Title

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Journal

Sociology of Development, 6(3)

ISSN

2374-538X

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Publication Date

2020-09-29

DOI

10.1525/sod.2020.6.3.275

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Production Globalization and the Segmentation of the Global Manufacturing Sector*

ABSTRACT I review three key claims regarding the impact of production globalization on manufacturing workers worldwide, and subject them to empirical scrutiny. Some argue that production globalization causes a "race to the bottom" that leads to a downward convergence of manufacturing workers' labor power worldwide. Others suggest instead that production globalization leads to an upward convergence of labor power among manufacturing workers worldwide. A third perspective is agnostic with respect to the average level of this labor power, but predicts divergence between the global North and global South. Using a novel empirical approach to cross-national and temporally comparable measurement of manufacturing labor market power, I show that both the (country-average) level and (between-country) dispersion of labor market power have increased worldwide since the mid-1960s. To explain these trends, I juxtapose insights from Heckscher-Ohlin trade theory with those from the interdisciplinary literature on global value chains and production networks. Both predict that globalization should increase labor market power more in the global North than in the global South. However, the former focuses on labor demand shocks from international trade, while the latter focuses on relationships between firms in the North and South in light of the strategic behavior of network/chain leaders. Augmenting the empirical approach to the measurement of the aggregate positional power of national manufacturing firms developed elsewhere, I show that both international trade and positional power matter for the distribution of manufacturing labor-market power worldwide, but the latter effects are stronger. I conclude by positioning these results within larger debates about the fate of labor in a globalized manufacturing economy. KEYWORDS economic globalization, value chains, production networks, labor, inequality

INTRODUCTION

How does globalization affect the power of manufacturing labor worldwide? In this article, I identify three broad claims linking the globalization of production to the labor market power of manufacturing workers worldwide. One claim originates in the now familiar "race to the bottom" thesis. Here, the globalization of production uniformly harms manufacturing labor's market power by eroding the skill base and increasing structural employment, leading to a downward convergence in labor power worldwide. I call this the "racing down" thesis. A second claim emerges from optimistic counts of globalization's impact on income inequality. In these accounts, economic globalization leads to an upward convergence of manufacturing workers' labor power worldwide by diffusing skilled manufacturing employment from North to South. I call this the "climbing up" thesis. A third claim originates in both "atomistic" economic theories of

Sociology of Development, Vol. 6, Number 3, pps. 275–295, electronic ISSN: 2374-538X DOI: https://doi.org/10.1525/sod.2020.6.3.275

international trade and relational accounts of the rise of globalized value chains and production networks (GVCs/GPNn). Both perspectives predict international divergence in manufacturing labor's market power, but they vary in the mechanisms underlying this divergence. I call these variants of the "falling apart" thesis.

To adjudicate between these three claims, I outline a novel operationalization of a specific form of manufacturing "labor market power" developed by Rudra (2005a, 2005b) that allows users to compare the labor market position of manufacturing workers across space (and the North/South divide in particular) and time. Consistent with sociological accounts of labor's structural bargaining power, labor market power is high when the labor force is relatively skilled and labor markets are tight (Wright 2000). With this operationalization of manufacturing labor market power in hand, I compare trends in the average *level* and *inequality* of manufacturing labor market power world-wide to the empirical claims outlined above. The evidence is most consistent with the third perspective. Contrary to the "racing down" thesis, I observe rising manufacturing labor-market power world-wide. And contrary to arguments linking the globalization of production to a surge in manufacturing labor market power in the global South (the "climbing up" thesis), I also observe rising inequality in labor market power worldwide.

To account for these empirical trends, I further explicate two causal accounts of the "falling apart" thesis. The first is something of an "atomized globalization" explanation (Granovetter 1985). This account draws from international trade theory, and in particular the Heckscher-Ohlin (H-O) framework. According to this account, rising international trade changes the demand structures facing capitalist firms across the North/South divide. In the North, rising international trade increases the demand for high-skill labor. In the South, international trade has the opposite effect, increasing demand for low-skill labor. Thus, international trade should increase the ratio of high-skill to low-skill labor in the North, but reduce this ratio in the South.

The second account is a more "relational" perspective originating in the interdisciplinary literature on GVCs/GPNs. In this account, the strategic agency of leading firms leads to rigid divisions of labor among sets of firms embedded in GVCs/GPNs. Because firms are spatially embedded in states, and because GVCs/GPNs have become a modal form of industrial organizational worldwide, between-country variation in labor market power is largely a function of the *positional* variation of national firms in GVCs/GPNs. Manufacturing workers in countries with firms in powerful network positions should have relatively high labor market power, while those in countries with firms in weaker network positions should have relatively low labor market power.

