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## **The Type of Right-wing Government and the Decline of Middle-Income Strata in Industrialized Democracies**

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### **Abstract**

Although the decline of middle-income strata (or polarization in income distribution) is an increasingly widespread phenomenon across industrialized democracies, it remains understudied compared to other forms of income inequality. I analyzed the decline of middle-income strata among 18 industrialized democracies between 1971 and 2010. Whereas previous research claimed that income polarization is a common development, brought upon by global market integration or skill-biased technological change, I found significant cross-country variation in the extent of polarization among the 18 cases. My findings suggest that the type of party government—in particular, whether the dominant right-wing party is Christian or secular—is associated with divergent outcomes in the degree of income polarization. I argue that secular-right governments have facilitated income polarization by undermining centralized wage-bargaining and social-insurance benefit generosity. In contrast, by maintaining these institutional arrangements, Christian Democratic governments have tempered polarization trends in the market, resulting in relatively larger middle-income strata.

Although the decline of middle-income strata is an increasingly widespread phenomenon across industrialized democracies (Alderson, Beckfield, & Nielsen, 2005; Gornick & Jäntti, 2013), it remains understudied compared to other forms of income inequality (Atkinson & Brandolini, 2013). According to Michael Wolfson (1994), middle-class decline is another expression of polarization in income distribution.<sup>1</sup> Polarization in income distribution is a phenomenon conceptually and empirically distinct from general inequality, typically represented by the Gini coefficient. Polarization can occur without any change in general inequality if the population shares of high- and low-income strata increase proportionally. Thus, the causes and consequences of polarization are not necessarily the same as those of general inequality.

Previous research has attributed detrimental effects to income polarization. Some economists suggested harmful effects on economic growth, which is a function of middle-class consumption power (Reich, 2011; Stiglitz, 2013). Others posited psychological effects such as societal anxiety and relative deprivation among the shrinking middle-income strata (Frank, 2007). Sociologists have highlighted issues such as sorting in school choice and marriage by people of similar socio-economic backgrounds, each of which has the potential to undermine social mobility and cohesion (Blossfeld & Buchholz, 2009; Putnam, 2015). To political scientists, middle-class decline has critical implications for democratic stability. According to Lipset (1959, 1981), stable democracy requires a large middle class whose moderate worldview and participation in cross-class civic associations contribute to compromises between the rich and the poor. As income distribution becomes polarized, compromises between left and right parties on redistributive policies may become more difficult to reach (McCarty, Poole, & Rosenthal, 2006).

Despite these well-studied consequences, the causes of middle-class decline remain understudied. According to existing theories, middle-class decline should either not occur in

industrialized democracies or, to the extent that it does, should occur equally across those countries. First, the median voter theory posits that all elected governments should pursue the interests of middle-income voters. For electoral victory, both left and right parties should meet the policy preferences of the median voter, who represents much of the middle-income strata. If the median income falls lower than the mean income, governments are expected to function as equalizers by enacting more egalitarian redistributive policies (Downs, 1957; Iversen & Soskice, 2006, 2015; Meltzer & Richard, 1981). Therefore, uninterrupted middle-class decline is a problematic case that the median voter theory cannot explain.

Second, technological change and globalization theories have been used widely to explain the decline of middle-income strata in post-industrial societies. On the one hand, skill-biased technological change leads to the replacement of low-skilled labor by machines and computers (Acemoglu & Autor, 2010; Autor & Dorn, 2009; Katz & Murphy, 1992). Whereas these middle-income jobs are disappearing, high-skilled jobs reap higher earnings. On the other hand, global market integration increases income disparities and volatility. Increased trade with developing countries and the influx of low-skilled migrants can threaten the wage levels and jobs of workers in high-income countries (Alderson & Nielsen, 2002; Kristal, 2010). In addition, greater capital mobility undermines governments' redistributive capacity (Huber & Stephens, 2001). Along with wage disparities, job insecurity has spread "from the manufacturing sectors to the lower and higher end service sectors" (O'Rand, 2011), and income volatility has increased across income groups (Hacker, 2006). These accounts suggest that middle-class decline should be a common development among industrialized countries because it is difficult for firms and individuals to abandon the productivity gains from technology in an increasingly competitive and globalized market.

However, in contrast to theories that predict converging outcomes (whether polarization or not), I found substantial cross-country variation in income polarization (middle-class

decline). As presented in Figure 1, the degree of polarization varies significantly across countries and over time. For instance, the degree of polarization did not differ much among Austria, Australia, and Sweden during the mid-1980s, but diverged sharply during the mid-2000s. In the mid-2000s, the Netherlands, Switzerland, Norway, and Austria had the lowest levels of income polarization (and the largest share of middle-income households), though they had higher levels of general inequality than Sweden, Denmark, and Finland.<sup>2</sup> This suggests that the determinants of polarization may differ from that of general inequality. Figure 2 shows that changes in polarization did not mirror those in general inequality. Then, why have some countries experienced sharp increases in greater polarization while others have experienced minimal increases, or even de-polarization? To explain this variation in polarization, I draw on institutional and party-government theories.

INSERT FIGURE 1 HERE

INSERT FIGURE 2 HERE

### **Theoretical Framework and Hypothesis**

In the literature on the polarization of income distribution, two neglected institutional theories are particularly relevant. They concern, respectively, the effect of centralized wage-bargaining and that of earnings-related social insurance benefits on the polarization of income distribution. I take these up in turn below.

Centralized wage-bargaining has been studied for its wage-constraining and wage-equalizing effects (Wallerstein, 1999). Centralized bargaining restrains wage increases in more productive sectors, while helping to increase wage levels in less productive sectors (Calmfors & Driffill, 1988; Busemeyer & Iversen, 2012). Although centralized wage-setting is primarily a European institution, the US employed a similar arrangement during the World War II period. Goldin and Margo (1992) found great wage-compression in the US during the

1940s, which they attribute to centralized wage-setting by the National War Labor Board during wartime.

Although commonly tested against general income inequality, centralized wage-bargaining is more directly relevant to polarization. The more centralized the wage bargaining processes, the more compressed are wages. If wage differentials widen, the population share of the middle-income strata declines. It should be noted, however, that centralized wage-bargaining consists of two components: the degree of centralization and the coverage of collective bargaining. It is important to make this distinction because centralized wage-bargaining does not necessarily have a wage-equalizing effect. This is particularly true if the outcomes of centralized bargaining cover only a portion of wage earners such as, for example, in cases of labor market dualization between insiders and outsiders (Rueda, 2005; Thelen, 2014). Over the past three decades, in some countries, like Germany, coverage has declined substantially without much change in the degree of centralization. In other countries, including Sweden and Austria, decentralization took place without much change in coverage. And in others, such as the UK, both coverage and centralization have declined substantially. Therefore, to examine the effects of centralized wage-bargaining on income polarization more precisely, it is necessary to consider its dual nature.

Although not tested, welfare regime theory suggests that the distinctive institutional features of social insurance systems have varying effects on income security among middle-income strata (Esping-Andersen, 1990). Unlike in liberal regimes, in social democratic and conservative regimes, the middle class receives substantial support from the welfare state. Particularly in conservative regimes, social-insurance benefit levels are set high enough for members of the middle class to maintain their previous income levels during periods of unemployment, sickness, or retirement. Such generous social-insurance benefits reflect the regime's conservative purpose of preserving existing status differences. Whereas the

literature has focused on the negligible redistributive effects of conservative welfare states, a very conservative welfare regime can in fact contribute to middle-class income security in times of greater job and income insecurity.

My hypothesis links the institutional theories described above to party-government theories. The reason is twofold: first, historically, centralized wage-bargaining arrangements and welfare regimes have been established by political parties in government; and second, these institutions have undergone reforms that vary with the type of party-government since the late-1970s.

The basic assumption of conventional party-government theory is that income distribution is influenced by the nature of party-government: whether a left-wing or right-wing party is in power (Bradley, Huber, Moller, Nielsen, & Stephens, 2003; Brady, 2003; Brady & Leicht 2008; Hibbs, 1977; Korpi, 1983). Whereas conventional party-government theory is based on a dichotomous left–right approach, my analytic focus lies in the distinction between Christian and secular-right governments. The literature suggests that even though both types of right-wing government represent business interests, they may exhibit different levels of receptiveness to collective-bargaining arrangements and social insurance systems, particularly in response to neoliberal reforms.

