[1.350]*	[2.108]	[1.428]*	[1.218]***	[1.028]	[1.599]	[2.320]*	[2.121]
_cons	2.975	4.268	2.671	2.325	2.202	2.262	3.671	1.518	1.676	1.303
	[0.234]***	[0.458]***	[0.361]***	[0.448]***	[0.327]***	[0.269]***	[0.265]***	[0.361]***	[0.482]***	[0.509]**
Adjusted R2	0.0028	0.0021	0.0066	0.0030	0.0130	0.0098	-0.0005	0.0074	0.0284	-0.0064
N	960	240	360	180	180	360	656	320	160	144

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; column (6) sample of Non-EU and Scandinavian countries; column (7) before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between Maastricht and Euro currency; column (10) after introduction of the Euro

Table 6A: Relation between Debt and Public Finances

	(1) Expenditure	(2) R&D	(3) Taxrevenue
Debt	0.163	-0.009	0.098
	[0.011]***	[0.002]***	[0.009]***
_cons	28.089	2.461	31.408
	[0.820]***	[0.128]***	[0.528]***
Adjusted R2	0.4365	0.0888	0.1258
N	234	214	734

* $p<0.05$; ** $p<0.02$; *** $p<0.01$

Table 6B: Relation between Debt and Public Finances (lagged values)

	(1) Debt	(1) Debt	(1) Debt
L.taxrevenue	1.284 [0.096]***		
L.rd		-10.355 [1.987]***	
L.expenditure			2.896 [0.218]***
_cons	-1.508 [3.453]	75.888 [5.045]***	-50.658 [7.775]***
Adjusted R2	0.1248	0.0982	0.4803
N	718	200	219

* $p<0.05$; ** $p<0.02$; *** $p<0.01$

Table 7A: Preferences as Determinant of Growth

	(1) Growth	(2) Growth	(3) Growth
CPG_01	-0.143 [0.104]		0.172 [0.196]
rd_share		-12.632 [6.665]	-12.715 [6.648]
_cons	3.585 [0.349]***	2.938 [0.379]***	2.412 [0.688]***
Adjusted R2	0.0010	0.0127	0.0111
N	911	215	215

* $p<0.05$; ** $p<0.02$; *** $p<0.01$

Table 7B: Influence of Public Finances on R&D as Share of Expenditure

	(1) R&D Share	(2) R&D Share	(3) R&D	(4) R&D Share
expenditure	-0.002 [0.000]***			
Debt		-0.000 [0.000]***		
taxrevenue			0.079 [0.008]***	0.001 [0.000]***
_cons	0.124 [0.015]***	0.078 [0.005]***	-1.193 [0.320]***	-0.002 [0.016]
Adjusted R2	0.1678	0.1855	0.3429	0.0925
N	215	215	214	215

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; column (3) has R&D as Share of GDP as dependent variable

Table 7C: Preferences by Conservatism I

	(1) Taxrevenue	(2) Debt	(3) Expenditure	(4) R&D
CPG_01	1.339 [0.321]***	-2.920 [1.229]**	-0.703 [0.418]	0.016 [0.071]
_cons	32.099 [1.091]***	52.754 [4.021]***	39.613 [1.389]***	1.877 [0.228]***
Adjusted R2	0.0214	0.0053	0.0027	-0.0045
N	715	922	234	214

* $p<0.05$; ** $p<0.02$; *** $p<0.01$

Table 8: Impact of Competition I

	(1) Taxrevenue	(2) Debt	(3) Expenditure	(4) R&D	(5) Growth	(6) Growth
Comp	-6.474	22.727	14.515	-3.007	1.401	0.050
	[3.524]	[7.119]***	[6.330]*	[0.506]***	[0.937]	[1.891]
Debt						-0.002
						[0.008]
expenditure						-0.096
						[0.040]**
rd						-0.815
						[0.336]**
taxrevenue						0.029
						[0.042]
CPG_01						0.088
						[0.193]
_cons	37.166	37.374	34.246	2.612	2.975	6.186
	[0.917]***	[1.895]***	[1.555]***	[0.132]***	[0.234]***	[1.586]***
Adjusted R2	0.0069	0.0073	0.0368	0.1091	0.0028	0.0571
N	736	973	234	214	960	212

* $p<0.05$; ** $p<0.02$; *** $p<0.01$

Table 9: Including other political variables

	(1) Debt	(2) Debt	(3) Growth	(4) Growth
RfT	0.634 [0.836]	0.659 [0.831]	0.025 [0.081]	-0.035 [0.075]
ToG	-2.167 [0.761]***	-2.497 [0.815]***	-0.006 [0.080]	0.128 [0.080]
Freq	-4.732 [1.717]***	-5.181 [1.775]***	0.086 [0.208]	0.276 [0.191]
Gov_share	-36.923 [2.357]***	-44.619 [3.786]***	1.184 [0.401]***	-0.140 [0.494]
CPG_01		-4.716 [1.223]***		-0.195 [0.102]
Comp		-37.158 [9.067]***		4.817 [1.123]***
Debt				-0.016 [0.003]***
_cons	63.626 [2.793]***	90.978 [6.195]***	2.805 [0.256]***	2.883 [0.676]***
Adjusted R2	0.1142	0.1182	0.0093	0.0787
N	973	922	960	909

* $p<0.05$; ** $p<0.02$; *** $p<0.01$

Table 10A: Preferences by Conservatism II

	(1) Taxrevenue	(2) Debt	(3) Expenditure	(4) R&D	(5) Growth
CPG_01	0.133	0.825	-0.104	0.014	-0.104
	[0.205]	[1.496]	[0.603]	[0.039]	[0.168]
_cons	30.797	45.955	33.718	1.292	2.421
	[0.795]***	[5.241]***	[2.076]***	[0.135]***	[0.668]***
Adjusted R2	0.8836	0.5285	0.8146	0.9506	0.4618
N	715	922	234	214	911

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; Coefficients for Year, Country and Region dummies not shown

Table 10B: Impact of Competition II

	(1) Taxrevenue	(2) Debt	(3) Expenditure	(4) R&D	(5) Growth
Comp	2.603	-27.326	0.845	-0.462	0.223
	[3.140]	[20.286]	[6.334]	[0.455]	[1.705]
_cons	28.961	56.166	33.205	1.459	2.707
	[0.966]***	[8.347]***	[2.808]***	[0.168]***	[0.853]***
Adjusted R2	0.8927	0.5511	0.8145	0.9513	0.4589
N	736	973	234	214	960

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; Coefficients for Year, Country and Region dummies not shown