To subject these two accounts to empirical scrutiny, I augment and combine two network-based measures of the power of national firms developed by Mahutga (2014a, 2014b). I then estimate fixed-effects regression models of manufacturing labor market power covering the period of 1965 to 2000. My results support both the more atomistic H-O framework and the relational approach. In reduced-form models, international trade increases the labor market power of manufacturing workers in the global North, but not in the global South. Similarly, positional power increases manufacturing workers' labor market power in the historical period coinciding with the entrenchment of GVCs/

GPNs as a predominant model of industrial organization worldwide (Mahutga 2014b). However, my analyses also suggest that the relational approach may provide a more empirically accurate explanation for international inequality in labor market power.

CLIMBING UP, RACING DOWN, OR FALLING APART?

According to radical discourse of the early twentieth century, capitalism survived because of the opulence of labor in the global North. One of the more famous treatises on the topic, V. I. Lenin's *Imperialism* (1921) argued that

> This stratum of workers-turned-bourgeois, or the labour aristocracy, who are quite philistine in their mode of life, in the size of their earnings and in their entire outlook, is the principal prop of the Second International, and in our days, the principal social (not military) prop of the bourgeoisie. For they are the real agents of the bourgeoisie in the working-class movement, the labour lieutenants.

While Lenin's argument, and his reasons for making it, are complex and beyond the scope here, this was one of the earliest pieces to recognize the importance of the international division of labor for the working class of the world as a whole. And given the historical moment in which it was written, manufacturing workers occupied the very center of this analysis. In the remainder of this paper, I use the more generic term *worker* or *labor* to refer to workers in the manufacturing sector.

The intensification of economic globalization raises a similar question, but scholars reach conflicting conclusions. Some suggest that globalization should produce an upward convergence in labor market power. In sociology, this argument is elaborated in the sociological literature on global income inequality (Firebaugh 2003; cf. Pandian 2017; Silver 2003). At its very core, globalization represents the diffusion of manufacturing activity from core to periphery. Compared to the agrarian economy in the stylized primordial, less developed country, the arrival of this advanced technology must improve the lot of the working class. In so doing, workers in less developed countries "reap the benefits of a 'structural change bonus' associated with shifting to higher-productivity activities" (Pandian 2017:910). Consequently, measured global income inequality declines: "the most important cause of [declining inequality] is the continuing spread of industrialization to the world's poorer regions" (Firebaugh 2003:187). Much like the trend in global income inequality, where world income has increased as the distribution of this income has become more even across countries, the empirical expectation for labor power is thus one of "upward convergence." Globalization encourages rising labor power in the South, and thereby fosters convergence toward the levels enjoyed by the global North. This "climbing up" perspective would be consistent with the hypothesis that

> H1: Labor power is rising over time, but international inequality in labor power is declining.

Many argue instead that the globalization of production creates a "race to the bottom," in which workers face a declining position in their respective labor markets

across the globe (Hyman 1992; Jenkins and Leicht 1997). According to these arguments, the growing interdependence between firms located in far-flung regions creates a larger and more fragmented labor pool in which workers compete with each other. In turn, this rising competition drives down the labor market power of workers in the aggregate (Bronfrenbrenner 1996; Cantin 2006; Frobel, Heinrichs, and Kreye 1980; Ross and Trachte 1990; Wood 1994). In so doing, it erodes the historical North/South divide by "peripheralizing" old industrial areas in historical core countries, and thereby dividing "the world into a global bourgeoisie and global proletariat" (Robinson and Harris 2000:16–17). In short, these analysts argue for a "downward convergence of conditions for workers" cross-nationally (Silver 2003:5). This "racing down" perspective suggests that

H2: Both the level and the international inequality of labor power are declining over time.

Others argue for a decidedly middle road, where globalization reproduces and even exacerbates the historical North/South divide in labor power (Arrighi, Silver, and Brewer 2003). One example lies in standard economic thinking on the effect of trade on the demand for labor in rich and poor countries (Leamer 1995; Ohlin 1933). The standard economic model is that of the H-O framework, which suggests that North–South trade "causes . . . a rise in the relative price of skill-intensive goods and the relative demand for skilled labor" in the North (Wood 1998:1465). The opposite is true in the South, where freer trade should increase the demand for low-skill and unskilled labor. Thus, if globalization simply represented freer trade between otherwise autonomous firms and states, the H-O model would predict rising skill differentials between countries. Such skill differentials should lead to more labor power in the North than the South, on average.

Similarly, the formation and expansion of GVCs/GPNs could lead to divergence in labor market power between countries (Feenstra 1998; Gereffi 1999). For example, offshoring behavior tends to be most extensive in the lowest-skill industries or industry segments (Blinder and Krueger 2013; Mahutga 2012). In the North, this results in a set of leading and "first-tier" supplier firms who do the bulk of high-skill manufacturing. In the South, production networks tend to concentrate low-skill manufacturing in an army of sub-contractor firms (Mahutga 2014a, 2014b). Thus, the "falling apart" perspective is perhaps ambivalent about trends in the cross-national average of labor market power. However, it clearly predicts

H3: International inequality in labor power is rising over time.

