

## Varieties of Capitalism and Income Inequality

### **Abstract:**

Why do countries diverge significantly in levels of income inequality across the Global North? Most scholars believe that the answer lies in the ways that economic resources are organized through institutions. Drawing on a country-level longitudinal dataset from 1985 to 2016 matched with three other data sources, the author explains how and to what extent institutions matter for income inequality across the ‘varieties of capitalism.’ To sort countries based on their institutional similarities, the author conducts cluster analysis and examines the extent to which institutions predict variation in the levels of income inequality, both cross-nationally and within each cluster of countries. In cross-national panel data regressions, evidence is presented that trade unions, characteristics of corporate governance, and labor market interventions such as vocational rehabilitation programs are important determinants of income inequality.

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Since the 1980s, most countries in the Global North have experienced a meteoritic rise in income inequality. While the magnitude of change varies substantially across countries, the broad trend is unmistakable: rising income inequality has been the defining challenge of societies in late capitalism. Research on income inequality from across three disciplines namely economics, political science and sociology has put forward four main explanations: (1) skill-biased technical change: a shift in the production of technology that favors skilled over unskilled labor by increasing its relative productivity and, therefore, its relative demand (Autor, Katz and Krueger 1998; Acemoglu 1998, 2002; Autor, Levy, and Murnane 2003; Katz and Murphy 1992; Bluestone and Harrison 1988); (2) decline of organized labor, stagnation of welfare state generosity, and the ever-weakening standards of employment protection as a result of the new dominant neoliberal regime (Lemieux 2008; Western and Rosenfeld 2011; Brandolini and Smeeding 2011, Kenworthy and Pontusson 2005; Rueda and Pontusson 2000; Pontusson, Rueda, and Way 2002); (3) tax policies, changes in compensation practices, and the rise of the “top-earners” epitomized by the premiums associated with high salaries of top management, particularly in the United States (Piketty 2014; Piketty and Saez 2006; Beckfield 2006, Cernat 2004, Leigh 2009); and (4) changes in family formation and practices such as assortative mating and a significant increase in the number of single mother families (Bramlett and Mosher 2002, Goldstein and Kenney 2001; Schwartz 2010).

In the sociological tradition, social stratification research often relies on human capital centric variables (i.e. educational attainment, parental resources, network of social capital) in order to predict social and economic inequalities among individuals (Western, Bloome, and Percheski 2008; McCall and Percheski 2008). But while the human capital approach in the social stratification research related to the study of income inequality is informative, there is a wide consensus among scholars from across social science disciplines that much of social and economic inequalities

observed both within and between countries are directly resulted from the ways in which economic resources are organized through institutions (Kenworthy and Pontusson 2005; Rueda and Pontusson 2000; Pontusson, Rueda, and Way 2002; Lemieux 2008). This behooves us to pay close attention to the role that institutions—and not *just* individual attributes—play in generating distributive outcomes (Beramend and Rueda 2014). Hence, drawing from political science and economic sociology, an important body of scholarship has developed known as the “varieties of capitalism” (henceforth, VoC) that underscores the important role of institutional configurations across different countries in producing socioeconomic outcomes (Hall and Soskice 2001).

The VoC approach was first articulated by Peter Hall and David Soskice in their seminal introductory book *Varieties of Capitalism* (2001) where they set out, in the Weberian sense, two ideal-types of capitalist economies namely, liberal market economies (i.e., U.S., U.K., Canada, Australia, New Zealand, Ireland) and coordinated market economies (i.e., Germany, Austria, Switzerland, Belgium, Japan). Institutions lie at the heart of the VoC approach to the study of economy and society, and the differences in their design implicates economic and social outcomes including macroeconomic growth, living standards, employment relations, patterns of technical change as well as social and economic inequalities among others (Hall and Soskice 2001; Streeck and Yamamura 2001; Yamamura and Streeck 2003, Schmidt 2002, Amable 2003; Baccaro and Pontusson 2016; Hope and Soskice 2016). VoC understands capitalism not as a *unified* or *static* economic system, but one that varies significantly across time and space—and the sources of these variations are identifiable: they lie in “system coordination” and “institutional complementarities” (Hall and Soskice 2001a, 2001b: 17; Deeg 2005). Here, institutional complementarities refer to a set of sub-systems that not only govern capital and labor but also mold capitalist models, and when presented in the “right” form, increase aggregate welfare and reduce income and social inequalities. In effect, institutional complementarities create a significant degree of *coordination capacity*, one that is independent of market’s coordination capacity. In this sense, the famous German vocational

training system and the extensive Norwegian social security network are conspicuous examples of such institutional complementarities. Essentially, the VoC literature seeks to underscore the importance of *non-market* coordinating forces, emphasizing the interventions of the state to not *just* ‘de-commodify’ social services (Esping-Andersen 1990) but also coordinate economic actions such that standards of living are raised and social disparities are reduced. Using this framework, variation in the levels of income inequality observed within different countries can be re-examined in a way that compliments and extends the existing literature on institutions and income inequality.

How do institutional complementarities—differences in institutional designs and blueprints across the Global North—explain the divergent levels of income inequality that we observe? After all, there is already a large body of scholarly work, suggesting that much of economic and social inequalities are the direct results of the ways in which economic resources are organized through institutions and their *interactions* with each other (Acemoglu and Robinson 2015; Krueger 2012; Piketty and Saez 2003; Piketty, Saez, and Zucman 2018; Piketty 2014). Indeed, by any measures, the levels of income inequality have risen dramatically in the developed world, particularly the United States (See Figures 1 and 2 below). This study will therefore explore the institutional determinants of income inequality, both across and within regimes<sup>1</sup> of capitalism, on both sides of the Atlantic. It examines how and to what extent institutional complementarities within different regimes of market economies produce such divergent levels of income inequality. In this context, institutions signify both codified rules or formal arrangements as well as various domains of policymaking (Hall and Sockice 2001).

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<sup>1</sup> I use the terms “variety” and “regime” of capitalism interchangeably in this paper.

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**Figure 1.**

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**Figure 2.**

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In particular, this paper makes three major contributions to the research on institutions and income inequality. First, it demonstrates that public expenditure on vocational rehabilitation programs, an important form of labor market intervention, inhibits income inequality cross-nationally. Vocational rehabilitation programs provide stable employment opportunities with benefits to individuals with disabilities, facilitating their labor market participation despite physical limitations. To the best of my knowledge, this study is the first that examines the effect of vocational rehabilitation programs and training programs on the levels of income inequality cross-nationally (OECD 2019, also see the bivariate scatterplot in Figure A2, Appendix A). Second, I test the relationship between the volume of companies listed on a country’s stock exchanges on the levels of income inequality, highlighting an important institutional dimension of corporate governance. Previous research has demonstrated that financialized<sup>2</sup> corporate governance is associated with higher levels of income inequality cross-nationally (Mahutga, Roberts, and Kwon 2017; Kwon, Roberts, and Zingula 2017; Godechot 2016; Flaherty 2015; Huber, Petrova, and Stephens 2020). However, the relationship between the *mode* of capital allocation to firms and the levels of income

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<sup>2</sup> Financialization is often described as a pattern of accumulation and economic activities relating to “the provision (or transfer) of liquid capital in expectation of future interest, dividends, and capital gains” (Krippner 2005:175-176).

inequality within countries has not been explored. This is another critical void that this research fills. Capital is allocated to firms predominantly through two major channels under different regimes of capitalism: stock exchanges in a liberal market economy such as the United States vs. relational banking (i.e., long-term lending) in a coordinated market economy such as Germany (Hall and Soskice 2001; Aoki 1994; Witt and Jackson 2016). I find that capital allocation through stock exchanges leads to higher levels of income inequality within countries, and that the mode of capital allocation to firms bears on distributive outcomes.

Finally, instead of taking for granted the existing typologies depicted in VoC, I take an inductive approach to generating a novel typology using cluster analysis, one that also takes into account the effect of *time* given that institutions are not static and subject to change over time (Thelen 2014). I use this methodology to examine the determinants of income inequality *within* the regimes of capitalism that are identified through clustering. The endogenous evolution of institutions and political equilibrium, as Acemoglu and Robinson (2015) argue, influence how markets function and how the gains of economic actions and arrangements are distributed to the public. The constructed time-series data that I employ enables us to investigate this dynamic character and endogenous evolution of institutions over time and examine their effects on the rising levels of income inequality across various regimes of capitalism.

In what follows, I will first identify the institutional spheres by which we can distinguish varieties of capitalism. Second, I will conduct cluster analysis in order to sort and group countries based on their institutional similarities. The VoC scholars have put forward numerous typologies in order to categorize national economies (Hall and Soskice 2001; Amable 2003; Whitley 1999). By conducting cluster analysis, I avoid taking for granted the existing typologies that we are bequeathed. But rather, I take an inductive, “morphological” approach to generating a typology by

'letting the data speak for themselves' (Ermakoff 2019). Third, I will use the clusters generated to examine the determinants of income inequality *within* each regime of capitalism. Drawing on a uniquely constructed cross-national, panel data entitled "Comparative Welfare States in the 21st Century" (Brady, Stephens and Huber 2020) matched with two other data sources namely, the Global Economy Dataset (2018) and World Intellectual Property Organization (WIPO) Statistics Data (2020), I identify the determinants of income inequality in various regimes of advanced capitalist economies. In so doing, I explore the extent to which institutional complementarities within varieties of capitalism matter for explaining divergent distributive outcomes such as income inequality.

