

**Market Forces and Workers' Power Resources:  
A Sociological Account of Real Wage Growth in Advanced Capitalism**

by

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## **Abstract**

Sociologists rarely study the determinants of real wage growth, even though it affects core sociological concerns such as social stratification and income inequality. Using data from 14 countries over a 38-year period, this study assesses the multifaceted determinants of real wage growth in the manufacturing sectors of advanced capitalist societies. On this topic, neoclassical economics suggests that wages should track labor productivity, but sociological theories of class conflict suggest that both firms and workers use “power resources” to shape distributional outcomes in their favor. Drawing on these ideas and others, the author argues that real wage growth is loosely related to productivity growth, but strongly related to the power resources of workers. This argument is tested with panel regression techniques. The results provide strong support for a power resource theory of wage determination. The study ends by considering possible reasons for the weak effect of labor productivity on real wages.

**Keywords:** Economic sociology, power resources, trade unions, wage bargaining, monopsony, productivity growth, wage-productivity gap.

## **Market Forces and Workers' Power Resources: A Sociological Account of Real Wage Growth in Advanced Capitalism**

### **INTRODUCTION**

The trajectory of real wage growth plays a crucial role in the social stratification of advanced capitalist societies, but sociologists rarely study this important issue. During the post-war era, the hourly wages of ordinary workers grew steadily in nearly all advanced capitalist countries, helping to raise wages, boost living standards, and create relatively egalitarian societies. Yet, over recent decades, wage growth slowed in many countries even though productivity growth remained robust. This combination of outcomes—sluggish wage growth coupled with solid productivity gains—can push economic inequality upward, because it redirects the benefits of economic progress away from ordinary workers and toward capital and elite workers. Given the prominence of such distributional changes, Morris and Western (1999) urge sociologists not only to study inequality among workers—a mainstay of social stratification research—but also how markets themselves distribute earnings and income. The latter topic is traditionally the purview of economics, but slowly sociologists are turning their attention to this issue as well (e.g. Kollmeyer, 2012; Korpi, 2002; Kristal, 2010, 2013).

Given the wide-ranging importance of this phenomenon, and its theoretical implications for our understanding of social stratification and inequality, it is surprising that few sociologists study the determinants of real wage growth (cf. Sakamoto and Kim, 2014; Western and Healy, 1999). To fill this gap in the literature, the present study analyzes trends in the real hourly wages of manufacturing workers in 14 advanced capitalist countries over the last four decades. The study focuses on the manufacturing sector partly because most advanced capitalist countries keep detailed historical data for this sector but not

for others, and also because manufacturing has been the focal point of much theorizing about capitalism and its development.

To gain insight into the multifaceted social forces shaping real wage growth, the present study weighs the actual experiences of 14 countries against theoretical expectations about wage determination derived from sociological and economic theory. The starting point is neoclassical economics, which holds that under competitive market conditions workers earn wages equivalent to their productivity levels. This idea is a bedrock of modern economic thought and a mainstay of economic textbooks. However, some economists and sociologists note that a host of recent factors—such as technological change and industrial restructuring—advantage the pecuniary interests of capital and elite workers, possibly allowing them to retain more of the benefits of productivity growth for themselves (in economics, see Acemoglu, 2003; Autor et al., 1998; in sociology, see Fernandez, 2001; Kristal, 2013). I extend this model of real wage growth by drawing on sociological theories of class conflict, in particular the idea that workers use various forms of collective action to advance their interests in distributional struggles with their employers and capital more generally (e.g. Korpi, 1983; Wright, 2000). Importantly, to my knowledge, no study uses such a wide-ranging theoretical framework to articulate an account of how real wage trajectories evolve in advanced capitalism.

Combining these ideas and others, the present study departs from the neoclassical perspective. In particular, I argue that productivity growth creates the possibility for real wage gains, because it forms the material basis upon which new wealth is created, but whether real wages rise accordingly depends on multiple social forces affecting the relative bargaining power of firms and workers. In this regard, over recent decades, neoliberal economic policy, high unemployment and the offshoring of routine production jobs serve to heighten the bargaining power

of domestic manufacturing firms. If left unchecked, these social forces weaken the link between wages and productivity by allowing capital and elite workers to increase their remuneration relative to ordinary workers. Indeed, this appears to be happening in the United States (see Figures 1 and 2). Yet, in other advanced capitalist countries, workers successfully attenuate these downward forces on their real wages by wielding organizational power in labor markets and political power in government. To anticipate my main finding, I conclude that over recent decades real wage growth in the manufacturing sectors of advanced capitalist countries is loosely related to productivity growth, but strongly related to the power resources of workers.

#### **REAL WAGE GROWTH IN ADVANCED CAPITALISM**

To contextualize the present study and introduce its dependent variable, Figures 1 and 2 show trends in the real hourly wage paid to manufacturing workers in 14 advanced capitalist countries since 1970. As the figures show, there is considerable variation in the trajectories of real wage growth among these countries. In this regard, the United States is particularly noteworthy. While over this nearly 40-year period the real wage grew by about 1.0 to 1.5 per annum in most countries, it stagnated in the United States. This occurred even though the US manufacturing sector enjoyed sound productivity growth. The stagnation of real wage growth means that, after adjusting for price inflation, American manufacturing workers are essentially no better off today than 1970. How can we explain the uneven trajectory of growth across these countries? The study now turns to developing theoretical explanations for this question by drawing on ideas from sociology and economics.

[Insert Figures 1 and 2 about here.]

## MARKET FORCES AND STRUCTURAL ECONOMIC CHANGE

Productivity Growth. A basic tenet of neoclassical economics is that under competitive market conditions workers earn wages equivalent to their productivity levels. As workers become more productive—due to improved workplace technologies, new organizational strategies, or better occupational skills—market competition should compel employers to pass along the benefits of rising productivity to their workers in form of higher wages.

This idea stems from marginal productivity theory, an account of the distribution of income developed by several economists around the turn of the 20th century (e.g. Clark, 1902). Here the main idea is that market competition ensures that each factor of production—labor, capital, land—receives an income equivalent to its marginal productivity. For labor markets, this means that the real wage should equal the marginal product of labor (MPL), defined as the value of the output produced by the last worker hired. This should occur because if the real wage falls below MPL, firms can profit by adding more workers and workers can benefit from finding better paying jobs. Both actions help to restore equilibrium at the point where the real wage equals the MPL.

An influential interpretation of marginal productivity theory is that the relative share of income going to each factor of production should be constant over time. This was famously demonstrated by Cobb and Douglas (1928), who analysed labor's share of income in the US manufacturing sector from 1889 to 1922 and found that it was remarkably stable over this period, staying around 75 percent of the sector's total income (see also Kander, 1961). They surmised that when markets are competitive and the elasticity of substitution between workers and equipment is constant, rising labor productivity will increase labor's aggregate income, but not its relative share, even if the ratio of workers to equipment changes. For the purposes of my study, this argument suggests that wage growth

is essentially a function of productivity growth, albeit short-term shocks and cyclical changes in labor demand may cause temporary deviations from this equilibrium (Elgin and Kuzubas, 2013). This “stylized fact” of economics paints a rosy picture of capitalism, because it implies that workers and firms equitably share the benefits of rising productivity growth.

Recently, some neoclassical economists question the idea of constant factor shares, and by extension the notion that productivity growth drives real wage growth in a stable manner. Here the main insight is that recent technological change may not be factor neutral, but instead advantage capital more than labor. For instance, Acemoglu (2003) argues that if technological advancements in the workplace bolster the efficiency of equipment rather than workers, and if capital and labor are not easily interchangeable, then the returns to capital can outpace the returns to labor (see parallel argument in sociology by Kristal, 2013). For labor markets more specifically, Autor and his colleagues (1998) argue that the growing use of computers and high-technology in the workplace affects workers with different skill levels in dissimilar ways, with technology tending to displace less-skilled workers altogether, while making highly skilled workers more productive (see parallel argument in sociology by Fernandez, 2001).

Ultimately, the above-mentioned arguments suggest that the pay-off for productivity growth may not be constant, but instead varies by the skill level of workers. For my study, an obvious limitation of this explanation is that the trajectory of real wage growth varies considerably across my sample of 14 countries, even though these countries are experiencing similar types of technological change. Hence, if technological change alone cannot explain the unequal slowdown in real wage growth across my sample, what can? Here I turn to the idea of market power.