In short, there are three distinct hypotheses with respect to trends in the level and dispersion of labor power worldwide. The first is the "climbing up" thesis. In this view, globalization is producing a "single homogenous world working class" (Silver 2003:9). The second, the "racing down" thesis, is that labor market conditions are converging downward to an ever-falling global minimum standard. And the "falling apart" thesis embodies two different explanations, each predicting that labor power is diverging across countries as a dynamic consequence of production globalization.

AN OPERATIONALIZATION OF NATIONAL LABOR MARKET POWER

Adjudicating between the three perspectives proves difficult for empirical reasons. The most common method of assessing labor power, unionization, captures one important dimension of labor's associational and institutional power (Western 1997), but union density is largely incomparable across the North/South divide (Banuri and Amadeo 1991; Valenzuela 1989). For example, "many LDC [less developed country] governments mandate compulsory membership in corporatist unions and impose constraints on labor's demands, leadership, and internal governance. China, for example, has the highest union density in the developing world, but labor has very little bargaining power" (Rudra 2005a:38). Differences in the reliability of union data across the North/South divide further undermine comparisons of union density as a measure of labor power (McGuire 1997). Thus, previous work on labor in the global South has used a range of alternative indicators (Kerrissey 2015; McGuire 1997; Rudra 2005a; cf. Martin and Brady 2007).

In this article, I employ an operationalization of "labor market power" that captures the power workers derive from the character of national labor markets. This concept resonates with sociological accounts of one of two types of labor power. Most generally, the concept of labor power refers to workers' collective capacity to "demand better living and working conditions" (Rudra 2005a:33). Using the language of class analysis, labor power reflects "the capacity of [labor] to realize [its] class interests" (Wright 2000:962). The late Erik Olin Wright (2000:962) differentiates between two different sources of labor power: associational power and structural power. Associational power refers to "the various forms of power that result from the formation of collective organizations of workers," such as labor unions and political parties. Structural power refers to the "power that results from the location of workers within the economic system."

The focus here is on structural power, as opposed to associational power, for two reasons. First, my substantive interest lies in the effect of globalization on labor power, and I am keenly interested in comparing countries in the global North to those in the global South. Second, as I noted above, the most conventional measure of associational power (unionization) tends to measure the same thing among developed countries, but unions in LDCs are "rife with collective action problems and often subject to a broad range of government controls," such that comparing union density figures across LDCs may be an exercise in futility (Rudra 2005a:56). Finally, unionization rates can be rather slow to change in response to the purely economic dynamics of production globalization discussed above (Western 1997). Thus, to make comparisons of labor power across the North/South divide in the absence of comparable measures of unionization, I follow others in conceptualizing labor power as labor's capacity to pursue its interests in the labor market.

Given this definition, there are at least two distinct factors that raise or lower the aggregate power of labor within a given country. The first is the aggregate skill level of the workforce. Low-skill or unskilled workers can be more easily substituted, because a large share of the labor force possesses the minimum requisites to do these jobs. This is reflected in research that shows that these workers are hard to organize into unions (Ingersen 1984; Lok 1993; Rudra 2005a:34). High-skill workers are less substitutable.

They often engage in manufacturing activity that is in high demand and central to the flow of the whole production process. Moreover, higher skills insulate workers from competition. Indeed, many of the success stories of labor organizations that we do observe in LDCs "have historically occurred in skilled industries" (Rudra 2005a:34; see also Deyo 1989). Second, labor is in a stronger position *vis-à-vis* employers where labor markets are "tight" (Olson 1971; Rudra 2005a; Silver 2003; Wright 2000). In such cases, workers can more effectively bargain with their employers.

Given this two-fold intuition, I borrow from Rudra (2005a), who develops a measure of the labor market power (LMP) of each country that is a product of the ratio of skilled to unskilled workers and the inverse of the size of the surplus labor pool:

$$\text{LMP} = \frac{\text{high-skill workers}}{\text{low-skill workers}} \times \frac{1}{\text{surplus labor}}$$

Thus, the measure rises when the skill ratio is high and the surplus labor pool is small, and falls when the opposite occurs. While Rudra (2005a) calls this "potential labor power," I opt for the more general term, "labor market power." Strategically, this measure is restricted to the manufacturing sector. For one, the theoretical frameworks discussed above are clearly limited in scope to the manufacturing sector. For another, the historical trajectory of labor's rise as a collective voice has been strongly associated with the rise of capitalist manufacturing (Marx 1867; Silver 2003). This measure has been shown to correlate positively with other composite measures of labor power (McGuire 1999), unionization (Rudra 2005a), democracy (Rudra 2005b), labor rights (Gamso 2016), economic development (see below), and subjective assessments of the strength of labor by area experts (Rudra 2002).