Table 11A: Regressions with Fixed Effects

	(1) Debt	(2) Debt	(3) Growth	(4) Growth	(5) Debt	(6) Growth	(7) Growth
L.Debt	0.964	0.964	0.095	0.093			
	[0.012]***	[0.011]***	[0.042]*	[0.041]*			
L.Growth	-0.409	-0.385	0.269	0.260			
	[0.131]***	[0.118]***	[0.078]***	[0.074]***			
CPG_01	-0.292	-0.152	0.447	0.416	14.513	0.173	0.591
	[0.399]	[0.414]	[0.167]**	[0.189]*	[3.878]***	[0.543]	[0.240]*
Comp	-7.219	-4.926	6.944	6.516	22.802	-6.267	9.765
	[4.200]	[4.313]	[1.964]***	[2.018]***	[46.164]	[7.359]	[2.830]***
CPG_comp	1.831	1.430	-2.163	-1.985	-26.095	1.226	-2.723
	[1.382]	[1.488]	[0.614]***	[0.723]**	[11.764]*	[2.371]	[0.968]**
RfT		0.107		-0.045	0.437	0.051	-0.071
		[0.086]		[0.051]	[0.351]	[0.063]	[0.053]
ToG		-0.448		0.145	-0.802	0.528	0.304
		[0.230]		[0.062]*	[2.196]	[0.148]***	[0.150]
Freq		0.192		0.135	-0.529	-0.028	0.150
		[0.310]		[0.107]	[0.766]	[0.189]	[0.128]
Gov_share		2.380		0.261	10.522	2.496	0.305
		[0.970]*		[0.523]	[7.668]	[1.028]*	[0.862]
Debt				-0.102			
				[0.041]*			
L.GDP_cap					-0.005	-0.001	-0.000
					[0.002]***	[0.000]***	[0.000]*
expenditure					1.247	-0.219	
					[0.436]**	[0.033]***	
_cons	5.538	4.712	2.752	2.449	81.149	20.953	2.188
	[2.353]*	[2.080]*	[1.113]*	[1.029]*	[24.160]***	[4.461]***	[1.680]
Adjusted R2	0.9881	0.9883	0.5503	0.5515	0.9451	0.8129	0.4890
N	894	894	894	894	234	234	911

* $p<0.05$; ** $p<0.02$; *** $p<0.01$; Coefficients for Year, Country, Region and Maastricht dummies not shown

Table 11B: Correlation of Endogenous Variables related to Growth

	L. GDP/capita	GDP/capita	F. GDP/capita	Growth	Debt	L. Expenditure	Expenditure	F. Expenditure
GDP/capita								
L.1	1.0000							
. . .	0.9897	1.0000						
F.1	0.9712	0.9892	1.0000					
Growth	-0.2693	-0.1343	-0.0784	1.0000				
Debt	-0.4860	-0.5050	-0.5112	-0.0782	1.0000			
Expenditure								
L.1	-0.2618	-0.2637	-0.2588	0.0021	0.6890	1.0000		
. . .	-0.1946	-0.2249	-0.2345	-0.1919	0.6712	0.9527	1.0000	
F.1	-0.1131	-0.1570	-0.1937	-0.2827	0.6003	0.8680	0.9450	1.0000

L. refers to lagged values, *F.* refers to forwarded values

Statistical Tests

Breusch and Pagan Lagrangian multiplier test for random effects

Growth[Num,t] = Xb + u[Num] + e[Num,t]

Estimated results:

	Var	sd = sqrt(Var)
Growth	7.180264	2.679601
e	5.264478	2.294445
u	.2091678	.4573486

Test: Var(u) = 0

chibar2(01) = 18.92
Prob > chibar2 = 0.0000

Hausman test fixed against random effects

Test: Ho: difference in coefficients not systematic

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.69
Prob>chi2 = 0.9999
(V_b-V_B is not positive definite)