Starting in the 1930s, heterodox economists began questioning the notion that real wages always track productivity growth. Famously, Robinson (1933) developed the concept of “monopsony” as an ideal type of “imperfect competition,” arguing that in some circumstances firms wield sufficient market power to set wages below MPL. For labor markets, monopsony arises when dominant firms face limited competition for available workers, enabling them to set wages below the MPL. Hence, whereas monopolists exploit consumers by inflating consumer prices, monopsonists exploit workers by suppressing wages (see parallel argument in sociology by Sørensen, 2000). Although Robinson envisioned several circumstances under which monopsony might arise, including a “gentlemen’s agreements not to spoil the market by bidding up wages” (p. 293), mainstream economics treat it as a rare phenomenon, one that mainly occurs in geographically isolated communities with only one major employer (e.g. rural mining towns). But I suggest it could arise from other circumstances, including attempts by policymakers to deregulate labor markets and relax anti-trust laws that previously prohibited the growing concentration of capital, which is found in many countries today (Foster et al., 2011). Such neoliberal policy stances are pronounced in the United States, but evident in other advanced capitalist countries as well (Prasad, 2006).

Recently, Erickson and Mitchell (2007) argue that the US labor market resembles a textbook case of monopsony. In supporting this claim, they point to the simultaneous occurrence of labor shortages, wage stagnation, and falling labor market participation in the 1990s. This combination of outcomes is indicative of monopsony, because under competitive market conditions, labor shortages should force wages upward as firms compete to attract non-working persons back into the workforce. However, in a monopsonistic labor market, dominant firms can hold wages in check, preventing them from rising to “clear” the labor shortage.



If firms do enjoy market power in terms of setting wages, how would this affect the productivity-wage relationship? According to Vercherand (2014: 96-7), when consumer markets are competitive but labor markets are not, firms maximize profits by retaining the benefits of rising productivity for themselves (in the form of higher profits) rather than passing them along to their workers (in the form of higher wages). To the degree that this occurs, the link between wages and productivity weakens—or perhaps breaks altogether.

There is little sociological research on wage determination, but what exists finds little support for the neoclassical depiction of the wage-productivity relationship. In the most comprehensive study to date, Western and Healy (1999) examine real wage growth in the manufacturing sectors of 18 OECD countries from 1966 to 1992 and find that the wage-productivity link weakened markedly in the late 1970s. This finding, they believe, reflects a systematic shift in labor market performance—moving from a “golden age” in which full employment, productivity growth and strong labor market institutions facilitated rising real wages, to a “slow growth regime” in which changing market forces and weaker labor market institutions contribute to slower wage growth. They conclude that “the oil crisis [of the 1970s] initiated a novel type of recession that set all the advanced capitalist labour markets on a new path of development” (p. 244).<sup>1</sup> Similarly, Sakamoto and Kim (2014) examine data from 65 industries within the US manufacturing sector from 1971 to 2001 and find that the earnings pay-off for labor productivity was higher in 1971-1981 than 1991-2001. Indeed, these arguments are consistent with data gathered for the present study (see Table 1).

[Insert Table 1 about here.]

When combined with the monopsony argument from economics, the empirical findings from sociological research suggest that labor markets may be

insufficiently competitive to compel firms to equate pay with productivity. Indeed, as Figure 1 and 2 show, this appears to be happening in the United States, and to a lesser degree in other countries as well. In sum, drawing on the aforementioned literature, I expect productivity growth to be positively linked to real wage growth, but not to the extent suggested by the neoclassical model of labor markets. I also expect the wage-productivity relationship to weaken from the early 1980s onward, as the rise of neoliberalism bestows greater market power upon dominant firms.

Unemployment. The social sciences contain competing views on the relationship between unemployment and wages. Starting with Marx (1867/1967: Chapter 25), critical scholars see high unemployment as a major impediment to wage growth (Kalecki, 1943; Schor, 1985). On this subject, Marx described the unemployed as an “industrial reserve army,” used by capital to undercut the wage demands of workers. In this way, Marx saw the jobless as an ever-present drag on the bargaining power of the working class, helping employers to discipline workers, check wage growth and maintain profitability. Following this line of reasoning, Kalecki (1943) argued that left-labor parties should push for full employment, because it not only helps the jobless find work, but more importantly shifts the entire balance of class power toward workers (see also Korpi, 2002).

In stark contrast, the neoclassical model argues that unemployment arises from overly generous wages (Friedman, 1968; Hall, 1979). Here the idea is that competitive market forces yield a “natural rate of unemployment,” emanating from the inherent dynamism of labor markets and reflecting the equilibrium wage. If the real wage exceeds the equilibrium rate—because it was bid up by strong trade unions and labor-friendly government—the supply of labor will outstrip its demand, making jobs relatively scarce. More recently, however, Blanchflower and Oswald (1996) question this view. Using data from local labor markets in 16

countries, they find that the wage-unemployment relationship forms a downward-sloping “wage curve,” suggesting that high unemployment reduces wages. Their theoretical explanation is equivocal, but they do not dismiss Marx’s account of the “industrial reserve army.”

Hence, following Marx’s theoretical explanation and Blanchflower and Oswald’s empirical findings, I expect unemployment to slow wage growth by altering the dynamics of wage bargaining. In particular, when unemployment increases (making available workers more abundant), firms can retain workers and attract new ones without raising wages. However, when unemployment falls (making available workers scarce), wage hikes become increasingly necessary to attract and retain workers. In sum, given that most advanced capitalist countries experienced rising unemployment during the 1980s and 1990s—a stark break from the full employment of the post-war era—I expect that widespread joblessness slowed real wage growth over this period.

*New International Division of Labor.* Globalization spatially reorganized manufacturing processes worldwide. In an earlier account of this phenomenon, Fröbel and his colleagues (1980) explain that for most of the modern era North-South trade manifest as firms in advanced capitalist countries importing raw materials from less developed countries (LDCs), manufacturing these materials into finished goods, and then exporting the surplus production around the world. By the 1970s, however, technological developments and trade liberalization enabled these firms to outsource many of their routine production jobs to contractors in LDCs. Ultimately, the growing popularity of this production strategy created a “new international division of labor,” in which most of the world’s low-valued added manufacturing activities now occurs in LDCs. We know that this spatial reallocation of labor contributed to the deindustrialization of advanced

capitalist countries (Kollmeyer, 2009), but how did it affect wages in the manufacturing sectors of these countries?

As described by Wood (1994), North-South trade should put downward pressure on the wages of less-skilled workers in advanced capitalist countries. This should occur, he argues, because North-South trade essentially links labor markets in advanced capitalist countries with those in LDCs, especially for the types of labor used in routine manufacturing. As manufacturing jobs move overseas, demand for less-skilled workers in advanced capitalist countries falls, creating downward pressure on their wages.

Despite the soundness of Wood's economic reasoning, empirical studies of the US labor market in the 1990s and 2000s find limited support for his argument (see Krugman, 2008). Common explanations for these counter-intuitive findings are that the volume of trade with LDCs is simply too small (relative to size of US economy) to engender meaningful effects, or that technological change rather than trade is the primary cause of slowing wage growth. By contrast, cross-national studies of advanced capitalist countries conclude that trade with LDCs puts upward pressure on income inequality, as Wood's theory predicts (Kollmeyer, 2015), but whether it slows real wage growth in the manufacturing sectors is unclear.

Complementing Wood's argument, I propose another mechanism by which trade globalization may affect the real wages of domestic manufacturing workers. Clearly, the new international division of labor contributes to deindustrialization, which in turn reduces demand for labor in this sector. However, it may also qualitatively reshape domestic manufacturing in ways that put upward pressure on wages. Here the crucial point is that manufacturing firms are not outsourcing a broad cross-section of jobs, but rather routine production jobs in particular (Kollmeyer, 2009:1652; Whitford, 2005). In other words, the outsourced jobs disproportionately entail labor-intensive and low value-added activities, whereas

the retained jobs disproportionately entail capital-intensive and high-value added activities. In this way, the new international division of labor facilitates an industrial upgrading of domestic manufacturing, making the sector not only smaller, but also more focused on high value-added activities. It is unclear which of these countervailing forces will affect real wages the most—the falling demand for labor (as Wood suggests) or the upgrading to higher value-added activities (as I suggest). My expectation is that these two forces counterbalance one another, creating a situation in which the new international division of labor exerts little overall effect on the real wages of manufacturing workers in advanced capitalist countries.