On the one hand, secular-right party power has risen alongside a transformative economic paradigm that emerged in the late-1970s. Faced with the stagflation, the monetarist paradigm emerged as a viable alternative to the Keynesian paradigm, arguing that active government policy was, at best, unnecessary and, at worst, harmful to the economy (Krugman, 2009). Some right-wing parties discovered the new paradigm fit well with their ideology and interests, while bringing the paradigm into comprehensive liberal reforms. In the US, the monetarist paradigm confirmed the traditional conservative political idea that opposed government activism in the market (Krugman, 1995, 52). In the UK, it provided “a

new rationale for many measures the political right had long supported,” such as weakening union power (Hall, 1993, 286). The Thatcher and the Reagan governments’ early initiatives and electoral successes opened a neo-liberal path to right-wing parties in other countries. In Denmark, “a confirmed neoliberal” reformer, Poul Schlüter, led a center-right government in 1982, diminishing union influence (Scheuer, 1992; Thelen, 2014, 61). In Sweden, Carl Bildt’s government pursued policies in 1991 prescribed by both monetarism and rational expectations theory (Blyth, 2001).

On the other hand, previous research has offered three interrelated reasons why Christian Democratic governments have been hesitant to adopt neoliberal reforms, at least within the social and labor policy domains: adherence to a non-liberal conservative ideology, reliance on cross-class electoral bases, and welfare states of their own creation.

First, the neo-liberal paradigm does not comport with the Christian right’s traditional version of conservatism, formed historically as a non-liberal alternative to socialism (van Kersbergen, 1995). Its ideological foundation, Catholic social doctrine, embraces the capitalist order, but gives equal emphasis to some countering principles (Leo XIII, 1891; Gabor, 2012). Specifically, the principle of subsidiarity encourages a community-based approach to industrial issues, such as negotiations between trade unions and employer associations, and opposes individualist or statist approaches (van Kersbergen & Manow, 2009). This principle provides ideological grounding for Christian Democratic parties’ recognition of trade unions as social partners.

In addition, Christian Democratic parties are based on cross-class constituencies. When they were first established, the parties’ leadership was assumed by lay Catholic members based in Catholic trade unions (Kalyvas, 1996). Since then, these parties have continued to seek the working-class vote (Huber, Ragin, & Stephens, 1993). Thus, for electoral as well as

ideological reasons, antagonism to trade unions (or to coordination with social partners) is less acceptable to Christian rights than to secular rights.

Lastly, welfare states in many Continental European countries are largely creations of Christian Democratic governments own making (Esping-Andersen, 1990; van Kersbergen, 1995). What distinguishes conservative welfare states from social democratic ones is not only the amount of redistribution, but more importantly, the institutional design of redistribution: risk-averse orientation rather than redistribution of income from the rich to the poor (Esping-Andersen, 1990). Substantial cuts to social-insurance benefits are less acceptable to this type of right-wing government.

For 18 industrialized democracies from 1961 to 2011, these two types of right-wing government have had starkly different associations with centralized bargaining and social-insurance benefit generosity. Table 1 presents the correlation coefficients between the party-government (secular right, Christian right, leftist) and the two institutional features. The time period is divided into a pre-1980 and post-1980 period (before and after the onset of neoliberal reforms). To test the merits of distinguishing between types of right-wing government, I present the coefficients of the combined right-wing government variable (column A) along with the coefficients of each type of right-wing government (column B).

INSERT TABLE 1 HERE

Whereas secular-right government is negatively associated with centralized wage-bargaining and social-insurance benefits, both Christian right and leftist government are positively associated with these two variables. Notably, the negative association between secular-right government and centralized bargaining became much stronger in the post-1980 period, while the positive association between Christian right government and centralized bargaining became stronger during the same period. The positive association between leftist government and the two institutional features became weaker in the post-1980 period.

From a dichotomous left–right framework, these distinctive associations between secular-right and Christian right governments would be largely concealed. Combined right-wing control in government is not associated with centralized wage-bargaining during the pre-1980 period (column A). And for the post-1980 period, combined right-wing control in government is negatively correlated with centralized wage bargaining. But such outcomes are possible if the negative association of secular right government is offset by the positive association of Christian right government. Indeed, once separated, Christian Democratic government appears to be positively associated with centralized wage-bargaining, whereas secular-right government is negatively correlated (column B). The same associations are apparent with regard to social-insurance benefit generosity—a negative association with the combined right-wing measure of government, but a positive association with Christian right government.

My hypothesis is that secular-right government facilitates polarization in income distribution by undermining centralized wage-bargaining and social-insurance benefit generosity, whereas Christian Democratic government mitigates polarization processes by keeping these institutions intact (Figure 3). Furthermore, due to distinctive responses to neoliberal reforms since the late-1970s, the contrasting association between the two types of right-wing government and the two institutional arrangements has become even stronger. Consequently, countries where a Christian Democratic party is influential have experienced relatively less polarization (i.e., a larger middle class), while countries where secular right parties are dominant in the political right have experienced a greater degree of polarization (i.e., a smaller middle class).

INSERT FIGURE 3 HERE

My party-based argument is in line with welfare regime theory in the following sense: each recognizes that the institutional features of collective bargaining and social-insurance

systems in the post-WWII period have been shaped by cumulative years of government control by the major political parties. However, unlike regime theory, my hypothesis reflects the fact that party competition between the right-wing and leftist parties has increased since the late-1970s. And among the social democratic regimes in particular, as the political right has had increased electoral success, a substantial degree of institutional reform was made possible.

My argument is also distinct from power resource theory, which holds that distributive outcomes are the result of working class mobilization through unions and leftist parties (Korpi, 1983, 2006). According to power resource theory, the Christian Democratic government's medium-level redistribution efforts are explained by its partial working-class base, while the conservative welfare regime's medium-level redistribution is understood as the result of working-class power being split between Social Democratic and Christian Democratic parties. However, the theory overlooks the dynamics of different party systems. It makes a difference, for example, whether the main competitor to the Social Democratic party is a Christian Democratic or a secular-right party. Christian Democratic parties are much more supportive of centralized wage-bargaining and generous social-insurance benefits than are secular right parties. In most cases, one type of right-wing party has been dominant over the other on the political right. In countries such as the Netherlands and Switzerland, where both types of right-wing parties are influential, Christian Democratic parties split right-wing power as much as they split leftist power. This division in the political right may prevent full-fledged neoliberal reform driven by a secular-right government.

Christian Democratic governments are distinguished from social-democratic governments not just by the degree of working class composition, but also by their unique model of the welfare state. Although conservative welfare states spend relatively little on social spending, they maintain higher income-replacement rates for social-insurance programs

than social-democratic welfare states.<sup>3</sup> Thus, if the amount of redistribution is more directly related to general income inequality and poverty, the risk-averse design may be more relevant to the income security of the middle class.

### **Data, Methods and Measures**

For statistical estimation, I analyzed data for 18 industrialized democracies between 1971 and 2010: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK, and the US. I used unbalanced panel data by incorporating three different datasets. I drew data for the dependent variables (the degree of income polarization and the population share of middle-income households) from the Luxembourg Income Study Database (LIS) (LIS, 2016),<sup>4</sup> and data for the explanatory variables from the Comparative Welfare State Dataset (CWS) (Brady, Huber, & Stephens, 2016) and the Comparative Welfare Entitlements Dataset (CWED) (Scruggs, Kuitto, & Jahn, 2014). The unit of analysis is a country–year, and the number of observation is 139, with numbers of observations among the countries varying from five to twelve (Appendix A).