To differentiate between skilled and unskilled workers, Rudra uses the classification into "low" and "high" skill of Wood and Mayer (1998), which is based on UNIDO's International Standard Industrial Classification, Revision 2 (ISIC 2). Thus, I obtained the number of employees in low-skill and high-skill industries from UNIDO (2006). Low- and high-skill industries are listed in Table 1.

The surplus labor pool is measured as the difference between the working-age population and the sum of the labor force and secondary and tertiary school enrollments as a share of the working-age population; the data are from the World Bank (2018a, 2018b).

We can explore the merits of Hypotheses 1 to 3 by examining the temporal trends in global mean labor market power and inequality in global labor market power. Global mean labor market power is simply the average labor market power over all the countries in the sample in each year. To measure between-country inequality in labor market power, I employ two measures.[1] The first is the familiar Gini coefficient (G):

$$G = \frac{\sum_{i=1}^{N} r_i(q_i - Q_i)}{N}$$

where r is the ratio of country i's labor market power to the world average labor market power; q_i is the proportion of countries with less labor market power than country i; and

TABLE 1. Manufacturing job categories from UNIDO's International Standard Industrial Classification, Revision 2

Low-skill manufacturing	High-skill manufacturing
321: Textiles	351: Industrial chemicals
322: Wearing apparel, except footwear	352: Other chemicals
323: Leather products	354: Misc. petroleum and coal products
324: Footwear, except rubber or plastic	356: Plastic products
331: Wood products, except furniture	382: Machinery, except electrical
332: Furniture, except metal	383: Machinery, electrical
341: Paper and products	384: Transport equipment
355: Rubber products	
361: Potter, china and earthenware	
362: Glass and products	
369: Other non-metallic mineral products	
371: Iron and steel	
381: Fabricated metal products	
390: Other manufactured products	

Q_i is the proportion of countries with higher labor market power than country *i*. The Gini index varies between 0 and 1, with 0 indicating perfect equality and 1 occurring when one country has all the labor market power.

The second measure I examine is the coefficient of variation (CV):

$$\mathrm{CV} = \sum_{i=1}^{N} (r_i - 1)^2 = \frac{\sigma}{\mu}$$

where σ is the standard deviation of global labor market power in a given year, and μ is the global mean labor market power the same year.

Figure 1 depicts global mean labor market power from 1965 to 2000. Recall that the "racing down" thesis would predict a downward trend. Instead, we observe a consistent increase, which sharply steepens after 1990. Thus, Figure 1 is inconsistent with the "racing down" thesis but consistent with the first part of Hypothesis 2. Figure 2 depicts the trends in the Gini coefficient and coefficient of variation. The coefficient of variation shows a steady rise that increases in slope after 1980 and then again after 1990. The Gini coefficient shows a similar trend, though the post-1990 increase in slope is less extreme. Thus, countries with high labor market power had larger increases in labor market power between 1965 and 2000 than did countries with low initial labor market power. The Gini coefficient trend tells a similar story. There is a shallower but steadily upward trend during the entire period.

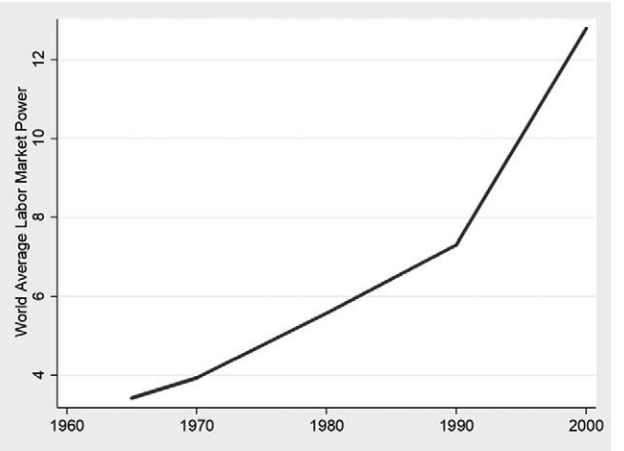

FIGURE 1. World-average labor market power

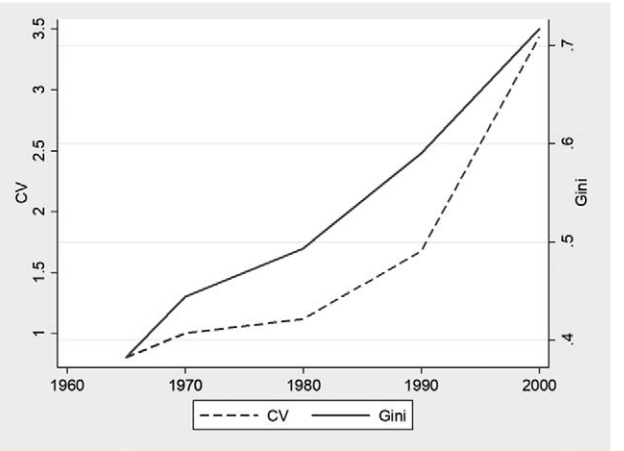

FIGURE 2. International inequality in labor market power

Figures 1 and 2 support neither the "upward convergence" prediction of Hypothesis 1 nor the "downward convergence" prediction of Hypothesis 2. Rather, we find that the global mean in labor market power is rising (contrary to Hypothesis 2) and that countries are diverging (contrary to Hypothesis 1).[2] Thus, the evidence presented thus far seems to support Hypothesis 3: the global mean in labor market power is rising, but the gap between countries is widening.