#### **NON-MARKET INSTITUTIONS AND WORKERS' POWER RESOURCES**

Undoubtedly market forces are important determinants of real wage growth, but social forces lying beyond the strict sphere of the market are important as well. In this regard, sociologists emphasize that employment relations often generate class conflict, and that firms and workers use different types of “power resources” to advance their interests within these conflicts (e.g. Esping-Anderson, 1985; Jacobs, 1988; Korpi, 1983, 2006; Western, 1998; see similar argument in economics by Calmfors and Driffill, 1988). As articulated by Korpi (1983, 2006), dominant firms are structurally advantaged in labor market relations by their strict control over enormous economic assets (see also Jacobs, 1988). This constitutes their key power resource, because it gives them considerable bargaining power over lone workers when setting wages and working conditions. Yet workers can respond by creating and wielding their own power resources, but this entails some sort of collective action.

Trade Unions. Trade unions are notable in this regard. The lone worker must accept the prevailing wage, even if depressed by the bargaining power of

dominant firms. But large groups of workers, acting in a coordinated fashion, generate their own power, which can be used to improve wages and working conditions. The positive effect of trade unions for workers is well documented. Studies suggest that unions help workers to earn higher wages (Rosenfeld, 2014: 68-73) and to reduce wage inequality among unionized and nonunionized workers alike (Rosenfeld, 2014: 74-79). Other studies show that unions boost labor's share of income (Kristal, 2010, 2013) and reduce overall levels of income inequality (Kollmeyer, 2014).

However, in order to generate these beneficial effects for workers, trade unions must be sufficiently strong. Here two points are noteworthy. First, due to divergent trends over recent decades, participation in trade unions varies greatly across advanced capitalist countries. For instance, by the late 2000s, trade union density was almost six times higher in Denmark and Sweden than in the United States and France (Visser, 2011). These differences mean that workers in different advanced capitalist countries possess dissimilar levels of organizational power.

Second, strong trade unions may not always result in higher wages. On this topic, Wright (2000) puts forward the theoretical claim that trade unions reduce profits and increase wages, but only at low to moderate levels of strength. Once workers' organizational power becomes strong enough to induce robust labor-capital collaboration, powerful trade unions may improve profits by facilitating cooperation between firms and workers. Wage restraint is one conceivable outcome of such cooperation (pg. 980). For instance, since rapid wage growth may jeopardise the profitability of employers, strong trade unions may accept slower wage growth in an effort to secure their long-term job prospects. Based on this logic, I expect unionization's effect on real wage growth to be curvilinear, with low levels unionization being associated with rising real wages, but high levels of unionization being associated with wage moderation.

Wage Bargaining Systems. The centralization of wage bargaining is another potential power resource for workers (Crouch, 1993; Streeck and Kenworthy, 2005; Western, 1998). In corporatist systems, such as those found in Sweden and Austria, decisions about wages and employment relations are made through tripartite negotiations at the national level, with the resulting decisions uniformly implemented by local employers and trade unions. In decentralized systems, such as those in the United States and Canada, individual workers or local trade unions negotiate directly with their local employers, giving trade unions little influence over national wage policy. Hence, corporatism should constitute a power resource for workers, because it enables them to organize and pursue their class interests across the breadth of the economy.

Yet how does corporatism affect wage growth? Similar to Wright's (2000) argument, some scholars contend that corporatism embeds trade unions in formal state power structures, thereby encouraging them to consider the wider socio-economic implications of their actions (Calmfors and Driffill, 1988; Hedström, 1986; Hicks and Kenworthy, 1998; Wallerstein, 1990). Given that robust wage growth can undermine the competitiveness of a country's economy or spur inflation and unemployment, trade unions operating within corporatist bargaining systems may view wage moderation as strategically beneficial to their long-term interests. Conversely, trades unions operating in decentralized wage bargaining systems have less capacity to coordinate farsighted actions and to ensure that related costs and benefits are shared equally among relevant actors. For this reason, strategic wage moderation is unlikely to occur in this institutional context.

Overall, my expectation is that corporatism leads to wage moderation, because it allows trade unions to consider the negative consequences of robust wage growth. Yet this effect may be curvilinear. Here Calmfors and Driffill (1988) famously argue that intermediate levels of corporatism afford trade unions enough

power to put upward pressure on real wages, but not enough coordinating capacity to implement wage moderation strategies. Hence, they link wage moderation with low levels of corporatism (due to insufficient bargaining power) and with high levels of corporatism (due to the organizational capacity to consider the negative consequences of rapid wage growth).

*Left-Labor Parties.* Left-labor parties are another important power resource for workers. As described by Korpi and others, workers can pursue a “democratic class struggle” by joining and voting for political parties that champion their class interests (Esping-Andersen, 1985; Korpi, 1983). When in government, left-labor parties typically pursue economic policies that benefit workers, including policies that may increase the real wage. However, like trade union participation, the power of left-labor parties varies greatly across advanced capitalist countries. In this regard, the United States and Canada are notable for lacking genuine left-labor parties, as political experts often regard the Democratic Party and Liberal Party as centrist not left-labor (see Castles and Mair, 1984).

However, it is questionable whether left-labor parties can still advance the interests of workers. For some scholars, the rise of globalization and the maturation of the welfare state led to multi-partisan support for fiscal consolidation and neoliberal regulatory approaches, causing left-labor parties to moderate their social democratic aims (Pierson, 1996). Despite such claims, my expectation is that left-labor governments still matter for basic distributional outcomes, especially ones such as whether real wages rise or stagnate.

## **DATA AND MEASUREMENT**

### **Sample**

To test my arguments about the determinants of real wage growth, I collect annual observations on 14 advanced capitalist countries from 1970 to 2007. The



countries are Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, the United Kingdom and the United States. Large amounts of missing data on labor productivity prevent the inclusion of other advanced capitalist countries, such as Australia, Ireland, New Zealand, and Switzerland. Combining the cross-sectional and temporal dimensions of the data yields a maximum of 532 observations per variable ( $t = 38 \times n = 14$ ), but missing data reduce the number of complete observations to 520.<sup>2</sup>

## Measurement

The study's dependent variable is the *real wage*. Data come from the OECD's (2015a) *Main Economic Indicators* database. The OECD collects and harmonizes national data on the average hourly wage paid to manufacturing workers. This data is only available for the manufacturing sector, which is the primary reason why my study focuses on manufacturing rather than the whole private sector.<sup>3</sup> The data come from nationally representative surveys of manufacturing firms and reflect not only regular wages, but also overtime pay, recurring cash bonuses, and employer contributions to private or government-mandated social insurance schemes. The OECD presents these wage series as indices (with the year 2007 = 100). I then deflate the series with the OECD's (2015b) Consumer Price Indices. I experiment with a log transformation of this variable. The substantive results are the same, but the regression output is cumbersome to interpret. Hence, I kept this variable in its original index form. Also note that Western and Healy (1999), the study most similar to mine, do not use a log transformation.

Three variables capture economic conditions thought to affect real wage growth. The variable *productivity growth* gauges the growing efficiency of the manufacturing sector. It uses the OECD's (2010) "labor productivity index," which

measures total value-added per worker expressed in volumes of output. Although hours worked is preferable to total employment as a measure of labor inputs, this variable significantly improves upon the measure used by Western and Healy (1999), since they used real GDP per person in the national workforce as a proxy for productivity in the manufacturing sector. I benchmark this index against output levels prevailing in 2007, but since the index is measured in volumes rather than monetary amounts, there is no need to adjust for inflation.

The second economic variable is the OECD's harmonized measure of *unemployment* (OECD 2015c). Implementing standards set by the International Labour Organization, the OECD measures unemployment as the percentage of a country's civilian workforce unable to find employment in a given year. To be considered unemployed, individuals must be jobless but available for work and actively seeking it. Following Blanchflower and Oswald (1995), I use the *log of unemployment* as the functional form. This captures the curvilinear relationship suggested by their "wage-curve" hypothesis. I experiment with other functional forms—i.e. inverse of unemployment and unemployment and its squared term. Each works but the logarithmic format performs best.

The final economic variable is *imports from LDCs*. This variable captures the emergence and intensification of the "new international division of labor" and equals the annual value of imported manufactured goods from LDCs. The resulting figures are expressed as percentages of GDP. For the purpose of this variable, LDCs are defined as non-OECD countries, plus Mexico and Turkey, and manufactured goods are defined as categories five through eight of the international standard industrial classification scheme, revision two. Trade data come from OECD (2012a) and GDP data come from the OECD (2012b).