Due to the unbalanced nature of the data and the results from the Breusch-Pagan Lagrange test, traditional ordinary least squares (OLS) regression was deemed inappropriate (Hsiao, 2003). To treat the cross-country heterogeneity that made OLS regression problematic, I employed Random Effects (RE) models with heteroscedasticity-robust standard errors (clustering errors within countries).<sup>5</sup> Compared to the Fixed Effects (FE) model, the RE model is better fit to my research design for the following reasons. First, although FE analysis is known as more robust than RE analysis, FE analysis cannot be used if there are time-constant factors in the key independent variables because there is no way to distinguish the effects of time-constant observables from that of time-constant unobservables (Woodridge, 2010, 266). In my analysis, the key explanatory variable, the main right-party in

power, is largely time-constant: Christian Democratic governments have not existed at all in certain countries. Second, Hausman's (1978) chi-square test results prefer RE models to FE models as more efficient estimation for my model specification.<sup>6</sup> Third, previous comparative research used RE models when both cross-national and historical variations are important to the theoretical questions of interest (Alderson & Nielson, 2002; Brady, 2003). RE models better facilitate the explanation of cross-national variation with causal variables rather than removing such variation with country-specific constants (Beck, 2001; Brady & Leicht, 2008).

To assess the hypothesized effects of right-wing government on polarization in income distribution through the institutions of wage bargaining and social insurance, I presented two RE model estimations. In order to assess the mediating effects of centralized wage bargaining and social insurance benefit generosity, the institutional variables were only included in the second estimation. I expected that the effects of party-government on income polarization would become insignificant or weaker if the institutional variables were included in the estimation. In additional estimations, I included the two institutional variables one by one to further specify the causal paths mediated by each institutional variable.

### **Dependent variables**

The main dependent variable is the degree of polarization in income distribution. To measure income polarization, I constructed Foster and Wolfson's Polarization Index (Foster & Wolfson, 2010) by aggregating household-level income data from the LIS at the country-level.<sup>7</sup> The index presents the degree of polarization in income distribution: 100 for complete polarization and 0 for no polarization.

To supplement the polarization measure, I measured the population share of the middle-income strata and compared it to the polarization index. Following previous research (Atkinson & Brandolini, 2013), I used the population share of middle-income households with incomes between 75 and 200 percent of the median disposable household income.<sup>8</sup> The

main advantage of using a relative income-boundary measure is that it enables measurement of the population share of the middle-income strata. In contrast, a fixed income-boundary measure (e.g., the middle four deciles) is suitable to measure the income share of the middle class.

Consistent with what Wolfson (1994) has suggested, these two measures are highly correlated. They are most highly correlated, with a coefficient of -0.932 ( $p < 0.01$ ), if the middle-income boundaries are set as 75 and 200 percent of the median income. The correlation becomes weaker when alternative thresholds of middle income are used. For instance, the correlation coefficient is -0.824 ( $p < 0.01$ ) for middle-income thresholds between 75 and 150 percent of the median income.

Both measures have pros and cons. Although a direct measure of middle-class size provides concrete information (e.g., the value of 38 indicates that 38 percent of the population makes a middle-class income), it is subject to the critique that it is arbitrary to choose certain middle-income boundaries. In contrast, the polarization index measure, although safe from the arbitrariness critique, provides abstract information.

### **Independent variables**

The main explanatory variables are the two types of right-party control in government, centralized wage bargaining, and social insurance benefit generosity. To measure *party control in government*, I used the cumulative, not the yearly, measure from the CWS. Although an institutional change can occur abruptly within a year, it usually takes several years of consecutive government control for the change to become established. In addition, cross-country differences in institutional settings result from the cumulative efforts of previous governments, rather than from yearly change in government control. First, party control in government was measured yearly by each party category's share of seats in parliament as a percentage of all seats held by the government. Each year's party share

ranges from 0 to 1.<sup>9</sup> The cumulative measure was calculated by adding this yearly score from 1946 to the year of the observation. I measured this for three party categories: secular right, Christian Democratic, and leftist parties. *Secular-right party* is a residual category that includes all right-wing parties except Christian Democratic parties. Because the key independent variable is Christian Democratic control of government that worked as a restraint on neo-liberal reforms, I include all other right parties in a single category, the secular right.

As for *centralized wage-bargaining*, the degree of wage coordination was multiplied by the coverage of collective bargaining, drawing data from the CWS. Wage coordination level was coded on a scale of 1 to 5, for which 5 represents the most centralized level.<sup>10</sup> Coverage was measured by the percentage of employees covered by collective bargaining agreements.

For *social-insurance benefit generosity*, I use the combined generosity index from the CWED. This index reflects the income replacement rates, duration, and coverage of three major social-insurance programs: unemployment insurance, sickness insurance and public pensions. Social-assistance benefits are not included because these benefits are not set high enough for the middle-income stratum to remain at its previous income level.

### **Control variables**

I controlled for leftist party control in government, economic conditions, socio-demographic factors, and political institutions. The main source of data was the CWS. Leftist party power was controlled for each type of right-wing government. This is because I assumed that the right-wing government's reform efforts related to collective bargaining arrangements and social-insurance benefits would be restrained by the relative strength of leftist parties in the country.

Among economic conditions, I controlled for three aspects of global market integration. *Trade openness* was measured by the sum of exports and imports as a share of GDP; *capital account openness* was based on the Chinn-Ito index (Chinn & Ito, 2008); and *population*

*share of immigrants* was measured by the percentage of foreign residents in the country. In addition, to account for skill-biased technological change in the economy, *high-skilled labor share* was measured as the percentage of the population aged 25 or older who completed tertiary schooling.<sup>11</sup> This can be used as a proxy measure of the skill-biased technological change in the country's economy if the supply for high-skilled labor is assumed to reflect the demand. Lastly, I controlled for the *GDP growth rate* as general economic conditions are widely perceived to influence income distribution.

Among the socio-demographic variables, *elderly population share* was included to control for the effects of the relative size of the retired population, whose income is less likely to reach the middle income. It was measured by the population share of the elderly (65 and older). *Female labor force participation rate* was also controlled for because it can affect household income distribution. The expectations here were mixed. Women's earnings may reduce inequality among households by doubling the number of income earners in low-income households or by compensating the male spouse's income loss (Harkness, 2013). In contrast, it may increase income polarization if the marriage is between individuals with similar socio-economic backgrounds (Blossfeld & Buchholz, 2009).

As for political institutions, *electoral system* was controlled for because of its studied effects on redistribution outcomes: redistribution tends to be more equal in proportional representation systems than in majoritarian systems (Iversen & Soskice, 2006). *European Union (EU) membership* was controlled for not only because the EU pursues a single European market, but also because party-government effects may be constrained by policy making at supra-national EU institutions (Schmidt, 2006; Wallace, Pollack, & Young, 2010). These two variables were coded as dummy.

## Findings

Table 2 presents regression estimates of party-government effects on polarization in income distribution, mediated by centralized wage-bargaining and social-insurance benefits. The dependent variable was the degree of income polarization in the first four models (Model 1, 2, 3, and 4), and the population share of middle-income households in the next four models (Model 5, 6, 7, and 8).

For the degree of polarization, the two types of right-wing government had contrasting effects. Whereas secular-right government increased polarization (Model 1), Christian right government reduced polarization (Model 2). It should be noted that party-government had a cumulative rather than a yearly influence. That is, if the country's secular-right parties had greater control of government for a longer period of time, income distribution in the country was more polarized, having a smaller population share of middle-income households. In contrast, Christian Democratic party control of government resulted in less polarized income distribution, or a larger share of the middle class.

As hypothesized, both institutional features had significant effects on the reduction of income polarization. And the effects of both types of right-wing government were weaker and insignificant when the two institutional variables, centralized wage-bargaining and social-insurance benefit generosity, were included (Models 3 and 4). The positive effects of secular-right government on income polarization were reduced by 50 percent and became insignificant, when the institutional variables were included. Moreover, when the institutional variables were included, the negative effects of Christian right government on income polarization were reduced by 20 percent and became insignificant.

This suggests that right-wing government effects are substantially mediated by the effects of the institutional arrangements of collective bargaining and social insurance, but in different directions and to varying degrees. Whereas secular-right government facilitates income polarization through undermined centralized wage-bargaining and social-insurance benefit

generosity, Christian right government reduces income polarization by maintaining (or enhancing) those institutions. And the mediating effects of the institutions were much larger for secular right governments than for Christian Democratic governments, since the former has been the main transformer of those institutions.