### **VARIETIES OF CAPITALISM (VoC)**

The VoC literature identifies five spheres within which firms coordinate their activities with other actors (Hall and Soskice 2001; Hall and Gingerich 2009; Streeck and Yamamura 2001; Yamamura and Streeck 2003, Schmidt 2002, Amable 2004; Morgan et al. 2005). The first sphere is industrial relations. Coordination of collective action, strikes, bargaining over wages and working conditions are usually undertaken through workers' associations and labor unions, which fall in the sphere of industrial relations. The labor force in liberal market economies (LMEs) tends to be less organized and unions tend to be both weaker and fewer in numbers than that of coordinated market economies (CMEs) (Hall and Soskice 2001, Kenworthy 2005). CMEs set wages through industry level bargaining between trade unions and employer associations, and by equalizing wages at equivalent skill levels across an industry, this version of capitalism makes it difficult for firms to poach workers. The upshot is that workers tend to be more loyal to their employers in CMEs than LMEs (Hall and Soskice 2001; Thelen 2007).

The second sphere is a set of labor market interventions through vocational training and rehabilitation programs. While the LMEs tend to invest in general—‘portable’—skills transferrable across firms rather than company and asset-specific skills, the CMEs have a labor force with a high degree of industry and *asset-specific* skills, usually trained through various apprenticeship programs. Industry-level employer associations and trade unions supervise the publicly subsidized training systems. In this vein, Germany is a canonical example of such labor market interventions in the form of vocational training and rehabilitation programs (Thelen 2007; Amable 2003). Career trajectories in CMEs, therefore, tend to be stable while fluid labor markets in LMEs incentivize poaching and employees’ movement between firms (Hall and Soskice 2001). Additionally, the CMEs exhibit significantly larger expenditure on vocational rehabilitation programs compared to the LMEs.

The third sphere is corporate governance, which concerns the question of how capital is allocated to firms in either of the two varieties of capitalism. While the LMEs encourage firms to be attentive to the current earnings and the price of shares in the equity market and secure funds through stock market, firms in CMEs usually secure funds through “patient capital” and through relational banking (Vitols et al. 1997, 2005). Capital is allocated to firms (large and small) through stock and equity markets in LMEs, whereas firms in CMEs depend on bank-coordinated capital allocation (Witt and Jackson 2016). The difference in access to the sources of finance between LMEs and CMEs is not arbitrary nor contingent. As Aoki demonstrates, if the financial markets in the CMEs are deregulated in the way they are in the LMEs, facilitating long-term employment will face serious challenges, and as a result, it becomes harder for firms to recruit skilled labor or sustain worker loyalty (1994; Jackson and Miyajima 2007). It is thus with reason that countries across the VoC exhibit different degrees of “financialization” of national economies which then implicates both capital allocation to firms and the levels of income inequality.



The fourth sphere is the internal management of the firms and the degree of employment protection across various sectors of the economy. It is often the case that in CMEs, company-level workers councils—composed of elected employee representatives—are usually endowed with considerable authority over layoffs, which stands in glaring contrast with LMEs’ ‘employment at will’ tradition. In LMEs, the upper echelon of the firms has almost unilateral control over the decision-making processes, including substantial autonomy to hire or fire for a good reason, bad reason and no reason at all. In CMEs, however, top managers of the firm must secure agreement for major decisions from supervisory boards, which include employee representatives as well as major shareholders (Aoki 1994, Jackson and Miyajima 2007). The German ‘co-determination’ councils in firms involve workers to participate in the internal management of the firms, which increases the participatory dimension of workers in the managerial domain (Turner et al. 2001). Hence, the lack of employer coordination in LMEs is indicative of a less regulated and more flexible labor markets. The direct result of this is that LMEs feature considerably less employment protection compared to CMEs.

The fifth sphere is innovation and technological change. Hall and Soskice proposed that LMEs and CMEs show distinct patterns of institutional comparative advantage for radical or incremental innovations. Radical innovation “entails substantial shifts in product lines, the development of entirely new goods, or major changes to the production process,” whereas incremental innovation is “marked by continuous but small-scale improvements to existing product lines and production processes” (2001, 381). Hall and Soskice conclude that the combination of factors such as patient capital, long term employment, and firm-specific skills in the CMEs enable more efficient production in industries with incremental patterns of innovation, because the relative immobility of labor and capital restrained firms to focus their efforts on improving existing lines of

production. Conversely, fluid capital markets with short-term employment and general skills in LMEs facilitate efficient production in industries with radical patterns of innovation, as these conditions support firms using external markets to mobilize risky equity finance and workers with different skill sets, and thereby take advantage of new technological breakthroughs.

These are the five spheres by which the institutional diversity across national contexts presents itself in a more pronounced way. Indeed, there is a general consensus among scholars that significant variation exists across these core institutional domains, including` industrial relations, employment relationship, financial systems, interfirm networks, corporate governance, and of course, the characteristics of the state itself (Hall and Soskice 2001; Witt and Redding 2013; Hall and Gingerich 2009; Whitley 1999). A number of studies have attempted to explore how such differences allow categorization of distinct types of institutional configurations that go beyond Hall and Soskice’s original binary categorization of LMEs and CMEs (2001). For example, Amable (2003) identifies five versions of capitalism namely, market-based, Asian, Continental European, social-democratic, and Mediterranean. Looking beyond the Global North and the “developed” countries, the typologies of the VoC have also been extended to the Global South (Witt et al. 2015). Additionally, Schneider and Panuescu (2012) use cluster analysis incorporating data in different points in time to investigate how countries can be grouped together based on their institutional configurations.

Rather than assigning countries to the categories of the VoC based on previous research and taking for granted the taxonomies they have put forward, I take an inductive and *morphological approach* to generate a typology in order to empirically demonstrate how countries can be group together in terms of their institutional designs (Ermakoff 2019).<sup>3</sup> As a result, I conduct cluster

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<sup>3</sup> As noted, there have been attempts to use principal components analysis (PCA) technique to group countries together, but their clustering of countries have either strictly centered around welfare state literature (Kenworthy and Hicks

analysis by employing variables connected to the five spheres of institutional configurations across the VoC. Those five spheres that I enumerated are universally accepted to be different from each variety of capitalism to another (Hall and Soskice 2001; Amable 2003; Witt and Redding 2013; Hall and Gingerich 2009; Whitley 1999; Schneider and Panuescu 2012). A cluster, in this sense, refers to a collection of data points aggregated together because of certain similarities (Everitt et al. 2011). The variables by which I cluster countries together include: union density (i.e., defined as net union membership as a percentage of employed wage and salary earners), wage setting coordination (i.e., degree of coordination in setting wages by firms, industries, and the state), employment protection (i.e. an index signifying the degree of employment protection), public expenditure in vocational rehabilitation programs, stock market capitalization as a percent of GDP, and patent rate. It is worth emphasizing that the selection of these variables is not arbitrary, they are based on the difference in institutional spheres that I delineated above. Indeed, in all attempts at generating taxonomies of VoC, a combination of the variables that I underscored above have been taken into account (Hall and Soskice 2001; Whitley 1999; Amable 2003; Witt and Redding 2013; Hall and Gingerich 2009; Schneider and Panuescu 2012).

Cluster analysis in this paper is conducted using the *k*-means technique, which is one of the popular algorithms to group data objects given their similarities. That is to say, a data point is considered to be in a particular cluster if it is closer to that cluster's centroid than any other centroid. In effect, *k*-means clustering aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean, which serves as a prototype of the cluster. The clusters generated can also be statistically tested in order to obtain the optimal number of

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2002) or have been old (Hall and Gingerich 2009; Schneider and Panuescu 2012) using data limited to the period 1990-2005. As already noted, institutions are dynamic (Acemoglu and Robinson 2015), which necessitates a more up-to-date cluster analysis. The cluster analysis in this paper makes use of the latest longitudinal data on institutional variables in order to take into account the effect of time by averaging the values of the components for the time span of the study.

clusters. The cubic clustering criterion (CCC) test is conducted to estimate the number of clusters using Ward's minimum variance and the performance of the CCC is evaluated by Monte Carlo methods. After conducting cluster analysis, the CCC score indicated that 3 is the optimal number of clusters. Appendix (A) at the end of this paper includes a discussion of the *k*-mean cluster analysis algorithm as well as its technical dimensions.

As Table 1 below demonstrates, countries are clustered around 6 main components that are universally taken to address institutional designs and complementarities in the VoC literature (Hall and Soskice 2001; Hall and Gingrich 2009; Iversen and Soskice 2009; Schneider and Panuescu 2012; Whitley 1999). Countries that have the lowest average of union density, wage setting coordination, employment protection but the highest level of stock market capitalization and patent rate are the liberal market economies (see Table 1 below). Conversely, those countries that have the highest average of union density, wage setting coordination, employment protection and expenditure on vocational rehabilitation are the social democratic market economies. Those countries that fall in between this continuum are the coordinated market economies. In Figure 3 below, social democratic market economies are located around the centroid of the first cluster while liberal democratic market economies are located around the centroid of the third cluster. One can easily note the enormous difference in the average of union density, wage bargaining coordination as well as stock market capitalization between clusters in Table 1 below.

