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Getting closer or falling apart? Euro countries after the Euro crisis

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Getting closer or falling apart?
Euro countries after the Euro crisis.

Massimo Bordignon, Nicolò Gatti, Massimiliano Gaetano Onorato[*]

June 2021

Abstract

We study convergence and divergence dynamics in a sample of EMU countries by assembling an extensive dataset that contains information on public spending and policy outcomes in a variety of areas of government intervention including education, health, and civil justice from the early 1990s. We also focus on other important determinants of a country's economic performance such as the level of regulation of product and labor markets, as well as the trust in political institutions, quality of governance and inequality. Results show that despite divergent economic growth in the Euro periphery countries after the 2011-13 Euro crisis, the quality of services and level of regulation did not deteriorate or indeed improved, increasing convergence with the core Euro countries. However, the debt crisis dramatically worsened citizens' perceptions of quality of governance as well as the level of social trust. The very different approach followed with the Covid crisis might have mitigated the problem, but the Euro project has still shaky foundations. This calls in question its future political viability and asks for reform.

Keywords: Euro, debt, crisis, convergence, reforms, governance, trust

JEL codes: H5, G01, P48, P51

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1. Introduction

The formation of the European Union (EU) and European Monetary Union (EMU) was predicated on increasing convergence among member countries. Economic convergence first, but also political convergence in terms of quality of institutions, respect of rule of law, transparency in governance, reduction in corruption and tax evasion and so on. As for the EMU, while it was obvious that the common currency did not satisfy the criteria of an Optimal Currency Area at the time of its introduction, the expectation was that this problem would have been gradually solved over time. Increased economic convergence would have also made it easier to introduce institutional reforms further strengthening the Euro area, making it possible to converge eventually to a fully-fledged political union. The Euro was to become the common currency of the EU and, indeed, all EU countries - except Denmark and the UK - had legally committed to adopt it.

Observing the situation 22 years after the first decision concerning the adoption of the Euro (1999) and 17 years after the decision concerning the Eastern enlargement (2004), it is tempting to conclude that European policy makers could not have been more wrong. One big Western country, the UK (the second European economy) has decided to quit and leave the EU. Economic convergence between Western and Eastern European countries has been strong, but political models have diverged so much that the long run permanence in the EU of countries such as Poland and Hungary should not be taken for granted. Focusing on the Euro area, the economic convergence of the first years, as measured in terms of GDP per capita, reverted to strong divergence after the sovereign debt crisis (2011-13) that followed the global financial crisis of 2009-10, creating expectations of a breakup of the common currency. The Covid-19 pandemic hit the area in a situation that just showed the first signals of recovery and resumed economic convergence. The pandemic represented an obvious "symmetric" shock, but once again its effects were largely asymmetric, hitting Southern Europe much more than its Northern component. In 2020, for instance, GDP losses in euro countries such as Spain, France or Italy were more than double than in Germany, Netherlands, or Finland. The possibility of a breakup of the Eurozone and as a result, of the entire EU, was again on the table.

However, this pessimistic forecast has not come true, at least so far. On the contrary, the pandemic has led to a renewed effort of integration. If Euro area institutions were already revised after the Euro crisis –with the introduction of the European Stability Mechanism (ESM), the first steps towards a Banking and Capital Union and by an attempt to enforce a stronger coordination of fiscal policy—the Covid crisis has led to a further jump in European integration. Monetary policy has been relentlessly supportive and for the first time EU countries agreed to raise common debt to support the economies more wasted by the pandemic. And if such support was partly meant to address the immediate consequences of the health crisis (e.g., with the SURE mechanism and other short-term funding), it also had the clear ambition to increase the convergence across the EU economies (e.g., with the NG-EU), endorsing structural reforms and coordinating public investments in digital economy and energy transition.

Considering these events, one might then hope that the observed economic divergence in the aftermath of the two large crises might just be temporary episodes in an overall process of long run

economic and political convergence. And while it is of course too early to be able to comment on the effects of the NG-EU, one can explore what happened after the Euro crisis, when many countries in the periphery implemented deep structural reforms and consolidated their public finances, in some cases in exchange for the support by the ESM. To address these issues properly, however, one needs to go beyond the simple evolution of GDP or GDP per capita and look instead at factors that might affect the potential future growth of a country, such as the accumulation of human capital (health and education), the competitiveness of markets (civil justice, labor and product market regulations, tax system) and the quality of political and social institutions. If, despite the Euro crisis, convergence has continued across EMU countries with respect to these fundamental factors, economic convergence might also be expected to resume even after the pandemic.

To perform this systematic analysis of convergence\divergence patterns among EMU countries along all these dimensions, we collect a vast array of comparable data from several sources concerning public services, product and labor markets regulation, and quality of institutions for the period 1990-2019. In the case of public services, we collect indicators regarding not only expenditure but also organization and output. We complement the descriptive analysis based on *sigma* and *beta* convergence with difference-in-difference and "event-study" estimates. We, first, test whether "participation at the monetary union" had any impact on the performance of the countries which adopted the Euro compared to other OECD economies with similar market and political institutions[1]. Second, we test whether Eurozone countries hit by the "sovereign debt crisis" experienced different patterns of economic and institutional performance than those not affected.

We report both good and bad news. Using standard measures of convergence (i.e., *sigma* and *beta convergence*), it does not seem that in the period 1990-2019 EMU countries were on a diverging path with respect to the economic indicators more strictly connected to efficiency and economic growth. Although the countries more stricken by the international economic crisis in 2009 and then by the sovereign-debt crisis had to reduce public expenditure in many fundamental services, the process of convergence in the main output indicators related to the accumulation of human capital was not affected by this. For example, there was still convergence in the quality of health care services or in the share of graduates in the population. Concerning civil justice, "Doing Business" indicators about competitiveness, regulation of labor and product markets, and female participation to the labor market, there was actually a strong *evidence of convergence*, as many EMU countries implemented massive reforms in to improve the functioning of the public sector and make their markets more flexible and competitive.

Our evidence from difference-in-difference estimates broadly confirms these results. With the partial exception of an indicator of quality of the health care sector and of labor market outcomes, most of the estimated effects of participation at the EMU turn out to be not significant, but the effects of the debt crisis are clear-cut. Expenditure in civil justice declines, but regulatory reforms led to a reduction in the number of procedures needed for a trial, thus generally improving the

[1] To secure a higher level of economic and institutional homogeneity, we exclude from the sample of the OECD countries that we use as control group those that joined the OECD after 1989 and Turkey.

efficiency of the sector. We also observe a greater liberalization of the labor market and an increase in male and female unemployment.

However, the picture changes once we look at political and social indicators. Using again sigma and beta convergence indicators, after the crisis Euro countries started diverging strongly in terms of citizens' perceptions about quality of governance and corruption, trust in national and European institutions, as well as turnout at national elections and share of votes to populist parties. Perhaps surprisingly, a divergent trend among EMU countries with respect to some of these variables (e.g., corruption or quality of governance) appears even before the international economic crisis of 2009, as perceptions were already deteriorating in countries such as Greece, Italy, Portugal and Spain in the first part of the 2000's. However, as our difference-in-difference estimates confirm, countries hit by the sovereign debt crisis saw in the aftermath a collapse in social trust. Moreover, trust in national parliaments and in politicians as well as in European institutions decreased (even if in all these cases we detect statistically significant pre-trends). The quality of governance indicators worsened.

Summing up, our results suggest that after the Euro crisis the viability of the EMU project (and probably, consequently, of the entire EU project) was more in trouble on political rather than economic grounds. Even if the fiscal consolidation and the economic reforms implemented in the EMU countries more hit by the economic crisis were necessary and useful to the future growth of these countries, in democracies citizens' perceptions matter. The fall of trust in national institutions and politicians, as well as the deterioration of the perceived quality of governance in several Southern European countries, led to a political backlash against the political parties that introduced the reforms. This happened for example in Italy in 2018, when populist parties gained power on an anti-Europe and anti-fiscal austerity agenda. And at the European elections of 2019, if populist parties did not manage to win a majority, they however substantially increased their voting shares and were the most voted in several important countries both belonging (France, Italy, Austria) and not belonging to the Euro area (Poland). Notice that the story might turn out to be different after the Covid crisis, as the EU was much more supportive to the countries more hit by the pandemic and there was widespread support for the idea of European solidarity. On the other hand, the additional economic divergence created by the pandemic, if it does not revert quickly, might again pit national public opinions one against the other, leading to lower support for the EMU project.

Our work is related to several strands of literature. An extensive macro-econometric literature has already discussed convergence or divergence trends among EMU countries, particularly questioning whether symmetric or asymmetric shocks have become more likely after the monetary unification (e.g., Eichengreen, 2007; Campos et al., 2014; Alesina et al., 2017). Bargain et al. (2013) studied asymmetric shocks, fiscal systems, and debt crises in the Eurozone. Campos et al. (2018), moreover, explored the relationship between core and periphery countries in the single currency area, while Gros (2018) compared the convergence between Eastern and Western European countries with the divergence between Northern and Southern ones, focusing on macroeconomic variables such as wages, investment, and consumption. Finally, in another contribution, Campos et al. (2018)

provided a meta-analysis that summarizes this literature. Our analysis, however, differs from these studies not only in terms of methodology but also because our focus is on the evolution of fundamental factors, including political institutions, which lie behind economic developments.

A more micro-founded economic literature, instead, has examined the effects of the introduction of the Euro on some specific sectors and markets. An example is the work of Alesina et al. (2008) that documents how the EMU triggered a deregulation process in the product markets, while labor markets lagged behind. More generally, several authors have used the indicators of reforms, productivity and growth in the OECD area developed by Nicoletti et al. (2003), which we also rely on in this paper, to discuss comparable issues. A novelty of our approach, nevertheless, is that we consider also institutional and political variables, because of their relevance for the sustainability of economic convergence. Our work is also related to the literature that investigates the effects of economic and financial crises on the adoption of economic reforms (Alesina et al., 2006; Mian et al., 2012; Gokmen et al., forthcoming). This literature typically analyses the characteristics of the crisis or of the political system that favor or impede reforms. Abstaining from these issues, we limit our research to study the effect of crises on reforms in EMU countries.

We are certainly not the first to document the fall in the level of trust in political institutions in the European countries hit by the economic crisis, although other authors do not offer a similar detailed convergence analysis. For example, Dustmann et al. (2017) documented empirically the effects of the economic crisis and increased immigration in Europe. Algan et al. (2017) study the political consequences of the Great Recession in Europe, documenting that in post-2008 elections, EU regions with higher unemployment experienced the sharpest decline in trust in institutions and traditional politics. Rodrik (2017) traces back the rise of populism to globalization, also distinguishing between a “left” and a “right” populism in Europe based on the characteristics of the immigrated population. Guiso et al. (2017) discuss the emergence of populist parties in Europe, distinguishing more carefully between supply and demand factors. They suggest that the rise of populism is linked not only to truly declining economic conditions, such as for example an increase in unemployment, but more generally to the feeling of insecurity that economic phenomena such as globalization, reforms and digitalization might have created in vast segments of the population. In an extension and in line with our findings, Guiso et al. (2019) argue that populist movements gained more consensus in the Euro countries because the institutional constraints imposed by participation to the EMU (common monetary policy and the European fiscal rules) limited the possible actions that mainstream parties could take in the face of shocks.

Inequality can also affect citizens’ perceptions about the quality of governance, their level of trust in institutions and the support for populist parties. Several authors have examined empirically the relationship between inequality and the establishment of the European Monetary Union or the occurrence of the global financial crisis. Bertola (2009) suggests the existence of a U-shaped relationship between the establishment of the Eurozone and inequality. Inequality in EMU countries diminished until 1999, remained constant in 2000-2001 and grew during the subsequent years. Atkinson et al. (2011) explore the relationship between inequality and the economic crisis: they do not find any empirical evidence that rising inequality leads to crises, but they document that

inequality grows after a crisis. Initially a financial crisis mainly affects the richest individuals, while the subsequent recession hits more the poorest groups of the population.

Finally, Alesina et al. (2017), in another contribution closely related to ours, asked whether the EMU is an optimal political and cultural area by studying the cultural, political, and social divergence across EMU countries over time using social surveys. Their answer is broadly positive, as the cultural variance *inside* EMU countries is much larger than that *across* EMU countries, and that the US, despite being a consolidated political union, do not exhibit a lower level of cultural variance with respect to the Eurozone. However, they also noted that several indicators, including perceptions of quality of governance and corruption, were on a diverging path in the EMU even before the advent of the economic crisis.

The rest of the paper is organized as follows. Section 2 details the characteristics of our data set, specifying the collected variables and their sources. Section 3 presents a convergence analysis, looking at indicators of convergence for all our variables in the EMU context. Section 4 describes how we code membership to the Euro area and the occurrence of the debt crisis and discusses the econometric evidence. Section 5 concludes. Appendix 1 describes in detail the data sources. Appendix 2 presents the graphical analysis relative to sigma convergence.

2. Data set

To implement our empirical analysis, we collect a variety of data for a sample of relatively homogeneous countries. The largest sample of country used in our econometric analysis includes all countries that joined the Organization for Economic Cooperation and Development (OECD) before 1989, except for Turkey, which has been excluded because of its remarkably different political features. The sample has been chosen to guarantee enough institutional homogeneity, a fundamental feature to reduce distortions in the assessment of the effects induced by decision of some of these countries to adopt the Euro as their currency. The countries part of our larger sample are then: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States.

Most observations cover the years from 1990 to 2019. This allows us to identify three different periods for the countries that adopted the Euro: a first period before the establishment of the single currency area in 1999; a second period between 1999 and the sovereign debt crisis outbreak, conventionally set in 2010 (see section 4 for further discussion on the identification of the economic crisis); a third final phase marked by the consequences of the Euro crisis. However, observations for some variables are available only for a shorter time horizon (see Appendix 1): in this case, we develop our analysis only for the available period.