Testing time fixed effects after running random-effects GLS regression

testparm i.Year

(1) 1952.Year = 0
(2) 1953.Year = 0
.
.
.
(58) 2009.Year = 0
(59) 2010.Year = 0

chi2(59) = 516.21
Prob > chi2 = 0.0000

Pesaran's test of cross sectional independence

= 24.589, *Pr* = 0.0000

Average absolute value of the off-diagonal elements

= 0.317

Do-file

```
// The data set and the do-file are uploaded in my Dropbox, and are available on request
// NB! the command run quietly will give error notifications that some variables do not exist
// this has to do with collapsing the observations on mean values when creating most of the figures;
// it works if those parts are replicated by using Execute (do) //

use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear

*********
* Means *
*********
* All countries
sum Growth Debt expenditure taxrevenue rd CPG_01 Comp RfT ToG Freq Gov_share
*Regions separately
sort region
by region: sum Growth Debt expenditure taxrevenue rd CPG_01 Comp RfT ToG Freq Gov_share

***********************************************
* 2.1.1 Investigating different debt thresholds *
***********************************************
*Figure 1A: Means by Debt Ranges as Reinhart and Rogoff
*Figure 1B ///
    graph twoway (lfit Growth Debt) (scatter Growth Debt)
reg Growth Debt, robust
    outreg, ctitle("","(1)"\"","Growth"\"","  Overall  ")note(Reported for nominal growth rates only)/*
        */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4)replace
reg Growth Debt if Debt <= 30, robust
    outreg, ctitle("","(2)"\"","Growth"\"","  if Debt<30 ")/*
        */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge
reg Growth Debt if Debt >30 & Debt <= 60, robust
    outreg, ctitle("","(3)"\"","Growth"\"","if Debt<30 & >60")/*
        */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge
reg Growth Debt if Debt > 60 & Debt <= 90, robust
    outreg, ctitle("","(4)"\"","Growth"\"","if Debt<60 & >90")/*
        */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge
reg Growth Debt if Debt > 90, robust
    outreg using data_Europe1, title(Table 2: Investigating different Debt Thresholds) ctitle("","(5)"\"","Growth"\"","  if Debt>90 ")/*
        */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge

*************************************************************************
* 2.1.2.1 Examining the distribution of debt shares across regions and time*
*************************************************************************
*gen so = 0
*gen ne = 0
*gen mw = 0
*gen sc = 0
*"so is Southern, ne Non-EU, mw Middle-Western, sc Scandinavia"
*replace so = 1 if Num == 9
*replace so = 1 if Num == 11
*replace so = 1 if Num == 15
*replace so = 1 if Num == 16
*replace mw = 1 if Num == 2
*replace mw = 1 if Num == 3
*replace mw = 1 if Num == 7
*replace mw = 1 if Num == 8
*replace mw = 1 if Num == 10
*replace mw = 1 if Num == 13
*replace sc = 1 if Num == 5
*replace sc = 1 if Num == 6
*replace sc = 1 if Num == 17
*replace ne = 1 if Num == 14
*replace ne = 1 if Num == 18
*replace ne = 1 if Num == 19
*gen region=0
*replace region=1 if so==1
*replace region=2 if mw==1
*replace region=3 if sc==1
```

```
67  *replace region=4 if ne==1
68
69  *Figure 2 panel A to D///
70      graph twoway (lfit Growth Debt) (scatter Growth Debt) if region == 1
71      graph twoway (lfit Growth Debt) (scatter Growth Debt) if region == 2
72      graph twoway (lfit Growth Debt) (scatter Growth Debt) if region == 3
73      graph twoway (lfit Growth Debt) (scatter Growth Debt) if region == 4
74
75  reg Growth Debt if region== 1, robust
76      outreg, ctitle("","(1)"\"","Growth"\"","  Southern  ")/*
77          */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
    "N") summdec(4) replace
78  reg Growth Debt if region == 2, robust
79      outreg, ctitle("","(2)"\"","Growth"\"","Middle-Western")/*
80          */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
    "N") summdec(4) merge
81  reg Growth Debt if region == 3, robust
82      outreg, ctitle("","(3)"\"","Growth"\"","  Scandinavian")/*
83          */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
    "N") summdec(4) merge
84  reg Growth Debt if region == 4, robust
85      outreg using data_Europe1, addtable pretext(""\"") title(Table 3: Distribution of Debt
     Shares across Regions)ctitle("","(4)"\"","Growth"\"","   Non-EU   ")/*
86          */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
    "N") summdec(4) merge
87
88
89  * How good is the linear specification? *
90  *Figure 3: Quadratic fit ///
91      graph twoway (qfit Growth Debt if region==1)(qfit Growth Debt if region==2) (qfit
    Growth Debt if region==3) (qfit Growth Debt if region==4)
92      graph twoway (qfit Growth Debt if Num==2)(qfit Growth Debt if Num==3) (qfit Growth
    Debt if Num==5) (qfit Growth Debt if Num==6)/*
93      */(qfit Growth Debt if Num==7)(qfit Growth Debt if Num==8)(qfit Growth Debt if Num==9
    )(qfit Growth Debt if Num==10)/*
94      */(qfit Growth Debt if Num==11)(qfit Growth Debt if Num==13)(qfit Growth Debt if Num==
    14)(qfit Growth Debt if Num==15)/*
95      */(qfit Growth Debt if Num==16)(qfit Growth Debt if Num==17)(qfit Growth Debt if Num==
    18)(qfit Growth Debt if Num==19)
96  *graph twoway (qfit Growth Debt if Num==9)
97
98
99  * Examining the distribution of debt shares across time *
100 *Figure 4A ///
101 use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
102 gen year=.
103 local k=1950
104 local i=1951
105 local j=1
106 while `i' <= 2010 {
107 replace year=`j' if (Year<=`i'&Year>=`k')
108 local i = `i' + 1
109 local k = `k' + 1
110 local j = `j' + 1
111 }
112 sort Country year Year
113 egen dec=min(Year), by(Country year)
114 collapse (mean) Debt, by(region dec)
115 reshape wide Debt, i (dec) j(region)
116 rename Debt1 so
117 rename Debt2 mw
118 rename Debt3 sc
119 rename Debt4 ne
120 label variable dec ""
121 label variable so "Southern"
122 label variable ne "Non-EU"
123 label variable mw "Middle-Western"
124 label variable sc "Scandinavia"
125 # delimit ;
126 scatter so mw sc ne dec, title("Figure 4A: Average Debt share of GDP by regions", margin(
    medsmall) size(large))
127 ytitle("Debt share", margin(small) size(medsmall))
128 xtitle("Year", margin(small) size(medsmall))
129 xlabel(1950 "1950" 1960 "1960" 1970 "1970"
130 1980 "1980" 1990 "1990" 2000 "2000" 2010 "2010")
```

```
131   msymbol(none none none none) msize(medium medium medium medium) mcolor(dark_blue green
      maroon dark_orange)
132   connect(l l l l);
133
134   *Figure 4B: until Maastricht (so,sc,mw vs. ne) ///
135   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
136   gen year=.
137   local k=1950
138   local i=1951
139   local j=1
140   while `i' <= 1992 {
141   replace year=`j' if (Year<=`i'&Year>=`k')
142   local i = `i' + 1
143   local k = `k' + 1
144   local j = `j' + 1
145   }
146   sort Country year Year
147   egen dec=min(Year), by(Country year)
148   collapse (mean) Debt, by(region dec)
149   reshape wide Debt, i (dec) j(region)
150   rename Debt1 so_mw_sc
151   rename Debt2 ne
152   label variable dec ""
153   label variable so_mw_sc "Southern, Middle-Western, Scandinavia"
154   label variable ne "Non-EU"
155   # delimit ;
156   scatter so_mw_sc ne dec, title("Figure 4B: Average Debt shares before Maastricht Treaty",
      margin(medsmall) size(large))
157   ytitle("Debt share", margin(small) size(medsmall))
158   xtitle("Year", margin(small) size(medsmall))
159   xlabel(1950 "1950" 1960 "1960" 1970 "1970" 1980 "1980" 1990 "1990")