Three variables measure workers' power resources. To capture workers' organizational strength, *trade union density* equals the number of workers in trade

unions expressed as a percentage of the national workforce. A squared term is included to allow for the inverted U-shaped relationship depicted by Wright (2000). Data come from Visser (2011). To capture the distributional effects of wage-setting institutions, *corporatist wage bargaining* measures the degree of concertation, centralization and coordination within wage-bargaining systems, with higher scores representing higher degrees of corporatism. Data come from Jahn (2016), who creates his corporatism index from Visser's data on trade unionism and wage bargaining institutions. A squared term is also included to allow for non-linear effects. To account for workers' political strength, *left-labor government* measures the percentage of all cabinet posts held by social-democratic, labor or other left parties in given years. Note the Democratic Party in the United States and the Liberal Party in Canada are coded as centrist not left-labor. Data come from Armingeon and colleagues (2012).

## STATISTICAL ESTIMATION

My estimation strategies account for three overarching complications associated with panel data. The first complication is that standard applications of ordinary least squares (OLS) assume that the sample's observations are independent, but my panel data track individual countries over time. While this allows me to model growth in real wages across different market and institutional contexts, it also introduces unmeasured heterogeneity into my model. If this is not addressed and unmeasured heterogeneity is correlated with one or more of the independent variables, OLS will yield biased and inconsistent parameter estimates. To account for this complication, I use a two-way fixed effects (FE) estimating strategy (Halaby, 2004; Wooldridge, 2012: chapter 14). This technique absorbs unmeasured country- and time-specific heterogeneity by introducing unique dummy variables for each country and year in my data set. I also consider a

random effects (RE) model, but a Hausman test suggests that this technique is inappropriate for my study.<sup>4</sup> Note that FE models allow me to explain change in the real wage within countries, but not differences in levels across countries.

A second complication arises from the complex error structures generated by panel data (Wooldridge, 2012: chapter 12). Given the long temporal dimension of my data, serial correlation could be a problem. Additionally, the model's errors may be contemporaneously correlated and heteroscedastic. If some or all of these issues are present but not addressed, OLS regression will generate inefficient parameter estimates and biased standard errors (Halaby, 2004: 523-4). To investigate whether my model is suspect in this manner, I conduct post estimation tests on my two-way FE model. The null hypotheses are that the errors in this model are neither heteroscedastic, contemporaneously correlated, nor serially correlated. Results suggest that these issues are present in my data.<sup>5</sup>

To deal with these complications, I estimate my models with a version of feasible generalized least squares (FGLS) regression. Through a two-sequence transformation, FGLS rids the model of serial correlation and heteroscedasticity. Specifically, I use the Prais-Winsten procedure, which is more efficient than other FGLS techniques because it retains the first observation in the time-series (Wooldridge 2012: 425). Additionally, I adopt panel corrected standard errors (PCSE) to account for contemporaneously correlated errors.

A final complication arises from time trends within my data. When using data with a temporal dimension (either time-series or panel data), one must be wary of "spurious regression" (DeBoef and Keele, 2008; Wooldridge, 2012: chapters 10, 11 and 18). Spurious regression can occur when key variables trend over time rather than vary randomly. This is the case for both my *real wage* and *productivity* variables, which as shown in Figure 1 drift upward in most countries.<sup>6</sup> Given shared time trends, my FE models may generate statistically significant

results, even if there is no underlying causal relationships. To guard against this outcome, researchers often introduce a time-trend variable to their models (i.e. trend = 1, 2, 3... n). This variable absorbs statistical distortions related to trending data, thereby reducing the chance of spurious regression. However, for my study, it is inappropriate to impose a single trend across my whole sample. Hence, I capture country-specific time trends by creating unique interaction terms between the generic time-trend and each of the 14 country dummy variables.

In sum, my main modelling strategy uses all the aforementioned procedures (e.g. two-way FE regression with PCSE, country-specific time trends, and estimation by FGLS). While this strategy addresses the primary complications associated with panel data, I nonetheless check the robustness of my findings and provide additional safeguards against spurious regression by re-estimating my parameters using first difference (FD) regression (Wooldridge, 2012: chapter 13; DeBoef and Keele, 2008). This technique entails first differencing each variable—e.g.  $(t_2 - t_1)$ —and then estimating the model as normal. This mathematical transformation eliminates time trends within the data and accounts for unmeasured heterogeneity, making the use of country fixed effects unnecessary. However, I retain the 14 country-specific time trends, because even after first differencing slight trends can remain. As with my FE models, I account for the complex error structure with FGLS and PCSE and use year dummy variables to account for unmeasured time-specific effects.

Finally, a few additional steps are taken to improve the accuracy of my model. First, I test for problematic outliers with the BACON robust outlier detection algorithm ( $p = .05$ ), but none are found. Second, I test for multicollinearity by examining variance inflation factors for each independent variable. Only acceptable levels of multicollinearity are found<sup>7</sup>. Third, for Model 4 only, I use a dynamic specification in which a one-year lag of the real wage is

introduced as a right-hand side regressor. Dynamic processes often characterize phenomena of interest to social scientists, and comparative researchers commonly use such specifications in their statistical models. Yet lagged dependent variables can create biases and complications (Keele and Kelly, 2006; Plümper et al., 2005). Hence, I use this specification sparingly, mainly to demonstrate that my general argument holds under a dynamic specification.

## **RESULTS**

### **Fixed Effects Models**

Using the data and methods described above, Table 2 presents FE regression models of change in the real hourly wage of manufacturing workers in 14 advanced capitalist countries. Model 1 begins by examining the effects of market conditions in isolation. Recall that neoclassical theory views productivity growth as the main driver of real wage growth, but some sociological and economic theories question this view. Consistent with the neoclassical view, results from Model 1 support the argument that rising productivity growth propels the real wage forward. Additionally, consistent with Marx's (1867/1967) account of the "industrial reserve army" and Blanchflower and Oswald's (1995) account of the "wage curve," results indicate that unemployment slows real wage growth. This latter finding suggests that the rising unemployment experienced by many advanced capitalist countries in the 1980s and 1990s contributed to slower real wage growth for manufacturing workers in these countries. Note that my FE models cannot directly adjudicate the neoclassical view of unemployment, because this view emphasizes levels rather than changes in the real wage.

[Insert Table 2 about here.]

Model 1 also considers the effects of the new international division of labor. Here the variable imports from LDCs captures the emergence and intensification of the new international division of labor and its associated effect on the real wages of manufacturing workers in advanced capitalist countries. Consistent with Wood's theoretical expectations about falling demand for less-skilled workers, the parameter estimate for this variable is statistically significant and negative, suggesting that trade with the LDCs slows real wage growth in manufacturing sectors of advanced capitalist countries. For my sample, imports of manufactured goods from LDCs rose, on average, from 0.8 percent of GDP in 1970 to 5.5 percent of GDP in 2007, suggesting that the accumulative effect of imports from LDCs on real wage growth is likely to be considerable.

Next, Model 2 presents a power resource model of real wage growth. As anticipated by sociological accounts of class struggle under democratic capitalism, all the parameter estimates are statistically significant and exhibit expected signs. Specifically, the results show that trade union density and left-labor governments heighten real wage growth, but that corporatist wage bargaining moderates it. Furthermore, the squared term for trade union density is negative and statistically significant, providing some support for Wright's claim that increases in workers' organizational power can induce wage restraint along a curvilinear path. Similarly, the squared term for corporatist wage bargaining is positive and statistically significant, suggesting the moderating effect of corporatism is curvilinear. In sum, Model 2 provides strong support for the argument that workers' power resources are important determinants of real wage growth.

Model 3 combines market and power resource explanations for real wage growth into single model. Interestingly, the results are remarkably similar to the earlier models, suggesting few confounding effects between the market and institutional factors examined in my study. However, one notable change is that

the effects of unemployment and left-labor government are both smaller in the full model. This suggests that some of left-labor government's positive effect on real wages results from its drive to lower unemployment, and that some of unemployment's negative effect on real wages results from its positive link with pro-business governments. Once these confounding influences are controlled for in the full model, the specific effects of unemployment and left-labor government become clearer.