For each country, we collect detailed information regarding the main services provided by the public sector, taking also into account regulation, governance, and trust. In the selection of the indexes concerning expenditure, organization of services and outcomes, we consider both data availability

and the relevance of the index for our analysis. Table 1 reports the summary statistics for these outcome variables of interest.

2.1 Human capital indicators: Tertiary education

Within the sphere of education, we focus specifically on the *tertiary level*, given its importance for the economic development of a country. According to the definition provided by the World Bank[2], tertiary education includes public and private universities, colleges, technical training institutes and vocational schools. Data about the *expenditure for students* attending tertiary education, measured as a fraction of per capita GDP, have been collected from the World Bank database, where information is available for the period from 1999 to 2016. Using the same database, we also consider the *ratio between students and teachers* as an indicator that summarizes the production technology of the service. This index might be taken as a measure of the efficiency of the educational system: a low value, in fact, suggests higher quality as the size of classes is smaller. Finally, we searched the OECD database to obtain *the share of individuals aged 25-34 who hold a tertiary level degree* as a measure of output of the service.

2.2 Human capital indicators: Health care

We looked for government expenditure (as a fraction of GDP) *devoted to health care* for the years between 1990 and 2019 in the OECD statistics, which also provide the number of (maintained, staffed and immediately available) *beds in* (public and private*) hospitals per 1,000 inhabitants,* an index of the organization of the service. Quality can be assessed through the *Healthcare Access and Quality index* (HAQ), a score ranging between 0 and 100 assigned every five years since 1990 to each country by the Institute for Health Metrics and Evaluation (IHME). This measure is preferable to the most used life expectancy at birth, as the HAQ index measures specifically the premature deaths avoided thanks to the effectiveness of the health care system. It is therefore not affected by geographic environment or genetic makeup.

2.3 Civil justice

To explore the field of civil justice, we use some of the "Doing Business" indicators, developed since 2004 and available at the World Bank database. In particular, the section concerning contract enforcement includes a country-level variable that measures the *average cost of a trial* as a percentage of the value of the underlying (average) claim. The same database also provides data about the *number of procedures underlying the solution of a dispute*, which can be interpreted as a measure of the efficiency of the organization of the system: a disproportioned number of procedures might lead, in fact, to inefficiencies and delays. Finally, a traditional outcome indicator available in the same data set is the *length of trials*, expressed as the number of days that are necessary to enforce a contract.

[2] http://www.worldbank.org/en/topic/tertiaryeducation

2.4 Labor market

We first consider the *share of GDP invested in Labor Market Policies*, which reflects subsidies and incentives targeted at people who are unemployed, employed but at risk of job loss, inactive but willing to work. This variable is available at the OECD dataset for the period from 1990 to 2018. Regulation, then, is measured in terms of *employment protection* in the case of both *permanent* and *temporary* contracts: a score ranging between 0 and 6 has been computed by the OECD for the period from 1990 to 2018 to measure the strictness of the regulation concerning individual and collective dismissals in each country. Higher scores are associated to stricter regulation, which in turn implies lower labor market flexibility. Two other useful indicators for the performance of the labor market are the *share of active women* (older than 25) and the *unemployment rate*, which is computed separately for both males and females as a fraction of the labor force. These outcome variables have been extracted from the International Labor Organization (ILO) database for the whole period 1990-2019.

2.5 Product market regulation

To study the regulation of markets, we rely on the "Doing Business" indicators, which concern several features: *Starting a Business, Dealing with Construction Permits, Getting Electricity, Registering Property, Getting Credit, Protecting Minority Investors, Paying Taxes, Trading across Borders, Enforcing Contracts* and *Resolving Insolvency*. Every feature is evaluated using a score (from 0 to 100) that is defined as "Distance to Frontier" because it measures how far each country is from the best performer observed across all economies and all years. To obtain a synthetic index, we computed an *annual average of all these scores* for each country. A further indicator of the quality of regulation is derived from the OECD measure of the *strictness of product market regulation*, an index that evaluates the control of the government as well as the presence of barriers to entrepreneurship, investment, and trade. This index, available from 1998 to 2018, takes values from 0 to 6 and increases in presence of stricter regulation. Finally, as a proxy for fiscal pressure, we collect information about *total tax revenues as a percentage of GDP* for the years between 1990 and 2018.

2.6 Governance, corruption, and shadow economy

As far as governance and corruption are concerned, the most relevant source of information is represented by the World Governance Indicators computed by the World Bank since 1996. These indicators are the result of surveys addressed to entrepreneurs, citizens, and expert respondents. The World Bank computes six separate indicators regarding *Voice and Accountability*, *Political Stability and Absence of Violence*, *Government Effectiveness*, *Regulatory Quality*, *Rule of Law* and *Control of Corruption*. Each index is computed by aggregating individual data and is expressed in units of a standardized normal distribution: hence, values range between -2.5 to 2.5, with higher numbers corresponding to better governance. To capture the overall quality of governance with a *unique measure*, we use the Principal Component Analysis to extract for each year the main component of the six variables listed above. Another indicator, which focuses more specifically on corruption, is the *Corruption Perception Index*, developed by Transparency International and

available for the period 1996-2019. This index measures citizens' perceptions about corruption on a scale from 0 to 100, with higher scores attributed to countries where corruption is perceived as *less* pervasive. Finally, we use the estimates provided by the Institute for Economic Research (IFO), which cover the period between 1990 and 2015, to measure the *share of shadow economy on GDP*.

2.7 Trust

Economic crises might also affect citizens' *trust in institutions* and *toward other members* of the society. We searched the European Social Survey (ESS) database to obtain measures concerning trust in the *national Parliament*, trust in *national politicians*, trust in the *European Parliament* and *social trust* in European countries. The ESS database, which contains information for the period between 2002 and 2018, is based on interviews conducted in each country every two years: questions are asked to resident people aged 15 and over, regardless of their nationality, language, or legal status. Everyone's level of trust is expressed on a scale between 0 and 10, with higher scores associated to higher trust. For each country, we computed an annual average of individual scores.

2.8 Voting turnouts, populist parties, economic inequality. and poverty

Crises might affect democratic participation and political support for extreme parties. To measure the *turnout at national elections* since 1992, we use the database of the International Institute for Democracy and Electoral Assistance (IDEA). Using the European Election database and Van Kessel's classification (2013), instead, we compute the *share of votes obtained by populist parties*.

2.9 Economic inequality and poverty

Crises can have an impact on the level of inequality and poverty. Therefore, we collect data on the share of income held by the top 10%, the top 1% and the bottom 50% of the population. These variables are taken from the World Inequality database and are available for the period 1990-2019.

2.10 Crisis indicators: credit ratings and other control variables

To identify the emergence of a crisis (see section 4 for a discussion), we also exploit the *credit ratings* attributed to each country by Standard & Poor's since 1990, which are available at the "Trading Economics" database.

3. An overview of convergence/divergence trends

Figure 1 presents the evolution of GDP per capita in selected EMU countries from 1990 to 2019. As it is clear from the figure, the EMU countries in our sample grew at approximately the same rate before joining the EMU in 1999. With the monetary union, we first observe a period of sharp convergence, when relatively poorer countries like Spain, Greece and Finland grew much faster than richer countries such as Germany, Belgium, Austria, or the Netherlands. After the crisis, since 2010, we observe a process of divergence with richer countries growing faster than poorer ones, particularly with respect to Greece, whose economy collapsed. France, Italy, and Portugal, two

relatively rich countries and a relatively poor one, did rather badly even during the decade before the recession (1999-2009), with the growth rate of the last two countries collapsing after the crisis.

Keeping these figures in mind, we now look at what happened to the variables in our sample. Borrowing from the economic growth literature (e.g., Barro and Sala-i-Martin, 1992), we use both *sigma-convergence* and *beta-convergence* to check for convergence/divergence trends across countries[3]. Sigma-convergence is a standard measure of dispersion among countries (e.g., the standard deviation) in each specific year: a rising value along years suggests increasing divergence and vice versa. The analysis of beta-convergence, instead, focuses on the average annual growth rate of a variable over a given period and compares it with the initial value of the series: if lower initial levels are associated to subsequent higher growth rates, there is evidence of convergence. These two indicators capture the same phenomenon (indeed, *beta-convergence* is a necessary, although not sufficient, condition for *sigma-convergence*), but the former allows to appreciate trends over a long period, whereas the latter to look at convergence/divergence in specific time intervals.
We compute *sigma* and *beta-convergence* for each variable in the sample of EMU countries. Appendix 2 reports the graphs regarding sigma convergence for our indicators, while Table 2 provides a qualitative summary of the results, displaying "plus" and "double plus" ("minus" and "double minus") to indicate, respectively, weaker, or stronger convergence (divergence). Results are reported for the three periods under consideration: before the introduction of the Euro; after 1999 but before the outbreak of the sovereign debt crisis in 2010; after 2010.

Starting with ***Tertiary Education***, the analysis of *sigma-convergence* shows that EMU countries in the sample *converged in terms of expenditure* between 2004 and 2011, when the crisis induced a short temporary divergence. This is confirmed by *beta-convergence* (not displayed in the Appendix), with initially lower spending countries increasing their expenditure more than higher spending ones, a trend that on balance has not been affected by the crisis. The crisis has also not affected *outcome*, measured by the *share of graduates*, which shows an overall convergence along the whole period under consideration. Concerning our proxy for the *organization* of the service, however, some dispersion emerges; indeed, *sigma-divergence* in the *students-teacher ratio* across countries grew uninterruptedly after 2008 because of the recession.

A similar story emerges for the ***Health Care Sector***. Expenditure started diverging after the crisis according to both convergence indicators and so did the number of staffed beds in hospitals. However, the HAQ index, which was sharply converging before the crisis, did not diverge after it. The index, in fact, shows a continuous process of *convergence* despite the crisis and diverging expenditure. This might point to an increased efficiency in the provision of services even by countries that reduced expenditure because of the crisis. These findings need, though, to be interpreted with some caution as the private and public sector are simultaneously considered.

A more complex pattern characterizes ***Civil Justice***, for which information is available only after 2004. Concerning expenditure, convergence tends to prevail after the crisis. Moreover, a *marked*

[3] Strictly speaking, as we have reduced ex ante the sample to a subset of homogeneous countries characterized by similar institutions, ours is an exercise of "conditional convergence".

convergence emerges in terms of the *number of procedures* after the crisis, as in many countries reforms were implemented to enhance efficiency in the judicial system by reducing procedures, especially in EMU periphery countries such as Greece, Spain, Italy, and Portugal. However, several countries also show a remarkable *growth of the length of trials*, which slightly decreased only in Italy and Portugal. This increased divergence.

The ***Labor Market*** series show clearer dynamics. Expenditure as a percentage of GDP increased rapidly after the crisis in the countries hit by the recession and this increased the divergence between 2008 and 2010. After then, convergence resumed. Concerning *labor market regulation*, a *sharp convergence* for *permanent contracts* emerges after the crisis, parallel to what had happened for temporary contracts before it. Indeed, Portugal, Spain, Greece, Ireland and, to a lesser extent, Italy and France reduced protection for regular permanent contracts. Furthermore, the process of *sigma-convergence* for *female labor market participation* continued in the EMU countries despite the crisis, while, as expected, a sharp *sigma-divergence* characterized (male and female) *unemployment rates* after the outbreak of the crisis until 2013. Unemployment, in fact, increased everywhere immediately after 2009, with the only exception of Germany, where it declined.

As far as the ***Doing Business*** (average) indicator is concerned (only available since 2004), there was a slight convergence before 2008. However, because of the crisis, the process of *convergence strengthened*, particularly after 2011. Again, the countries that achieved the strongest improvements were those that suffered the worst consequences of the crisis, namely Greece, Italy, Portugal, and Spain. The same process characterizes ***Product Market Regulation:*** even in this case, the convergence process among EMU countries after the crisis towards a reduced protection is strong. In addition, after a period of *sigma-convergence* before the crisis, EMU countries started diverging also in terms of ***Fiscal pressure*** immediately after 2007.

Different results emerge about the ***Quality of Governance*** indicator. After the foundation of the EMU and up to the crisis, *divergence increased* following a deterioration in the indicator in Southern Europe, particularly in Greece, Italy and, to a lesser extent, Spain, and Portugal. The economic crisis influenced this scenario by worsening it. Consequently, *divergence increased even further*. Indeed, in the extreme case of Greece, the index fell by 12% yearly between 2008 and 2016. About the ***Corruption Perception*** index, convergence was interrupted by the introduction of the Euro[4]; then, divergence sharply increased with the crisis between 2008 and 2012, when it reversed again into convergence. Italy and Spain stand out because in these countries the perception of corruption was already growing before the crisis. Divergence in ***Shadow Economy*** increased in the period preceding the foundation of the EMU but fell consistently after 1999. With the crisis, however, *divergence* started rising again until 2013, particularly because of the worsening performance of Greece, Italy, Portugal, and Spain.

[4] Alesina et al. (2017) note the same and suggest that this might be due to the specialization induced by the EMU, with countries in the North of Europe specializing more in manufactures and countries in the South more on services that are more prone to corruption and bad government. This is however little consistent with the case of Italy, that has a strong manufacture sector.

Trust* in *the national Parliament and in national politicians (available only for EU countries from 2002 to 2014) continuously diverged between 2002 and 2008 and diverged even more strongly after the crisis, before showing a slight *sigma-convergence* in recent years. This last phenomenon is due to a broad reduction in trust levels across almost all countries. Specifically, while trust did not change in most EU countries up to 2008, it was already declining in Portugal, Italy and, most of all, Greece in the period 1999-2007. With the crisis, apart from Germany, Norway and Sweden, a *sharp reduction* in trust in national institutions occurred everywhere, with Greece as an extreme case.