160   msymbol(none none none none) msize(medium medium medium medium) mcolor(dark_blue
      dark_orange)
161   connect(l l l l);
162
163   *Figure 4C: after Maastricht (so,sc,mw vs. ne) ///
164   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
165   drop if Year <= 1990
166   gen year=.
167   local k=1991
168   local i=1992
169   local j=1
170   while `i' <= 2010 {
171   replace year=`j' if (Year<=`i'&Year>=`k')
172   local i = `i' + 1
173   local k = `k' + 1
174   local j = `j' + 1
175   }
176   sort Country year Year
177   egen dec=min(Year), by(Country year)
178   collapse (mean) Debt, by(region dec)
179   reshape wide Debt, i (dec) j(region)
180   rename Debt1 so_mw_sc
181   rename Debt2 ne
182   label variable dec ""
183   label variable so_mw_sc "Southern, Middle-Western, Scandinavia"
184   label variable ne "Non-EU"
185   # delimit ;
186   scatter so_mw_sc ne dec, title("Figure 4C: Average Debt shares after Maastricht Treaty",
      margin(medsmall) size(large))
187   ytitle("Debt share", margin(small) size(medsmall))
188   xtitle("Year", margin(small) size(medsmall))
189   xlabel(1990 "1990" 1995 "1995" 2000 "2000" 2010 "2010") msymbol(none none none none) msize
      (medium medium medium medium) mcolor(dark_blue dark_orange)
190   connect(l l l l);
191
192   ********************************************************************************
193   * 2.1.2.2 Examining the distribution of growth rates across regions and time *
194   ********************************************************************************
195   *Figure 5A ///
196   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
197   gen year=.
198   local k=1950
199   local i=1951
200   local j=1
```

```
  while `i' <= 2010 {
  replace year=`j' if (Year<=`i'&Year>=`k')
  local i = `i' + 1
  local k = `k' + 1
  local j = `j' + 1
  }
  sort Country year Year
  egen dec=min(Year), by(Country year)
  collapse (mean) Growth, by(region dec)
  reshape wide Growth, i (dec) j(region)
  rename Growth1 so
  rename Growth2 mw
  rename Growth3 sc
  rename Growth4 ne
  label variable dec ""
  label variable so "Southern"
  label variable ne "Non-EU"
  label variable mw "Middle-Western"
  label variable sc "Scandinavia"
  # delimit ;
  scatter so mw sc ne dec, title("Figure 5A: Average Growth rate by regions", margin(
      medsmall) size(large))
  ytitle("Growth rate", margin(small) size(medsmall))
  xtitle("Year", margin(small) size(medsmall))
  xlabel(1950 "1950" 1960 "1960" 1970 "1970"
  1980 "1980" 1990 "1990" 2000 "2000" 2010 "2010")
  msize(medium medium medium medium) msymbol(none none none none) mcolor(dark_blue green
      maroon dark_orange)
  connect(l l l l);

  *Figure 5B: until Maastricht (so,sc,mw vs. ne) ///
  use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
  gen year=.
  local k=1950
  local i=1951
  local j=1
  while `i' <= 1992 {
  replace year=`j' if (Year<=`i'&Year>=`k')
  local i = `i' + 1
  local k = `k' + 1
  local j = `j' + 1
  }
  sort Country year Year
  egen dec=min(Year), by(Country year)
  collapse (mean) Growth, by(region dec)
  reshape wide Growth, i (dec) j(region)
  rename Growth1 so_mw_sc
  rename Growth2 ne
  label variable dec ""
  label variable so_mw_sc "Southern, Middle-Western, Scandinavia"
  label variable ne "Non-EU"
  # delimit ;
  scatter so_mw_sc ne dec, title("Figure 5B: Average Growth before Maastricht Treaty",
      margin(medsmall) size(large))
  ytitle("Growth", margin(small) size(medsmall))
  xtitle("Year", margin(small) size(medsmall))
  xlabel(1950 "1950" 1960 "1960" 1970 "1970"
  1980 "1980" 1990 "1990")
  msize(medium medium medium medium) msymbol(none none none none) mcolor(dark_blue
      dark_orange)
  connect(l l l l);

  *Figure 5C: after Maastricht (so,sc,mw vs. ne) ///
  use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
  drop if Year <= 1990
  gen year=.
  local k=1991
  local i=1992
  local j=1
  while `i' <= 2010 {
  replace year=`j' if (Year<=`i'&Year>=`k')
  local i = `i' + 1
  local k = `k' + 1
  local j = `j' + 1
  }
```

```
sort Country year Year
egen dec=min(Year), by(Country year)
collapse (mean) Growth, by(region dec)
reshape wide Growth, i (dec) j(region)
rename Growth1 so_mw_sc
rename Growth2 ne
label variable dec ""
label variable so_mw_sc "Southern, Middle-Western, Scandinavia"
label variable ne "Non-EU"
# delimit ;
scatter so_mw_sc ne dec, title("Figure 5C: Average Growth after Maastricht Treaty", margin
(medsmall) size(large))
ytitle("Growth", margin(small) size(medsmall))
xtitle("Year", margin(small) size(medsmall))
xlabel(1990 "1990" 1995 "1995" 2000 "2000" 2005 "2005" 2010 "2010")
msize(medium medium medium medium) msymbol(none none none none) mcolor(dark_blue
dark_orange)
connect(l l l l);

*summary table, average growth rates _ DO NOT INCLUDE*
su Growth if Year <= 1970
su Growth if Year > 1970 & Year <= 2008

***********************************************
* 3.1.1 Investigating strategic debt hypothesis *
***********************************************
*Figure 6 ///
use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
gen year=.
local k=1950
local i=1951
local j=1
while `i' <= 2010 {
replace year=`j' if (Year<=`i'&Year>=`k')
local i = `i' + 1
local k = `k' + 1
local j = `j' + 1
}
sort Country year Year
egen dec=min(Year), by(Country year)
collapse (mean) CPG_01, by(region dec)
reshape wide CPG_01, i (dec) j(region)
rename CPG_011 so
rename CPG_012 mw
rename CPG_013 sc
rename CPG_014 ne
label variable dec ""
label variable so "Southern"
label variable ne "Non-EU"
label variable mw "Middle-Western"
label variable sc "Scandinavia"
# delimit ;
scatter so mw sc ne dec, title("Figure 6: Average Conservatism by regions", margin(
medsmall) size(large))
ytitle("CPG", margin(small) size(medsmall))
xtitle("Year", margin(small) size(medsmall))
xlabel(1950 "1950" 1960 "1960" 1970 "1970"
1980 "1980" 1990 "1990" 2000 "2000" 2010 "2010")
msize(medium medium medium medium) msymbol(none none none none) mcolor(dark_blue green
maroon dark_orange)
connect(l l l l);

use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
reg Debt CPG_01, robust
    outreg, ctitle("","(1)"\"","Debt"\"","Overall")/*
        */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
"N") summdec(4) replace
reg Debt CPG_01  if region==1, robust
    outreg, ctitle("","(2)"\"","Debt"\"","  Southern ")/*
        */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
"N") summdec(4) merge
reg Debt CPG_01 if region==2, robust
    outreg, ctitle("","(3)"\"","Debt"\"","Middle-Western")/*
        */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
"N") summdec(4) merge
```

```
340   reg Debt CPG_01 if region==3, robust
341       outreg, ctitle("","(4)"\"","Debt"\"","Scandinavian")/*
342           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
343   reg Debt CPG_01 if region==4, robust
344       outreg, ctitle("","(5)"\"","Debt"\"","  Non-EU  ")/*
345           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
346   reg Debt CPG_01 if region>=3, robust
347       outreg, ctitle("","(6)"\"","Debt"\"","Non-EU & Scan")/*
348           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
349   reg Debt CPG_01 if Year<=1991, robust
350       outreg, ctitle("","(7)"\"","Debt"\"","  Year<=1991 ")/*
351           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
352   reg Debt CPG_01 if Year>=1991, robust
353       outreg, ctitle("","(8)"\"","Debt"\"","  Year>=1991 ")/*
354           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
355   reg Debt CPG_01 if Year>1991 & Year<=2001, robust
356       outreg, ctitle("","(9)"\"","Debt"\"","Year>1991 & <=2001")/*