Importantly, Model 3 suggests that trade union density is a major determinant of real wage growth. This is especially true given that trends in trade union density vary considerably across my sample. For example, trade union participation in Finland increased from 51 percent to 80 percent of the workforce between 1970 and 1996. It then slowly ebbed back to 72 percent by 2007. Conversely, trade union participation in the United States steadily dwindled over the entire 38-year period, falling from 26 percent of the workforce in 1970 to only 11 percent in 2007. These diverse trends, coupled with the relatively large parameter estimate for trade union density shown in Model 3, suggest that variation in the organizational power of workers is an important factor in explaining why real wages in manufacturing are stagnate in some countries but not in others.

Next, Model 4 re-examines my full FE model, but this time using a dynamic specification. This is accomplished by including a lagged dependent variable (LDV) as a right-hand side regressor. For my study, a LDV captures the possibility that prior levels of the real wage affect present rates of change in the real wage. Indeed, this appears to be the case, as the LDV is highly significant. Interestingly, under a dynamic specification, the effect of market explanations for real wage growth decline substantially. In particular, the magnitude and statistical significance of the productivity and unemployment parameter estimates are greatly reduced, but the



parameter estimates for the workers' power-resource variables change in less notable ways. Regarding the latter, the biggest change is the enlargement of the negative effect of corporatism. This is consistent with the theoretical argument that corporatism induces wage moderation when the prevailing real wage becomes large enough to threaten economic performance and employment stability. In sum, the power resource explanations appear more robust to this dynamic specification than the market-forces explanations.

### **First Difference Models**

The empirical analysis now re-examines the determinants of real wage growth, but this time using FD regression. Recall that due to shared time trends in my data some of the statistically significant relationship shown in Table 2 may be spurious. This could happen even though I guard against such outcomes with country-specific time trends. I am particularly worried that the apparently strong link between productivity and the real wage is spurious, since both phenomena generally trend upward over the period in question (see Figure 1 and Note 6). To examine this possibility, I re-estimate my models using the more conservative FD regression techniques described above. The results are shown in Table 3.

[Insert Table 3 about here.]

After introducing this more strenuous control for spurious regression, the substantive conclusions change in pronounced ways. Under the FD regression, the effect of productivity growth on real wages weakens notably, both in terms of its magnitude and statistical significance. These revised results—pointing toward a weak relationship between productivity and real wages—are now consistent with critical accounts from heterodox economics and sociology. Additionally, the parameter estimate for imports from LDCs is smaller and highly insignificant. Although this outcome is unanticipated by Wood's account of trade globalization,

it is consistent with my argument that the new international division of labor has limited effect on real wages because it not only shrinks the manufacturing sectors in advanced capitalist countries, but also upgrades them to higher value-added activities. From a methodological perspective, the difference between the FD and FE models suggests that shared time trends between productivity and real wages and between imports from LDCs and real wages account for some of the strong effects found in the earlier FE models. By contrast, the variables representing workers' power resource retain much of their explanatory power despite the introduction of the more conservative FD approach.

Finally, continuing with the FD regression, I examine the possibility of a temporal break in the distributional effects of productivity growth. Recall that Western and Healy (1999) and Sakamoto and Kim (2014) find that the wage-productivity link weakened sometime in the late 1970s. If this occurred, then my models are misspecified because they fail to account for this structural shift. To test this idea, I introduce a multiplicative interaction term between productivity growth and the neoliberal era (coded 1 for years 1980 onward). This specification assumes that a clear and uniform break occurred across the breadth of my sample. Admittedly, this is a simplistic assumption, but a more realistic model (one trying to identify unique temporal breaks for each country) is difficult to undertake. (See Western and Healy, 1999, for an explanation of how this might be done using Bayesian methods). Nonetheless, if a general shift in the productivity-wage relationship did occur sometime around 1980, my re-specified model should provide some evidence of this outcome.

Model 8 examines this more complex specification. Starting with the variables from Model 7, it adds a neoliberal period indicator and the aforementioned interaction term. Contrary to expectations derived from Western and Healy (1999) and Sakamoto and Kim (2014), results from this re-specified

model provide only tentative evidence of a temporal break. Although the main effect and the interaction effect exhibit the expected signs, both are statistically insignificant. In particular, the main effect is positive and now slightly larger, suggesting that the effect of productivity growth on wage determination in the 1970s was more consistent with neoclassical expectations. Conversely, the interaction effect is negative, indicating a drop in the pay-off workers receive for rising productivity during the neoliberal era. This is consistent with the sociological research mentioned above. Note that, for the neoliberal era, productivity's net effect on real wage growth equals the sum of the main effect and the interaction effect (i.e.  $0.173 - 0.138 = 0.035$ ). Conversely, for the 1970s, productivity's net effect on real wage growth equals the main effect alone (i.e. 0.173). Notwithstanding the statistical insignificance of both terms, the net effect for the neoliberal era remains positive, albeit much smaller than the main effect alone. Also note that the neoliberal period indicator is negative, large and highly significant, indicating the presence of some factor, which depresses real wage growth but is not captured by my existing independent variables.<sup>8</sup> I return to this idea in the conclusion.

Lastly, the empirical analysis ends with a final robustness tests. Some readers may wonder whether my results reflect the unusual circumstances found in the United States. To assess this question, I omit the US observations from my sample and re-estimate Model 7. Although not reported to conserve space, the results from the model excluding the US data are remarkably similar to those including the US data. This outcome suggests that my findings are not reliant on the US case.

## CONCLUSION

Drawing on theoretical perspectives from sociology and economics, this study documents and explains the unique patterns of real wage growth found in the manufacturing sectors of 14 advanced capitalist countries since 1970. The analysis sheds light on the multifaceted social forces involved in wage setting—an important societal process, with deep implications for social stratification and income inequality, but one rarely studied by sociologists. Prodding the literature on wage determination in a more sociological direction, I depart from the neoclassical view by maintaining that productivity growth is a necessary but not sufficient condition for real wage growth (see Figures 1 and 2; Table 1). It is necessary because productivity growth plays an essential role in expanding the amount of income available for distribution, but insufficient because it alone cannot guarantee that workers receive pay raises. The latter outcome is influenced by a range of market and institutional forces that affect the balance of class power in labor markets. In particular, my empirical analysis shows that the real wage increases when unemployment falls and when trade unions and left-labor parties gain strength. I also find that, holding other factors constant, corporatist bargaining systems moderate wage growth, ostensibly by encouraging trade unions to consider the long-term implications of their wage demands. Notably, sociological theories of class conflict anticipate many of these findings, but until now have not been used to create an overarching account of wage determination.

While my empirical results support sociological theories of class conflict, they provide less support for the neoclassical view of wage determination. According to the neoclassical perspective, competitive market forces cause real wages to track labor productivity. Such a view of wage determination paints a rosy view of capitalism, because it suggests that workers and employers equitably share the benefits of rising productivity. My first set of models (i.e. the FE models) found

support for this idea, but my more rigorous models (i.e. those using dynamic specifications or FD regression techniques) cast serious doubt on the neoclassical view. Regarding the latter findings, it is conceivable that the neoclassical view is correct and that my results are erroneous in some way, perhaps reflecting measurement error. It is worth noting that productivity is an inherently difficult concept to measure (Block and Burns, 1986) and that adjusting nominal wages for historical price changes is not always straightforward. In fact, a close reading of neoclassical theory suggests that nominal wage trends should be deflated not with the consumer price index, as I do here and others do elsewhere, but with the producer price index, which more narrowly measures the prices domestic producers receive for their output. It is possible that the two inflation measures diverge in ways that obscure productivity's effect on real wage growth (Messina et al., 2009). Future sociological research should examine this possibility.

However, I contend that the neoclassical view is essentially correct, but no longer holds because contemporary labor markets are insufficiently competitive (i.e. too monopsonistic) or because they function differently due to technological, organizational, and regulatory changes. These latter ideas, I believe, account for the inconsistency between my results and the neoclassical view. Clearly, to rule out model misspecification, it would be helpful to assess wage determination with direct measures of market power and technological change, so these alternative explanations could be tested directly. Yet to my knowledge panel data on such variables do not exist.<sup>9</sup>

Regarding my model specification, I note that the neoliberal period indicator in Model 8 reveals a significant amount of change in real wage growth that cannot be attributed to other independent variables in my model. What accounts for this unexplained portion of real wage growth? To address this question, future research my wish to examine whether the so-called "shareholder

revolution,” brought about by the financialization of the economy, changed corporate business practices in ways that redirected earned income away from workers’ wages and toward shareholders’ dividends (see Lazonick and O’Sullivan, 2000). Perhaps this phenomenon could be measured with a variable capturing financialization. Similarly, the policy changes associated with the neoliberalism are broad ranging, clearly relevant to real wage growth, but difficult to measure directly. Perhaps future research can make headway by introducing more direct measures of the relevant policy changes brought about by neoliberalism.