EXPLAINING INTERNATIONAL INEQUALITY IN LABOR MARKET POWER

As described above, there are two explanations for the rising inequality in labor market power. That is, Hypothesis 3 draws from two distinct globalization stories. The first rests on classic international trade theory, and the familiar H-O framework in particular. In the H-O framework, labor market power responds to trade shocks that impact the global

North and South differentially. Northern firms and southern firms are equally capable of producing various types of goods, but unequal factor (skilled labor) endowments lead to specialization: high-skill workers are abundant in the North, while low-skill workers are abundant in the South. Globalization, conceptualized as heightened international openness, simply exacerbates this structural divide. "Falling trade barriers shift the North from 'manufacturing autarky,' in which it produces all the manufactures it consumes, to complete specialization in the production of skill-intensive manufactures and reliance on imports from the South to supply its needs for labour-intensive manufactures. This change in output mix increases the average skill-intensity of Northern manufacturing" and lowers the skill-intensity of southern manufacturing (Wood 1998:1465–66).

Put differently, growing trade openness should promote skill intensity in the North—and with it the labor market power of northern workers. But it should promote low-skill intensity in the South. In tandem, trade should promote diverging labor market power between the North and the South. Reasoning from the H-O framework leads to Hypothesis 4:

> H4: The association between labor market power and trade openness varies by level of development—it is positive at high development and negative at low development.

On the other hand, the GVC/GPN framework suggests a more relational explanation for the structural divide identified in Figure 2. Here, rising imports from the global South do not originate from independent firms producing for world markets. Rather, these flows are coordinated ties linking "leading" firms in the global North to their suppliers in the global South. GVCs/GPNs can therefore be conceptualized as node sets with segmented labor markets (Mahutga 2014b). Leading firms in the North externalize activity subject to relatively high competition. If a portion of this activity nevertheless requires relatively high skills, leading firms will tend to outsource to a co-located domestic firm. Leading firms tend to offshore the portions that require low skills (Gibbon and Ponte 2005; Mahutga 2012). At the level of the nation-state, then, countries without leading firms in these networks should consistently produce labor markets with low labor-market power.

In short, GVC/GPN formation should reproduce or even exacerbate international inequality in labor market power because firms are spatially embedded in states. As Mahutga (2014b:230) notes: "The diffusion of [network forms of economic organization] among lead firms multiplies production networks over time, creating entirely new 'markets' for both intermediate and finished goods. Because other firms must integrate into these networks in order to gain access to these markets and firms are spatially embedded within countries, the type of economic activity occurring within national borders is increasingly a function of the network position of firms located therein."

In distinction to the world of atomized firms responding to varying demand shocks in H-O theory, this relational perspective explains variation in labor market power across countries as a function of the links between firms in socially embedded production networks. This reasoning leads to Hypothesis 5:

H5: A country's positional power in GVCs/GPNs is positively associated with labor market power, net of the covariates from the H-O framework.

However, it has been noted elsewhere that the network effects theorized by the literature on GVCs/GPNs should operate only under key historical conditions. In particular, network defects depend "on the extent to which manufacturing processes become embedded in [GVCs/] global production networks" (Mahutga 2014b:233). While particular GVCs/GPNs vary in their internal divisions of labor, geographic scope, and interfirm power asymmetries (among other attributes), many GVC/GPN analysts point to the late 1980s as a key turning point after which these forms of organization were relatively entrenched worldwide (Bair 2006, 2008; Hamilton and Gereffi 2009; Mahutga 2014a, 2014b, 2014c; Sturgeon, Van Biesebroeck, and Gereffi 2008). This historical variation in the degree to which manufacturing came to be organized in GVCs/GPNs thus yields the final hypothesis (cf. Pandian 2017):

H6: a country's positional power in GVCs/GPNs is positively associated with labor market power, net of the covariates from the H-O framework, only after the 1980s.

METHODS

With the following analyses, I regress labor market power on covariates from the H-O framework and what I describe below as the "positional power" of nations. Matching the trade data collected by Mahutga (2014a; see below), the data for the models that follow represent repeated observations of countries at five points in time across a 35-year period from 1965 to 2000. Due to missing data on dependent and independent variables, the panels are unbalanced, with countries yielding a different number of observations through time. These are also "large N, small T" panels, in which the number of cross-sectional units greatly outnumbers the time-series observations. Pooling these time series violates assumptions necessary for unbiased and consistent estimates in the OLS framework. In particular, these data call for analytical techniques that account for unmeasured country- and period-specific heterogeneity.