357           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
358   reg Debt CPG_01 if Year>2001, robust
359       outreg using data_Europe1, addtable pretext("\pagebreak") title(Table 4A:
      Investigating Strategic Debt Hypothesis)/*
360           */ note("column (6) sample of Non-EU and Scandinavian countries; column (7)
      before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between
      Maastricht and Euro currency; column (10) after introduction of the Euro")/*
361           */ ctitle("","(10)"\"","Debt"\"","  Year>2001 ") se squarebrack starlevels(5 2 1)
      summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge
362
363   ************************************************************************
364   * 3.1.2 Examining correlation between conservatism and economic growth *
365   ************************************************************************
366   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
367   reg Growth CPG_01, robust
368       outreg, ctitle("","(1)"\"","Growth"\"","  Overall ")/*
369           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) replace
370   reg Growth CPG_01  if region==1, robust
371       outreg, ctitle("","(2)"\"","Growth"\"","  Southern ")/*
372           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
373   reg Growth CPG_01 if region==2, robust
374       outreg, ctitle("","(3)"\"","Growth"\"","Middle-Western")/*
375           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
376   reg Growth CPG_01 if region==3, robust
377       outreg, ctitle("","(4)"\"","Growth"\"","Scandinavian")/*
378           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
379   reg Growth CPG_01 if region==4, robust
380       outreg, ctitle("","(5)"\"","Growth"\"","  Non-EU  ")/*
381           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
382   reg Growth CPG_01 if region>=3, robust
383       outreg, ctitle("","(6)"\"","Growth"\"","Non-EU & Scan")/*
384           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
385   reg Growth CPG_01 if Year<=1991, robust
386       outreg, ctitle("","(7)"\"","Growth"\"","  Year<=1991")/*
387           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
388   reg Growth CPG_01 if Year>=1991, robust
389       outreg, ctitle("","(8)"\"","Growth"\"","  Year>=1991")/*
390           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
391   reg Growth CPG_01 if Year>1991 & Year<=2001, robust
392       outreg, ctitle("","(9)"\"","Growth"\"","Year>1991 & <=2001")/*
393           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
394   reg Growth CPG_01 if Year>2001, robust
395       outreg using data_Europe1, addtable pretext("","") title(Table 4B: Conservatism and
```

```
      Economic Growth)/*
 396          */ note("column (6) sample of Non-EU and Scandinavian countries; column (7)
      before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between
      Maastricht and Euro currency; column (10) after introduction of the Euro")/*
 397          */ ctitle("","(10)"\"","Growth"\"","Year>2001") se squarebrack starlevels(5 2 1)
      summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge
 398
 399
 400   ********************************************************************************
 401   * 3.2.1 Examining relationship between debt share and political competition *
 402   ********************************************************************************
 403   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
 404   *gen Comp = (abs(Seats_share - (1/Parties)))*(-1)
 405   *Figure 7 ///
 406   gen year=.
 407   local k=1950
 408   local i=1959
 409   local j=1
 410   while `i' <= 2010 {
 411   replace year=`j' if (Year<=`i'&Year>=`k')
 412   local i = `i' + 1
 413   local k = `k' + 1
 414   local j = `j' + 1
 415   }
 416   sort Country year Year
 417   egen dec=min(Year), by(Country year)
 418   collapse (mean) Comp, by(region dec)
 419   reshape wide Comp, i (dec) j(region)
 420   rename Comp1 so
 421   rename Comp2 mw
 422   rename Comp3 sc
 423   rename Comp4 ne
 424   label variable dec ""
 425   label variable so "Southern"
 426   label variable ne "Non-EU"
 427   label variable mw "Middle-Western"
 428   label variable sc "Scandinavia"
 429   # delimit ;
 430   scatter so mw sc ne dec, title("Figure 7: Average Political Competition by regions",
      margin(medsmall) size(large))
 431   ytitle("Comp", margin(small) size(medsmall))
 432   xtitle("Year", margin(small) size(medsmall))
 433   xlabel(1950 "1950" 1960 "1960" 1970 "1970"
 434   1980 "1980" 1990 "1990" 2000 "2000" 2010 "2010")
 435   msize(medium medium medium medium) msymbol(none none none none) mcolor(dark_blue green
      maroon dark_orange)
 436   connect(l l l l);
 437
 438   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
 439   reg Debt Comp, robust
 440       outreg, ctitle("","(1)"\"","Debt"\"","Overall")/*
 441           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) replace
 442   reg Debt Comp  if region==1, robust
 443       outreg, ctitle("","(2)"\"","Debt"\"","  Southern  ")/*
 444           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
 445   reg Debt Comp if region==2, robust
 446       outreg, ctitle("","(3)"\"","Debt"\"","Middle-Western")/*
 447           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
 448   reg Debt Comp if region==3, robust
 449       outreg, ctitle("","(4)"\"","Debt"\"","Scandinavian")/*
 450           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
 451   reg Debt Comp if region==4, robust
 452       outreg, ctitle("","(5)"\"","Debt"\"","  Non-EU  ")/*
 453           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
 454   reg Debt Comp if region>=3, robust
 455       outreg, ctitle("","(6)"\"","Debt"\"","Non-EU & Scan")/*
 456           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
 457   reg Debt Comp if Year<=1991, robust
 458       outreg, ctitle("","(7)"\"","Debt"\"","  Year<=1991  ")/*
```

```
459           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
460   reg Debt Comp if Year>=1991, robust
461       outreg, ctitle("","(8)"\"","Debt"\"","  Year>=1991 ")/*
462           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
463   reg Debt Comp if Year>1991 & Year<=2001, robust
464       outreg, ctitle("","(9)"\"","Debt"\"","Year>1991 & <=2001")/*
465           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
466   reg Debt Comp if Year>2001, robust
467       outreg using data_Europe1, addtable pretext("\pagebreak") title(Table 5A: Relation
      between Debt Share and Political Competition)/*
468           */ note("column (6) sample of Non-EU and Scandinavian countries; column (7)
      before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between
      Maastricht and Euro currency; column (10) after introduction of the Euro")/*
469           */ ctitle("","(10)"\"","Debt"\"","  Year>2001 ") se squarebrack starlevels(5 2 1)
      summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge
470
471   ***************************************************************************
472   * 3.2.2 Correlation between economic activity and political environment *
473   ***************************************************************************
474   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
475   reg Growth Comp, robust
476       outreg, ctitle("","(1)"\"","Growth"\"","  Overall ")/*
477           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) replace
478   reg Growth Comp  if region==1, robust