My study has important theoretical implications. My sociologically informed conceptualization of wage determination suggests that firms and workers have more agency than typically acknowledged by economic perspectives on labor markets, and that this agency can be used to alter market conditions in strategic ways. In particular, a sociological approach to studying labor markets could start from the premise that both markets and institutions affect distributional outcomes, and then proceed to examine how particular social actors use available power resources to shape markets and institutions to their advantage. For firms, this means gaining monopsonistic positions in labor markets, substituting high-wage domestic workers for machinery or low-wage foreign workers, and taking advantage of high unemployment to negotiate favorable wage contracts. For workers, this means using collective action to build organizational power in labor markets and political power in government. In this regard, my study corroborates the potential usefulness of Sørensen’s (2000) attempt to incorporate rent-seeking (e.g. via monopsony) into sociological accounts of class and class conflict.

My study also sheds light on an underappreciated determinant of social stratification and income inequality in advanced capitalist societies. Here the important point is that, if productivity increases but real wages stagnate, levels of

income inequality necessarily rise. This occurs because these conditions allow firms and their elite workers to monopolize the rewards of economic progress instead of sharing them more broadly as neoclassical theory suggests. If wages lag behind productivity over a significant period of time, patterns of social stratification can change significantly. This seems to be happening in the United States. For this reason, Sakamoto and Kim (2014) urge sociologists and related social scientists to pay greater attention to the interplay between productivity and wages as a determinant of income inequality and social stratification. My study provides further support for their call for more sociological research on this topic.

Finally, my empirical findings suggest that workers in most advanced capitalist countries wield enough bargaining power to offset at least some of the growing bargaining power of firms. When workers succeed in this regard, real wages can move upward even when their employers gain market advantages due to policy, technological, and organizational changes. Yet the situation in the United States is starkly different. Here falling trade union membership and the absence of a genuine left-labor party leave American manufacturing workers uniquely exposed to the growing bargaining power of their employers. Consequently, the real wages of American manufacturing workers continue to stagnate even though their labor productivity moves forward at a sound rate. In sum, my study suggests that real wages are most likely to track productivity when workers are sufficiently organized to demand and receive a fair price for their labor. Otherwise, the rewards of rising productivity are appropriated by capital and elite workers.

## **REFERENCES**

Acemoglu D (2003) Labor-and capital-augmenting technical change. *Journal of the European Economic Association* 1(1):1-37.

Armington K, Weisstanner D, Engler S, Potolidis P, Gerber M and Leimgruber P (2011) *Comparative Political Data Set 1960-2009*. Berne: Institute of Political Science, University of Berne. Available at <http://www.cpds-data.org/>

Autor D, Katz LF and Krueger A (1998) Computing inequality: Have computers changed the labor market? *Quarterly Journal of Economics* 113(4):1169-1214

Blanchflower DG and Oswald AJ (1996) *The Wage Curve*. Cambridge, MA: MIT Press.

Block F and Burns GA (1986) Productivity as a social problem: The uses and misuses of social indicators. *American Sociological Review* 51(6):767-780.

Calmfors L and Driffill J (1988) Bargaining structure, corporatism and macroeconomic performance. *Economic Policy* 3(6): 13-61.

Castles FG and Mair P (1984) Left-right political scales: Some 'expert' judgments. *European Journal of Political Research* 12(1): 73-88.

Clark JB (1902) *The Distribution of Wealth: A Theory of Wages, Interest and Profit*. London: Macmillan.

Cobb CW and Douglas PH (1928) A theory of production. *American Economic Review* 18(1) 139-165.

Crouch C (1993) *Industrial Relations and European State Traditions*. Oxford: Oxford University Press.

De Boef S and Keele L (2008) Taking time seriously. *American Journal of Political Science* 52(1): 184-200.



Elgin C and Kuzubas TU (2013) Wage-productivity gap in OECD economies. *Economics* 7(21):1-21

Erickson CL and Mitchell DJB (2007) Monopsony as a metaphor for the emerging post-union labour market. *International Labour Review* 146(3-4): 163-187.

Esping-Andersen G (1985) Power and distributional regimes. *Politics & Society* 14(2): 223-256.

Fernandez RM (2001) Skill-biased technological change and wage inequality: Evidence from a plant retooling. *American Journal of Sociology* 107(2): 273-320.

Foster JB, McChesney RW and Jonna RJ (2011) Monopoly and competition in twenty-first century capitalism. *Monthly Review* 62(11): 1-39.

Friedman, M (1968) The role of monetary policy. *American Economic Review* 58(1): 1-17.

Fröbel F, Heinrichs J and Kreye O (1980) *The New International Division of Labor: Structural Unemployment in Industrialized Countries and Industrialization in Developing Countries*. Cambridge: Cambridge University Press.

Halaby CN (2004) Panel models in sociological research: Theory into practice. *Annual Review of Sociology* 30:507-544.

Hall RE (1979) A theory of the natural unemployment rate and the duration of employment. *Journal of Monetary Economics* 5(2): 153-169.

Hedström P (1986) The evolution of the bargaining society: Politico-economic dependencies in Sweden. *European Sociological Review* 2(1): 20-29.

Hicks A and Kenworthy L (1998) Cooperation and political economic performance in affluent democratic capitalism. *American Journal of Sociology* 103(6): 1631-1672.

Jacobs D (1988) Corporate economic power and the state: A longitudinal assessment of two explanations. *American Journal of Sociology* 93(4): 852-881.

Jahn D (2016) Changing of the guard: Trends in corporatist arrangements in 42 highly industrialized societies from 1960 to 2010. *Socio-Economic Review* 14(1):47-71.

Kaldor N (1961) Capital accumulation and economic growth. In: Lutz F and Hague DC (eds) *The Theory of Capital*. London: MacMillan & Co.

Kalecki M (1943) Political aspects of full employment. *Political Quarterly* 14(4):322-330.

Keele L and Kelly NJ (2006) Dynamic models for dynamic theories: The ins and outs of lagged dependent variables. *Political Analysis* 14(2): 186-205.

Kollmeyer C (2009) Explaining deindustrialization: How affluence, productivity growth, and globalization diminish manufacturing employment. *American Journal of Sociology* 114(6): 1644-1674.

Kollmeyer C (2012) Consumer markets and national income inequality: A study of 18 advanced capitalist countries. *International Journal of Comparative Sociology* 53(5-6): 400-418.

Kollmeyer C (2014) Income inequality in advanced capitalism: How protective institutions can promote egalitarian societies. *Comparative Sociology* 13(4): 419-444.

Kollmeyer C (2015) Globalization and income inequality: How public sector spending moderates this relationship in affluent countries. *International Journal of Comparative Sociology* 56(1):3-28.

Korpi W (1983) *The Democratic Class Struggle*. Boston: Routledge and Kegan.

Korpi W (2002) The great trough in unemployment: A long-term view of unemployment, inflation, strikes, and the profit/wage ratio. *Politics & Society* 30(3): 365-426.

Korpi W (2006) Power resources and employer-centered approaches in explanations of welfare states and varieties of capitalism. *World Politics* 58(2):167-206.

Kristal T (2010) Good times, bad times: Postwar labor's share of national income in capitalist democracies. *American Sociological Review* 75(5): 729-763.

Kristal T (2013) The Capitalist machine: Computerization, workers' power, and the decline in labor's share within US industries. *American Sociological Review* 78(3): 361-389.

Krugman P (2008) Trade and wages, reconsidered. *Brookings Papers on Economic Activity* 39(1): 103-137.

Lazonick W and O'Sullivan M (2000) Maximising shareholder value: A new ideology for corporate governance. *Economy & Society* 29(1): 13-35.

Marx K (1967/1867) *Capital, Volume 1*. New York: International Publishers.

Messina J, Strozzi C and Turunen J (2009) Real wages over the business cycle: OECD evidence from the time and frequency domains. *Journal of Economic Dynamics and Control* 33(6): 1183-1200.

Morris M and Western B (1999) Inequality in earnings at the close of the twentieth century. *Annual Review of Sociology* 25: 623-657.