INSERT TABLE 2 HERE

As for leftist government, its positive association with income polarization is counter-intuitive given the well-documented role of leftist governments in reducing income inequality. With centralized wage bargaining and social insurance generosity, leftist government maintained its positive association even though the association has been substantially weakened since the 1980s (see Table 1). And in contrast to right-wing governments, the mediating effects of the institutional variables were not found for leftist government (Table 2). With the inclusion of the institutional variables, the effects of leftist government on polarization were greater and more significant. This suggests that the effects of leftist government on polarization may have to do with factors other than the change in centralized wage-bargaining and social-insurance benefit generosity under leftist government. For instance, it may have to do with leftist government's investment in higher education and technological innovation (Boix, 1997; Bussemeyer, 2009), which has a positive influence on earnings polarization in the labor market.

Among the economic variables, the effects of GDP growth on income polarization were significantly negative. The more the economy grows, the less polarized the income distribution. The general economic situation still matters, especially in such cases as the 1992–3 recession in Belgium that reduced its middle-class size from 62 percent in 1992 to 48 percent in 1995. This outcome is in line with modernization theory, which posits that economic development leads to an expansion of the middle class as well as the popular idea that a rising tide lifts all boats.

As for the variables related to global market integration, the population share of immigrants had negative and significant effects on income polarization, whereas neither trade nor capital account openness influenced income polarization to a statistically significant degree. These results are at odds with the globalization argument, which attributes income polarization to downward wage pressures driven by low-wage immigrant labor. Although the causal relationship and the exact effects can be assessed with more specified and precise data on immigrant populations, my results suggest that immigrants may not be the main cause for income polarization.

The share of highly-educated labor had significantly positive effects on income polarization. This outcome supports the skill-biased technological change argument. As the share of highly-educated labor increases in response to demand in the post-industrial economy, the wage differentials between the highly-educated and the less-educated contribute to income polarization.

Among the socio-demographic factors, female labor-force participation had negative effects on income polarization, and elderly population share had positive effects. However, both effects were statistically insignificant when other variables were controlled for (Models 3 and 4). The effect of EU membership was positive, while the effect of the PR system was negative on income polarization. However, neither of these effects was statistically significant.

In the following four models (Models 5 to 8), I present regression outcomes using the alternative measure of the dependent variable, the population share of middle-income households. Party-government effects mediated through centralized wage-bargaining and social-insurance benefit generosity were consistent. However, the coefficient signs were the opposite because greater polarization indicates a smaller population share of the middle-income stratum.

The only difference between the two measures of the dependent variable was the effect of female labor force participation (FLFP). Whereas its effects were statistically insignificant with the polarization measure, they were significant with the size of the middle class. A greater FLFP increased the population share of the middle-income stratum significantly. This may occur if the income distribution within the middle class has varying shapes, depending on female employment type and its combination with that of the male partner. For instance, the income distribution within the middle-income range may be polarized or skewed toward either lower-middle or upper-middle income, depending on the extent to which the dual income is based on part-time female labor combined with full-time male labor, two full-time earners, or marriage homogamy—marriages between low-skilled earners and high-skilled earners.

As for the effects of FLFP, it seems clear that a higher FLFP does not result in greater polarization (or a smaller share of the middle-income strata). This suggests that women's labor force participation contributed to reducing income differentials between households by doubling the number of income earners among low-income households or by compensating the male spouse's income loss, rather than by increasing the income differentials through marriages between similar income earners.

Table 3 presents further specified mediating effects between the two institutional variables for each type of right-wing government. The effects of secular-right government on income polarization were mediated through centralized wage-bargaining as well as social-insurance benefit generosity. However, the effects of Christian Democratic government were mediated mainly through centralized wage-bargaining. This result helps to clarify the nature of variation in income polarization among different welfare regimes. Since the 1970s, most Continental European countries have had less income polarization (or de-polarization) than Nordic countries, where secular-right governments could pursue neoliberal reforms in terms

of both centralized wage-bargaining and social-insurance benefit generosity. In Anglo-American countries, where secular-right governments' tenure had been longer and more secure than in Nordic countries, the extent of polarization was the greatest.

INSERT TABLE 3 HERE

To sum up, my analysis highlights the diversity of right-wing party governments to account for variation in income polarization among industrialized democracies. If the relative strength of leftist parties accounts for cross-country variation in general income inequality, it is the strength of Christian Democratic parties vis-à-vis secular-right parties that explains why some countries have experienced more (or less) polarized income distribution than others. Applying these results to individual country cases, one notable exception is Germany. In Germany, the Christian Democratic political alliance (the Christian Democratic Union and the Christian Social Union in Bavaria) is the dominant right-wing party, but the population share of the middle class has declined substantially, from 68 percent to 54 percent between 1983 and 2010. Since 1990, Germany has experienced a steep decline in its collective bargaining coverage (from 85 to 61 percent of employees) without much change in the degree of centralization. The majority of this decline occurred on two separate occasions: the first, in 1990, from 85 to 75 percent, and the second, between 1999 and 2004, from 75 to 65 percent (Brady, Huber, & Stephens, 2016). While the first big drop occurred under the Christian Democratic government, it is difficult to conclude that the German Christian Democratic government had a negative effect on bargaining coverage. Rather, the reduction in collective bargaining coverage may be attributed to the exogenous shock to the labor market caused by German reunification. And the second big decline took place under the Social Democratic government.

The policy implications of my findings deserve more attention than their implications for party government. Although suggested in the literature, whether (broader and more

centralized) collective bargaining and the risk-reverse orientation of conservative welfare states have negative effects on income polarization (or middle-class decline) has not been assessed empirically. My analysis is one of the first attempts to empirically examine these institutional effects. Certainly, the erosion of centralized wage-bargaining (especially in terms of bargaining coverage) is not a universal phenomenon under deindustrialization and the development of a dual labor market. In some countries, such as Austria and Switzerland, bargaining coverage has increased, while in many others it has maintained its previous levels. The decline was most dramatic in the UK, the US, and Australia (Brady, Huber, & Stephens, 2016). The Dutch case shows that collective bargaining coverage can be extended by a policy change, independent of union density. With the 1996 legislation, the Netherlands guaranteed the same collective bargaining agreements as standard full-time jobs to part-time jobs (Thelen, 2014).

With regard to social-insurance protection, as job insecurity and income volatility have increased across industrial sectors and income groups, it has become more important for middle-income households to avoid downward mobility. In this context, income polarization may be facilitated if the direction of social policy reform is toward privatization, the individualization of the burden of social risks, and the reduction of public insurance benefit levels (Hacker, 2006). I acknowledge that my analysis is inconclusive with regard to the effects of social-insurance benefit generosity. Future research will need to investigate the relative importance of insurance programs, such as unemployment, sickness, pension, and paid parental leave, as well as the relative importance of generosity components, such as income replacement rates, length, and coverage.

### **Conclusion**

The main contribution of this research is the finding that the extent of income polarization in post-industrial democracies varies significantly across countries and over time;

that is, income polarization is not simply a common development brought upon by global market integration or skill-biased technological change. My findings suggest that polarization in income distribution is shaped in large part by policies created under party-governments, and that cases of de-polarization are possible. I argue that the type of right-wing government is associated with divergent outcomes in the degree of income polarization (or the population share of the middle-income stratum). These contrasting party-government effects are explained by varying degrees of party acceptance of the neo-liberal policy reforms on wage-bargaining settings and social-insurance systems promoted since the late-1970s. I emphasized the effects of Christian Democratic parties' status-quo-oriented conservatism aimed at maintaining the earnings-related income protection of the welfare state as well as centralized wage-bargaining, which together tempered the polarization trend in the market.

One possible critique of my party-government explanation regards the issue of endogeneity, which is relevant in two circumstances. First, if a country already has a large middle class, regardless of partisanship, all major parties might pursue middle class votes to win elections and, thus, devise policies that favor the middle class. Under this condition, an extant large middle class might explain a future large middle class. Second, in a circumstance where the middle class votes for a certain party exclusively, this party may continue to make policies for its middle class constituents. That is, a party may make policies for the middle class because it is a middle-class party.