As for ***Trust* in the *European Parliament*,** there was a slight increase in *sigma-convergence before* the crisis, since Sweden became a bit less and Italy a bit more EU sceptic, but subsequently divergence prevailed sharply until 2010, when the trend became stable. However, stability was reached at a lower level of trust, as after the crisis all countries exhibited a reduction in this indicator. ***Social trust***, instead, was not affected by the crisis, remaining roughly constant in all countries. Hence, there are no patterns of convergence/divergence across countries.

The increasing divergence in trust in national institutions, quality of governance and perception of corruption affected ***Turnout at national elections***, too. After a period of substantial stability, in fact, *divergence* emerged between 2010 and 2013. Specifically, electoral turnout fell in Portugal, France, Italy and Greece, while it remained stable in the other European countries. Depressing enough, European countries show a remarkable process of divergence also in the ***Votes for Populist*** parties. The pattern of *beta-convergence*, indeed, confirms that populist parties were born and raised consensus in all European countries, even those less affected by economic losses such as France, Finland, or Sweden. Moreover, while in Greece and Spain the average annual growth rate of votes for populist parties steadily increased after the crisis, the growth rate is lower in countries like Italy or Austria, where the support for populist parties was already very high.

Results concerning trust and electoral turnouts are strictly related to the trends that emerge with respect to inequality and poverty: after an initial period of convergence, in fact, EMU countries exhibit a relevant pattern of sigma-divergence in terms of income distribution because of the outbreak of the crisis. In particular, the share of income held by the poorest 10% of the population fell significantly in Portugal, Spain, Italy, and Greece, where it was already low before the crisis, while it remained stable in the other countries, generating a remarkable diverging in the Euro area.

Summing up, as already anticipated in the Introduction, a general story seems to emerge from the analysis of all these indicators. If one looks only at the economic indicators more strictly connected to efficiency and economic growth, such as our proxies for the supply of human capital, civil justice, "Doing Business" or labor and product market regulations, it does not seem that EMU countries are on a diverging path. Although the countries mostly stricken by the Euro crisis had to reduce public expenditure on fundamental services, increase taxes and economize on the production of services, it turns out that the main output indicators, such as the HAQ index for health care or the share of graduates for tertiary education were not affected by this. Indeed, there is no evidence of divergence in the performance of the health care system and there is still convergence in tertiary education. Concerning civil justice, "Doing Business" and regulation of both labor and product markets, there is actually a very strong evidence of *convergence*, as many EMU countries hit by the

crisis implemented massive reforms to improve the functioning of the public sector and make their markets more flexible and competitive.

However, results are reversed if one looks at political and social indicators that depend on citizens' perceptions, such as the quality of governance, the level of trust in national and European institutions. Perhaps surprisingly, in this case a general divergent trend among EMU countries appears even before the economic crisis, when the EU and the EMU seemed largely able to keep their promises. However, the degree of divergence in terms of perceptions about governance quality accelerated strongly after the crisis. Such trend is mirrored in the growing divergence among Euro countries in terms of income inequality and support for populist parties, which highly increased in periphery countries. Paradoxically, a pattern of convergence emerges with respect to the level of trust in institutions after the outbreak of the sovereign debt crisis. Unfortunately, such trend cannot be attributed to higher trust in Southern European countries, but it is rather due to a collapse in the level of trust also in core Euro countries.

4. Empirical analysis

4.1 Econometric specifications

To cast further light on these processes, in this section we look in more detail on whether the adoption of the Euro (what we refer to as "*Euro membership*") or the occurrence of the sovereign debt crisis in some EMU countries (what we refer to as "*Euro crisis*") played any role in explaining the time patterns of the outcome variables described in Section 2. To this end, we rely on difference-in-difference estimates and on event-study analysis.

An issue to address when performing the empirical analysis relates to the coding of the two "events" of interest, i.e., the adoption of the Euro and the sovereign debt crisis. As regards the first event, in our main analysis it refers those countries which adopted the Euro in 1999. In the next section, we assess whether our findings are robust to the inclusion in the treatment group of Greece, which adopted the European single currency in 2001[5].

Coding the occurrence of the 2010-2013 sovereign debt crisis is not so straightforward. This crisis hit only some EMU countries, at different moments and with a different intensity. We could use variables such as GDP growth to determine the size and timing of the crisis, but indicators of this sort are themselves endogenous. For instance, the fiscal correction measures implemented by several countries after the debt crisis had an impact on the GDP performance. Hence, without pretense of fully addressing issues of endogeneity, we prefer to rely on different indicators to identify the occurrence of the crisis. In our main analysis, the event "*Euro crisis*" refers to Greece, Ireland, Italy, Spain, and Portugal that starting from 2010 were hit by the sovereign debt crisis (see Busetti and Cova, 2013). In the next section, we test the robustness of our results to the adoption of a different definition of *"Euro crisis*" based on variations of country credit ratings.

[5] Former Eastern Socialist European countries that joined the EMU after 2004 as well as Cyprus and Malta that became part of the Euro area in 2008 are excluded from the analysis.

The difference-in-difference specification that we use to test the impact of the adoption of the Euro on the variables of interest is as follows:

$$Y_{it} = \alpha + \beta PostEuro_{it} + \rho_i + \gamma_t + \varepsilon_{it} \qquad (1)$$

where Y_{it} denotes our outcome variables, $PostEuro_{it}$ is a dummy variable that in the period 1999-2004 is equal to one for all countries that adopted the Euro in 1999[6], ρ_i and γ_t are country and year fixed effects, respectively. The pre-treatment period starts six years before the adoption of the Euro (i.e., in 1993). The control group is given by the OECD countries listed in Section 2 that did not adopt the Euro. Standard errors are clustered at the country level.

To assess the impact of the sovereign-debt crisis that hit some Euro countries, we estimate the following difference-in-difference specification:

$$Y_{it} = \alpha + \beta PostCrisis_{it} + \rho_i + \gamma_t + \varepsilon_{it} \qquad (2)$$

The variable $PostCrisis_{it}$ takes value one for Greece, Ireland, Italy, Spain, and Portugal starting from 2010 and in the following five years (see Busetti and Cova, 2013). The specification includes country and year fixed effects (ρ_i and γ_t, respectively). Also in this case, the pre-treatment period begins six years before the occurrence of the "event" of interest (i.e., in 2004). When estimating equation (2), we restrict the control group to the Euro countries in our sample[7] that did not experience the sovereign-debt crisis. Standard errors are clustered at the country level.

To test for parallel trends and assess the dynamic effects of the treatment under consideration we also estimate the following model for the adoption of the Euro:

$$Y_{it} = \alpha + \sum_{k=-6}^{k=+5} \omega_k euro_{i,(t-k)} + \rho_i + \mu_t + \varepsilon_{it} \qquad (3)$$

Using this equation, we estimate a sequence of time varying coefficients of the variable $euro_{i,(t-k)}$ that for each year $t = 1993, \dots, 2004$ is equal to one for all countries that adopted the Euro in 1999. The omitted year is the one before the "treatment". The coefficients ω_k with $k < 0$ should not be statistically different from zero. The specification includes country and year fixed effects (ρ_i and μ_t, respectively). Standard errors are clustered at the country level. The control group is given by all our sample countries that did not adopt the European single currency.

In the same vein, we estimate the following equation for the occurrence of the sovereign debt crisis in the Euro area ("*Euro crisis*"):

$$Y_{it} = \alpha + \sum_{k=-6}^{k=+5} \tau_k crisis_{i,(t-k)} + \rho_i + \mu_t + \varepsilon_{it} \qquad (4)$$

[6] The countries which adopted the Euro in 1999 are Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. We drop Greece from these estimates.

[7] The Euro countries in the control group are Austria, Belgium, Finland, France, Germany, Luxembourg, and Netherlands.

The explanatory variable $crisis_{i,(t-k)}$ takes value one for Greece, Ireland, Italy, Spain, and Portugal for each year $t = 2004, \dots, 2015$. When estimating equation (4) too, we omit the year before the "treatment". The control group is given by the remaining Eurozone countries that did not experience the sovereign debt crisis.

4.2. Main results

Table 3 summarizes our findings concerning the adoption of the Euro. In particular, the second and third column of the table report estimates of the coefficient β from equation (1) with associated standard errors. It is worth noting that results reported in this table refer to a smaller number of outcome variables than in the sovereign-debt analysis as we do not always have enough observations for the years preceding the adoption of the Euro.

Some interesting considerations emerge from this Table, complementing the convergence analysis of Section 3. The adoption of the Euro is associated with an improvement of the Healthcare Access and Quality index, an increase in female labor market participation and a reduction in female unemployment. There is also evidence that countries that adopted the Euro experienced a reduction in temporary employment protection.

Tables 4.1 and 4.2 report our findings concerning the Euro crisis. They show in the second and third column estimates of the coefficient β from equation (2) with associated standard errors. The picture that emerges is somewhat different. In the aftermath of the sovereign debt crisis that hit Greece, Ireland, Italy, Spain, and Portugal starting from 2010, we observe a statistically significant reduction in permanent and temporary employment protection, an increase in male and female unemployment as well as in labor market expenditure. As regards civil justice, both the number of judicial procedures and expenditure reduce after the crisis. At the same time, we observe a worsening of citizens' perceptions about the quality of governance and a decline in trust in the European and national Parliaments as well as in politicians. Social trust decreases, too.

Estimates[8] of equations (3) and (4) are reported in Figures 2-17. The year zero on the vertical axis refers to 1999 in the "*Euro membership*" analysis and to 2010 in the "*Euro crisis*" estimates.

Results shown in Figure 8 confirm that the adoption of the Euro was associated to higher female labor market participation and lower female unemployment rate. We detect the presence of pre-trends for estimates of the Euro impact on the Healthcare Access and Quality index (Figure 3) and on temporary employment protection (Figure 6). As regards the latter outcome variable, estimates on the post-treatment period appear to be not very precise.

Estimates for the sovereign debt crisis confirm our difference-in-difference results on permanent employment protection, the number of civil justice procedures, and social trust. Figure 4 provides evidence of reduction in health care expenditure in the aftermath of the crisis (in particular, from the year +3 to the year +5), while Figure 15 suggests that the sovereign debt crisis was followed by decreasing electoral turnout and increasing electoral support for populist parties.

[8] Also in this case, due to data availability constraints we report estimates on a smaller number of outcome variables for the "Euro membership" analysis.

4.3 Robustness

In this section we test whether our main results are robust to a different definition of our treatments of interest.

For the adoption of the Euro, we estimate an equation identical to (1) but the $PostEuro_{it}$ dummy variable is now equal to one not only for all our sample countries that adopted the Euro in 1999 (over the period 1999-2004, as in Section 4.1) but also for Greece from the year 2001 until 2004. The control group is given by countries in our sample that did not adopt the Euro. Estimates shown in Table 5 are in line with our main findings reported in Table 3[9].

To test the robustness of our findings on the occurrence of the sovereign debt crisis, we estimate equation (2) on the same time-window as before but changing the coding of the explanatory variable $PostCrisis_{it}$. Specifically, we build upon Reinhart (2002) who suggests that variations in the rating attributed by agencies to the sovereign debt of a country can be exploited to identify whether, when and to which extent an economic crisis has affected it. Downgrades, in fact, reflect a fall in a country's capability to satisfy creditors and this signaling role can make them a good proxy for the occurrence of a crisis. We, therefore, collect the credit ratings attributed to each country by Standard & Poor's since 1990.

It is possible to construct different measures of intensity of the crisis based on these ratings, from "weaker" (such as the introduction of a "minus" to the credit rating) and "medium intensity" (such as the loss of letter -- e.g., from AA to A) to the most "severe" crises (such as a change in letter score -- e.g., from A to BBB). In our sample, several Euro countries (Austria, France, Finland, Netherlands, Portugal, Italy, Spain, and Greece) were subjected to a downgrade of medium intensity in the period we study. However, only few Euro countries underwent a "severe" downgrade moving from category A to category B: Greece (2009), Ireland (2011), Italy (2012), Portugal (2011), and Spain (2012). Therefore, the dummy variable $PostCrisis_{it}$ takes the value of one for these countries starting from the year in which the "severe" downgrade occurs[10]. The control group is given by the other Euro countries that did not experience a "severe" downgrade or with no downgrade at all.

Estimates are shown in Tables 6.1 and 6.2. All our findings discussed in Section 4.2 hold except for the results on civil justice (expenditure and number of procedures)[11].

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[9] As a further robustness check, we also estimate equation (1) using all the available data until the end of the sample period (2019). Estimates reported in Table 3 are largely confirmed, with only a few exceptions. Indeed, the negative impact of Euro membership on the level of protection of permanent contracts and on the share of income held by the top 1% of the population becomes statistically significant, whereas the negative effect on female unemployment is no longer statistically significant. Furthermore, the impact of the adoption of the Euro on the perceived quality of governance becomes significantly negative.

[10] We compared the credit ratings attributed by Standard and Poor's to the countries in our sample with those attributed by two other agencies, Moody's and Fitch. We noticed a broad agreement in the evaluations of the three agencies, with only slight temporal differences. Indeed, there is a high degree of similarity between the three series of ratings: their correlation exceeds 70% when we focus on minor downgrades (i.e., the introduction of a "minus" or the loss of a letter) and reaches 97% when the change in the letter score is considered.

[11] As a further robustness check, we also estimate equation (2) using all the available data until the end of the sample period (2019). The results reported in Table 4 are largely confirmed. The main difference is that the negative impact of the crisis on health care expenditure, product market regulation and electoral turnout becomes statistically significant, as does the positive effect on the share of income share held by the top 1% of the population.

5. Conclusions

In this paper, we enquire about the convergence / divergence dynamics of a set of current Euro countries in the period 1990-2019 by applying different techniques to several selected indicators. As well known, strong patterns of economic convergence and divergence across Euro countries characterized the period under consideration. After having obtained access to the EMU, GDP per capita grew more strongly in the poorer Southern countries than in richer Northern ones, while the process reversed with the economic crisis of 2008-09 and the Euro crisis of 2010-13. The results of our analysis tell a different story.