Organisation for Economic Cooperation and Development (OECD) (2010) *STAN: Structural Analysis Statistics* (database). Available from DOI: <http://dx.doi.org/10.1787/data-00031-en> (accessed on 13 October 2015).

Organisation for Economic Cooperation and Development (OECD) (2012a) *International Trade by Commodity Statistics, Rev 2*. Available from [http://www.oecd-ilibrary.org/trade/data/international-trade-by-commodity-statistics\\_itcs-data-en](http://www.oecd-ilibrary.org/trade/data/international-trade-by-commodity-statistics_itcs-data-en) (accessed 11 March 2013).

Organisation for Economic Cooperation and Development (OECD) (2012b) Gross domestic product and main aggregates. *OECD National Accounts Statistics*. Available from [http://www.oecd-ilibrary.org/economics/data/oecd-national-accounts-statistics\\_na-data-en](http://www.oecd-ilibrary.org/economics/data/oecd-national-accounts-statistics_na-data-en) (accessed 3 June 2013).

Organisation for Economic Cooperation and Development (OECD) (2015a) Labour: Hourly earnings. *Main Economic Indicators* (database). Available from DOI: <http://dx.doi.org/10.1787/data-00044-en> (accessed 26 October 2015).

Organisation for Economic Cooperation and Development (OECD) (2015b) Consumer price index—all items. *Main Economic Indicators* (database). Available from [http://stats.oecd.org/Index.aspx?DataSetCode=MEI\\_PRICES](http://stats.oecd.org/Index.aspx?DataSetCode=MEI_PRICES) (accessed 26 October 2015).

Organisation for Economic Cooperation and Development (OECD) (2015c) Labour force statistics: Summary tables. *OECD Employment and Labour Market Statistics* (database). Available from DOI: <http://dx.doi.org/10.1787/data-00286-en> (accessed 26 October 2015).

Pierson P (1996) The new politics of the welfare state. *World Politics* 48(2): 143-179.

Plümper T, Troeger VE and Manow P (2005) Panel data analysis in comparative politics: Linking method to theory. *European Journal of Political Research* 44(2): 327-354.

Prasad M (2006) *The Politics of Free Markets: The Rise of Neoliberal Economic Policies in Britain, France, Germany, and the United States*. Chicago: University of Chicago Press.

Robinson J (1933) *The Economics of Imperfect Competition*. London: Macmillan.

Rosenfeld J (2014) *What Unions no Longer Do*. Cambridge, MA: Harvard University Press.

Sakamoto A and Kim CH (2014) Bringing productivity back in: Rising inequality and economic rents in the U.S. manufacturing sector 1971- 2001. *Sociological Quarterly* 55(2):282-314.

Schor JB (1985) Changes in the cyclical pattern of real wages: Evidence from nine countries, 1955-80. *The Economic Journal* 95(378): 452-468.

Sørensen A (2000) Toward a sounder basis for class analysis. *American Journal of Sociology* 105(6): 1523-1558.

Streeck W and Kenworthy L (2005) Theories and practices of neocorporatism. In: Janoski T, Alford R, Hicks A, and Schwartz MA (eds) *The Handbook of Political Sociology*. Cambridge: Cambridge University Press.

Vercherand J (2014) *Labour: A Heterodox Approach*. Basingstoke: Palgrave Macmillan.

Visser J (2011) *Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts in 34 Countries between 1960 and 2007, Version 3*. Amsterdam: Institute for Advanced Labour Studies.

Wallerstein M (1990) Centralized bargaining and wage restraint. *American Journal of Political Science* 34(4):982-1004.

Western B (1998) Institutions and the labor market. In: Brinton M and Nee V (eds) *The New Institutionalism in Sociology*. Stanford: Stanford University Press.

Western B and Healy K (1999) Explaining the OECD wage slowdown: Recession or labour decline? *European Sociological Review* 15(3): 233-249.

Whitford J (2005) *The New Old Economy: Networks, Institutions, and the Organizational Transformation of American Manufacturing*. Oxford: Oxford University Press.

Wood A (1994) *North-South Trade, Employment and Inequality. Changing Fortunes in a Skill-Driven World*. Oxford: Clarendon Press.

Wooldridge J (2012) *Introductory Econometrics: A Modern Approach, 5<sup>th</sup> edition*. Mason, OH: South-Western

Wright EO (2000) Working-class power, capitalist-class interests, and class compromise. *American Journal of Sociology* 105(4):957–1002.

**Table 1.** Average per Annum Growth Rates in Real Wages and Productivity by Decade,  
14 Advanced Capitalist Countries, 1970 to 2007

|                         | 1970s | 1980s | 1990s | 2000s | Total |
|-------------------------|-------|-------|-------|-------|-------|
| Real Wage Growth        | 2.03  | 0.55  | 0.94  | 0.99  | 1.12  |
| Productivity Growth     | 1.24  | 1.43  | 1.89  | 3.15  | 1.90  |
| Wage-Productivity Ratio | 1.64  | 0.38  | 0.49  | 0.31  | 0.59  |

**Note:** Wage-productivity ratio equals growth in the real wage divided by growth in productivity. The 2000s only include years 2000 to 2007.

**Table 2.** Fixed Effects, FGLS Regression Estimates of Real Wage Growth in the Manufacturing Sectors of 14 Advanced Capitalist Countries, 1970 to 2007.

|                                 | <i>Real Wage</i>    |                    |                    |                     |
|---------------------------------|---------------------|--------------------|--------------------|---------------------|
|                                 | (1)                 | (2)                | (3)                | (4)                 |
| <b>Market Conditions</b>        |                     |                    |                    |                     |
| Productivity growth             | .206***<br>(.043)   |                    | .193***<br>(.039)  | .037†<br>(.023)     |
| Unemployment (log)              | -1.800***<br>(.380) |                    | -1.180**<br>(.372) | -.169<br>(.264)     |
| Manufactured imports from LDCs  | -.520*<br>(.226)    |                    | -.562*<br>(.145)   | -.338*<br>(.150)    |
| <b>Workers' Power Resources</b> |                     |                    |                    |                     |
| Trade union density             |                     | .691***<br>(.154)  | .542***<br>(.144)  | .302***<br>(.069)   |
| Trade union density squared     |                     | -.008***<br>(.001) | -.006***<br>(.001) | -.003***<br>(.001)  |
| Corporatism                     |                     | -1.017*<br>(.503)  | -1.099*<br>(.542)  | -1.438***<br>(.340) |
| Corporatism squared             |                     | .625†<br>(.358)    | .707*<br>(.360)    | .897***<br>(.222)   |
| Left-labor government           |                     | .008**<br>(.003)   | .006*<br>(.003)    | .008***<br>(.002)   |
| Real wage <sub>t-1</sub>        |                     |                    |                    | .850***<br>(.024)   |
| Constant                        | 42.73***<br>(2.26)  | 30.31***<br>(5.52) | 29.85***<br>(5.23) | 8.52***<br>(3.06)   |
| Number of observations          | 520                 | 520                | 520                | 506                 |
| Country dummies?                | Yes                 | Yes                | Yes                | Yes                 |
| Year dummies?                   | Yes                 | Yes                | Yes                | Yes                 |
| Country-specific trend dummies? | Yes                 | Yes                | Yes                | Yes                 |

**Note:** Numbers in parentheses are panel corrected standard errors.

† = p < .10; \* = p < .05; \*\* = p < .01; \*\*\* = p < .001.

**Table 3.** First Difference, FGLS Regression Estimates of Real Wage Growth in the Manufacturing Sectors of 14 Advanced Capitalist Countries, 1970 to 2007.