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**Table 1.**

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**Figure 3.**

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It must be emphasized that the cluster analysis in this research takes into account the important effect of *time*, given that institutions are not static; they change over time. Indeed, as the ‘liberalization thesis’ suggests, some of the institutional characteristics of national economies (i.e., employment protection and union density) have considerably changed since the 1990s (Lucio and Howell 2017; Hall and Thelen 2009; Schneider and Panuescu 2012). By incorporating the average values of the time-varying institutional variables in the cluster analysis, I take into account the time effect. The most conspicuous advantage of my approach is some of the noticeable changes we see in the typology presented here compared to others (Hall and Soskice 2001; Hall and Gingrich 2009; Iversen and Soskice 2009; Hicks and Kenworthy 2003). For example, Japan has always been taken as a CME, whereas Ireland has been considered to be an LME, but that is not the case here. Both Japan and Ireland have moved in opposite directions, the former towards LMEs and the latter towards CMEs precisely because the analysis is not based on just one point in time, but on the average of the principal components over the time span of this study (See Figure 3).<sup>4</sup>

## **DATA AND VARIABLES**

I explicated the theoretical foundation of the institutional differences within varieties of capitalism. To empirically test how those differences in institutional designs of advanced capitalist economies affect the levels of income inequality, I use cross-national fixed-effect regression

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<sup>4</sup> To be sure, I also averaged the principal components by only the past 10 years (2006-2016) in order to account for the most recent institutional changes and re-conducted cluster analysis. The results of the cluster analysis are consistent when the time span is limited to only last decade.

models. The time period of the panel data for this study is from 1985 to 2016. This section details the data, method, and variables that are used in the empirical analysis. Drawing on multiple panel datasets namely, Comparative Welfare Dataset (Brady, Huber, and Stephens 2020),<sup>5</sup> the Global Economy (2019), and the World Intellectual Property Organization (WIPO, 2020), I examine the extent to which institutional complementarities matter for determining the levels of income inequality across various regimes of capitalism. Detailed statistical description of the variables for each country is presented in Table A1, Appendix (A) at the end of the paper.

I incorporate a host of variables that directly pertain to the institutional complementarities across varieties of capitalism. Table 2 below presents the definition and the sources of the variables included in this study. The variables that have already been examined in other cross-national studies on income inequality include: (1) union density; (2) wage setting coordination; (3) unemployment rate; (4) employment protection in legislation; (5) stock market capitalization as a measure of financialization; (6) total public expenditure on social benefits and welfare as a percentage of GDP<sup>6</sup> (Rueda and Pontusson 2000; Alderson and Nielsen 2002; Roberts and Kwon 2017; Godechot 2016; Mahutga, Roberts, and Kwon. 2017, Huber, Petrova, and Stephens 2020). The variables that have not yet been tested in previous research on income inequality from the VoC perspective that I test in this study include: (7) public expenditure on vocational training programs as a percentage of GDP; (8) public expenditure on vocational rehabilitation programs as a percentage of GDP; (9) listed companies on stock exchange as a dimension of corporate governance as to how capital is allocated to firms; (10) patent rate as a measure of technical change; (11) Tax revenues as a

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<sup>5</sup> Some of the key variables are missing after 2016 in the Comparative Welfare Dataset (2020), even though other variables are updated until 2020. Hence, I limit the time span from 1980-2016 not to compromise the high quality of the panel dataset.

<sup>6</sup> It should be noted that I also included the welfare state generosity index constructed by Scruggs et al (2010) as an alternative measure to public expenditure on total social benefits, but since Scruggs' dataset is not extended after 2010, it would severely limit my sample size. Hence, I include the public expenditure on total social benefits as a comprehensive measure that captures every aspect of welfare expenditure: healthcare, old-age and sickness benefits, etc.

percentage of GDP, which is a measure of the degree to which the government controls economic resources since it includes all forms of taxes levied (i.e., income, profits, payroll, ownership and transfer of property, goods and services, etc.) (OECD 2019). There are two controls included in the research design of the paper: globalization and population. Given the salience of the globalization thesis in the study of income inequality (Hager 2018; Alderso and Nielsen 2002; Kollmeyer 2015; Roberts and Kwon 2017), I control for trade openness defined as the sum of exports and imports as a percentage of GDP at current prices, which is often used as a measure of globalization (Rueda and Pontusson 2000). Additionally, in auxiliary analysis, I also controlled for volume of imports from the Global South as a measure of deindustrialization and the proportion of single mother families to account for demographically oriented explanation of income inequality. Both of these measures, however, suffer from significant number of missing data, which would severely curtail my sample size and the time span of the study. But even when I include these controls for much smaller sample, the results are consistent.

The outcome variable incorporated in this study is Gini coefficient (post-tax-and-transfer) for household income. The choice to use this outcome variable was not arbitrary. First, there was no missing data for this variable and OECD's series of Gini coefficients are of the highest quality data on income inequality that we have available cross-nationally. Second, income generated from employment accounts for the lion's share of earnings in countries of the Global North and the distribution of income from employment by other measures (i.e., 90/10 ratio) correlate quite closely with cross-national measures of income distribution such as the Gini coefficient. Third, the post-tax-and-transfer Gini coefficient is a better measurement of income inequality compared to pre-tax-and-transfer Gini coefficient because the former takes into account the households' *disposable* rather than gross income (Rueda and Pontusson 2000; Pontusson et al., 2002; Piketty 2014). Fourth, and as a robustness check, I test the analysis with Solt's standardized inequality database, but the

results were similar (2020).

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**Table 2.**  
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## **METHODS**

Since the dataset analyzed here is structured as a multilevel panel dataset where repeated measures of income inequality and other variables are nested within time and countries, I use a fixed-effects model to account for the heterogeneity of unobserved variables. It should be noted that I initially modeled the data as a random-effects specification, but after running the Hausman test, the random-effects specification was resoundingly rejected at  $\alpha < 0.001$ .

Fixed effects regression models are widely used in longitudinal and panel data in the social sciences (Angrist and Pischke 2008), and their virtue lies in their ability to adjust for unobserved, unit-specific and time-invariant confounders when estimating effects from observational data (Halaby 2004; Imai and Kim 2019). But while fixed effects models adjust for unobserved and time-invariant confounders, time-varying omitted variables may still confound the estimates. Finding a way to adjust for time-varying confounders in a fixed effect model has recently been an important area of discussion in the use of panel data in social science research (Halaby 2004; Imai and Kim 2019). An important strategy to adjust for time-varying confounders has been centered around including lagged endogenous variables (Halaby 2004; Imai and Kim 2019). Therefore, in order to



account for the time-varying confounders (in addition to the time-invariant ones), I lag all of the time-varying covariates in the model demonstrated below:

$$Y_{it} = \beta_1 + \beta_2 X_{1it-1} + \beta_3 X_{2it-1} + \beta_4 X_{3it-1} \dots + \xi_{0i} + \varepsilon_{ij} \quad (1)$$

Equation (1) is a fixed-effects regression model with country-specific intercept  $\beta_1 + \xi_{0i}$ , where  $\xi_{0i}$  is a fixed parameter.  $X_{it-1}$  represents time-varying explanatory variables with a time lag of one year. Since fixed effects regressions model within group (i.e., country, in my case) variation, I also include the results of random effects model in Table A2 of Appendix (A) in order to demonstrate how they may be different if we were interested in between-country variation. The results are by and large consistent in both random and fixed effects models.

I examine multiple models of the determinants of income inequality across 21 countries in the Global North. Four models are presented in Table 3: Model (1) incorporates a whole array of variables that are directly connected to the institutional complementarities of national economies but does not restrict the sample to any variety of capitalism. It is crucial to note that what matters for the levels of income inequality in liberal market economies could very well be different than that of social democratic market economies. In order to investigate how and to what extent the effects of institutions *vary* across the varieties of capitalism, I restrict the sample to those countries that fall under each regime of capitalism namely, liberal market economies (LMEs), coordinated market economies (CMEs), social democratic market economies (SDMEs). I then run the fixed effects model with lagged independent variables separately for each variety of capitalism in order to demonstrate the *within-regime* determinants of the levels of income inequality. Models (2, 3, and

4) in Table 3 demonstrates the determinants of the levels of income inequality within each regime of capitalism.

## RESULTS

Considering that I present the results from fixed effects models with lagged endogenous independent variables, the coefficients demonstrate the effect of temporal change in independent variables on change in the dependent variables. To ease interpretation, I standardize the coefficients, so that the effect size of each independent variable can also be compared more easily to others. Table 3 demonstrates the results for the determinants of the levels of income inequality across the varieties of capitalism. Model (1) in Table 3 demonstrates the results cross-nationally, with no sample restriction. The organizational power of the working class measured by union density as well as public expenditure on vocational rehabilitation programs inhibit income inequality, whereas capital allocation to firms through stock markets (i.e., listed companies on stock exchanges) and financialized corporate governance (i.e., stock market capitalization) incubate it.