Despite the different crises, a process of convergence continued and even intensified on several economic indicators usually considered as strictly connected to efficiency and economic growth, such as market regulation, Doing Business, and the provision of fundamental public services in the fields of Health, Education and Justice. However, citizens' perceptions about the quality of governance, the level of trust in national and European institutions, as well as the turnout at national elections strongly diverged with the crisis, with the EMU countries more stricken by the crisis that witnessed a larger fall in all these variables. On political grounds, these phenomena reflected themselves in a stronger support for populist and national political parties that being largely anti-European threatened the survival of the EMU project.

This paper is mostly descriptive, but we believe it provides some useful messages. First, differently from what is often argued in Northern Euro and EU countries, Southern Euro countries more hit by the economic crisis did a lot to "put their house in order". The convergence that we detect on the outcomes of several public services as well as on the regulation of product and labor markets is the result of the strong effort that these countries did to tackle the crisis. This is a positive result because it implies that a process of economic convergence might still resume in the future and might be further accelerated by the NG-EU plan.

Second, the reaction to the Euro crisis was mostly asymmetric. Lacking coordination of national fiscal policies and any form of a Euro central stabilization mechanism, crisis-hit countries were largely left alone to confront the consequences of the crisis. Fiscal policy in the Eurozone was strongly pro-cyclical in the 2011-13, as all Euro countries simultaneously consolidate their public finances, thus worsening the recession and increasing the costs of the reforms (see Baglioni and Bordignon, 2018). Even the limited financial support granted by the ESM to program countries was accompanied by intrusive policy interventions, which were often resented by the population. This might have exacerbated the anti-establishment and anti-EU perceptions that form the basis for the populistic support.

Third, although several steps have been taken to put the EMU architecture on somewhat stronger bases, most problems remain. The different approach followed with the Covid crisis might have made an important difference, but one has also to remind that these new institutional tools (including common European debt) are supposed to be only *temporary* and to expire once the health shock is overcome.

Fourth, as also suggested by Guiso et al. (2019) a more complete EMU on fiscal and political grounds might have avoided some of the worst consequences of the Euro crisis, including the increasing

citizens' frustration that led to increased support for the populists. Despite the new inclusive steps taken to fight the Covid crisis, the lack of adequate governance structure and of common tools at the European level still weighs heavily on the future of the EU and EMU projects.

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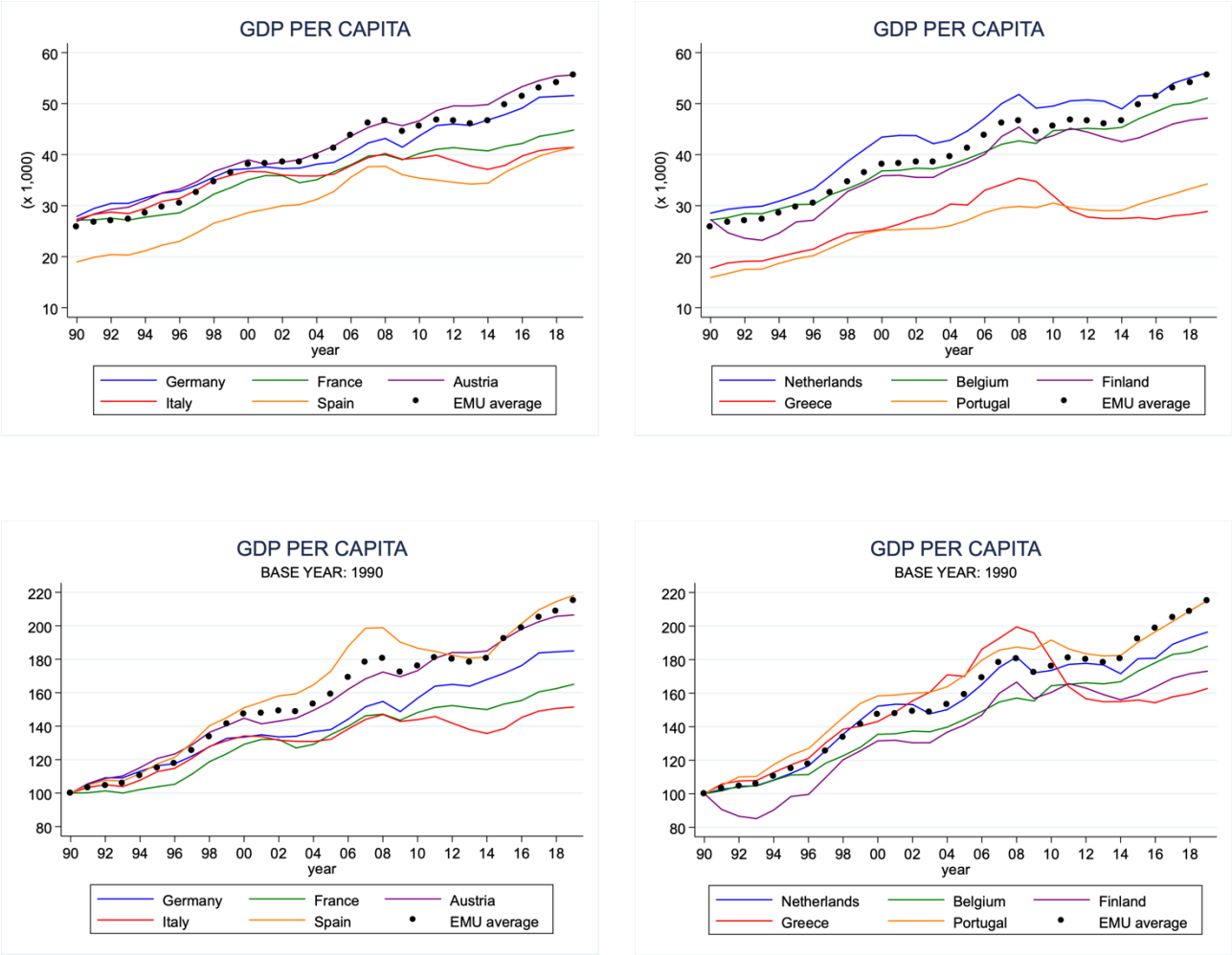
Figure 1 – GDP per capita (1990-2019)



Note: The two graphs on the top of Figure 1 display the evolution over time of GDP per capita for two sets of Eurozone countries and the EMU's average GDP per capita; in the two graphs on the bottom of the figure the value of per capita GDP in 1990 is set equal to 100.

Figure 2 – Tertiary education – Euro crisis (2010)

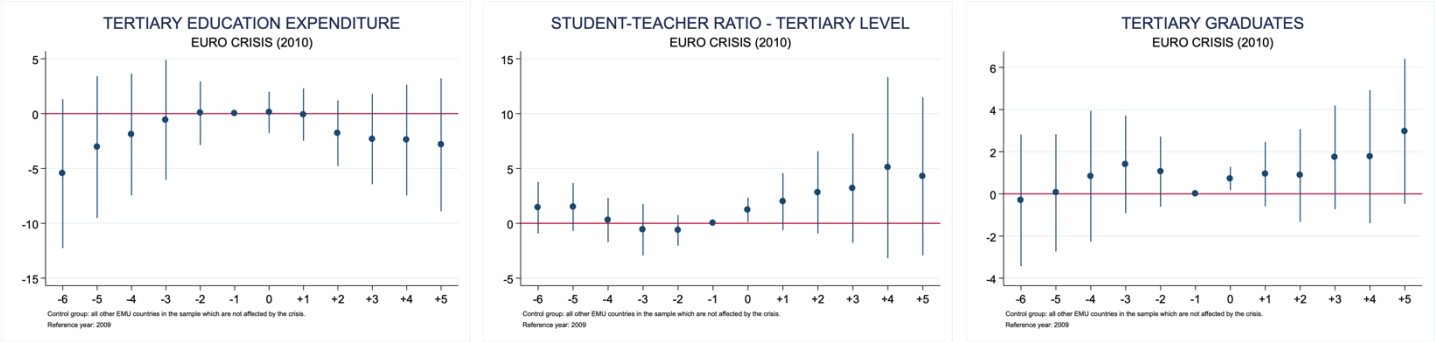


Figure 3 – Health care – Euro membership (1999)

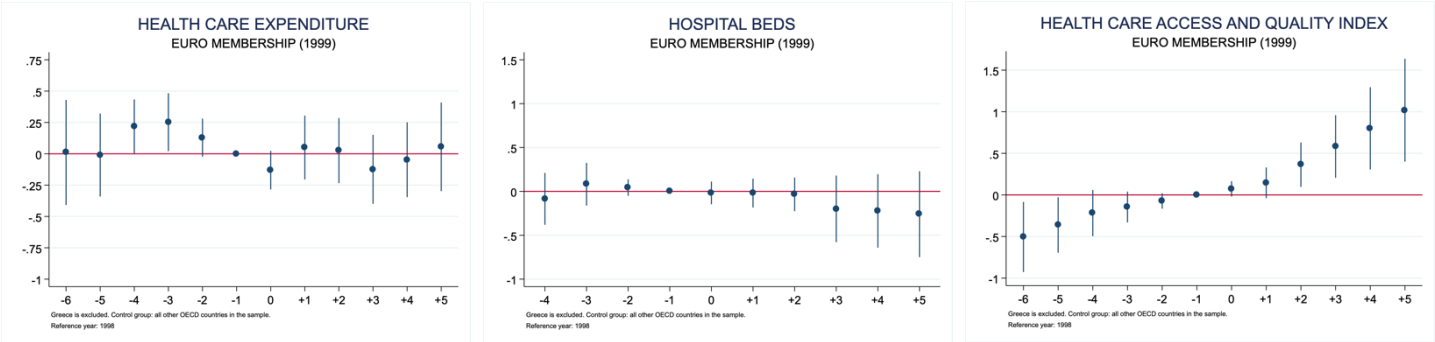
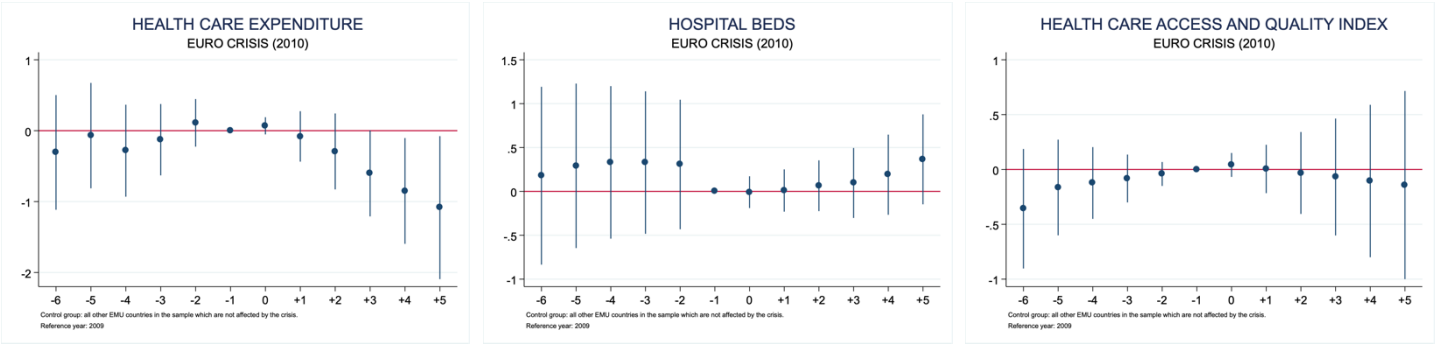


Figure 4 – Health care – Euro crisis (2010)



Note: The year in which the event under consideration occurs is denoted by zero on the x-axis. All specifications include country and year fixed effects. The omitted year is -1. Robust standard errors clustered at the country level.
10% confidence intervals.

Figure 5 – Civil Justice – Euro crisis (2010)

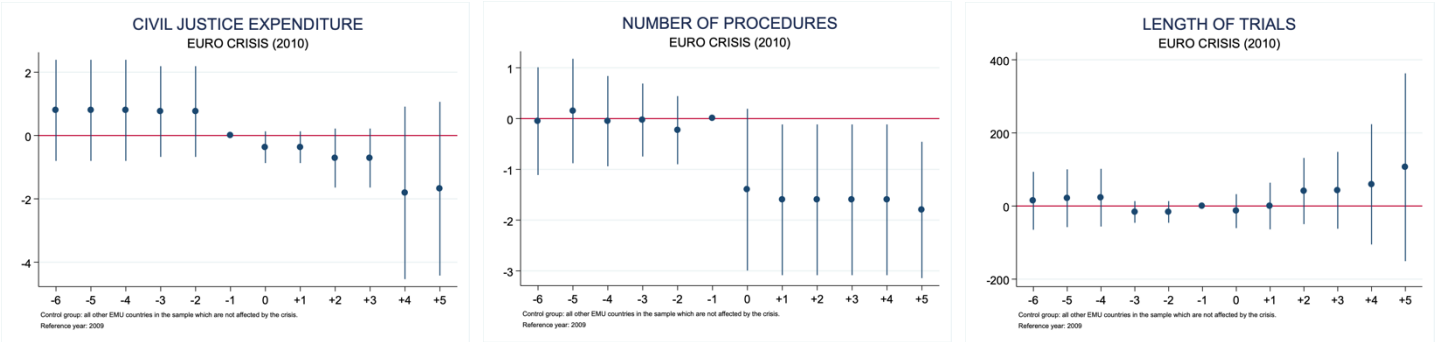


Figure 6 – Labor Market Expenditure and Employment protection – Euro membership (1999)