There is no empirical support for the first circumstance. As I have shown, middle-class sizes were not very different among countries in 1980, but diverged significantly by 2010. The middle-class size in Norway was smaller than that of the US in 1980, but grew to 1.5 times larger than the US middle class by 2005. In the mid-1990s, Austrian middle-class size was similar to that of the UK (about 47 percent of the population) but grew to as large as 61 percent, while the UK middle class remained at 47 percent through the mid-2000s.

For the second circumstance, existing literature agrees that the middle class is constituted by swing voters, who switch their political support depending on certain conditions, rather than voters loyal to a certain party (Iversen & Soskice, 2006). Furthermore, because the middle class (defined by income) has not emerged as a coherent voter group, their votes are distributed across the political spectrum. Although there are parties named “the Center Party” in Europe, these parties represent agricultural (and more recently self-employed) interests rather than the interests of middle-income households (Heidar 2005; Luebbert 1987; Rokkan, 1970).

My findings also speak to two prevailing theories from the distributional studies literature in political science: welfare regime theory and median voter theory. Whereas welfare regime theory pays less attention to the distributive effects of conservative welfare states, I have demonstrated that a very conservative design may prevent middle-class decline. In most cases the largest middle-class countries were what welfare regime theory categorizes as conservative welfare regimes, where a Christian Democratic party is established as the dominant right party. While social-democratic regimes appear more effective at controlling general income inequality, conservative regimes appear more effective at tempering income polarization.

In addition, this study highlighted the fact that institutional features of the welfare state (and their effects) are time-variant rather than static. Since the 1980s, Denmark, a typical social-democratic regime, has experienced a dramatic decrease in unemployment and sickness benefit generosity under a secular right government. In contrast, Austria, a typical conservative regime, outpaced social-democratic Denmark and Sweden both in terms of collective-bargaining coverage and centralization (Brady, Huber, & Stephens, 2016). Notably, the same institutional design can have different effects at different times. As the middle class’s economic insecurity has increased, generous earnings-related social-insurance

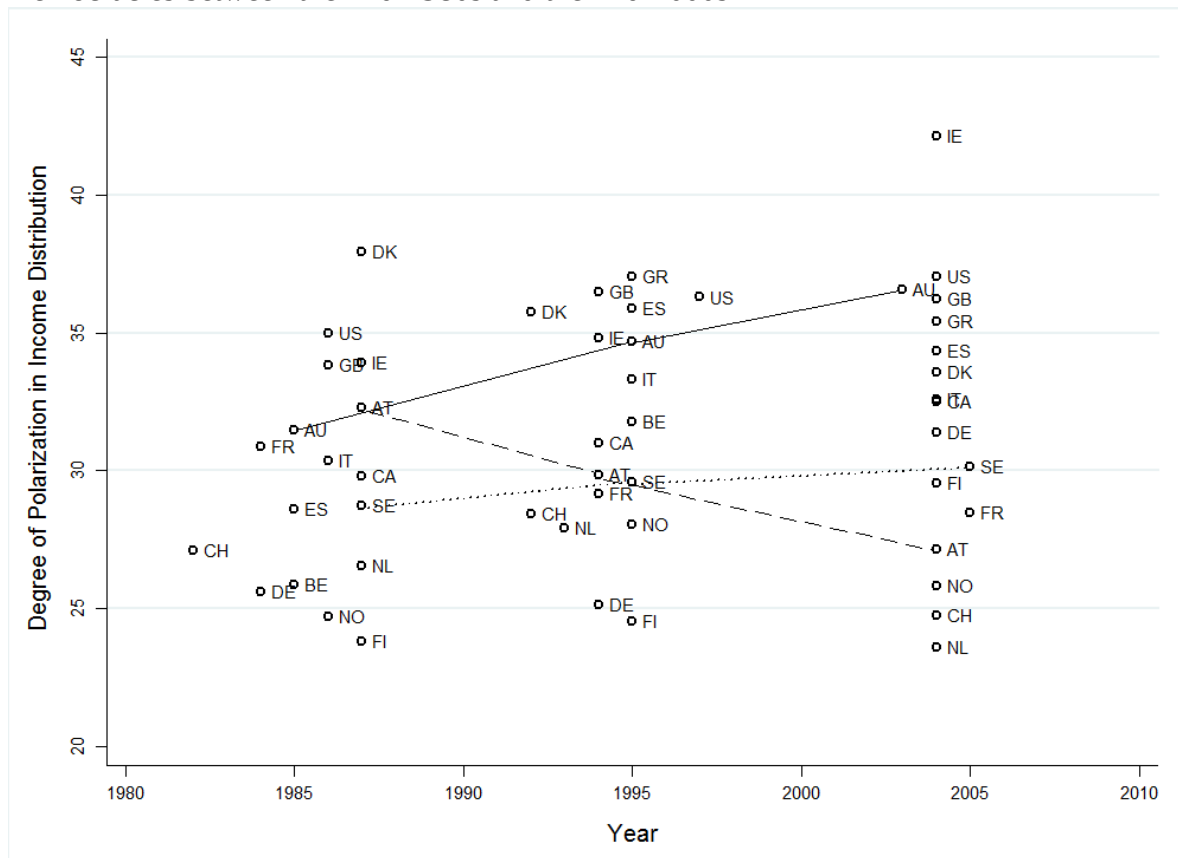
benefits in conservative welfare regimes have become more effective at preventing middle class decline.

With regard to median voter theory, my findings raise an important question about its core assumption, namely, that income distribution follows a normal distribution curve, where middle-income households comprise a plurality of the population. Based on this assumption, the theory argues that both left and right governments have incentives to reduce income inequality. However, if the development of inequality follows a non-normal curve, such as a bi-polar distribution, middle-income voters may not necessarily comprise a plurality of the population. Furthermore, with the development of income polarization, a substantial share of the middle class may experience upward mobility. In this structure of inequality, party governments would have far fewer incentives to reverse the trend of income polarization.

This study attempted to describe and explain an increasingly widespread, but understudied type of income inequality, namely, polarization in income distribution (or middle-class decline). Present research on redistribution tends to focus on the degree of general income inequality (measured by the Gini coefficient), which fails to capture a distinctive type of inequality development (Wolfson, 1994). And among those studies on specific income groups, the middle of the income distribution has been “forgotten”—distributional studies have typically focused on either the poor, at one end, or the rich, at the other (Atkinson & Brandolini, 2013). As Pontusson and Lupu (2011) have argued, the different structures of income inequality require further scholarly attention because they may have causes and consequences that are distinct from one another. Given its critical implications for social cohesion, equal opportunity for future generations of citizens, and democratic stability, research on income polarization must receive more attention in the field of political economy on redistribution. This research expects to attract further interest from scholars and policy makers concerning the topic.