Two common approaches to unmeasured-country effects are the fixed-effects and random-effects regression. The fixed-effects approach accounts for unit-level heterogeneity by estimating a separate intercept for each unit, which is equivalent to OLS on unit demeaned covariates on each side of the equation. The random-effects approach accounts for unit-level heterogeneity by estimating an additional unit-specific error term that is assumed to be uncorrelated with the regressors. While it has been shown that random-effects models are more efficient than fixed-effects models, violations of the assumption of uncorrelated unit-specific error terms and right-hand-side covariates yield biased parameter estimates (Halaby 2004; Wooldridge 2002). The models that follow use the fixed-effects approach because it is unbiased under weaker assumptions than the random-effects approach, and thus provides a conservative test of the hypotheses outlined above. I correct for heteroscedasticity and serial correlation of these problems with clustered standard errors (Rogers 1993).

DATA

Dependent Variable: Labor Market Power

Labor market power was defined above. As noted, the data for the skill ratio come from UNIDO (2006). Unfortunately, UNIDO discontinued the Industrial Statistics Database: 3-Digit Level of the ISIC Code, Revision 2, in 2007, which makes it impossible to extend the period much beyond 2000. Data for the size of the surplus labor pool come from the World Bank (2018b). This measure is base-10 logged for skewness.

Independent Variables

Trade openness. I control for openness with the standard ratio of trade (imports + exports) to GDP. The aggregate trade data come from the IMF's (2018) Direction of Trade Statistics, and GDP comes from the World Bank (2018b) and is measured at the foreign exchange rate in concordance with the unit of measurement from the IMF (2018).

Development. My instrument for level of development comes primarily from the Penn World Tables (Heston, Summers, and Aten 2009) and reflects real GDP per capita converted to achieve purchasing power parity. This variable is base-10 logged for skewness.

Positional power in GVCs/GPNs. I estimate the average network position of resident firms in a large sample of countries following Mahutga (2014a, 2014b). Mahutga measured two versions of positional power, one for the "buyer-driven" garment industry and another for the "producer-driven" transportation equipment industry. Each was motivated by attention to the distinct kinds of value-chain/production-network "governance" that allegedly characterize the industry. In the case of buyer-driven networks, where bargaining power is said to accrue to concentrated buyers rather than diffuse producers, he used

$$P_j^{\mathrm{B}} = \sum_{i=1}^{n} \log_{10}\left(Y_{ij}/X_i + 1\right)$$

where Y_{ij} is the imports received by country j from country i in the garment industry, and X_i is the total garment exports of the sending country, i. Here, countries rank high when they have many dependent import partners and low when they have few, with scores increasing with the absolute dependency of each import partner thereafter. In the case of producer-driven networks, where powerful actors inculcate many dependent buyers and capture a large share of their markets, he used

$$P_j^{\mathrm{P}} = \sum_{i=1}^{n} \log_{10}\left(Y_{ji}/X_i + 1\right)$$

Here, countries rank high when they have many dependent export partners and low when they have few, and increase in power with the absolute dependency of each export partner thereafter.

These measures have been shown to correlate with industry-specific wages, firm retail or manufacturing activities, and the rise and fall of national industries (Mahutga 2014a, 2014b). Mahutga conceptualized these as ideal types. Given that my present purpose is to understand the role of positional power in a country's economy-wide labor market power, I combine these measures into an overall index of positional power. I *z*-score standardized buyer- and producer-driven power and add them together (Kentor 2000). Mahutga measured these variables with trade data collected at five points in time over the 35-year period from 1965 to 2000.[3]

Human capital. One of the more fundamental insights from modern growth theory is that human capital is a critical ingredient in the development of a dynamic, skill-based labor force (Barro and Sala-i-Martin, 1995). In the present context, where the ratio of high-skill to low-skill workers is a key component of the measurement of labor market power, human capital—itself a measure of the stock of skill—is a critical control variable. I employ a standard measure of human capital: secondary school enrollment. These data come from the World Bank's EdStat (World Bank 2018a), supplemented by the UN's Statistical Yearbook (various years).

Network period. Consistent with the intuition above that GVCs/GPNs didn't become modal organizational forms until after the 1980s, I also include a dummy variable equal to 1 after 1980.

RESULTS

Table 2 reports the results of the regression analysis described above. In Model 1, I include trade openness, GDP per capita, secondary education, and network period (defined in the previous paragraph). Both development and human capital are positively related to labor market power, as one would expect. Secondary education proxies for the stock of human capital, and its effect appears particularly large.[4] However, trade openness has no unconditional effect. Thus, Model 2 includes the interaction between trade openness and GDP per capita, which is both positive and significantly different from zero. Consistent with H-O trade theory, the effect of trade openness increases by 0.198 units for every (logged) dollar of GDP per capita. The coefficient on trade openness has a less-than-ideal interpretation in Model 2—it is the effect of trade openness when GDP per capita is zero, which is beyond the observed range of these data. I return to this interpretive discussion below.