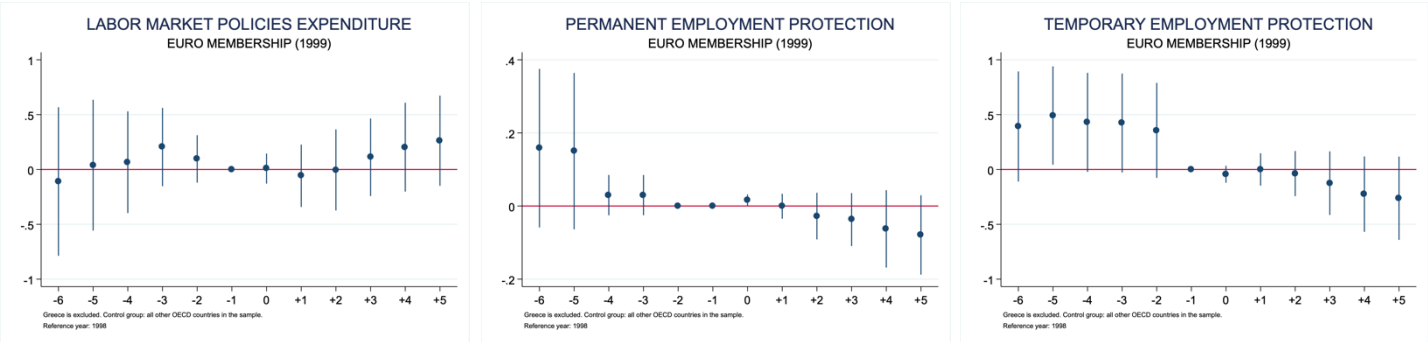
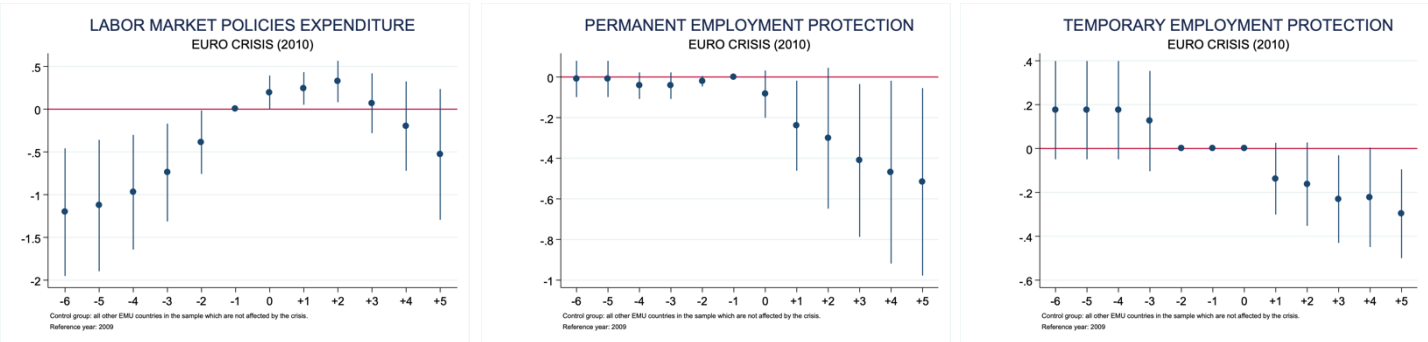


Figure 7 – Labor Market Expenditure and Employment protection – Euro crisis (2010)



Note: The year in which the event under consideration occurs is denoted by zero on the x-axis. All specifications include country and year fixed effects. The omitted year is -1. Robust standard errors clustered at the country level.
10% confidence intervals.

Figure 8 – Female participation and Unemployment rates – Euro membership (1999)

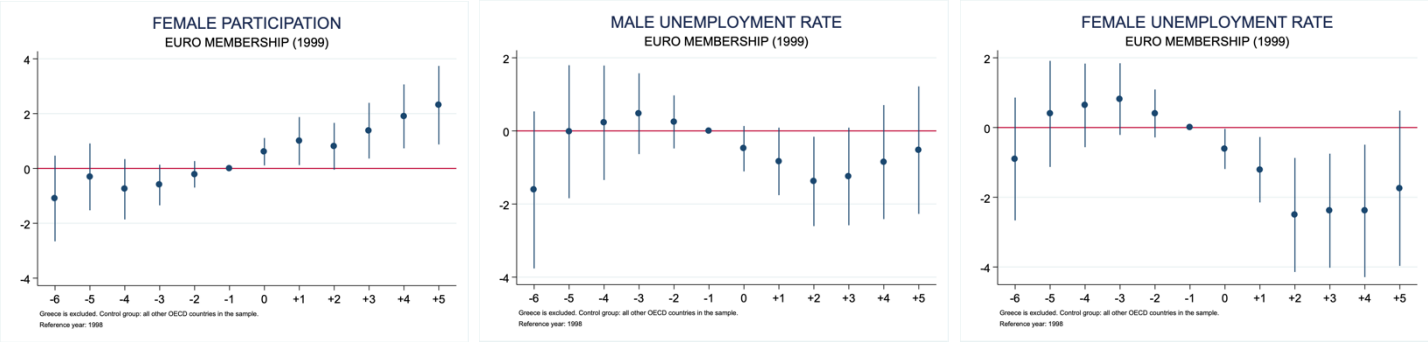


Figure 9 – Female participation and Unemployment rates – Euro crisis (2010)

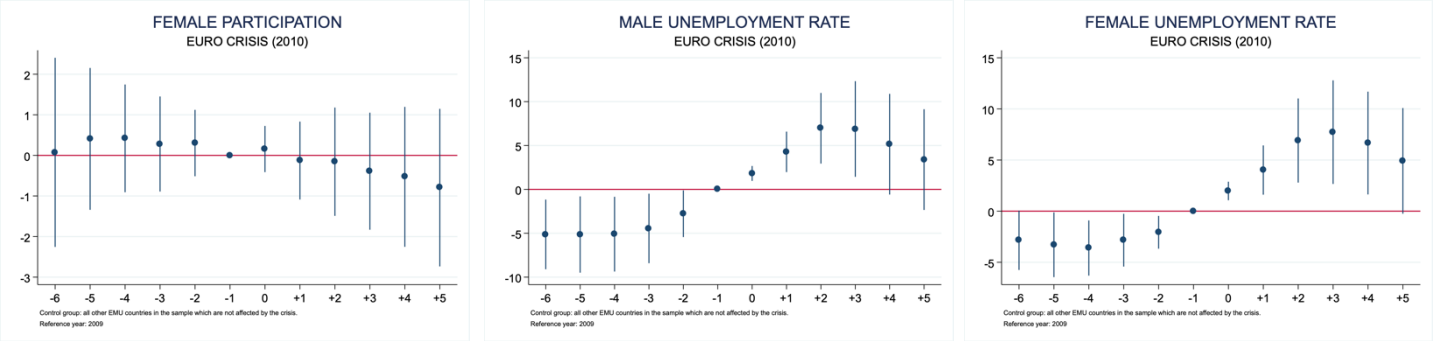
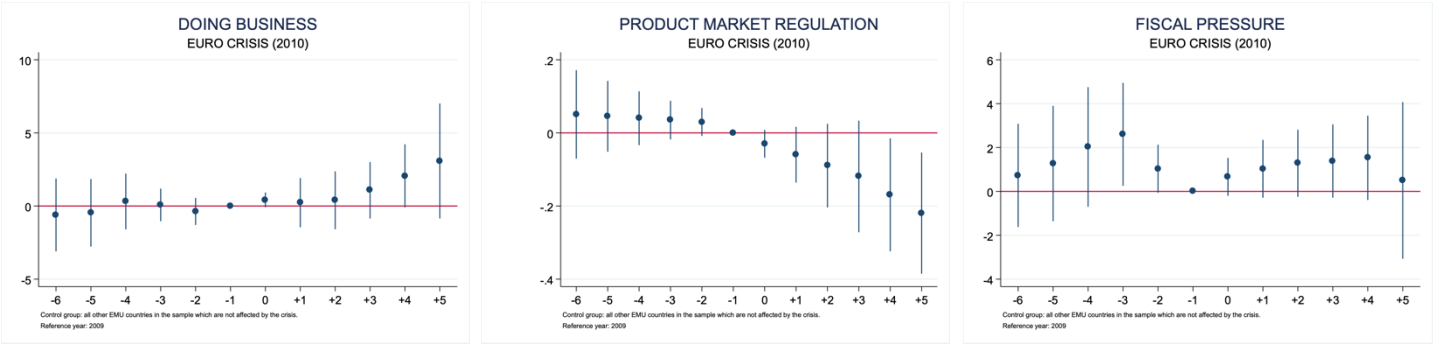


Figure 10 – Doing Business, Product market regulation, fiscal pressure – Euro crisis (2010)



Note: The year in which the event under consideration occurs is denoted by zero on the x-axis. All specifications include country and year fixed effects. The omitted year is -1. Robust standard errors clustered at the country level.
10% confidence intervals.

Figure 11 – Governance, Corruption and Shadow Economy – Euro membership (1999)

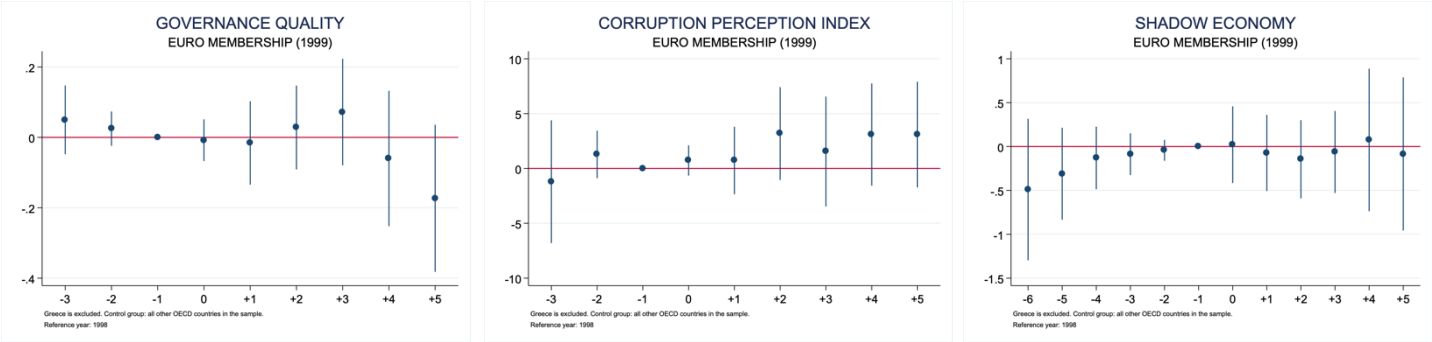


Figure 12 – Governance, Corruption and Shadow Economy – Euro crisis (2010)

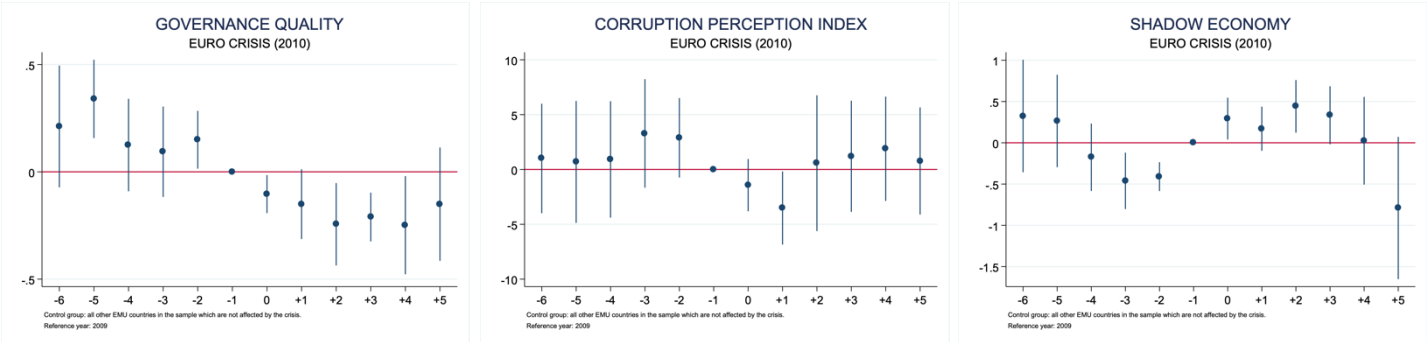
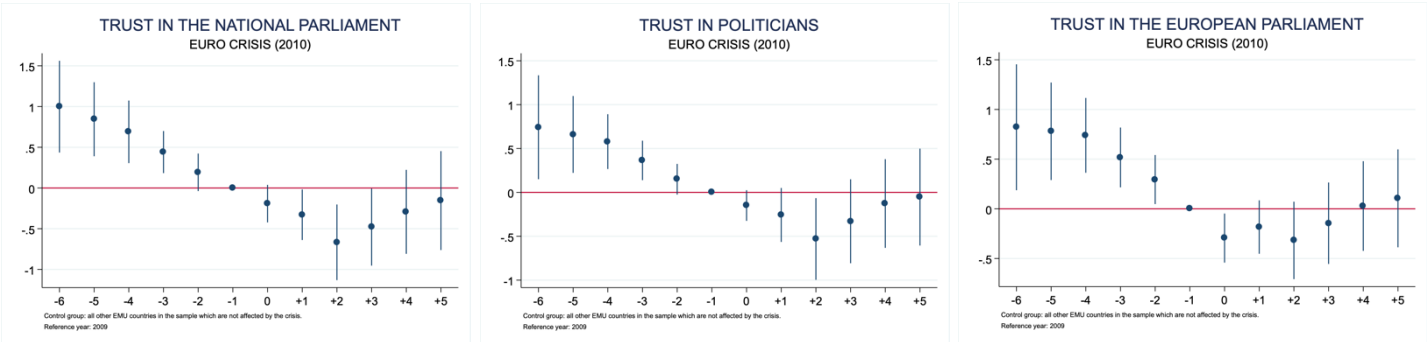


Figure 13 – Trust in Institutions – Euro crisis (2010)



Note: The year in which the event under consideration occurs is denoted by zero on the x-axis. All specifications include country and year fixed effects. The omitted year is -1. Robust standard errors clustered at the country level.
10% confidence intervals.
Because the World Governance Indicators and the Corruption Perception Index are available since 1996, in these event studies it is possible to consider only three years before 1999 (i.e., the year in which all the Euro countries under analysis joined the EMU, with the only exception of Greece, which joined it in 2001).