The results of my analysis exhibit two novel findings. First, the persistent *negative* effect of changes in public expenditure on vocational rehabilitation programs—a vastly underexplored area in cross-national research on inequalities—on the levels of income inequality. Public expenditure on vocational rehabilitation programs is aimed at facilitating labor market participation for individuals with disability, enabling them to generate stable income and benefits for themselves (OECD 2019). This result is particularly new. Indeed, across model specifications, I find the negative association between public expenditure on vocational rehabilitation programs as a crucial labor market intervention and the levels of income inequality to be statistically significant ( $\alpha < 0.05$ ), and with relatively large effect size. The extent to which employees with disability participate

in ordinary paid work that generates stable income and benefits for themselves is a major contributing factor to *reducing* the levels of income inequality. For instance, in an important report by the Organization for Economic Cooperation and Development (OECD), in 2009, only 35% of individuals with disability were able to find employment in Spain, whereas 55% of individuals with disability found employment opportunities in Finland, which is a much higher percentage.<sup>7</sup> We can also observe the average Gini coefficient for household income for the time period that is covered in this study (1985-2016) in Spain is significantly higher than Finland (see Figure A1, Appendix A). Relatively equal treatment of individuals with disability in the hiring processes enables them to generate stable fiscal resources and benefits, which then allow them to achieve better labor market outcomes. Investment in vocational rehabilitation programs hence inhibit income inequality within countries (OECD 2019).

Second, I find that a crucial dimension of corporate governance namely, the mode of capital allocation to firms (i.e., listed companies on stock exchanges) also affects the levels of income inequality. As more firms relied on stock exchanges in order to secure funds, the levels of income inequality increased within countries. The effect of financialization on income inequality often measured by “stock market capitalization” in cross-national studies is well known (Ola 2009; Huber, Petrova, and Stephens 2020; Godechot 2016; Kwon, Roberts, and Zingula 2017; Mahutga, Roberts, Kwon. 2017; Flaherty 2015), but less known is the relationship between the mode of capital allocation to firms and income inequality. Listed companies on stock exchanges allows us to test the relationship between the mode capital allocation to firms and the levels of income inequality. While previous studies have found financialization of corporate governance is positively associated with the increased income inequality, my results demonstrate that the mode of capital

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<sup>7</sup> See OECD (2019) Report titled ‘Sickness, and Disability, Work <http://www.oecd.org/employment/emp/42699911.pdf>, accessed April 10, 2020.

allocation to firms is also positively associated with an increase in the levels of income inequality. That is to say, as more firms rely more on stock exchanges within countries (as opposed to relational banking), the levels of income inequality also increase (Aoki 1994, Aoki and Dore 2001).

How may the results change if I restrict the sample to each regime of capitalism that are identified by the cluster analysis? Restricting the sample to only countries that fall under each regime of capitalism enables us to explore the institutional determinants of income inequality within each socio-economic structure. That is to say, what determines the level of income inequality in Germany as the exemplar of the coordinated market economies may well be different than those from Sweden as a conspicuous example of the social democratic market economies.

When restricting the sample to only LMEs as presented in model (2), union density inhibits inequality while more capital allocation to firms through stock exchanges incubates it, though its statistical significance is marginal. Hence, my results demonstrate that declining unionization has led to increased income inequality in LMEs. Model (3) demonstrates the results for CMEs. Crucially, for CMEs, public expenditure on total social benefits inhibits income inequality. That is to say, as the levels of public expenditure on total social and welfare benefits stagnated over time, the levels of income inequality increased in CMEs. In SDMEs, as shown in model (4), the financialization of corporate governance through greater stock market capitalization is positively associated with the levels of income inequality whereas public expenditure on vocational rehabilitation programs is negatively associated with the outcome variable, though the statistical significance of the latter is only marginal. I find no support for patent rate as a measure of technical change to facilitate or impede income inequality cross-nationally. To further investigate the impact of technical change on income inequality, I used two different measures. First, total expenditure by both public and private sectors on research and development (R&D) in each country over time, and

second, proportion of the working population in each country who completed college degree. Neither of these variables are statistically significant.

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**Table 3.**

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These are my key results, and the ones related to vocational rehabilitation programs and mode of capital allocation to firms are particularly new. However, one may wonder if the results are robust to alternative estimation choices, so I conducted a number of robustness checks. I find these results to be statistically significant at conventional level ( $\alpha < 0.05$ ) when I add a linear measure of time, when I omit one country at a time to test whether the results were driven by the outlying country, and when I employ random (rather than fixed) effects model whose results are exhibited in Table A2, Appendix (A). In fact, I find particularly consistent results when I run random effects model in order to explore between-country—as opposed to within-country—effects of the independent variables on the outcome variable.

**DISCUSSION & CONCLUSION**

Scholars from across social science disciplines agree that much of income and social inequalities are the direct result of the ways in which economic resources are organized through institutions and their interaction with each other (Hall and Soskice 2001; Acemoglu and Robinson 2015; Thelen 2007; Rueda and Pontusson 2000; Huber and Stephens 2014). The varieties of capitalism perspective endows us with the analytical tool to differentiate which institutions are—

and which are not—conducive towards building a more socially and economically equitable society. One of the central goals of this study was to bring in the varieties of perspective to bear on cross-national research on income inequality. By identifying a number of variables that capture the effects of differential institutional blueprints of national economies, this study explored what institutional factors matter for the levels of income inequality, both cross-nationally and within each regime of capitalism. While there is a wide consensus among scholars that the endogenous evolution of institutions and their interaction influence how gains of economic actions are distributed among individuals (Acemoglu and Robinson 2015; Hall and Soskice 2001), few studies actually take up research questions that systematically examine the effects of institutional complementarities that the varieties of capitalism perspective identifies on the levels of income inequality (Rueda and Pontusson 2000; Kenworthy and Pontusson 2005; Anthony and Kwon 2017; Kwon, Roberts, and Zingula 2017).

In this paper, I made three contributions to the broader research on institutions and income inequality. First, building on previous research, I identified variables that directly address the institutional complementarities of national economies from the varieties of capitalism perspective and tested whether their within-country variations bear on the levels of income inequality over time (Rueda and Pontusson 2000; Kenworthy and Pontusson 2005; Anthony and Kwon 2017; Kwon, Roberts, and Zingula 2017; Godechot 2016). In particular, I found evidence that the within-country temporal change in the levels of public expenditure on vocational rehabilitation programs negatively impacts the levels of income inequality. That is to say, as public expenditure in vocational rehabilitation programs declined (or in some cases stagnated) over time, the levels of income inequality increased within countries. The relationship between such important labor market interventions and the levels of income inequality has not been tested in previous research; this study is the first to present such findings. Second, I find evidence that the mode of capital

allocation to firms—one dimension of corporate governance (Aoki 1994; Aoki and Jackson 2008)—bears on the levels of income inequality within countries. The greater the volume of companies listed on the stock exchanges suggests that capital is allocated to firms more through stock markets, and less through relational banking (i.e., long-term lending).<sup>8</sup> As companies rely more on stock markets to secure funds (as opposed to relational banking), the levels of income inequality increase over time. Previous research has shown that the financialization of the corporate governance has led to a rise in the levels of income inequality, both within-country (Lin and Tomaskovic-Devey 2013) and cross-nationally (Godechot 2016; Kwon, Roberts, and Zingula 2017; Huber, Petrova, Stephens. 2020). Consistent with their findings, I also find evidence that an increase in stock market capitalization leads to an increase in the levels of income inequality, though its statistical significance is marginal ( $\alpha < 0.1$ ). The only time that financialization of corporate governance is significant at the conventional level ( $\alpha < 0.05$ ) is in the model for social democratic market economies.

Here, perhaps a detailed discussion of these two particular dimensions of corporate governance may be instructive since I find both of these measures to be positively associated with the levels of income inequality in different models. Corporate governance is broadly defined as systems that allocate power and control of resources among participants in the organization as well as a set of devices that facilitate the allocation of capital to firms (Aoki and Jackson 2008; Aoki 2010). As noted, stock market capitalization is a measure of the degree of the financialization of the corporate governance (Huber, Petrova, and Stephens 2020). Listed companies on stock exchange, however, measures how capital is allocated to firms. A long-lasting convention in the

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<sup>8</sup> Due to data limitations, I could not scale this by the total number of companies operating in a given country and given year. I tried scaling this by population and the results are consistent with the natural logarithm of the number of companies listed on stock exchanges.

VoC literature has been the idea that capital is allocated to firms in coordinated market economies through relational banking as well as through rolling over of the short-term loans on maturity, which is often referred to as patient capital (Hall and Soskice 2001; Aoki 2001). Stock market capitalization and listed companies on stock exchange as two measures of corporate governance in this study are significant, though the statistical significance of the latter is only marginal in model (1) where I do not restrict the sample (Aoki and Jackson 2008; Dore 2000; Aoki and Dore 2001).

Third, by conducting cluster analysis, I took an inductive and morphological approach to sorting and grouping countries based on their institutional arrangements. Instead of taking for granted the existing (mostly deductive) typologies of varieties of capitalism, I conducted cluster analysis to inductively demonstrate how countries can be distinctly grouped together. Indeed, the typology demonstrated here is the latest in the VoC literature that relies on machine learning techniques such as cluster analysis (Hastie, Tibshirani, and Friedman 2009; Schneider and Panuescu 2012). The motivation to conduct cluster analysis stems from the fact that institutions are not static, as the ‘liberalization thesis’ suggests (Thelen 2007, 2014), and the clustering here takes into account the important effect of time on the changing character of institutions (Schneider and Panuescu 2012). The important advantage of an inductive approach to generating a typology of the VoC in this paper is that it allows us to capture the effect of the *endogenous evolution* and changes in institutions when we attempt to cluster countries, as Acemoglu and Robinson emphasize (2015). For instance, Japan has always been considered a “coordinated market economy” in the VoC literature (Hall and Soskice 2001; Amable 2003; Witt and Redding 2013; Hall and Gingerich 2009; Whitley 1999), but in the cluster analysis I conducted, it consistently falls under the LMEs category. Conversely, Ireland has always been taken as an LME, but here it falls in the CMEs cluster. This is largely due to the fact that institutions evolve and change over time (i.e., unions decline,



employment protection weakens, expenditure in vocational rehabilitation programs dwindles, etc.), and that the institutional arrangements, which once allowed Japan to be categorized as a coordinated market economy twenty years ago (Hall and Soskice 2001) is no longer the case. Hence, cluster analysis captures this significant historical evolution and change of institutions while sorting and grouping them into a taxonomy. I then used the clusters generated to examine the determinants of income inequality *within* each variety of capitalism.