479       outreg, ctitle("","(2)"\"","Growth"\"","  Southern ")/*
480           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
481   reg Growth Comp if region==2, robust
482       outreg, ctitle("","(3)"\"","Growth"\"","Middle-Western")/*
483           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
484   reg Growth Comp if region==3, robust
485       outreg, ctitle("","(4)"\"","Growth"\"","Scandinavian")/*
486           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
487   reg Growth Comp if region==4, robust
488       outreg, ctitle("","(5)"\"","Growth"\"","   Non-EU   ")/*
489           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
490   reg Growth Comp if region>=3, robust
491       outreg, ctitle("","(6)"\"","Growth"\"","Non-EU & Scan")/*
492           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
493   reg Growth Comp if Year<=1991, robust
494       outreg, ctitle("","(7)"\"","Growth"\"","  Year<=1991")/*
495           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
496   reg Growth Comp if Year>=1991, robust
497       outreg, ctitle("","(8)"\"","Growth"\"","  Year>=1991")/*
498           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
499   reg Growth Comp if Year>1991 & Year<=2001, robust
500       outreg, ctitle("","(9)"\"","Growth"\"","Year>1991 & <=2001")/*
501           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
502   reg Growth Comp if Year>2001, robust
503       outreg using data_Europe1, addtable pretext("","") title(Table 5B: Competition and
      Economic Growth)/*
504           */ note("column (6) sample of Non-EU and Scandinavian countries; column (7)
      before Maastricht Treaty; column (8) after Maastricht Treaty; column (9) between
      Maastricht and Euro currency; column (10) after introduction of the Euro")/*
505           */ ctitle("","(10)"\"","Growth"\"","Year>2001") se squarebrack starlevels(5 2 1)
      summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4) merge
506
507   ************************************************
508   * 4.1 Evolution of debt, taxes and social spending *
509   ************************************************
510   *Figure 8: Expenditures*
511   drop if Year <1995
512   gen year=.
513   local k=1995
```

```
514   local i=1996
515   local j=1
516   while `i' <= 2010 {
517   replace year=`j' if (Year<=`i'&Year>=`k')
518   local i = `i' + 1
519   local k = `k' + 1
520   local j = `j' + 1
521   }
522   sort Country year Year
523   egen dec=min(Year), by(Country year)
524   collapse (mean) expenditure, by(region dec)
525   reshape wide expenditure, i (dec) j(region)
526   rename expenditure1 so_mw_sc_ne
527   label variable dec ""
528   label variable so_mw_sc_ne ""
529   # delimit ;
530   scatter so_mw_sc_ne dec, title("Panel A: Average Expenditure share of GDP", margin(
      medsmall) size(large))
531   ytitle("Expenditure share", margin(small) size(medsmall))
532   xtitle("Year", margin(small) size(medsmall))
533   xlabel(1995 "1995" 2000 "2000" 2005 "2005"
534   2010 "2010")
535   msize(medium) msymbol(none none none none) mcolor(mint)
536   connect(l);
537
538   *Figure 8: R&D*
539   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
540   drop if Year <1995
541   gen year=.
542   local k=1995
543   local i=1996
544   local j=1
545   while `i' <= 2010 {
546   replace year=`j' if (Year<=`i'&Year>=`k')
547   local i = `i' + 1
548   local k = `k' + 1
549   local j = `j' + 1
550   }
551   sort Country year Year
552   egen dec=min(Year), by(Country year)
553   collapse (mean) rd, by(region dec)
554   reshape wide rd, i (dec) j(region)
555   rename rd1 so_mw_sc_ne
556   label variable dec ""
557   label variable so_mw_sc_ne ""
558   # delimit ;
559   scatter so_mw_sc_ne dec, title("Panel B: Average R&D share of GDP", margin(medsmall) size(
      large))
560   ytitle("R&D share", margin(small) size(medsmall))
561   xtitle("Year", margin(small) size(medsmall))
562   xlabel(1995 "1995" 2000 "2000" 2005 "2005"
563   2010 "2010")
564   msize(medium) msymbol(none none none none)
565   connect(l);
566
567   *Figure 8: Taxes*
568   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
569   drop if Year<1965
570   gen year=.
571   local k=1965
572   local i=1966
573   local j=1
574   while `i' <= 2010 {
575   replace year=`j' if (Year<=`i'&Year>=`k')
576   local i = `i' + 1
577   local k = `k' + 1
578   local j = `j' + 1
579   }
580   sort Country year Year
581   egen dec=min(Year), by(Country year)
582   collapse (mean) taxrevenue, by(region dec)
583   reshape wide taxrevenue, i (dec) j(region)
584   rename taxrevenue1 so_mw_sc_ne
585   label variable dec ""
586   label variable so_mw_sc_ne ""
```

```
  587   # delimit ;
  588   scatter so_mw_sc_ne dec, title("Panel C: Average Tax revenue as share of GDP", margin(
        medsmall) size(large))
  589   ytitle("Tax share", margin(small) size(medsmall))
  590   xtitle("Year", margin(small) size(medsmall))
  591   xlabel(1965 "1965" 1970 "1970" 1975 "1975" 1980 "1980" 1985 "1985" 1990 "1990" 1995 "1995"
         2000 "2000" 2005 "2005"
  592   2010 "2010")
  593   msize(medium) msymbol(none none none none)
  594   connect(l);
  595
  596   *Figure 8: Debt*
  597   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
  598   drop if Year<1965
  599   gen year=.
  600   local k=1965
  601   local i=1966
  602   local j=1
  603   while `i' <= 2010 {
  604   replace year=`j' if (Year<=`i'&Year>=`k')
  605   local i = `i' + 1
  606   local k = `k' + 1
  607   local j = `j' + 1
  608   }
  609   sort Country year Year
  610   egen dec=min(Year), by(Country year)
  611   collapse (mean) Debt, by(region dec)
  612   reshape wide Debt, i (dec) j(region)
  613   rename Debt1 so_mw_sc_ne
  614   label variable dec ""
  615   label variable so_mw_sc_ne ""
  616   # delimit ;
  617   scatter so_mw_sc_ne dec, title("Panel D: Average Debt as share of GDP", margin(medsmall)
        size(large))
  618   ytitle("Debt share", margin(small) size(medsmall))
  619   xtitle("Year", margin(small) size(medsmall))
  620   xlabel(1965 "1965" 1970 "1970" 1975 "1975" 1980 "1980" 1985 "1985" 1990 "1990" 1995 "1995"
         2000 "2000" 2005 "2005"
  621   2010 "2010")
  622   msize(medium) msymbol(none none none none)
  623   connect(l);
  624
  625   use "C:\Users\Chrisi\Desktop\Masteroppgave 15.03.2014\data_Europe.dta", clear
  626   reg expenditure Debt, robust
  627       outreg, ctitle("","(1)"\"","Expenditure")/*
  628           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) replace
  629   reg rd Debt, robust
  630       outreg, ctitle("","(2)"\"","  R&D  ")/*
  631           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  632   reg taxrevenue Debt, robust
  633       outreg using data_Europe1, addtable pretext("\pagebreak") title(Table 6A: Relation
        between Debt and Public Finances) ctitle("","(3)"\"","Taxrevenue")/*
  634           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  635   ///DO NOT INCLUDE ///
  636   corr Debt expenditure Growth taxrevenue rd
  637
  638   reg Debt L.taxrevenue, robust
  639       outreg, ctitle("","(1)"\"","Debt")/*
  640           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) replace
  641   reg Debt L.rd, robust
  642       outreg, ctitle("","(1)"\"","Debt")/*
  643           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  644   reg Debt L.expenditure, robust
  645       outreg using data_Europe1, addtable pretext("\pagebreak") title(Table 6B: Relation
        between Debt and Public Finances (lagged values)) ctitle("","(1)"\"","Debt")/*