Figure 14 – Electoral turnout and Votes for populist parties – Euro membership (1999)

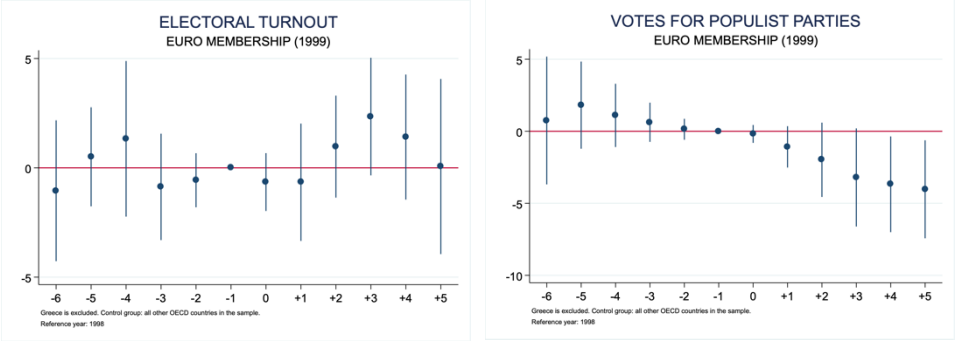


Figure 15 – Social trust, Electoral turnout, Votes for populist parties – Euro crisis (2010)

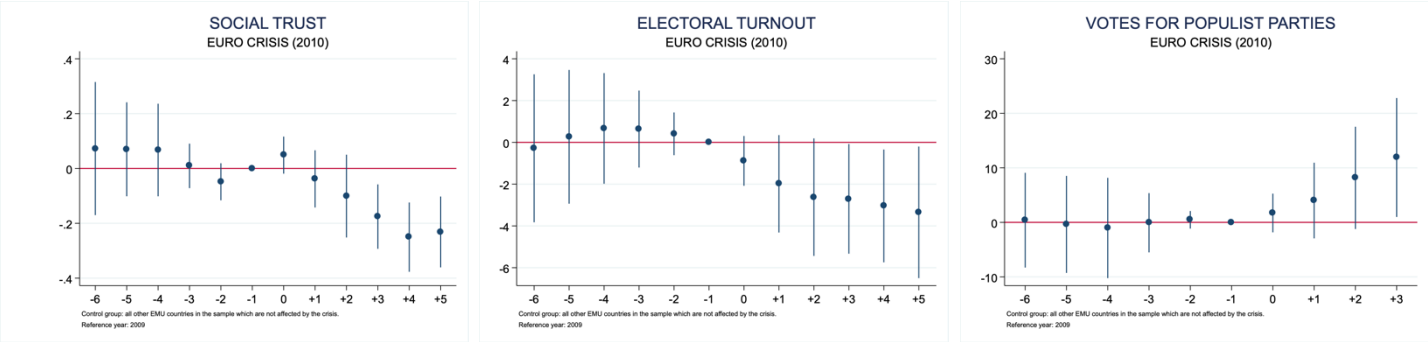
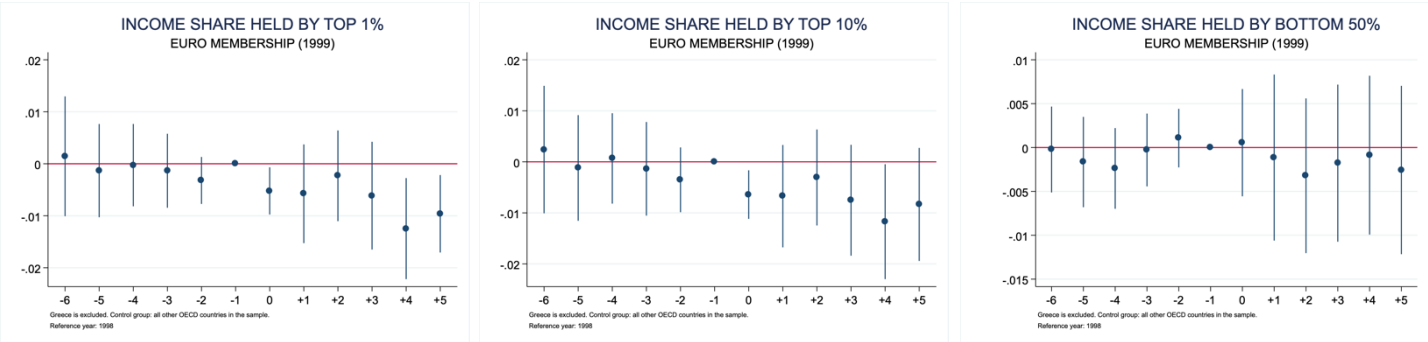
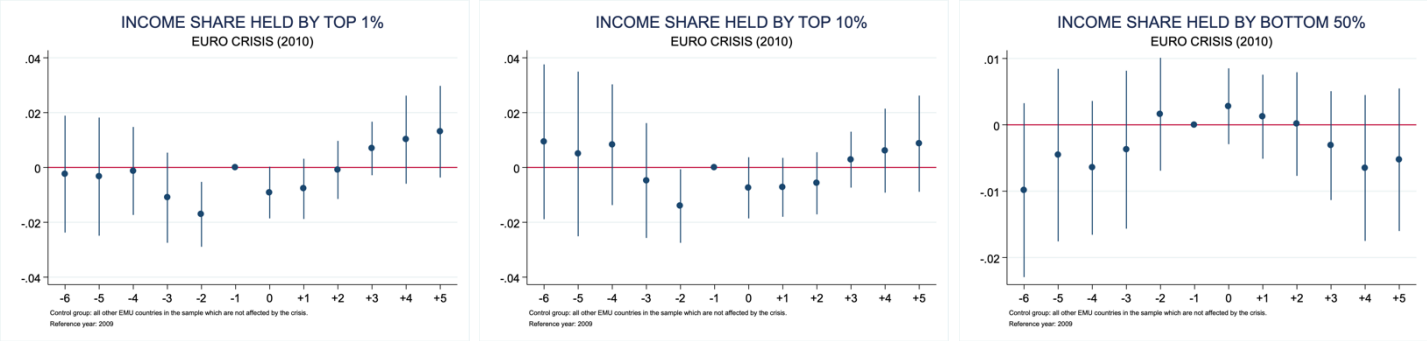


Figure 16 – Inequality of income distribution – Euro membership (1999)



Note: The year in which the event under consideration occurs is denoted by zero on the x-axis. All specifications include country and year fixed effects. The omitted year is -1. Robust standard errors clustered at the country level.
10% confidence intervals.

Figure 17 – Inequality of income distribution – Euro crisis (2010)



Note: The year in which the event under consideration occurs is denoted by zero on the x-axis. All specifications include country and year fixed effects. The omitted year is -1. Robust standard errors clustered at the country level.
10% confidence intervals.

Table 1 – Summary statistics

	Mean	*Std. Dev.*	*Median*	*Min*	*Max*
Tertiary education					
Expenditure	33.25	10.61	33.44	11.20	73.58
Students-teacher ratio	14.07	5.64	13.21	3.76	44.51
Graduates	36.15	11.34	37.60	6.57	62.96
Health care					
Expenditure	6.58	1.48	6.45	3.21	14.39
Hospital beds	5.30	2.65	4.51	2.14	15.58
HAQ	88.14	5.11	88.74	67.10	97.10
Civil justice					
Expenditure	21.12	7.61	22.10	7.70	45.70
Number of procedures	31.45	4.92	31.00	21.00	42.00
Length of trials	536.22	261.88	477.50	216.00	1711.00
Labor market					
LMP expenditure	1.97	1.20	1.79	0.24	7.07
Permanent employment protection	2.04	0.92	2.08	0.09	4.83
Temporary employment protection	1.68	1.20	1.34	0.25	4.87
Female participation	53.14	8.18	54.71	33.55	73.74
Male unemployment	6.92	3.78	6.10	1.13	25.60
Female unemployment	7.94	5.04	6.45	1.80	31.61
Regulation					
Doing Business – DTF average	77.13	6.93	79.41	57.09	89.30
Product Market Regulation	1.54	0.32	1.50	0.78	2.75
Fiscal pressure	35.67	6.50	35.10	22.66	50.81
Governance, corruption, and shadow economy					
World Governance Indicators	3.58	0.90	3.87	0.40	4.85
Corruption Perception Index	77.73	13.96	80.00	34.00	100.00
Shadow economy	14.77	5.28	13.83	6.60	29.00
Trust					
Trust in the national Parliament	4.90	0.91	4.83	2.09	6.69
Trust in politicians	3.93	0.98	3.92	1.39	5.53
Trust in the European Parliament	4.56	0.53	4.67	2.59	5.75
Social trust	5.42	0.86	5.29	3.65	6.93
Voting turnouts and populist parties, income, and inequality					
Electoral turnout	73.95	12.57	75.93	42.22	95.77
Votes for populist parties	9.82	9.80	7.80	0.00	51.12
Income share held by top 1%	0.11	0.02	0.11	0.04	0.19
Income share held by top 10%	0.34	0.04	0.33	0.23	0.46
Income share held by bottom 50%	0.21	0.03	0.21	0.13	0.28

Table 2 – Sigma and Beta Convergence – EMU countries

	Before Euro (1990-1998)	Before Crisis (1999-2009)	After Crisis (2010-2016)
Tertiary education			
Expenditure	NA	-/+	+/-
Students-teacher ratio	NA	s	--
Graduates	NA	s	+
Health care			
Expenditure	-	++	--
Hospital beds	s	++	--
HAQ	+	+	s
Civil justice			
Expenditure	NA	-	+
Number of procedures	NA	--	++
Length of trials	NA	+	--
Labor market			
LMP expenditure	++	-/+	-/+
Permanent employment protection	+	s	++
Temporary employment protection	s	++	s
Female participation	+	+	+
Male unemployment	-/+	++	--/+
Female unemployment	-/+	++	--/+
Regulation			
Doing Business – DTF average	NA	+	++
Product Market Regulation	NA	s	+
Fiscal pressure	s	+	-
Governance, corruption, and shadow economy			
World Governance Indicators	s	-	--
Corruption Perception Index	+	s	--/++
Shadow economy	--	++	-/++
Trust			
Trust in the national Parliament	NA	-	--/+
Trust in politicians	NA	-	--/+
Trust in the European Parliament	NA	s	-/+
Social trust	NA	s	-
Voting turnouts and populist parties, income, and inequality			
Electoral turnout	--	s	-
Votes for populist parties	-	+	--
Income share held by top 1%	+	s	+
Income share held by top 10%	+	s	+
Income share held by bottom 50%	+	s	+

Legend	
++	strong convergence
+	convergence
s	stability
-	divergence
--	strong divergence
-/+	divergence followed by convergence
+/-	convergence followed by divergence
NA	not available data

TABLE 3. Difference-in-differences: Adoption of the Euro (1993 – 2004)

Outcome variables	*Coefficient*	*Standard Error*	*Observations*	*R-squared*
Health care				
Expenditure	-0.130	(0.157)	262	0.626
Hospital beds	-0.0496	(0.264)	209	0.607
HAQ	0.714**	(0.284)	264	0.960
Labor market				
Expenditure	0.0410	(0.323)	237	0.440
Permanent Employment Protection	-0.0932	(0.056)	240	0.077
Temporary Employment Protection	-0.464*	(0.263)	240	0.268
Female Participation	1.830**	(0.783)	264	0.603
Male Unemployment	-0.772	(1.093)	264	0.385
Female Unemployment	-2.032*	(1.110)	264	0.469
Governance, corruption, and shadow economy				
World Governance Indicators	-0.0511	(0.076)	198	0.113
Corruption Perception Index	2.018	(2.116)	195	0.061
Shadow economy	0.132	(0.327)	246	0.564
Voting turnouts and populist parties, income, and inequality				
Electoral turnout	0.670	(1.485)	262	0.209
Votes for populist parties	-3.098	(1.786)	178	0.215
Income share held by top 1%	-0.006	(0.005)	264	0.393
Income share held by top 10%	-0.007	(0.006)	264	0.432
Income share held by bottom 50%	-0.001	(0.005)	264	0.115

Note: the table reports in the second and third column estimates of the coefficient β from equation (1) with associated standard errors for all available outcome variables. All specifications include country and year fixed effects. Robust standard errors clustered at the country level.

* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01

Table 4.1. Difference-in-differences: European sovereign-debt crisis (2004 – 2015)

Outcome variables	*Coefficient*	*Standard Error*	*Observations*	*R-squared*
Tertiary education				
Expenditure	0.201	(2.077)	122	0.200
Students-teacher ratio	2.650	(3.019)	131	0.183
Graduates	0.996	(1.870)	144	0.716
Health care				
Expenditure	-0.361	(0.342)	144	0.437
Hospital beds	-0.120	(0.427)	144	0.474
HAQ	0.078	(0.342)	144	0.948
Civil justice				
Expenditure	-1.586*	(0.844)	141	0.152
Number of procedures	-1.563*	(0.807)	141	0.555
Length of trials	35.56	(80.81)	141	0.139
Labor market				
Expenditure	0.756***	(0.225)	132	0.454
Permanent employment protection	-0.316*	(0.162)	140	0.377
Temporary employment protection	-0.280**	(0.103)	140	0.447
Female participation	-0.554	(1.138)	144	0.468
Male unemployment	8.516***	(1.965)	144	0.668
Female unemployment	7.810***	(1.834)	144	0.630
Regulation				
Doing Business – DTF average	1.381	(1.288)	141	0.521
Product Market Regulation	-0.148	(0.088)	144	0.725
Fiscal Pressure	-0.211	(1.088)	144	0.316

Note: the table reports in the second and third column estimates of the coefficient β from equation (2) with associated standard errors for all available outcome variables. All specifications include country and year fixed effects. Robust standard errors clustered at the country level.

* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01

Table 4.2. Difference-in-differences: European sovereign-debt crisis (2004 – 2015)

Outcome variables	*Coefficient*	*Standard Error*	*Observations*	*R-squared*
Governance, corruption, and shadow economy				
World Governance Indicators	-0.338**	(0.136)	144	0.454
Corruption Perception Index	-1.548	(1.710)	144	0.357
Shadow Economy	0.155	(0.250)	144	0.894
Trust				
Trust in the national Parliament	-0.874***	(0.180)	128	0.583
Trust in politicians	-0.654**	(0.220)	128	0.477
Trust in the European Parliament	-0.666***	(0.118)	128	0.615
Social trust	-0.147*	(0.067)	128	0.182
Voting turnouts and populist parties, income, and inequality				
Electoral turnout	-2.714	(1.938)	144	0.506
Votes for populist parties	7.697	(4.956)	117	0.491
Income share held by top 1%	0.008	(0.005)	144	0.275
Income share held by top 10%	-0.001	(0.007)	144	0.274
Income share held by bottom 50%	0.002	(0.003)	144	0.165

Note: the table reports in the second and third column estimates of the coefficient β from equation (2) with associated standard errors for all available outcome variables. All specifications include country and year fixed effects. Robust standard errors clustered at the country level.

* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01

TABLE 5. Difference-in-differences: Adoption of the Euro (1993 – 2004). Robustness

Outcome variables	*Coefficient*	*Standard Error*	*Observations*	*R-squared*
Health care				
Expenditure	-0.113	(0.144)	274	0.629
Hospital beds	-0.014	(0.245)	221	0.585
HAQ	0.668**	(0.264)	276	0.961
Labor market				
Expenditure	0.026	(0.320)	244	0.429
Permanent employment protection	-0.086	(0.051)	252	0.072
Temporary employment protection	-0.460*	(0.236)	252	0.266
Female participation	1.679**	(0.729)	276	0.611
Male unemployment	-0.714	(1.000)	276	0.357
Female unemployment	-1.877*	(1.010)	276	0.422
Governance, corruption, and shadow economy				
World Governance Indicators	-0.042	(0.069)	207	0.114
Corruption Perception Index	0.827	(2.121)	204	0.034
Shadow economy	0.103	(0.296)	258	0.572
Voting turnouts and populist parties, income, and inequality				
Electoral turnout	0.671	(1.390)	274	0.221
Votes for populist parties	-2.754	(1.588)	190	0.196
Income share held by top 1%	-0.006	(0.004)	276	0.394
Income share held by top 10%	-0.007	(0.005)	276	0.439
Income share held by bottom 50%	0.000	(0.005)	276	0.109

Note: the table reports in the second and third column estimates of the coefficient β from equation (1) with associated standard errors for all available outcome variables. The coding of the explanatory variable $PostEuro_{it}$ used for these estimates is described in Section 4.3. All specifications include country and year fixed effects. Robust standard errors clustered at the country level.

* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01

Table 6.1. Difference-in-differences: European sovereign-debt crisis (2004 – 2015). Robustness

Outcome variables	*Coefficient*	*Standard Error*	*Observations*	*R-squared*
Tertiary education				
Expenditure	-1.177	(1.966)	122	0.212
Students-teacher ratio	2.340	(2.543)	131	0.169
Graduates	0.873	(1.599)	144	0.715
Health care				
Expenditure	-0.352	(0.302)	144	0.437
Hospital beds	-0.036	(0.356)	144	0.471
HAQ	0.072	(0.293)	144	0.948
Civil justice				
Expenditure	-1.540	(0.874)	141	0.152
Number of procedures	-1.039	(0.656)	141	0.467
Length of trials	34.808	(64.112)	141	0.139
Labor market				
Expenditure	0.491**	(0.182)	132	0.347
Permanent employment protection	-0.285*	(0.155)	140	0.353
Temporary employment protection	-0.216**	(0.084)	140	0.370
Female Participation	-0.708	(0.941)	144	0.474
Male unemployment	6.455***	(1.244)	144	0.545
Female unemployment	6.112***	(1.176)	144	0.496
Regulation				
Doing Business – DTF average	1.679	(1.258)	141	0.536
Product Market Regulation	-0.136	(0.078)	144	0.718
Fiscal Pressure	-0.027	(0.858)	144	0.315

Note: the table reports in the second and third column estimates of the coefficient β from equation (2) with associated standard errors for all available outcome variables. The coding of the explanatory variable $PostCrisis_{it}$ used for these estimates is described in Section 4.3. All specifications include country and year fixed effects. Robust standard errors clustered at the country level.

* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01

Table 6.2. Difference-in-differences: European sovereign-debt crisis (2004 – 2015). Robustness

Outcome variables	*Coefficient*	*Standard Error*	*Observations*	*R-squared*
Governance, corruption, and shadow economy				
World Governance Indicators	-0.311**	(0.123)	144	0.434
Corruption Perception Index	-0.903	(1.658)	144	0.349
Shadow economy	0.151	(0.213)	144	0.894
Trust				
Trust in the national Parliament	-0.833***	(0.181)	128	0.588
Trust in politicians	-0.602**	(0.200)	128	0.465
Trust in the European Parliament	-0.642***	(0.184)	128	0.623
Social trust	-0.165**	(0.061)	128	0.233
Voting turnouts and populist parties, income, and inequality				
Electoral turnout	-2.166	(1.685)	144	0.483
Votes for populist parties	6.549	(3.734)	117	0.468
Income share held by top 1%	0.007	(0.006)	144	0.271
Income share held by top 10%	-0.002	(0.007)	144	0.275
Income share held by bottom 50%	0.002	(0.004)	144	0.162

Note: the table reports in the second and third column estimates of the coefficient β from equation (2) with associated standard errors for all available outcome variables. The coding of the explanatory variable $PostCrisis_{it}$ used for these estimates is described in Section 4.3. All specifications include country and year fixed effects. Robust standard errors clustered at the country level.

* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01

Appendix 1: Data

Tertiary education

- Expenditure for a student at tertiary level, as a fraction of per capita GDP (1999-2016). Source: World Bank. Available at: https://data.worldbank.org/indicator/SE.XPD.TERT.PC.ZS

- Ratio between the number of students and teachers (1998-2017). Source: World Bank. Available at: https://data.worldbank.org/indicator/SE.TER.ENRL.TC.ZS

- Share of individuals aged 25-34 holding a tertiary level degree (1998-2019). Source: OECD. Available at: https://data.oecd.org/eduatt/population-with-tertiary-education.htm

Health care

- Expenditure for health care (both public and private), as a fraction of GDP (1990-2019). Source: World Bank. Available at: https://data.oecd.org/healthres/health-spending.htm

- Number of equipped beds in hospitals (both public and private) per 1,000 inhabitants (1995-2019). Source: OECD. Available at: https://data.oecd.org/healtheqt/hospital-beds.htm

- Healthcare Access and Quality index, a score computed every five years which ranges between 0 and 100, with higher values associated to a better outcome, namely to a higher number of lives saved thanks to a prompt and effective intervention (1990-2016). Source: Institute for Health Metrics and Evaluation (IHME). Available at: http://ghdx.healthdata.org/record/ihme-data/gbd-2016-healthcare-access-and-quality-index-1990-2016

Civil Justice

- Average value of the cost of a trial, measured as the percentage of the value of the underlying claim (2004-2019). Source: Doing Business – World Bank. Available at: http://www.doingbusiness.org/Custom-Query

- Number of procedures necessary to solve a commercial dispute (2004-2015). Source: Doing Business – World Bank. Available at: http://www.doingbusiness.org/Custom-Query

- Length of trials, expressed as the number of days to enforce a contract (2004-2019). Source: Doing Business – World Bank. Available at: http://www.doingbusiness.org/Custom-Query

Labor Market

- Expenditure on Labor Market Policies in favor of groups in difficulty, like individuals who are unemployed or at risk of job loss, as a fraction of GDP (1990-2019). Source: OECD. Available at: https://data.oecd.org/socialexp/public-spending-on-labour-markets.htm

- Employment protection for permanent and temporary contracts, measured as the extent to which individual or collective dismissals are avoided on a scale between 0 and 6, with higher scores implying a stricter degree of labor market regulation (1990-2019). Source: OECD. Available at: http://stats.oecd.org/Index.aspx?DataSetCode=EPL_OV

- Female participation, measured as the share of women older than 25 who take part actively in the labor market (1990-2019). Source: International Labor Organization. Available at: http://www.ilo.org/ilostat/faces/wcnav_defaultSelection?_adf.ctrl-state=1c2i2n608h_4&_afrLoop=194376251993278&_afrWindowMode=0&_afrWindowId=1c2i2n608h_42#!

- Male and female unemployment rates, measured as the share of jobless labor force actively looking for an occupation (1990-2019). Source: International Labor Organization. Available at: http://www.ilo.org/ilostat/faces/wcnav_defaultSelection?_adf.ctrl-state=1c2i2n608h_4&_afrLoop=194376251993278&_afrWindowMode=0&_afrWindowId=1c2i2n608h_42#!

Regulation

- Doing Business – Distances to Frontier, which express through a score between 0 and 100, with higher values associated to a better performance, the efficiency of economic regulation in the fields of *Starting a Business, Dealing with Construction Permits, Getting Electricity, Registering Property, Getting Credit, Protecting Minority Investors, Paying Taxes, Trading across Borders, Enforcing Contracts* and *Resolving Insolvency* (2004-2016). Source: Doing Business – World Bank. Available at: http://www.doingbusiness.org/Custom-Query

- Product market regulation index, which measures every four years through a score between 0 and 6 the strictness of regulation, with higher values implying larger rigidity (1998-2018). Source: OECD. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=PMR

- Fiscal pressure, which is expressed as the total tax revenue as a percentage of GDP (1990-2018). Source: OECD. Available at: https://data.oecd.org/tax/tax-revenue.htm

Governance, corruption and shadow economy

- World Governance Indicators, evaluating the aspects of *Voice and Accountability*, *Political Stability and Absence of Violence*, *Government Effectiveness*, *Regulatory Quality*, *Rule of Law* and *Control of Corruption*. Each indicator takes a value between -2.5 and +2.5, with higher values associated to better outcomes (1996-2019). Source: World Bank. Available at: http://databank.worldbank.org/data/reports.aspx?source=Worldwide-Governance-Indicators

- Corruption Perception Index, which measures citizens' perceptions about corruption on a scale between 0 and 100, with higher scores attributed to lower bribing (1996-2019). Source: Transparency International. Available at: https://www.transparency.org/research/cpi

- Estimated size of shadow economy, as a percentage of GDP (1990-2015). Source: *ifo*. Available at: https://www.cesifo-group.de/ifoHome/facts/DICE/Public-Sector/Public-Finance/Taxes/tax-evasion-and-the-shadow-economy.html

Trust

- Trust in national Parliaments, in politicians and in the European Parliament, expressed every two years on a scale between 0 and 10, with larger values implying a higher level of citizens' trust in institutions (2002-2018). Source: European Social Survey (ESS). Available at: http://www.europeansocialsurvey.org/downloadwizard/

- Social trust, expressed every two years on a scale between 0 and 10, with higher scores suggesting a larger extent to which citizens trust each other (2002-2018). Source: European Social Survey (ESS). Available at: http://www.europeansocialsurvey.org/downloadwizard/

Voting turnouts, populist parties and economic inequality

- Percentage of citizens with voting rights who cast a vote at the elections for the national Parliament (1992-2019). Source: International Institute for Democracy and Electoral Assistance (IDEA). Available at: https://www.idea.int/data-tools/data/voter-turnout

- Share of votes obtained by each single competing party during the national elections for the Parliament (1992-2013). Source: European Election database. Available at: http://www.nsd.uib.no/european_election_database/election_types/parliamentary_elections.html

- Share of income held by the top 1% of the population (1990-2019). Source: World Inequality Database. Available at: https://wid.world/data/

- Share of income held by the top 10% of the population (1990-2019). Source: World Inequality Database. Available at: https://wid.world/data/

- Share of income held by the bottom 50% of the population (1990-2019). Source: World Inequality Database. Available at: https://wid.world/data/

Crisis indicators

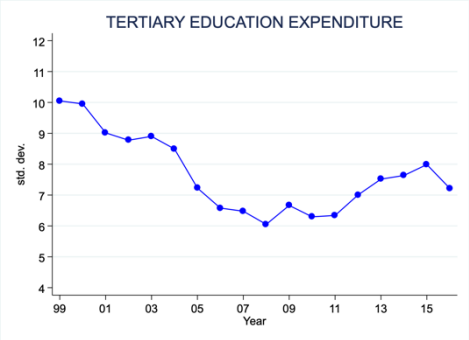
- Credit ratings attributed by Standard and Poor's (1990-2019). Source: Trading Economics. Available at: https://it.tradingeconomics.com/country-list/rating

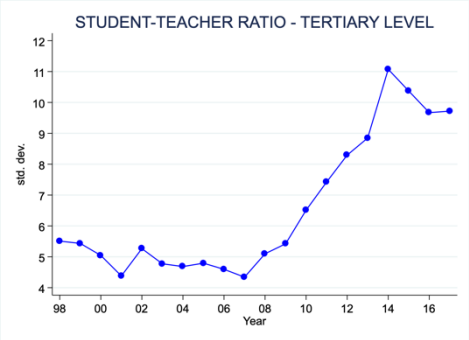
- Per capita GDP, retrieved as the ratio between GDP and population (1990-2019). Source: Penn World Tables (version 9.0). Available at: https://www.rug.nl/ggdc/productivity/pwt/