Model 3 replaces this interaction term with positional power. The effect is positive but non-significant. Model 4 includes the interaction between positional power and network period (the post-1980 indicator). This interaction is positive and significant. Because the moderator of positional power is a dummy variable, these have a straightforward interpretation: positional power had no significant effect on labor market power prior to the network period (0.01; $p > .05$), but this effect was nearly 4.5 times larger during the network period ($0.01 + 0.035 = 0.045$). Finally, Model 5 includes both of these interaction terms simultaneously. The interaction between trade openness and GDP per

TABLE 2. Fixed-effects regression of labor market power

	(1)	(2)	(3)	(4)	(5)
Trade Openness	0.039	-0.639*	0.011	0.013	-0.499
	(0.854)	(-2.189)	(0.225)	(0.297)	(-1.850)
GDP per Capita	0.150*	-0.219	0.114	0.057	-0.222
	(2.509)	(-1.335)	(1.639)	(0.886)	(-1.405)
Trade Openness × GDP per Capita		0.198*			0.149
		(2.243)			(1.870)
Positional Power			0.018	0.010	0.013
			(1.234)	(0.705)	(0.914)
Positional Power × Network Period				0.035***	0.033***
				(3.863)	(3.591)
Secondary Education	0.002***	0.002***	0.002***	0.002***	0.002***
	(5.225)	(4.829)	(4.382)	(4.624)	(4.246)
Network Period (post-1980 = 1)	0.014	0.016	0.005	-0.012	-0.011
	(0.940)	(1.052)	(0.340)	(-0.858)	(-0.740)
N	389	389	389	389	389
R^2	0.401	0.415	0.406	0.468	0.476

*$p < .05$; **$p < .01$; ***$p < .001$.

Note: Unstandardized fixed-effects regression coefficients. *T*-statistics based on heteroscedasticity, and serial-correlation consistent standard errors reported in parentheses.

capita is no longer significant in Model 5, while that between positional power and the network period attenuates slightly but remains significant.

Figures 3 and 4 graph the coefficients and confidence intervals for trade openness and positional power, respectively, across the full range of the moderators with which they are interacted. The left-hand side of each figure shows these associations and confidence intervals in Models 2 and 4, respectively. The right-hand side of each figure shows the associations and confidence intervals from Model 5. In Model 2 of Table 2 (i.e., when positional power and its interaction with the network period are not controlled), we observe that the coefficient on trade is negative but non-significant over the bottom third (or so) of the distribution of GDP per capita. It is positive and non-significant in the middle third (or so) of the range, and significantly positive in about 32 percent of the richest cases. When positional power and its interaction enter the model, however, trade has no significant effect on labor market power across the entire range of GDP per capita. Conversely, in the *ceteris paribus* condition of Model 5, the coefficient on positional power increases slightly and remains positive and significant.

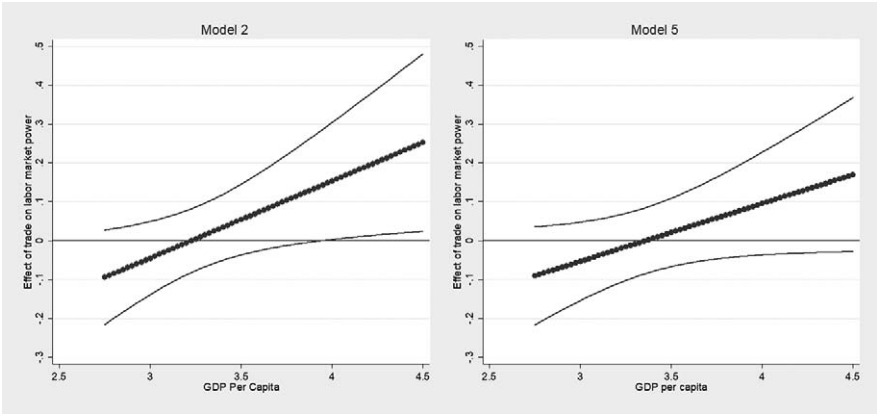

FIGURE 3. Marginal effect of trade on labor market power

Notes: Dashed line is estimated coefficient; solid lines are 95% confidence intervals. GDP per capita is reported in the base-10 logarithm