  646           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  647
  648   ********************************************************************************
  649   * 4.2 Are conservatives more likely to comply with the shrinking government effect? *
```

```
650   ********************************************************************************
651   reg Growth CPG_01, robust
652       outreg, ctitle("","(1)"\"," Growth ")/*
653           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) replace
654   reg Growth rd_share, robust
655       outreg, ctitle("","(2)"\"," Growth ")/*
656           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
657   reg Growth CPG_01 rd_share, robust
658       outreg using data_Europe1, addtable pretext("","") title("Table 7A: Preferences as
      Determinant of Growth") ctitle("","(3)"\"," Growth ")/*
659           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
660   *story behind no growth effect of R&D, conditional on CPG
661   *if expenditure up, for given R&D, then R&D share down
662   reg rd_share expenditure, robust
663       outreg, ctitle("","(1)"\"","R&D Share")/*
664           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) replace
665   reg rd_share Debt, robust
666       outreg, ctitle("","(2)"\"","R&D Share")/*
667           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
668   *if tax revenues move in same direction...
669   *Figure 9A ///
670       graph twoway (lfit taxrevenue expenditure) (scatter taxrevenue expenditure)
671   *...then, given that R&D positively correlated with taxes
672   reg rd taxrevenue, robust
673       outreg, ctitle("","(3)"\"," R&D ")/*
674           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
675   *R&D share should up
676   reg rd_share taxrevenue, robust
677       outreg using data_Europe1, addtable pretext("","") title("Table 7B: Influence of
      Public Finances on R&D as Share of Expenditure")/*
678       */note("column (3) has R&D as Share of GDP as dependent variable") ctitle("","(4)"\"",
      "R&D Share") se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2"
      \ "N") summdec(4) merge
679   *so, there are 2 effects of different sign and almost same size
680   *--> effect on growth should be close to zero and/or not significant
681   *reg Growth rd_share, robust
682   reg taxrevenue CPG_01, robust
683       outreg, ctitle("","(1)"\"","Taxrevenue")/*
684           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) replace
685   reg Debt CPG_01, robust
686       outreg, ctitle("","(2)"\"," Debt ")/*
687           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
688   reg expenditure CPG_01, robust
689       outreg, ctitle("","(3)"\"","Expenditure")/*
690           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
691   reg rd CPG_01, robust
692       outreg using data_Europe1, addtable pretext("","") title("Table 7C: Preferences by
      Conservatism I") ctitle("","(4)"\"","  R&D  ")/*
693           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
694   *so, since more liberal implies higher taxes and less debt, less overall and more R&D
      spending --> preference for R&D
695   *while the opposite is true for conservatives,
696   *the opposing effects on growth, both direct from CPG and indirect through R&D, cancel
      out in a balanced sample
697   *sign on R&D coefficient: R&D share up if debt down or taxes up
698   *since liberal have preference for R&D, it must be that taxes go up, which by itself
      reduces growth until technology improvements break through
699   *Figure 9B ///
700       graph twoway (lfit Growth taxrevenue) (scatter Growth taxrevenue)
701   *on the other hand, even though not significant, coefficient on CPG positive --> more
      liberal more growth-enhancing spending decisions in the longer run
702
703   ***********************************************
704   * Section 4.3 What is the role of competition? *
705   ***********************************************
```

```
  706   *Competition on public finance
  707   reg taxrevenue Comp, robust
  708       outreg, ctitle("","(1)"\"","Taxrevenue")/*
  709           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) replace
  710   reg Debt Comp, robust
  711       outreg, ctitle("","(2)"\"","  Debt  ")/*
  712           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  713   reg expenditure Comp, robust
  714       outreg, ctitle("","(3)"\"","Expenditure")/*
  715           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  716   reg rd Comp, robust
  717       outreg, ctitle("","(4)"\"","  R&D  ")/*
  718           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  719   reg Growth Comp, robust
  720       outreg, ctitle("","(5)"\"","  Growth  ")/*
  721           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  722   reg Growth Debt expenditure rd taxrevenue CPG_01 Comp, robust,
  723       outreg using data_Europe1, addtable pretext("","") title("Table 8: Impact of
        Competition I") ctitle("","(6)"\"","  Growth  ")/*
  724           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  725
  726
  727   *check BB --> no linear relationship
  728   *gen budget = Debt/taxrevenue /// Figure 10 panel A to D
  729   graph twoway (qfit Growth Debt)
  730   graph twoway (qfit Growth taxrevenue)
  731   graph twoway (qfit Growth budget)
  732   graph twoway (qfit Growth expenditure)
  733   graph twoway (qfit Growth rd)
  734
  735   ***************************************************************************
  736   * 5.2 Has the intuition been right? (including other political variables) *
  737   ***************************************************************************
  738   corr Growth Debt CPG_01 Comp RfT ToG Freq Gov_share
  739   reg Debt RfT ToG Freq Gov_share, robust
  740       outreg, ctitle("","(1)"\"","  Debt  ")/*
  741           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) replace
  742   reg Debt CPG_01 Comp RfT Freq ToG Gov_share, robust
  743       outreg, ctitle("","(2)"\"","  Debt  ")/*
  744           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  745   reg Growth RfT ToG Freq Gov_share, robust
  746       outreg, ctitle("","(3)"\"","Growth  ")/*
  747           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  748   reg Growth Debt CPG_01 Comp RfT ToG Freq Gov_share, robust
  749       outreg using data_Europe1, addtable pretext("\pagebreak") title(Table 9: Including
        other political variables) ctitle("","(4)"\"","Growth")/*
  750           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  751
  752   ***********************************************
  753   * Section 6.1 Tests for a better specification *
  754   ***********************************************
  755   *OLS vs. RE --> evidence of significant differences between countries
  756   xtreg Growth Debt L.Debt CPG_01 Comp CPG_comp RfT ToG Freq Gov_share, re robust
  757   xttest0
  758   *Hausman: FE vs. RE --> not reject H0, use RE
  759   xtreg Growth Debt L.Debt CPG_01 Comp CPG_comp RfT ToG Freq Gov_share, fe
  760   estimates store fixed
  761   xtreg Growth Debt L.Debt CPG_01 Comp CPG_comp RfT ToG Freq Gov_share, re
  762   estimates store random
  763   hausman fixed random
  764   *time fixed effects? - YES
  765   xtreg Growth Debt L.Debt CPG_01 Comp CPG_comp RfT ToG Freq Gov_share i.Year, re
  766   testparm i.Year
  767   *contemporaneous correlation? - YES
  768   xtreg Growth Debt L.Debt CPG_01 Comp CPG_comp RfT ToG Freq Gov_share, re robust