Cross-nationally, I find evidence for crucial institutional blueprints such as labor unions, public expenditure on vocational rehabilitation programs, and the mode of capital allocation to firms as important determinants of income inequality. I also find marginal support for the financialization of corporate governance (stock market capitalization) to bear on the levels of income inequality. While more capital allocation to firms through stock markets incubates income inequality, organizational power of the working class expressed in union density and labor market interventions in the form of public expenditure on vocational rehabilitation programs inhibit it. It is worth emphasizing that the *negative* effect of investment in vocational rehabilitation programs on the levels of income inequality has not been previously explored in cross-national research on institutions and income inequality, and this is particularly a novel finding of this study. Vocational rehabilitation programs facilitate more labor market participation for individuals with disability, enabling them to generate stable income and benefits for themselves and ultimately improve their labor market outcomes (OECD 2019). My results exhibit strong evidence that more investment in vocational rehabilitation has important implications for reducing the levels of income inequality.

Within clusters, and specifically for LMEs, union density is a negative determinant of the levels of income inequality. This suggests that as union density—the organizational power of the working class that enables them to win concessions from the employers for better material conditions—declined, the levels of income inequality increased within countries (Rueda and

Pontusson 2000; Kenworthy and Pontusson 2005; Anthony and Kwon 2017; Freeman and Katz 1995; Gottschalk and Smeeding 1997; Kollmeyer and Peters 2019; Kwon, Roberts, and Zingula. 2017). For CMEs, the public expenditure on total social benefits negatively predicts the outcome variable. This suggests that the temporal increase in the levels of public expenditure on total social benefits leads to a decrease in the levels of income inequality within countries over time. For SDMEs, the financialization of corporate governance measured by stock market capitalization positively predicts variation in the levels of income inequality, suggesting that as corporate governance became more financialized, the levels of income inequality increased within countries in SDMEs. Additionally, public expenditure on vocational rehabilitation programs negatively predicts the outcome variable in SDMEs, though its statistical significance is marginal ( $\alpha < 0.1$ ).

In short, building on previous cross-national studies, the primary purpose of this paper was to bring the varieties of capitalism perspective to bear on income inequality research by identifying variables that directly correspond to the institutional complementarities of national economies. The necessity to look at the role of institutional designs and their *differences* stems from the fact that much of social and income inequalities are the direct result of the ways in which economic resources are organized through institutions. The varieties of capitalism perspective presents itself as a useful analytical lens by which we can differentiate what institutional designs are most conducive towards building a more socially and economically equitable society. If anything, the current COVID-19 pandemic crisis has shown that the way institutions are set up and the way they interact with each other shape the strategies that the state adopts to respond to shocks and disasters, both in terms of containing its dissemination and providing relief to those most affected by it. Institutions thus heavily influence how economic resources are distributed, and this study identified the institutional variables across different regimes of capitalism that are most conducive to egalitarian outcomes from the varieties of capitalism perspective.

## Appendix A.

Table A1. Descriptive Statistics (1985-2016)

Variables	AUL	AUS	BEL	CAN	DEN	FIN	FRA	GER	IRE	ITA
Gini Coefficient	30.48 (2.00)	27.16 (2.43)	24.94 (1.39)	29.92 (1.60)	23.68 (1.90)	23.28 (2.46)	29.35 (1.45)	27.36 (1.16)	31.84 (1.73)	32.56 (1.37)
GDP Growth Rates	3.16 (1.52)	1.97 (1.51)	1.91 (1.49)	2.38 (2.04)	1.75 (1.94)	2.19 (3.14)	1.79 (1.38)	1.74 (1.93)	4.77 (5.07)	1.22 (1.89)
Union Density	30.49 (11.21)	39.49 (9.59)	52.62 (2.31)	31.15 (3.44)	73.13 (4.26)	72.14 (4.50)	9.87 (3.16)	26.56 (6.70)	41.28 (8.69)	37.94 (4.35)
Wage Bargaining Coordination	2.51 (.86)	4.05 (.32)	4.64 (.53)	1.02 (0.16)	3.86 (0.48)	4.13 (1.05)	2 (0.25)	3.89 (0.31)	3.02 (1.36)	3.02 (0.76)
Harmonized Unemployment Rates	7.03 (1.77)	4.13 (1.23)	8.45 (1.26)	8.39 (1.67)	6.15 (1.51)	8.47 (3.41)	9.17 (1.37)	7.27 (1.94)	10.61 (4.49)	9.24 (1.99)
Revenue Taxes as a % GDP	28.13 (1.45)	41.56 (1.28)	43.28 (0.98)	33.35 (1.54)	46.00 (1.11)	42.89 (1.70)	42.95 (1.26)	35.81 (0.85)	30.42 (2.88)	39.77 (2.74)
Public Expenditure on Total Social Benefits as % GDP	7.73 (.66)	18.77 (.67)	16.35 (0.70)	10.64 (1.26)	16.91 (1.31)	17.80 (2.78)	18.04 (1.09)	16.99 (1.27)	11.79 (2.81)	17.06 (1.72)
Public Expenditure on Vocational Training as % GDP	.08 (.08)	.27 (0.13)	0.17 (0.11)	0.20 (0.15)	0.50 (0.21)	0.38 (0.14)	0.33 (0.08)	0.08 (0.13)	0.35 (0.15)	0.19 (0.09)
Public Expenditure on Vocational Rehabilitation as % GDP	.11 (.17)	0.04 (.08)	0.13 (0.05)	0.41 (0.11)	0.36 (0.21)	0.09 (0.07)	0.5 (0.01)	.08 (0.05)	0.01 (0.06)	0.005 (0.01)
Employment Protection	1.35 (.80)	2.05 (.50)	2.49 (.64)	1.20 (0.91)	1.95 (0.68)	2.16 (0.57)	2.89 (0.23)	2.64 (0.65)	1.06 (0.34)	2.61 (0.91)
Log Number of Companies Listed on Stock Exchange	7.21 (.26)	4.47 (.18)	5.19 (0.24)	7.67 (0.46)	5.53 (2.61)	4.59 (0.67)	6.43 (0.31)	6.40 (1.12)	4.58 (1.03)	5.46 (0.26)
Stock Market Capitalization	78.53 (35.42)	17.89 (13.79)	48.54 (25.03)	108.52 (30.48)	43.01 (20.88)	63.37 (58.27)	50.98 (31.89)	33.07 (16.60)	34.21 (27.79)	40.64 (28.58)
Patent Rate	0.95 (.21)	0.40 (.32)	0.19 (0.19)	0.82 (0.27)	0.29 (0.26)	0.54 (0.20)	0.38 (0.15)	0.32 (0.09)	0.32 (0.33)	0.21 (0.15)
Trade Openness	38.10 (8.71)	84.96 (21.50)	135.18 (21.70)	63.68 (11.39)	78.51 (13.39)	65.94 (12.47)	47.62 (6.93)	62.79 (21.98)	132.32 (35.46)	48.43 (14.52)
Population (in million)	18.92 (2.73)	8.00 (.35)	10.33 (0.45)	30.15 (3.47)	5.32 (0.19)	5.14 (0.20)	60.26 (4.01)	80.67 (1.75)	3.91 (0.45)	57.65 (1.30)

Note: The first rows of data signify means and the second standards of deviations for each variable.