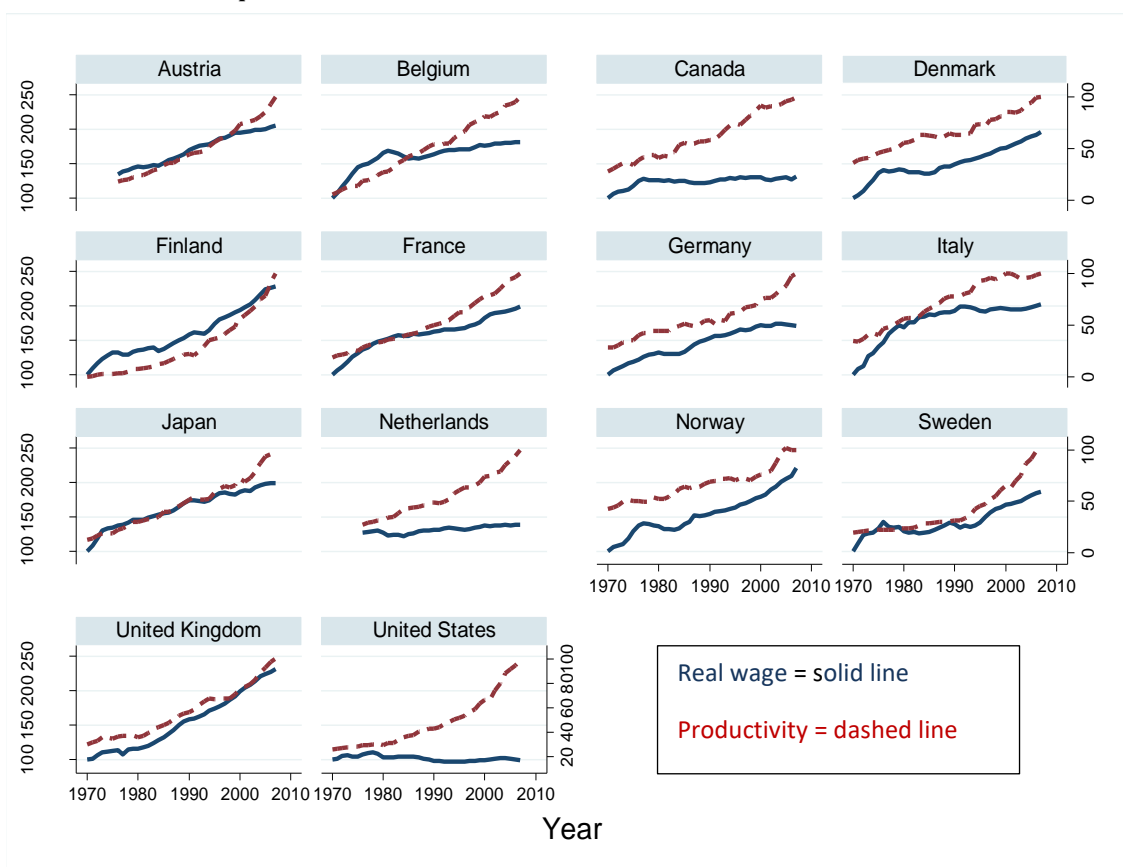
|   | <i>Real Wage <math>\Delta</math></i> |                   |                     |                     |
|---|--------------------------------------|-------------------|---------------------|---------------------|
|   | (5)                                  | (6)               | (7)                 | (8)                 |
| <b>Market Conditions</b>                        |                                      |                   |                     |                     |
| Productivity growth $\Delta$                    | .036<br>(.038)                       |                   | .045<br>(.037)      | .173<br>(.114)      |
| Unemployment (log) $\Delta$                     | -1.616***<br>(.344)                  |                   | -1.469***<br>(.355) | -1.514***<br>(.357) |
| Manufactured imports from LDCs $\Delta$         | -.007<br>(.084)                      |                   | -.011<br>(.170)     | -.024<br>(.171)     |
| <b>Workers' Power Resources</b>                 |                                      |                   |                     |                     |
| Trade union density $\Delta$                    |                                      | .291*<br>(.137)   | .295*<br>(.145)     | .305*<br>(.155)     |
| Trade union density squared $\Delta$            |                                      | -.003*<br>(.001)  | -.002*<br>(.001)    | -.002*<br>(.001)    |
| Corporatism $\Delta$                            |                                      | -.957*<br>(.441)  | -1.009*<br>(.446)   | -.942*<br>(.447)    |
| Corporatism squared $\Delta$                    |                                      | .853**<br>(.291)  | .858**<br>(.293)    | .830**<br>(.294)    |
| Left-labor government $\Delta$                  |                                      | .005*<br>(.002)   | .004†<br>(.002)     | .003<br>(.002)      |
| <b>Interaction Effect</b>                       |                                      |                   |                     |                     |
| Year $\geq 1980$                                |                                      |                   |                     | -4.358***<br>(.236) |
| Year $\geq 1980$ * Productivity growth $\Delta$ |                                      |                   |                     | -.138<br>(.121)     |
| Constant  | 3.76***<br>(.155)                    | 3.58***<br>(.167) | 3.77***<br>(.174)   | 3.36***<br>(.203)   |
| Number of observations                          | 506                                  | 506               | 506                 | 506                 |
| Country dummies?                                | No                                   | No                | No                  | No                  |
| Year dummies?                                   | Yes                                  | Yes               | Yes                 | Yes                 |
| Country-specific trend dummies?                 | Yes                                  | Yes               | Yes                 | Yes                 |

**Note:** Numbers in parentheses are panel corrected standard errors.

† =  $p < .10$ ; \* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$ .



**Figure 1.** Trends in the Real Wage and Productivity in the Manufacturing Sectors of 14 Advanced Capitalist Countries, 1970 to 2007



**NOTE:** The real wage is the inflation-adjusted hourly wage, which includes overtime pay, incentive pay, and employer contributions to private or government-mandated social insurance schemes. Productivity equals output per manufacturing worker (measured in volumes). Left axis measures the growth index of the real wage, and the right axis measures the growth index of productivity.

**Figure 2.** Average per Annum Growth in Real Wages and Productivity in the Manufacturing Sector: 14 Advanced Capitalist Countries, 1970 to 2007



**Note:** Countries arrayed from highest to lowest based on average productivity growth between 1970 and 2007.

## NOTES

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<sup>1</sup> My study differs from Western and Healy (1999) in several notable ways: (i) I emphasize the assumed importance of labor productivity, while they use it merely as a control variable. (ii) My measure of labor productivity (output per worker in the manufacturing sector) is much better than their measure (GDP per worker in the total economy). (iii) They focus on whether the oil crisis of the 1970s initiated a temporal break in the longstanding determinants of wage growth, or whether the observed slowdown arose from the normal business cycle. This contrasts significantly with my theoretical framework. (iv) My models include more independent variables (i.e. trade globalization) and assess data over a more current period.

<sup>2</sup> Data on labor productivity are missing from Austria (1970–1975) and the Netherlands (1970–1976).

<sup>3</sup> This creates a mismatch in the level of measurement. Real wage growth and labor productivity are measured at the sector level, but the other independent variables at the economy-wide level. This cannot be helped due to the lack of panel data on wages for the total economy.

<sup>4</sup> Results from a Hausman test on Model 3, assessing a null hypothesis that the random effects are uncorrelated with the model's existing regressors, could not be rejected (Prob>chi2 = 0.0309.). This suggests that RE estimation should not be used.

<sup>5</sup> Using an OLS-FE estimator, three post-estimation tests are conducted on Model 3 from Table 2. (1) A Wooldridge test, performed with the *xtserial* command, assesses a null hypothesis that the errors in the specified model do not exhibit first-order serial correlation. The results (prob > F = 0.000) strongly suggest the presence of serial correlation. (2) A modified version of the Breusch-Pagan test, performed with the *xttest2* command, assesses a null hypothesis that the errors in the specified model are independent across countries. The results (prob >  $\chi^2$  = 0.000) suggest the presence of contemporaneously correlated errors across countries. (3) A modified version of the Wald test, performed with the *xttest3* command, assesses a null hypothesis that the errors in the specified model have a common variance across panels. This null hypothesis is also rejected (prob >  $\chi^2$  = 0.000).

<sup>6</sup> Im-Pesaran-Shin unit-root tests, using the *xtunitroot* command, indicate that three variables (real wage, productivity and imports from LDCs) are non-stationary even after including a time trend.

<sup>7</sup> The highest IVFs is 2.37 and the average is 1.79. This does not consider the correlation between independent variables and their squared terms (i.e. union density and union density squared).

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<sup>8</sup> I also test for temporal breaks among the other independent variables in my model. Although not reported here, none of these interaction effects are statistically significant, although most exhibit the expected signs. For instance, the effects of left-labor parties on real wage growth lessen in the neoliberal era, but not in a statistically significant way. These findings are marginally consistent with the evidence presented by Western and Healy (1999).

<sup>9</sup> I know of no measures of market power. However, the EU KLEMS project (<http://www.euklems.net/>) offers high-quality panel data on annual investment in telecommunication and computer technologies (a proxy for technological change), but data only go back to 1995 for most countries. In the future, as new observations are added, this should become a good source for panel data on technological change.