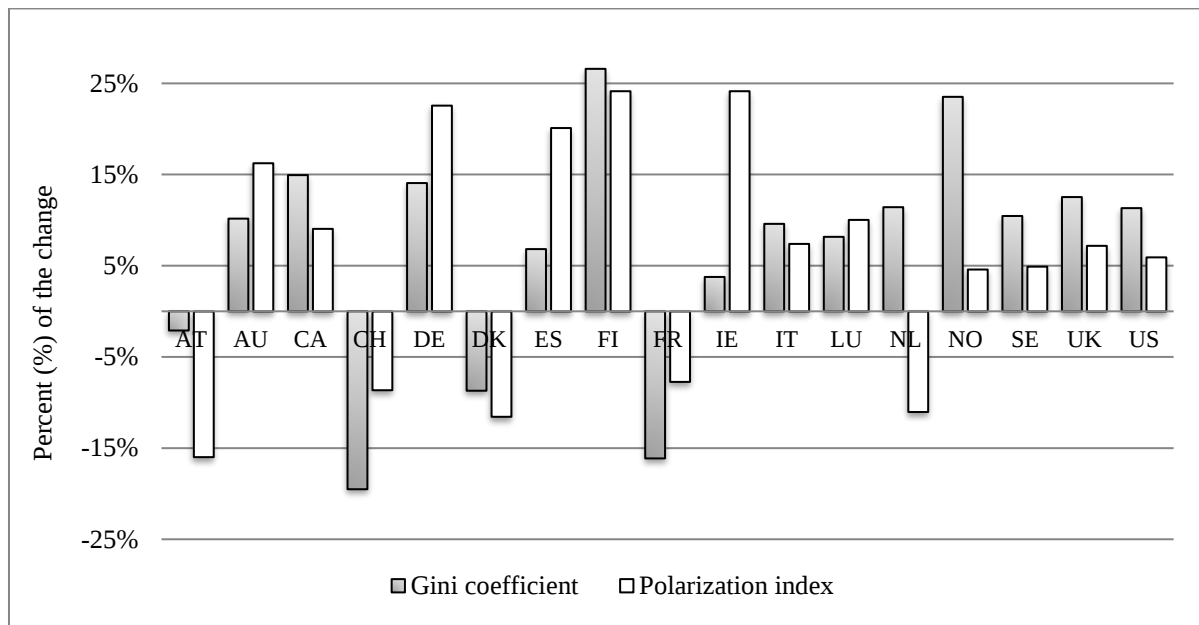
## Figures and Tables

Figure 1. Development of Income Polarization among Households in 18 Industrialized Democracies between the mid-1980s and the mid-2000s



*Source:* The author's calculation of Wolfson's Polarization Index based on disposable household income data from Luxembourg Income Study (LIS). The solid line traces the change in Australia, the dot line for Sweden, and the dashed line for Austria. Dashed lines indicate increase in middle class size. Country abbreviations: Australia (AU), Austria (AT), Belgium (BE), Canada (CA), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Ireland (IE), Italy (IT), The Netherlands (NL), Norway (NO), Spain (ES), Sweden (SE), Switzerland (CH), the UK (GB), and the US (US). Data are not available for Greece in the mid-1980s and for Belgium in the mid-2000s.

Figure 2. Change in Gini and Polarization Index in 16 Industrialized Democracies between the mid-1980s and the mid-2000s



Source: The author's calculation of Gini Coefficients and Foster and Wolfson's Polarization Index based on disposable household income data from the LIS. Of 18 countries in Figure 1, data are not available for Greece and Belgium for this comparison.

Figure 3. Party-government Effects on Polarization in Income Distribution

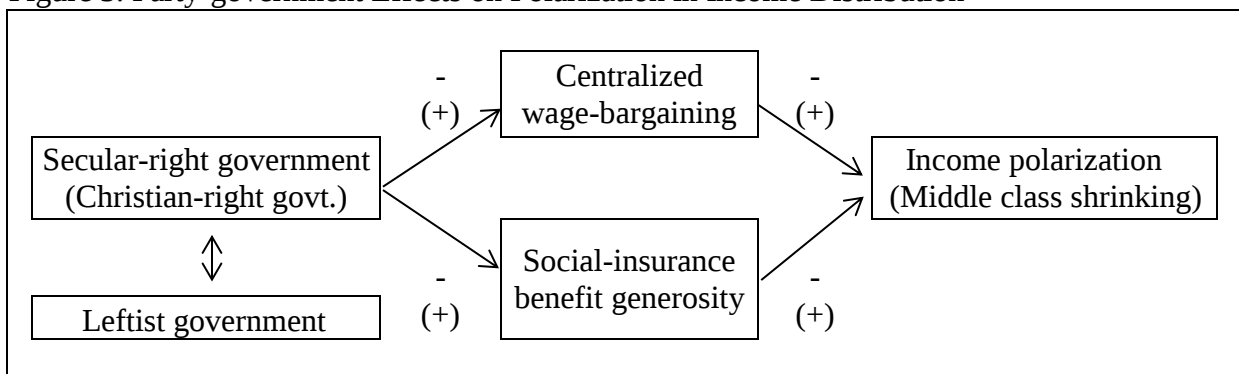


Table 1. Party-government's Association with Centralized Bargaining and Social-insurance Benefit Generosity in 18 Industrialized Democracies, 1961-2011

|                                       | Centralized Wage Bargaining |                     |                     |                     | Social Insurance Benefit Generosity |                     |                     |                     |
|---------------------------------------|-----------------------------|---------------------|---------------------|---------------------|-------------------------------------|---------------------|---------------------|---------------------|
|                                       | Pre-1980                    |                     | Post-1980           |                     | Pre-1980                            |                     | Post-1980           |                     |
|                                       | (A)                         | (B)                 | (A)                 | (B)                 | (A)                                 | (B)                 | (A)                 | (B)                 |
| Right-wing Control in Govt.           |                             |                     | -0.202**<br>(0.000) |                     | -0.285**<br>(0.003)                 |                     | -0.185**<br>(0.000) |                     |
| Secular Right Control in Govt.        |                             | -0.394**<br>(0.000) |                     | -0.663**<br>(0.000) |                                     | -0.546**<br>(0.000) |                     | -0.449**<br>(0.000) |
| Christian Democratic Control in Govt. |                             | 0.320**<br>(0.001)  |                     | 0.411**<br>(0.000)  |                                     | 0.210*<br>(0.028)   |                     | 0.203**<br>(0.000)  |
| Leftist Control in Govt.              | 0.768**<br>(0.000)          | 0.768**<br>(0.000)  | 0.583**<br>(0.000)  | 0.583**<br>(0.000)  | 0.757**<br>(0.000)                  | 0.757**<br>(0.000)  | 0.593**<br>(0.000)  | 0.593**<br>(0.000)  |
| N                                     | 104                         | 104                 | 308                 | 308                 | 109                                 | 109                 | 552                 | 552                 |

*Source:* The author's assessment based on data from the Comparative Welfare State Dataset and the Comparative Welfare Entitlements Dataset. I used cumulative index of party control in government, centralized wage bargaining (level of wage coordination multiplied by bargaining coverage) and social insurance benefit generosity index. Notes: P-values are in parentheses, \* p<0.05, \*\* p<0.01

Table 2. The Effects of the Type of Right-wing Government, Centralized Bargaining and Social-insurance Benefit Generosity on Income Polarization and the Size of the Middle Class in 18 industrialized democracies, 1971-2010