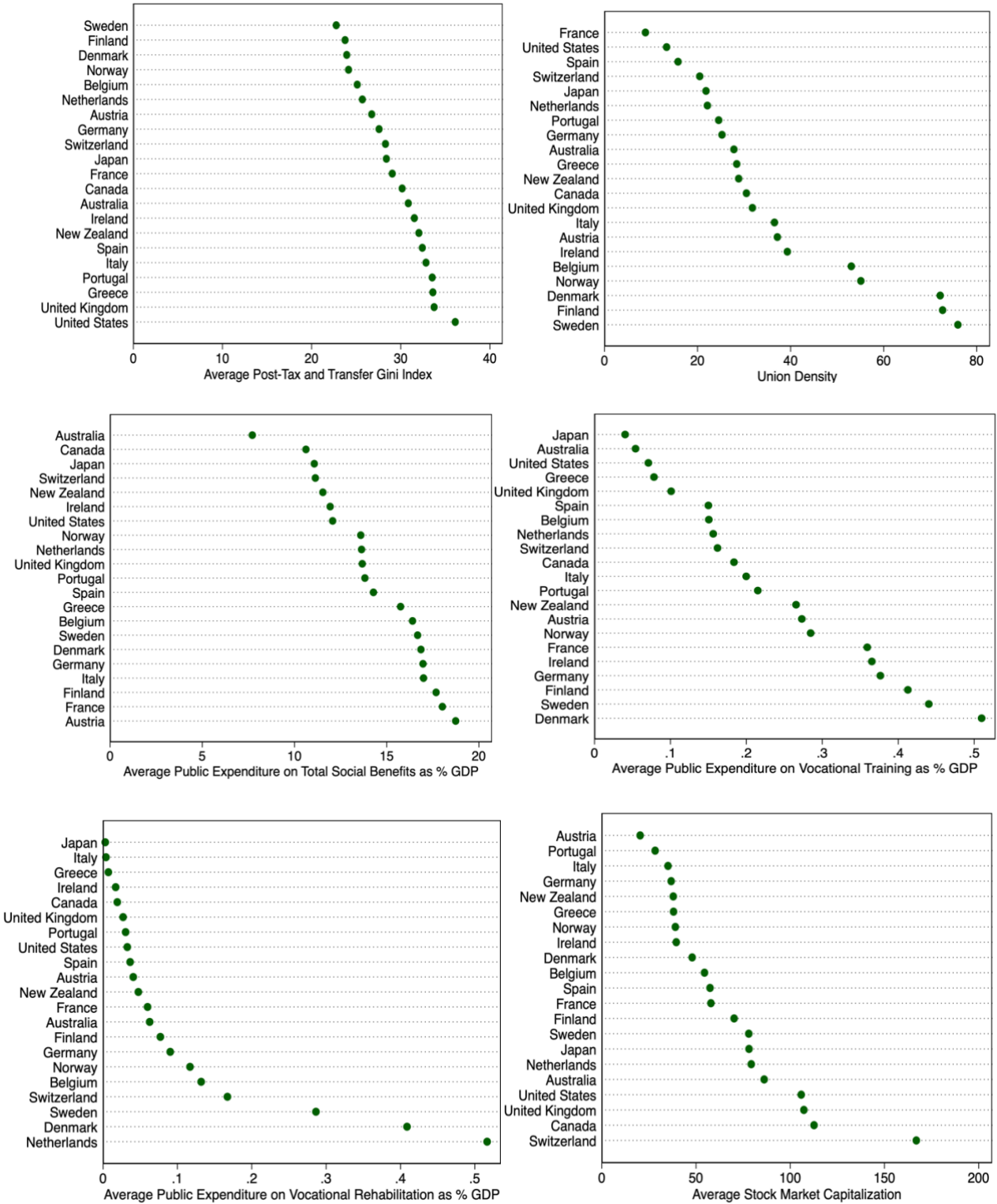
**Table A1., (continued)**

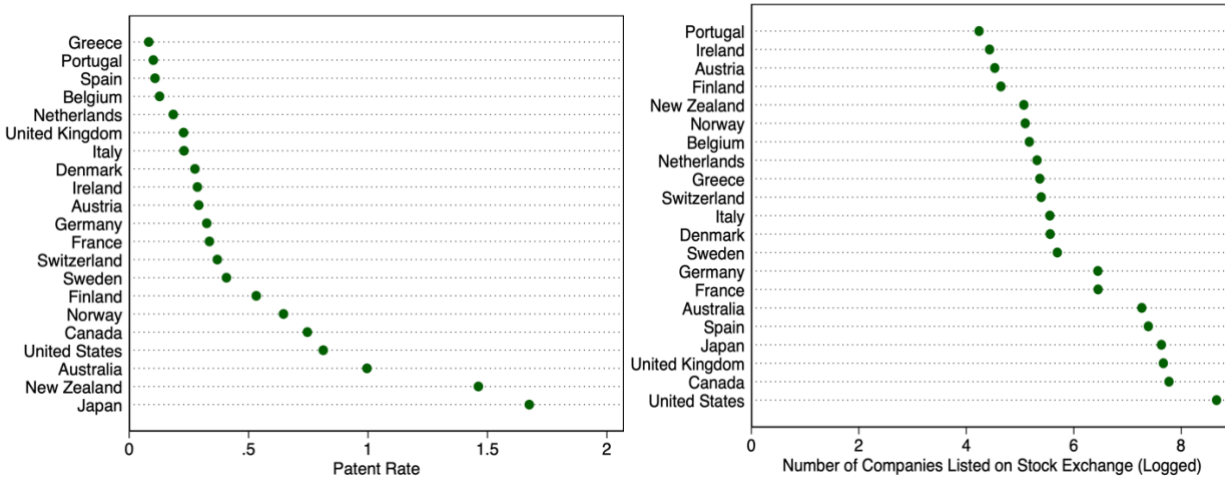
	<b>GRE</b>	<b>JPN</b>	<b>PRT</b>	<b>NET</b>	<b>NZL</b>	<b>NOR</b>	<b>SPA</b>	<b>SWE</b>	<b>SWZ</b>	<b>UKM</b>	<b>USA</b>
Gini Coefficient	27.36 (1.16)	27.65 (2.62)	32.96 (3.13)	25.55 (1.04)	31.30 (2.75)	23.84 (1.12)	32.28 (2.57)	22.34 (2.34)	28.30 (2.21)	32.88 (2.63)	35.40 (2.51)
GDP Growth Rates	1.74 (1.93)	1.98 (2.29)	1.94 (2.67)	2.07 (1.85)	2.58 (1.91)	2.51 (1.75)	2.29 (2.22)	2.15 (2.23)	1.84 (1.64)	2.19 (1.96)	2.64 (2.64)
Union Density	26.56 (6.70)	22.96 (4.51)	28.06 (11.20)	23.45 (4.59)	33.68 (17.03)	55.51 (2.24)	15.33 (2.10)	76.38 (6.99)	21.30 (3.12)	34.09 (8.24)	14.27 (3.08)
Wage Bargaining Coordination	3.89 (0.31)	4.45 (0.55)	2.51 (0.50)	3.70 (0.51)	1.45 (0.83)	4.05 (0.57)	3.13 (0.82)	3.89 (0.61)	3.24 (0.49)	1.05 (0.32)	1.00 (0.00)
Harmonized Unemployment Rates	7.27 (1.94)	3.45 (1.08)	7.60 (3.01)	5.47 (1.51)	5.95 (2.08)	3.67 (1.15)	15.78 (4.97)	5.78 (2.62)	3.05 (1.92)	7.54 (2.13)	6.35 (1.58)
Revenue Taxes as % GDP	30.42 (3.99)	27.07 (1.67)	30.11 (2.62)	37.50 (2.41)	33.28 (1.91)	40.87 (1.36)	32.41 (1.77)	45.63 (2.16)	26.03 (1.24)	31.97 (1.35)	6.81 (1.20)
Public Expenditure on Total Social Benefits as % GDP	15.81 (2.17)	11.08 (2.39)	13.92 (2.63)	13.47 (2.92)	11.56 (1.72)	13.60 (2.59)	14.28 (2.05)	16.64 (2.54)	11.07 (1.09)	13.66 (1.35)	0.68 (0.37)
Public Expenditure on Vocational Training as % GDP	0.35 (0.13)	0.04 (0.02)	0.23 (0.14)	0.18 (0.16)	0.27 (0.14)	0.27 (0.14)	0.14 (0.06)	0.42 (0.28)	0.18 (0.18)	0.11 (0.10)	0.07 (0.03)
Public Expenditure on Vocational Rehabilitation as % GDP	0.08 (0.05)	0.002 (0.008)	0.05 (0.10)	0.45 (0.19)	0.05 (0.08)	0.12 (0.08)	0.03 (0.02)	0.26 (0.11)	0.16 (0.08)	0.02 (0.03)	0.03 (0.01)
Employment Protection	2.64 (0.65)	1.48 (0.53)	3.24 (1.01)	2.45 (0.52)	1.21 (0.66)	2.34 (0.87)	2.84 (0.91)	2.49 (0.87)	1.37 (0.60)	0.96 (0.73)	0.50 (0.79)
Number of Companies Listed on Stock Exchange	6.40 (0.18)	7.58 (0.26)	4.09 (0.56)	5.32 (0.34)	5.09 (0.62)	5.05 (0.22)	7.30 (0.68)	5.58 (1.03)	5.31 (0.28)	7.67 (0.12)	8.65 (0.20)
Stock Market Capitalization	33.07 (16.60)	72.92 (24.92)	24.53 (16.63)	71.06 (37.10)	34.86 (14.44)	37.51 (22.34)	50.61 (32.41)	69.64 (35.42)	149.30 (79.73)	96.76 (35.16)	97.46 (39.79)
Patent Rate	0.32 (0.09)	1.53 (0.86)	.11 (0.12)	0.24 (0.20)	1.37 (0.53)	0.65 (0.27)	0.14 (0.11)	0.54 (0.45)	0.62 (0.78)	0.28 (0.18)	0.75 (0.30)
Trade Openness	62.79 (21.98)	25.33 (14.48)	64.43 (7.30)	118.50 (16.23)	57.51 (5.09)	70.98 (10.11)	47.55 (10.72)	74.50 (13.34)	77.36 (9.86)	54.74 (4.45)	22.75 (4.01)
Population (in million)	80.67 (1.75)	125.04 (3.22)	10.21 (0.25)	15.65 (0.89)	3.82 (0.46)	4.50 (0.34)	41.58 (3.31)	8.89 (0.45)	7.17 (0.59)	59.40 (2.84)	274.91 (30.36)

Note: The first rows of data signify mean and the second standard of deviation of each variable for each country.