```

```
  769   xtcsd, pesaran abs
  770
  771   ************************************************
  772   * Section 6.2 Robustness of linear correlations *
  773   ************************************************
  774   *Generate country and time dummies
  775   *quietly tab Year, gen(yy)
  776   *quietly tab Country, gen(ctrydum)
  777
  778   * preference for expenditure variables, debt & growth w/ year, country, region fixed
        effects
  779   qui reg taxrevenue CPG_01 yy* i.region ctrydum2-ctrydum16, cluster(Country)
  780       outreg, keep(CPG_01 _cons) ctitle("","(1)"\"","Taxrevenue")/*
  781           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) replace
  782   qui reg Debt CPG_01 yy* i.region ctrydum2-ctrydum16, cluster(Country)
  783       outreg, keep(CPG_01 _cons) ctitle("","(2)"\"","  Debt  ")/*
  784           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  785   qui reg expenditure CPG_01 yy* i.region ctrydum2-ctrydum16, cluster(Country)
  786       outreg, keep(CPG_01 _cons) ctitle("","(3)"\"","Expenditure")/*
  787           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  788   qui reg rd CPG_01 yy* i.region ctrydum2-ctrydum16, cluster(Country)
  789       outreg, keep(CPG_01 _cons) ctitle("","(4)"\"","  R&D  ")/*
  790           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  791   qui reg Growth CPG_01 yy* i.region ctrydum2-ctrydum16, cluster(Country)
  792       outreg using data_Europe1, keep(CPG_01 _cons) addtable pretext("\pagebreak") title(
        "Table 10A: Preferences by Conservatism II") ctitle("","(5)"\"","  Growth")/*
  793           */note("Coefficients for Year, Country and Region dummies not shown") se
        squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4)
         merge
  794
  795   * competition and expenditure variables, debt & growth w/ year, country, region fixed
        effects
  796   qui reg taxrevenue Comp yy* i.region ctrydum2-ctrydum16, cluster(Country)
  797       outreg, keep(Comp _cons) ctitle("","(1)"\"","Taxrevenue")/*
  798           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) replace
  799   qui reg Debt Comp yy* i.region ctrydum2-ctrydum16, cluster(Country)
  800       outreg, keep(Comp _cons) ctitle("","(2)"\"","  Debt  ")/*
  801           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  802   qui reg expenditure Comp yy* i.region ctrydum2-ctrydum16, cluster(Country)
  803       outreg, keep(Comp _cons) ctitle("","(3)"\"","Expenditure")/*
  804           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  805   qui reg rd Comp yy* i.region ctrydum2-ctrydum16 , cluster(Country)
  806       outreg, keep(Comp _cons) ctitle("","(4)"\"","  R&D  ")/*
  807           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) merge
  808   qui reg Growth Comp yy* i.region ctrydum2-ctrydum16, cluster(Country)
  809       outreg using data_Europe1, keep(Comp _cons) addtable pretext("","") title("Table 10B:
        Impact of Competition II") ctitle("","(5)"\"","  Growth ")/*
  810           */note("Coefficients for Year, Country and Region dummies not shown") se
        squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \ "N") summdec(4)
         merge
  811
  812   * including the other political variables w/ fixed effects and interaction of CPG and Comp
  813   * creating Maastrich dummy
  814   *gen MT=0
  815   *replace MT=1 if Year>=1991
  816   *replace MT=0 if Num==5
  817   *replace MT=0 if Num==14
  818   *replace MT=0 if Num>=17
  819   *gen MT_dum_1 = MT*CPG_01
  820   *gen MT_dum_2 = MT*Comp
  821   qui reg Debt L.Debt L.Growth CPG_01 Comp CPG_comp yy* i.region MT_dum_1 MT_dum_2 ctrydum2-
        ctrydum16 , cluster(Country)
  822       outreg, keep(L.Debt L.Growth CPG_01 Comp CPG_comp _cons) ctitle("","(1)"\"","  Debt  ")/*
  823           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
        "N") summdec(4) replace
  824   qui reg Debt L.Debt L.Growth CPG_01 Comp CPG_comp RfT ToG Freq Gov_share yy* i.region
        MT_dum_1 MT_dum_2 ctrydum2-ctrydum16 , cluster(Country)
```

```
825       outreg, keep(L.Debt L.Growth CPG_01 Comp CPG_comp RfT ToG Freq Gov_share _cons) ctitle
      ("","(2)"\"","  Debt ")/*
826           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
827   qui reg Growth L.Growth Debt L.Debt CPG_01 Comp CPG_comp yy* i.region MT_dum_1 MT_dum_2
      ctrydum2-ctrydum16, cluster(Country)
828       outreg, keep(L.Debt L.Growth CPG_01 Comp CPG_comp _cons) ctitle("","(3)"\"","  Growth")
      /*
829           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
830   qui reg Growth L.Growth Debt L.Debt CPG_01 Comp CPG_comp RfT ToG Freq Gov_share yy* i.
      region MT_dum_1 MT_dum_2 ctrydum2-ctrydum16, cluster(Country)
831       outreg, keep(Debt L.Debt L.Growth CPG_01 Comp CPG_comp RfT ToG Freq Gov_share _cons)
      ctitle("","(4)"\"","  Growth")/*
832           */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
833
834   * Using GDP/capita *
835   corr L.GDP_cap GDP_cap F.GDP_cap Growth Debt L.expenditure expenditure F.expenditure

836   reg expenditure L.GDP_cap, robust
837   qui reg Debt L.GDP_cap expenditure CPG_01 Comp CPG_comp RfT ToG Freq Gov_share yy* i.
      region MT_dum_1 MT_dum_2 ctrydum2-ctrydum16 , cluster(Country)
838       outreg, keep(L.GDP_cap expenditure CPG_01 Comp CPG_comp RfT ToG Freq Gov_share _cons)
      ctitle("","(5)"\"","  Debt ")/*
839           */ se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
840   qui reg Growth L.GDP_cap expenditure CPG_01 Comp CPG_comp RfT ToG Freq Gov_share yy* i.
      region MT_dum_1 MT_dum_2 ctrydum2-ctrydum16, cluster(Country)
841       outreg , keep(L.GDP_cap expenditure CPG_01 Comp CPG_comp RfT ToG Freq Gov_share _cons)
       ctitle("","(6)"\"","  Growth")/*
842           */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
843   qui reg Growth L.GDP_cap CPG_01 Comp CPG_comp RfT ToG Freq Gov_share yy* i.region MT_dum_1
       MT_dum_2 ctrydum2-ctrydum16, cluster(Country)
844       outreg using data_Europe1, keep(L.GDP_cap CPG_01 Comp CPG_comp RfT ToG Freq Gov_share
      _cons) ctitle("","(7)"\"","  Growth")/*
845       */ addtable pretext("\pagebreak") title(Table 11A: Regressions with Fixed Effects)
      note("Coefficients for Year, Country and Region dummies not shown")/*
846           */se squarebrack starlevels(5 2 1) summstat(r2_a \ N) summtitle("Adjusted R2" \
      "N") summdec(4) merge
847
848   *Figure 12: GDP/capita over time
849   gen year=.
850   local k=1950
851   local i=1951
852   local j=1
853   while `i' <= 2010 {
854   replace year=`j' if (Year<=`i'&Year>=`k')
855   local i = `i' + 1
856   local k = `k' + 1
857   local j = `j' + 1
858   }
859   sort Country year Year
860   egen dec=min(Year), by(Country year)
861   collapse (mean) taxrevenue, by(region dec)
862   reshape wide taxrevenue, i (dec) j(region)
863   rename taxrevenue1 so
864   rename taxrevenue2 mw
865   rename taxrevenue3 sc
866   rename taxrevenue4 ne
867   label variable dec ""
868   label variable so ""
869   label variable mw ""
870   label variable sc ""
871   label variable ne ""
872   # delimit ;
873   scatter so mw sc ne dec, title("Figure 12: Average GDP per Capita", margin(medsmall) size(
      large))
874   ytitle("GDP/capita", margin(small) size(medsmall))
875   xtitle("Year", margin(small) size(medsmall))
876   xlabel(1950 "1950" 1960 "1960" 1970 "1970" 1980 "1980" 1990 "1990" 2000 "2000"
877   2010 "2010")
878   msize(medium) msymbol(none none none none)
879   connect(l);
```