|                                          | Polarization in Income Distribution |                     |                     |                     | The Share of Middle-income Strata |                     |                     |                     |
|------------------------------------------|-------------------------------------|---------------------|---------------------|---------------------|-----------------------------------|---------------------|---------------------|---------------------|
|                                          | 1                                   | 2                   | 3                   | 4                   | 5                                 | 6                   | 7                   | 8                   |
| Secular Right Control in Government      | 0.176**<br>(0.08)                   | 0.089<br>(0.06)     |                     |                     | -0.223**<br>(0.10)                | -0.117*<br>(0.07)   |                     |                     |
| Christian Democratic Control in Govt.    |                                     |                     | -0.078*<br>(0.05)   | -0.062<br>(0.04)    |                                   |                     | 0.134**<br>(0.07)   | 0.106**<br>(0.05)   |
| Centralized Bargaining                   |                                     | -0.008**<br>(0.00)  |                     | -0.009***<br>(0.00) |                                   | 0.013**<br>(0.01)   |                     | 0.013**<br>(0.01)   |
| Social Insurance Benefit Generosity      |                                     | -0.290***<br>(0.10) |                     | -0.313***<br>(0.09) |                                   | 0.288*<br>(0.16)    |                     | 0.348**<br>(0.14)   |
| Leftist Control in Govt.                 | 0.135**<br>(0.07)                   | 0.159***<br>(0.05)  | 0.101<br>(0.09)     | 0.136**<br>(0.06)   | -0.178**<br>(0.09)                | -0.236***<br>(0.08) | -0.112<br>(0.11)    | -0.195**<br>(0.09)  |
| GDP Growth                               | -0.016<br>(0.07)                    | -0.133**<br>(0.07)  | -0.006<br>(0.08)    | -0.146**<br>(0.07)  | 0.028<br>(0.11)                   | 0.179*<br>(0.10)    | 0.031<br>(0.11)     | 0.219**<br>(0.10)   |
| Trade Openness                           | 0.002<br>(0.02)                     | 0.022<br>(0.02)     | 0.002<br>(0.02)     | 0.026<br>(0.02)     | -0.023<br>(0.04)                  | -0.050<br>(0.03)    | -0.028<br>(0.04)    | -0.061**<br>(0.03)  |
| Capital Account Openness                 | -0.001<br>(0.02)                    | 0.003<br>(0.02)     | 0.005<br>(0.03)     | 0.006<br>(0.02)     | -0.001<br>(0.03)                  | -0.002<br>(0.03)    | -0.008<br>(0.03)    | -0.005<br>(0.03)    |
| Immigrant Population Share               | -0.271**<br>(0.12)                  | -0.308***<br>(0.10) | -0.187<br>(0.12)    | -0.256**<br>(0.10)  | 0.335*<br>(0.18)                  | 0.381**<br>(0.16)   | 0.208<br>(0.18)     | 0.268*<br>(0.14)    |
| High-skilled Labor Share                 | 0.256***<br>(0.09)                  | 0.244***<br>(0.07)  | 0.282**<br>(0.11)   | 0.240***<br>(0.08)  | -0.405**<br>(0.16)                | -0.366**<br>(0.15)  | -0.412**<br>(0.17)  | -0.330**<br>(0.14)  |
| Female Labor Force Participation (15-64) | -0.124*<br>(0.07)                   | -0.088<br>(0.06)    | -0.086<br>(0.07)    | -0.070<br>(0.06)    | 0.222***<br>(0.08)                | 0.195**<br>(0.08)   | 0.177**<br>(0.09)   | 0.184**<br>(0.08)   |
| Elderly Population Share (65 and older)  | 0.173<br>(0.34)                     | 0.229<br>(0.26)     | 0.325<br>(0.32)     | 0.341<br>(0.26)     | -0.323<br>(0.42)                  | -0.419<br>(0.33)    | -0.569<br>(0.37)    | -0.622**<br>(0.29)  |
| EU Membership                            | 0.809<br>(1.24)                     | 0.439<br>(1.18)     | 0.858<br>(1.22)     | 0.532<br>(1.18)     | 0.240<br>(1.54)                   | 0.749<br>(1.57)     | -0.109<br>(1.56)    | 0.188<br>(1.57)     |
| PR System                                | -1.156<br>(1.56)                    | -0.503<br>(1.27)    | -2.341<br>(1.62)    | -1.008<br>(1.06)    | 1.695<br>(2.32)                   | 1.195<br>(1.85)     | 3.555<br>(2.27)     | 2.053<br>(1.71)     |
| Constant                                 | 31.661***<br>(4.68)                 | 39.362***<br>(4.28) | 29.747***<br>(4.89) | 38.929***<br>(4.34) | 53.195***<br>(4.68)               | 44.385***<br>(4.93) | 55.769***<br>(5.03) | 44.364***<br>(4.79) |
| R <sup>2</sup> (within)                  | 0.2135                              | 0.2855              | 0.1716              | 0.2734              | 0.1819                            | 0.2345              | 0.1493              | 0.2144              |
| R <sup>2</sup> (between)                 | 0.4493                              | 0.7027              | 0.4362              | 0.7308              | 0.5213                            | 0.6965              | 0.5437              | 0.7773              |
| R <sup>2</sup> (overall)                 | 0.3493                              | 0.5516              | 0.3303              | 0.5663              | 0.3603                            | 0.4981              | 0.3586              | 0.5378              |
| Number of observations                   | 139                                 | 139                 | 139                 | 139                 | 139                               | 139                 | 139                 | 139                 |

Notes: Standard errors are in parentheses

\* p&lt;0.1, \*\* p&lt;0.05, \*\*\* p&lt;0.01

Table 3. Mediating Effects of Centralized Bargaining and Social-insurance Benefit Generosity on Income Polarization in 18 Industrialized Democracies, 1971-2010

|                                          | Polarization in Income Distribution |                     |                     |                     |                     |                     |                     |                     |
|------------------------------------------|-------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|                                          | 1                                   | 2                   | 3                   | 4                   | 5                   | 6                   | 7                   | 8                   |
| Secular Right Control in Government      | 0.176**<br>(0.08)                   | 0.109<br>(0.07)     | 0.127*<br>(0.07)    | 0.089<br>(0.06)     |                     |                     |                     |                     |
| Christian Democratic Control in Govt.    |                                     |                     |                     |                     | -0.078*<br>(0.05)   | -0.035<br>(0.04)    | -0.091**<br>(0.04)  | -0.062<br>(0.04)    |
| Centralized Bargaining                   |                                     | -0.011***<br>(0.00) |                     | -0.008**<br>(0.00)  |                     | -0.013***<br>(0.00) |                     | -0.009***<br>(0.00) |
| Social Insurance Benefit Generosity      |                                     |                     | -0.341***<br>(0.11) | -0.290***<br>(0.10) |                     |                     | -0.388***<br>(0.10) | -0.313***<br>(0.09) |
| Leftist Control in Govt.                 | 0.135**<br>(0.07)                   | 0.166***<br>(0.05)  | 0.137**<br>(0.06)   | 0.159***<br>(0.05)  | 0.101<br>(0.09)     | 0.154**<br>(0.07)   | 0.094<br>(0.07)     | 0.136**<br>(0.06)   |
| GDP Growth                               | -0.016<br>(0.07)                    | -0.083<br>(0.06)    | -0.096<br>(0.07)    | -0.133**<br>(0.07)  | -0.006<br>(0.08)    | -0.089<br>(0.06)    | -0.112<br>(0.07)    | -0.146**<br>(0.07)  |
| Trade Openness                           | 0.002<br>(0.02)                     | 0.014<br>(0.02)     | 0.014<br>(0.02)     | 0.022<br>(0.02)     | 0.002<br>(0.02)     | 0.016<br>(0.02)     | 0.021<br>(0.02)     | 0.026<br>(0.02)     |
| Capital Account Openness                 | -0.001<br>(0.02)                    | 0.004<br>(0.02)     | -0.000<br>(0.02)    | 0.003<br>(0.02)     | 0.005<br>(0.03)     | 0.008<br>(0.02)     | 0.005<br>(0.02)     | 0.006<br>(0.02)     |
| Immigrant Population Share               | -0.271**<br>(0.12)                  | -0.311***<br>(0.10) | -0.295***<br>(0.11) | -0.308***<br>(0.10) | -0.187<br>(0.12)    | -0.277***<br>(0.10) | -0.203*<br>(0.11)   | -0.256**<br>(0.10)  |
| High-skilled Labor Share                 | 0.256***<br>(0.09)                  | 0.281***<br>(0.07)  | 0.221**<br>(0.09)   | 0.244***<br>(0.07)  | 0.282**<br>(0.11)   | 0.302***<br>(0.08)  | 0.220**<br>(0.09)   | 0.240***<br>(0.08)  |
| Female Labor Force Participation (15-64) | -0.124*<br>(0.07)                   | -0.153**<br>(0.06)  | -0.050<br>(0.07)    | -0.088<br>(0.06)    | -0.086<br>(0.07)    | -0.136**<br>(0.06)  | -0.026<br>(0.07)    | -0.070<br>(0.06)    |
| Elderly Population Share (65 and older)  | 0.173<br>(0.34)                     | 0.228<br>(0.29)     | 0.197<br>(0.31)     | 0.229<br>(0.26)     | 0.325<br>(0.32)     | 0.313<br>(0.27)     | 0.355<br>(0.28)     | 0.341<br>(0.26)     |
| EU Membership                            | 0.809<br>(1.24)                     | 0.112<br>(1.19)     | 0.916<br>(1.23)     | 0.439<br>(1.18)     | 0.858<br>(1.22)     | 0.017<br>(1.17)     | 1.112<br>(1.16)     | 0.532<br>(1.18)     |
| PR System                                | -1.156<br>(1.56)                    | -1.399<br>(1.33)    | -0.273<br>(1.36)    | -0.503<br>(1.27)    | -2.341<br>(1.62)    | -2.178*<br>(1.24)   | -0.905<br>(1.13)    | -1.008<br>(1.06)    |
| _cons                                    | 31.661***<br>(4.68)                 | 35.208***<br>(3.86) | 37.615***<br>(4.61) | 39.362***<br>(4.28) | 29.747***<br>(4.89) | 34.873***<br>(3.90) | 37.055***<br>(4.43) | 38.929***<br>(4.34) |
| N                                        | 139                                 | 139                 | 139                 | 139                 | 139                 | 139                 | 139                 | 139                 |