# Appendix A.

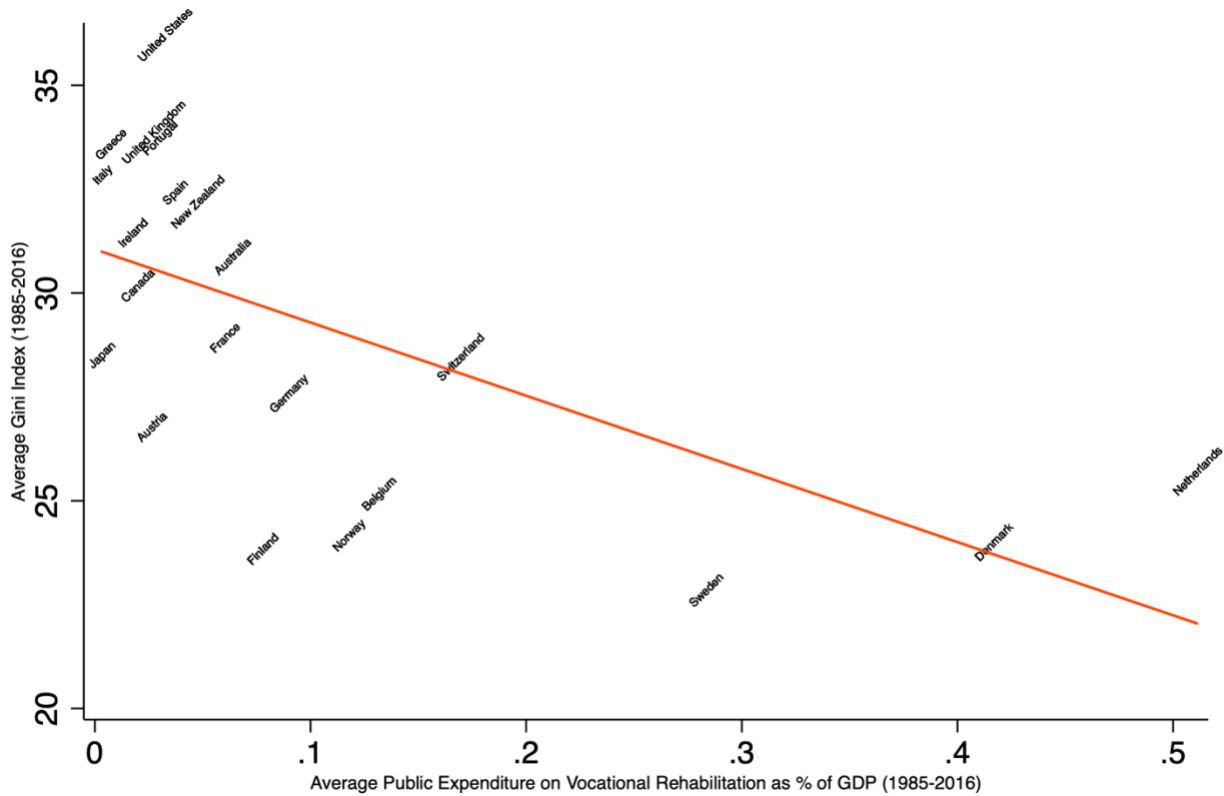
## Figure A1. Visual Descriptive Statistics of Variables Based on Each Country\*





\*Dot plots demonstrates the average of each variable for the entire time-period of the study (1985-2016) for each country.

**Figure A2 Bivariate Scatterplot of Gini Index and Vocational Rehabilitation Programs**



## Technical Dimensions of Cluster Analysis

$K$ -means partition observations into groups that minimize the within-cluster variation, defined as the sum of all of the pairwise squared Euclidean distances. This optimization can be formally demonstrated below:

$$C_1, \dots, C_k \left\{ \sum_{k=1}^k \frac{1}{|C_k|} \sum_{i, i' \in C_k} \sum_{j=1}^p (x_{ij} - x_{i'j})^2 \right. \quad (1)$$

where  $K$  is the number of predefined clusters,  $C_k$  denotes a cluster,  $i$  and  $j$  represent particular observations within a cluster, and  $x_j$  is one of the components drawn from the data. As noted earlier, I use six of such components: union density, wage setting coordination, employment protection, vocational rehabilitation, stock market capitalization, patent rate. The algorithm solving equation (1) is described in Hastie, Tibshirani, and Friedman's book *The Elements of Statistical Learning* (2009).

**Table A2. Determinants of Income Inequality, Random Effects Regression**

VARIABLES	(1) All Countries	(2) Liberal Market Economies	(3) Coordinated Market Economies	(4) Social Democratic Economies
<b><i>Economic Indicators</i></b>				
GDP Growth Rates (t-1)	-0.018† (0.009)	-0.011 (0.028)	-0.082* (0.038)	-0.048† (0.024)
Unemployment Rates (t-1)	0.020† (0.011)	-0.005 (0.043)	0.078* (0.033)	0.068† (0.036)
<b><i>Labor Organization</i></b>				
Union Density (t-1)	-0.027*** (0.006)	-0.022** (0.008)	0.003 (0.015)	-0.039*** (0.006)
Wage Setting Coordination (t-1)	-0.013 (0.049)	-0.554*** (0.066)	-0.117 (0.126)	0.098 (0.100)
<b><i>Taxation</i></b>				
Revenue Tax as % GDP (t-1)	0.006 (0.020)	0.025 (0.021)	0.006 (0.023)	0.005 (0.063)
<b><i>Welfare Generosity</i></b>				
Expenditure on Social Benefits as % GDP (t-1)	-0.009 (0.015)	0.071 (0.047)	-0.194*** (0.036)	-0.030 (0.046)
<b><i>Labor Market Interventions</i></b>				
Expenditure on Vocational Training as % GDP (t-1)	-0.016 (0.199)	-2.193** (0.752)	0.375 (0.760)	0.042 (0.687)
Expenditure on Vocational Rehabilitation as % GDP (t-1)	-0.897*** (0.193)	2.434 (1.670)	-3.612* (1.408)	-0.834*** (0.235)
Employment Protection Legislation (t-1)	0.0123 (0.034)	0.046 (0.052)	-0.203*** (0.047)	0.009 (0.149)
<b><i>Corporate Governance</i></b>				
Stock Market Capitalization as % GDP (t-1)	0.002** (0.009)	0.001 (0.001)	0.003*** (0.008)	0.007** (0.002)
Listed Companies on Stock Exchange (natural log, t-1)	0.098 (0.067)	-0.137 (0.096)	-0.212 (0.169)	0.136 (0.158)
Patent Rate (t-1)	0.024 (0.077)	-0.048 (0.127)	-1.180 (0.757)	-1.094* (0.507)
<b><i>Controls</i></b>				
Trade Openness(t-1)	-0.001 (0.002)	-0.014** (0.005)	-0.013*** (0.003)	0.002 (0.004)
Population (1-1)	0.002 (0.002)	0.002 (0.001)	-0.002 (0.006)	-0.109** (0.0379)
Constant	0.098 (0.941)	1.736* (0.758)	5.396*** (1.484)	1.871 (1.477)
Observations	651	217	248	186
Number of id	21	7	8	6

Robust standard errors in parentheses  
\*\*\* p<0.001, \*\* p<0.01, \* p<0.05 † p<0.1



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**Table 1. Principal Components of Cluster Analysis**

<b>Cluster 1, 2, 3</b>	<b>Mean Union Density</b>	<b>Mean Wage Setting Coordination</b>	<b>Mean Employment Protection</b>	<b>Mean Vocational Rehabilitation</b>	<b>Mean Stock Market Capitalization</b>	<b>Mean Patent Rate</b>
(1) Social Democratic Market Economies	59.54	4.08	2.11	7.96	53.61	14.48
(2) Coordinated Market Economies	28.74	3.07	2.90	1.27	38.77	13.34
(3) Liberal Market Economies	28.43	1.74	1.10	2.64	91.18	26.13