COUNTRY	ISO-2
Australia	AU
Austria	AT
Belgium	BE
Canada	CA
Denmark	DK
Finland	FI
France	FR
Germany	DE
Greece	GR
Iceland	IS
Ireland	IE
Italy	IT
Japan	JP
Luxembourg	LU
Netherlands	NL
New Zealand	NZ
Norway	NO
Portugal	PT
Spain	ES
Sweden	SE
Switzerland	CH
United Kingdom	GB
United States	US

Appendix 2: Sigma-convergence trends – EMU countries

Figure A2.1 – Tertiary education – Sigma convergence





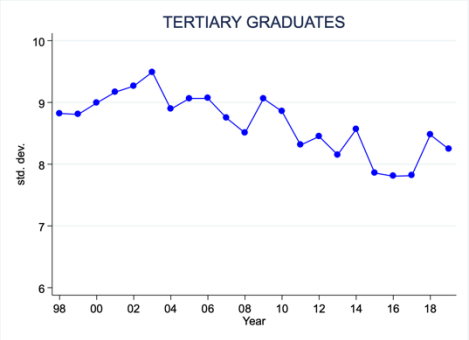
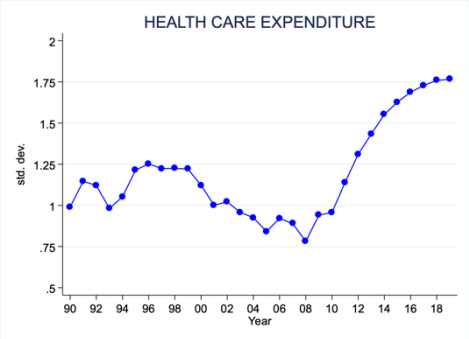
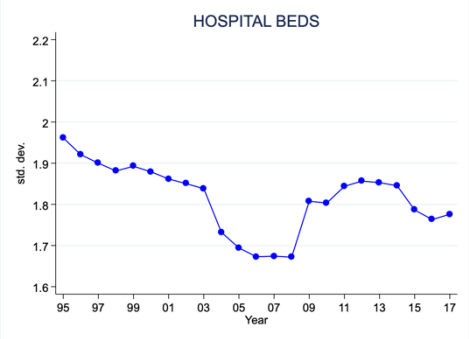


Figure A2.2 – Health care – Sigma convergence





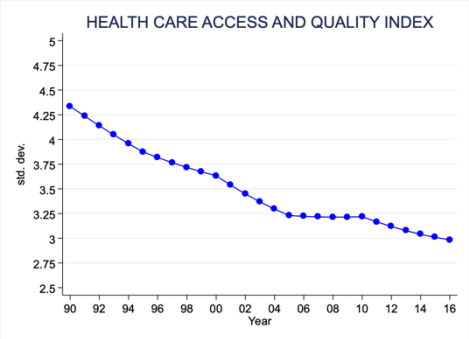
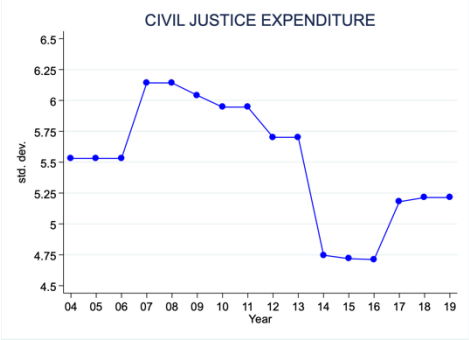
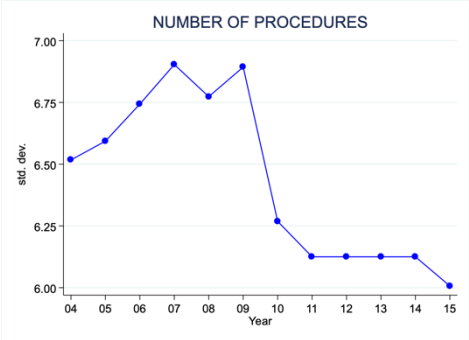


Figure A2.3 – Civil justice – Sigma convergence





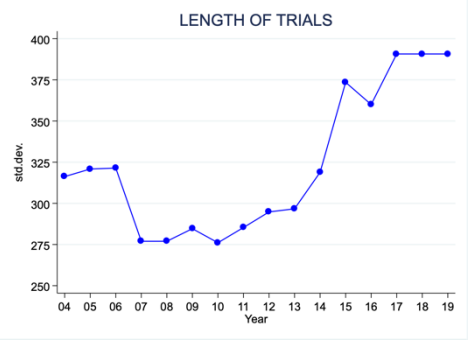


Figure A2.4 – Labor Market expenditure and employment protection – Sigma convergence

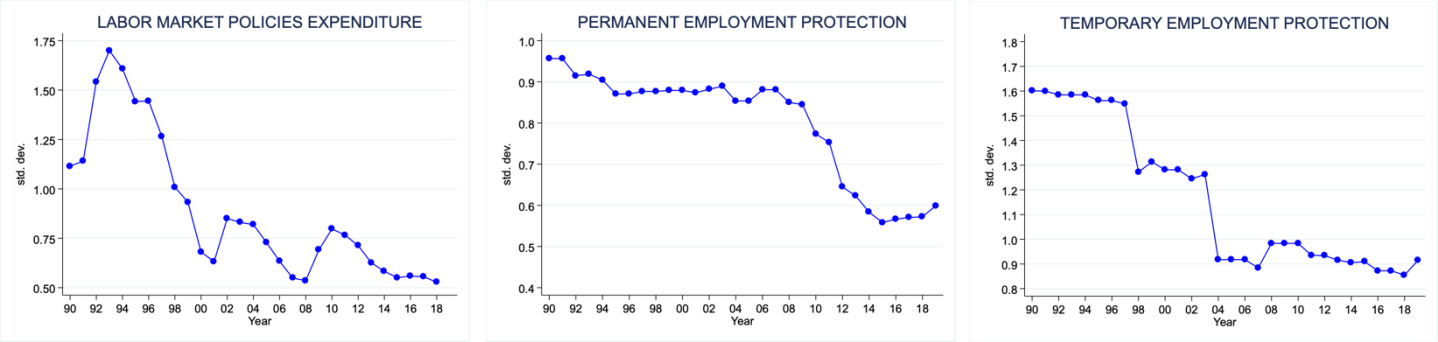


Figure A2.5 – Female participation and unemployment rates – Sigma convergence

Figure A2.6 – Doing Business, Product Market Regulation and Fiscal Pressure – Sigma Convergence

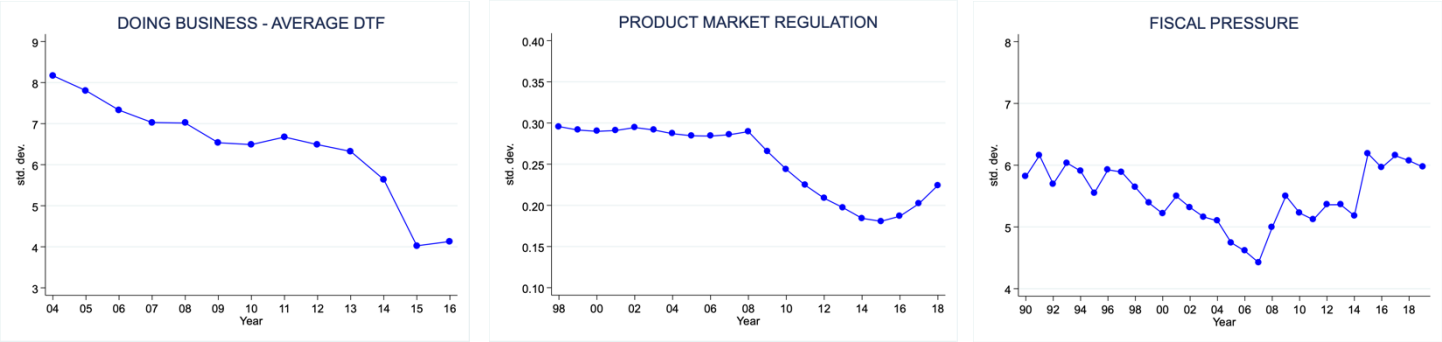
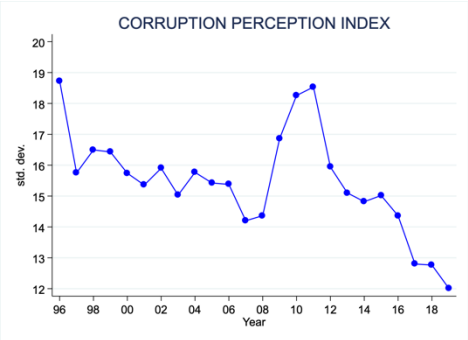


Figure A2.7 – Governance, Corruption and Shadow economy – Sigma convergence



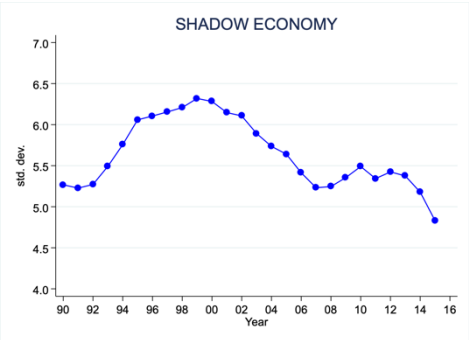
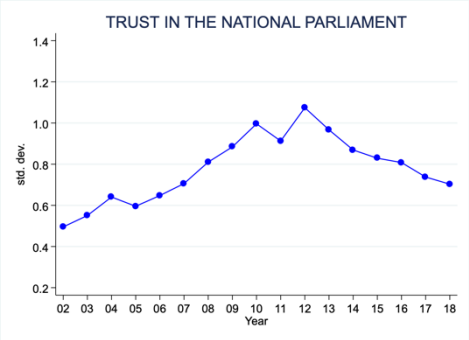
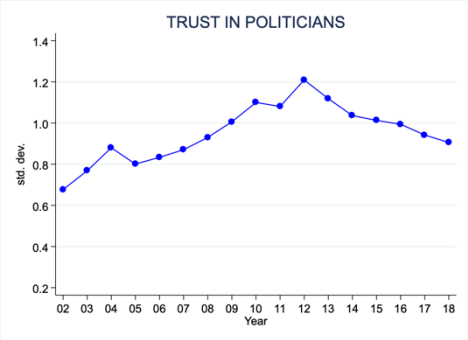


Figure A2.8 – Trust in institutions – Sigma convergence





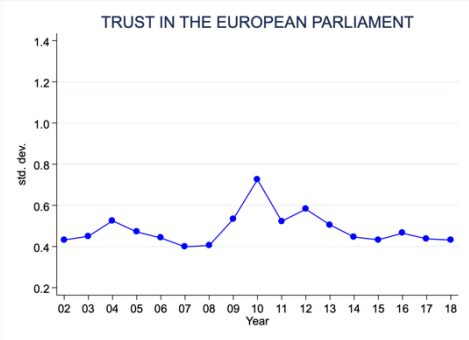
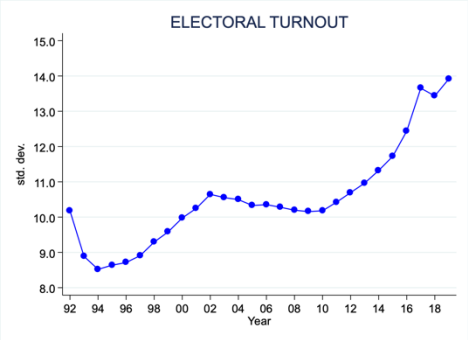


Figure A2.9 – Social trust, Electoral turnout and Votes for populist parties – Sigma convergence



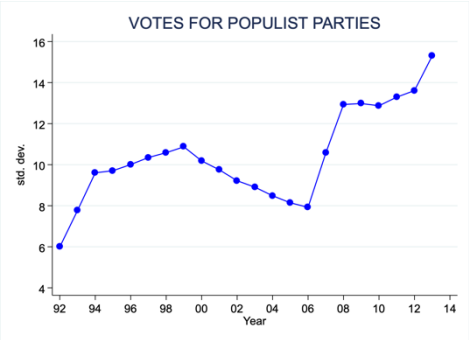
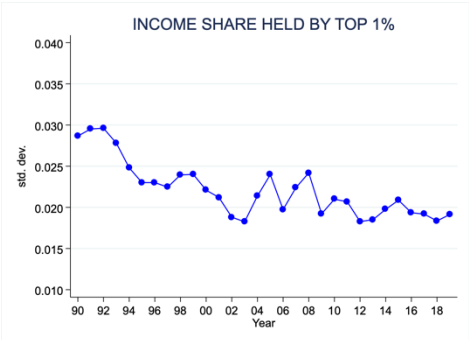
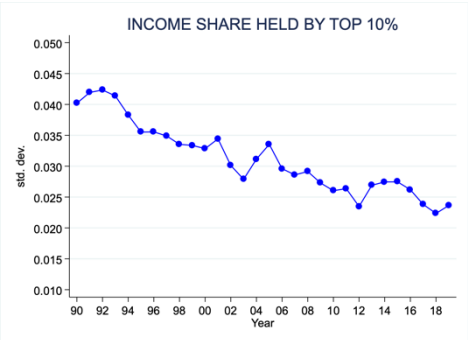
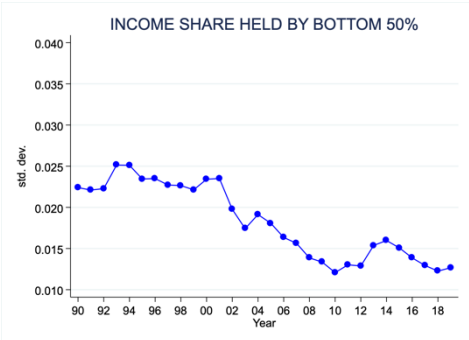


Figure A2.10 – Inequality of income distribution – Sigma convergence







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