Notes: Standard errors are in parentheses

\* p&lt;0.1, \*\* p&lt;0.05, \*\*\* p&lt;0.01

## Appendix A

### Country-year Datasets from LIS (for statistical estimation)

|                 |                                                                        |
|-----------------|------------------------------------------------------------------------|
| Australia       | AU81, AU85, AU89, AU95, AU01, AU03, AU08, AU10                         |
| Austria         | AT87, AT94, AT95, AT97, AT00, AT04, AT07, AT10                         |
| Belgium         | BE85, BE88, BE92, BE95, BE97, BE00                                     |
| Canada          | CA71, CA75, CA81, CA87, CA91, CA94, CA97, CA98, CA00, CA04, CA07, CA10 |
| Denmark         | DK87, DK92, DK95, DK00, DK04, DK07, DK10                               |
| Finland         | FI87, FI91, FI95, FI00, FI04, FI07, FI10                               |
| France          | FR78, FR84, FR89, FR94, FR00, FR05, FR10                               |
| Germany         | DE89, DE94, DE94, DE00, DE04, DE07, DE10                               |
| Greece          | GR95, GR00, GR04, GR07, GR10                                           |
| Ireland         | IE94, IE95, IE96, IE00, IE04, IE07, IE10                               |
| Italy           | IT86, IT87, IT89, IT91, IT93, IT95, IT98, IT00, IT04, IT08, IT10       |
| The Netherlands | NL83, NL87, NL90, NL93, NL99, NL04, NL07, NL10                         |
| Norway          | NO79, NO86, NO91, NO95, NO00, NO04, NO07, NO10                         |
| Spain           | ES85, ES90, ES95, ES00, ES04, ES07, ES10                               |
| Sweden          | SE75, SE81, SE87, SE92, SE95, SE00, SE05                               |
| Switzerland     | CH00, CH02, CH04, CH07, CH10                                           |
| The UK          | GB74, GB79, GB86, GB91, GB94, GB95, GB99, GB04, GB07, GB10             |
| The US          | US74, US79, US86, US91, US94, US97, US00, US04, US07, US10             |

## Appendix B

### Descriptive Statistics

| Variable                                 | M       | SD      | Min    | Max     |
|------------------------------------------|---------|---------|--------|---------|
| The Degree of Income Polarization        | 31.589  | 4.180   | 23.611 | 42.129  |
| The Share of Middle-Income Strata        | 54.026  | 5.667   | 39.010 | 66.890  |
| Leftist Control in Government            | 16.150  | 12.252  | 0      | 49.860  |
| Secular Right Control in Govt.           | 13.337  | 11.485  | 0      | 42.084  |
| Christian Democratic Control in Govt.    | 9.274   | 13.456  | 0      | 39.162  |
| Centralized Wage Bargaining              | 220.702 | 134.579 | 13.100 | 480     |
| Social Insurance Benefit Generosity      | 31.916  | 6.946   | 10.800 | 45.800  |
| GDP Growth                               | 2.372   | 2.320   | -8.609 | 10.586  |
| Trade Openness                           | 70.487  | 34.471  | 17.106 | 183.285 |
| Capital Account Openness                 | 88.777  | 20.378  | 24.423 | 100     |
| Immigrant Population Share               | 9.873   | 5.987   | 0.738  | 22.113  |
| High-skilled Labor Share                 | 13.251  | 6.486   | 3.300  | 31.590  |
| Female Labor Force Participation (15-64) | 63.151  | 10.839  | 33.966 | 82.201  |
| Elderly Population Share (65 and older)  | 14.679  | 2.430   | 8.026  | 20.981  |
| EU Membership                            | 0.626   | 0.486   | 0      | 1       |
| PR System                                | 0.640   | 0.476   | 0      | 1       |

## Notes

<sup>1</sup> I use the term “middle class” as shorthand for middle income strata, and I use the decline of middle income strata and polarization in income distribution interchangeably because they represent basically the same change in income distribution. They are highly and significantly correlated, with the correlation coefficient of -0.9321 ( $p < 0.01$ ) for my cases.

<sup>2</sup> In 2004, Denmark (0.232), Sweden (0.234), and Finland (0.254) had the lowest Gini scores. OECD Statistics, available at <http://stats.oecd.org/Index.aspx?DataSetCode=REV>

<sup>3</sup> Whereas the maximum benefit level is set below the median income in social democratic welfare regimes, it is set above the median income in conservative regimes. Social Policy Indicators (SPIN) Dataset, available at <http://www.sofi.su.se/spin/>

<sup>4</sup> LIS provides income survey data from high- and middle-income countries. The LIS database contains detailed information on household and individual characteristics and their income sources. Given the careful harmonization of national income surveys, use of the LIS data to study income trends is widely accepted (Bradley et al. 2003). Despite these advantages, the LIS data have some limitations: LIS provides unbalanced panel datasets, with countries providing different numbers of observations according to data availability. In addition, the starting year of each dataset differs across countries: some countries have datasets as far back as 1967, while others have datasets beginning in 1987.

<sup>5</sup> See Long & Ervin (2000) and Brady & Leicht (2008, 84).

<sup>6</sup> Hausman's  $\chi^2$  accepts RE for all models except Model 3 in Table 2. For all four models using middle-class size as the dependent variable, the values of probability  $> \chi^2$  are larger than 0.05 – 0.8322 (Model 5), 0.9998 (Model 6), 0.9997 (Model 7), and 1.00 (Model 8). For models using the polarization index as the dependent variable, the  $\chi^2$  statistics are -2.73 (Model 1), -7.66 (Model 2), 0.00 (Model 3), and -6.02 (Model 4). The negative values are not an unusual outcome for the Hausman test, particularly when the sample is relatively small, and they can be interpreted as strong evidence that we cannot reject the null hypothesis that the difference in coefficients between FE and RE models are not systematic (StataCorp, 2015, 946).

<sup>7</sup> To equalize household income by household size is a measurement technique widely used in the field of income distribution. In particular, it is preferred for research on poverty for the purpose of measuring per capita consumption capacity more precisely, while holding the assumption that household is a basic unit of economic life. For instance, a 100,000 USD income for a four-member household is equalized to a 50,000 USD income for a single-member household. But I do not equalize household income by household size because my analysis is focused on the revenue side of household income, and household size is largely independent of the main explanatory variables, including centralized wage-bargaining and social-insurance benefit generosity (e.g., one does not get higher wages or unemployment benefits because one has more children than others).

<sup>8</sup> Following Atkinson and Brandolini (2013), I define the middle class, using a relative-income band measure, as those households that have income sufficiently beyond the poverty line, but not enough to be considered rich. The lower boundary of the middle class is set as 150 percent of the poverty line income. The “sufficiently beyond poverty line” component is important because previous research (Pressman, 2007) often sets the threshold as the poverty line, designating, for example, a household that earns a dollar beyond the poverty line as middle class. The upper threshold is set as 200 percent of the median income. Using this measure, the US middle class comprises those with disposable household incomes in 2013 between \$34,453 and \$91,875. By middle class decline, I mean the decline in the population share of these middle-income households.

<sup>9</sup> For the US case, the president's party scores 1.

<sup>10</sup> Originally from Jelle Visser, ICTWSS, accessible at <http://www.uva-aiaas.net/207>.

<sup>11</sup> For data on the share of immigrant population and the highly educated, the original CWS data has 5-year intervals from 1960 to 2010. I interpolated the values between the data points, using STATA command, *ipolate*.

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