**Table 2.****Variables Description**

Variables	Description	Source
GINI Coefficient	Net (Post-Tax-and-Transfer) GINI Coefficient for Household income.	Comparative Welfare States Dataset
Union Density	Net union membership as a percentage of employed wage and salary earners	Comparative Welfare States Dataset
Wage Setting Coordination	This variable is coded in the following way: 1 = fragmented wage bargaining, confined largely to individual firms or plants; 2 = fixed or alternating industry-and firm level bargaining, with weak enforceability of industry agreements; 3 = industry-level bargaining with no or irregular pattern setting, limited involvement of central organizations, and limited freedoms for firm-level bargaining; 4 = mixed industry and economy-wide bargaining; 5 = economy-wide bargaining	Comparative Welfare States Dataset. OECD, Employment and Labor Force Statistics (database) via Comparative Welfare States Dataset
Harmonized Unemployment Rate	The number of unemployed persons as a percentage of the civilian labor force.	OECD, Employment and Labor Force Statistics (database) via Comparative Welfare States Dataset
Revenue Taxes Collected as % of GDP	Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes	OECD, Tax Revenue Statistics Dataset
Expenditure on Social Benefits as % GDP	Public and mandatory private expenditure which supports families, as a percentage of GDP.	OECD, Revenue Statistics (database) via Comparative Welfare Dataset
Expenditure on Vocational Training as % GDP	Public expenditure on job training, as a percentage of GDP. This variable covers two categories of training: vocational and remedial training for the unemployed and targeted retraining for the employed.	OECD, Social Expenditure Statistics (database) via Comparative Welfare States Dataset
Expenditure on Vocational Rehabilitation as % GDP	Public expenditure on job rehabilitation, as a percentage of GDP. Vocational rehabilitation programs provide employment opportunities for individuals with reduced working capacity which prepares them to move on to work or regular training with stable income and benefits.	OECD, Social Expenditure Statistics (database) via Comparative Welfare States Dataset
Listed Companies on Stock Exchange	Listed of companies on stock exchange. It is measure of how capital is allocated to firms. The greater volume of companies on stock markets, the more capital is allocated though stock exchanges and less through relational banking.	The Global Economy Dataset
Employment Protection	Employment protection legislation, an index of the overall strictness ranging from 0 (least strictness) to 6 (most strictness). This variable is the unweighted average of the sub-indicators of employment protection legislation for regular contract.	OECD, Employment Statistics (database) via Comparative Welfare States Dataset
Stock Market Capitalization	Market capitalization (also known as market value) is the share price times the number of shares outstanding (including their several classes) for listed domestic companies. Investment funds, unit trusts, and companies whose only business goal is to hold shares of other listed companies are excluded.	The Global Economy Dataset



Patent Rate

The rates are generated by multiplying the total number of registered patents in each country by 1000 and then dividing it by the population of aged 15-65.

World Intellectual Property Organization

Trade Openness

Trade openness, defined as the sum of exports (export) and imports (import) as a percentage of GDP.

OECD, National Accounts Statistics (database)  
via Comparative Welfare States Dataset

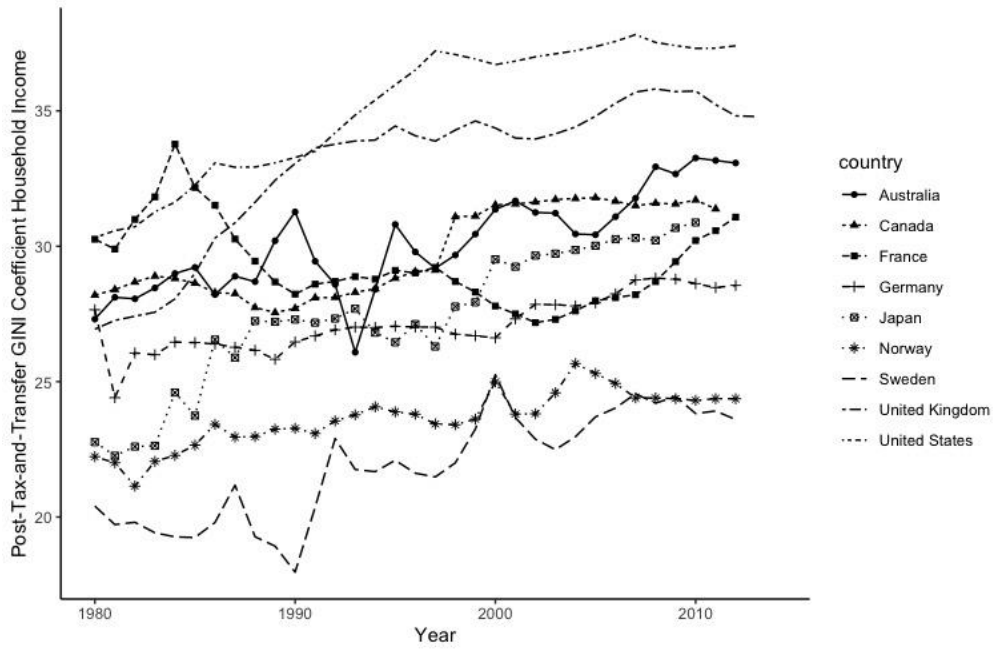
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**Table 3. Determinants of Income Inequality, Fixed Effects Regression**

Explanatory Variables	(1) All Countries	(2) Liberal Market Economies	(3) Coordinated Market Economies	(4) Social Democratic Economies
<i>Economic Indicators</i>				
GDP Growth Rates (t-1)	-0.015 (0.009)	-0.014 (0.017)	-0.025 (0.025)	-0.028 (0.028)
Unemployment Rates (t-1)	0.019 (0.011)	-0.005 (0.026)	0.014 (0.016)	0.062 (0.031)
<i>Labor Organization</i>				
Union Density (t-1)	-0.030*** (0.007)	-0.040** (0.010)	-0.021 (0.041)	-0.049 (0.031)
Wage Setting Coordination (t-1)	0.005 (0.044)	-0.147 (0.187)	-0.047 (0.124)	0.185† (0.078)
<i>Taxation</i>				
Revenue Tax as % GDP (t-1)	0.015 (0.023)	-0.004 (0.034)	0.058 (0.043)	0.016 (0.047)
<i>Welfare Generosity</i>				
Expenditure on Social Benefits as % GDP (t-1)	-0.018 (0.015)	0.009 (0.020)	-0.088* (0.029)	0.017 (0.033)
<i>Labor Market Interventions</i>				
Expenditure on Vocational Training as % GDP (t-1)	0.071 (0.191)	-0.292 (0.560)	0.990 (0.530)	-0.372 (0.870)
Expenditure on Vocational Rehabilitation as % GDP (t-1)	-0.706*** (0.141)	0.609 (0.938)	-1.224 (1.175)	-2.172† (0.854)
Employment Protection Legislation (t-1)	0.009 (0.030)	0.001 (0.027)	-0.052 (0.079)	0.148 (0.152)
<i>Corporate Governance</i>				
Stock Market Capitalization as % GDP (t-1)	0.001† (0.000)	-0.002 (0.000)	-0.002 (0.001)	0.007* (0.002)
Listed Companies on Stock Exchange (natural log, t-1)	0.146* (0.068)	0.295† (0.140)	0.146 (0.165)	0.098 (0.170)
Patent Rate (t-1)	0.009 (0.074)	-0.057 (0.036)	0.179 (0.496)	-1.060† (0.462)
<i>Controls</i>				
Trade Openness (t-1)	-0.002 (0.003)	0.008 (0.006)	-0.004 (0.009)	0.003 (0.011)
Population (t-1)	0.013*** (0.0024)	0.016*** (0.002)	0.048 (0.027)	0.199 (0.276)
Constant	-0.656 (0.969)	-2.278 (1.716)	-2.226 (1.689)	-1.390 (3.689)
Observations	651	217	248	186
R-squared	0.340	0.644	0.244	0.506
Number of id	21	7	8	6

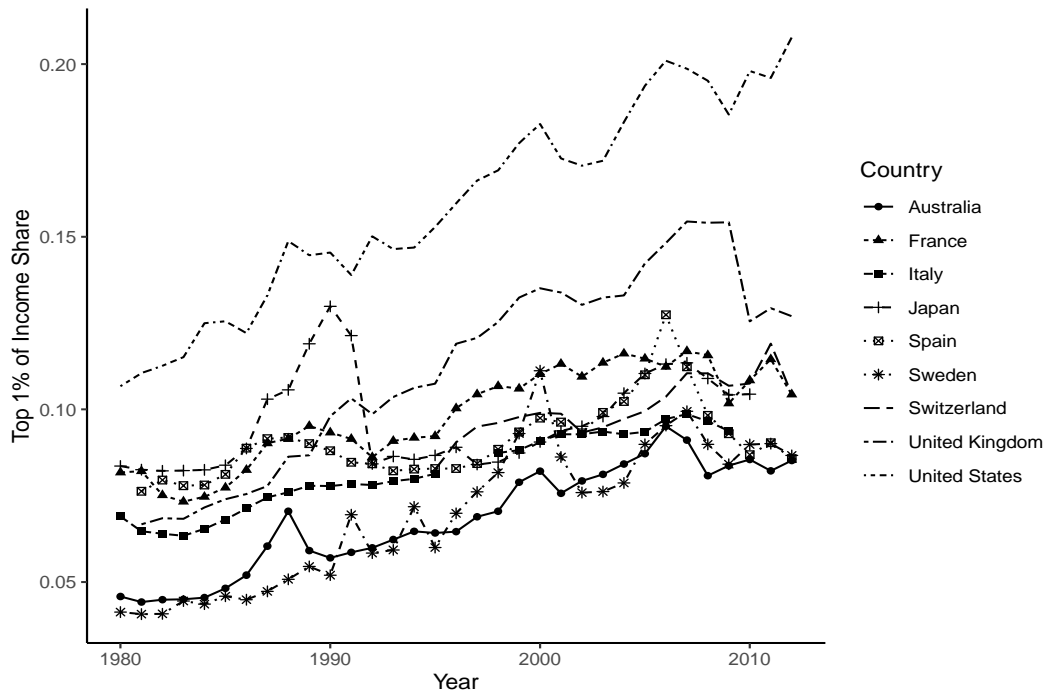
Standard errors in parentheses \*\*\* p<0.001, \*\* p<0.01, \* p<0.05, † p<0.1

**Figure 1. Net (Post-Tax-and-Transfer) Gini Coefficient Household income**



Source: Comparative Welfare States Data Set, 2014

**Figure 2. Top 1% of Income Share**



Source: Comparative Welfare States Data Set, 2014

**Figure 3. K-Mean Cluster Analysis**