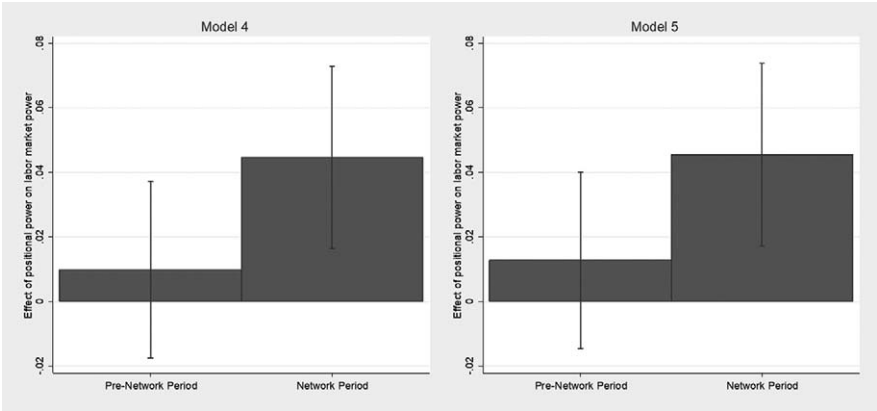

FIGURE 4. Marginal effect of positional power on labor market power

Note: Error bars are 95% confidence intervals.

The positive effect of positional power in the post-network period is relatively large. To substantiate this assessment, Figure 5 plots predicted labor market power across the observed range of secondary education and positional power in the post-network period when all other covariates in the Model 5 are equal to their mean. At minimal levels of both secondary education and positional power, the predicted levels of labor market power are virtually identical. However, the slope of secondary education is steeper, such that predicted labor market power is about 6 percent higher at the maximum observed rate of secondary school enrollment *vis-à-vis* positional power. While the labor market power predicted by secondary education is within the 95-percent confidence interval of the positional power prediction for most of the range of secondary education, labor market power increases by 44.6 and 56.4 percent across the observed range of positional power and secondary education, respectively. In short, the stock of human capital has a larger impact on labor market power than does the positional power of national firms.

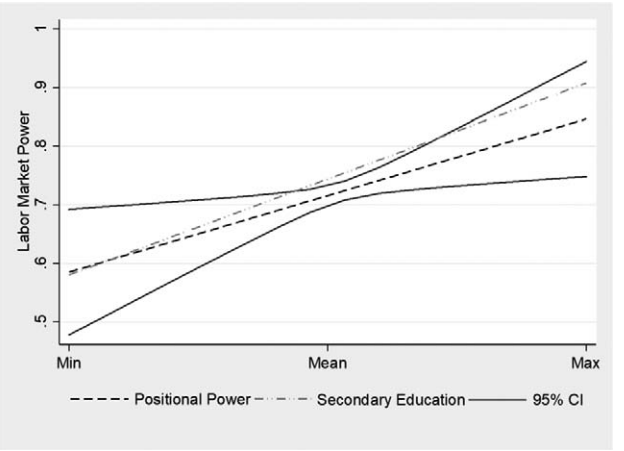

FIGURE 5. Predicted levels of labor market power with secondary education and positional power

Note: Margins based on Model 5 of Table 1 and restricted to the post-network period with all other covariates at their mean. The 95% confidence interval refers to the positional power effects.

Still, the difference is not terribly large, and there is strong theory to suggest that human capital is probably the strongest of all drivers of labor market power.[5]

CONCLUSION

The fate of labor in a globalized world economy has been subject to much debate. One argument is the "race to the bottom" thesis, whereby labor market power declines in all countries (Mehmet, Mendes, and Sinding 1999; Tonelson 2000). The second view predicts instead that globalization enhances the labor market power of workers, particularly in the global South. In this view, globalization is eroding the historical North/South divide and thereby facilitating an upward convergence of labor power worldwide. Finally, a third perspective—explicable in terms of both economic theories of trade and GVCs/GPNs—predicts rising international inequality in labor market power. The evidence presented here is most consistent with this third perspective. The world-wide average labor market power is rising over time (contrary to the race-to-the-bottom thesis), as is international inequality in labor market power (contrary to the upward-convergence thesis).

I also provide evidence to adjudicate between two explanations for the observed rise of inequality in labor market power. Both the "atomized" world of independent firms responding to trade-induced demand shocks and the more relational accounts of the emergence of GVCs/GPNs predict a rising North/South divide in labor market power. The fixed-effects regression models reported in Table 2 provide some support for both perspectives. On the one hand, rising trade openness increases labor market power in the North, but not in the South. On the other, my operationalization of positional power in GVCs/GPNs increases labor market power after the 1980s, when these models of

industrial organization became entrenched worldwide (Mahutga 2014b). However, the trade effects motivated by H-O trade theory shrink and become non-significant when positional power is controlled. *Ceteris paribus*, the post-1980 effect of positional power remains significant and slightly increases in magnitude.

One important caveat. As discussed above, the coding scheme of Wood and Mayer (1998) requires employment data according to ISIC Revision 2 at the three-digit level. Unfortunately, UNIDO discontinued these data in 2007. Thus, while my analysis gives us a snapshot of the trends and determinants of labor market power over a pretty long (35 years) and historically important time period (the latter decades of the twentieth century), it is possible that the world-economy has changed in important ways since the year before the global financial crisis. Recent work on global income inequality, for example, finds that it declined only after 2000 (Alderson and Pandian 2018). The data employed here are strategic because they have been extensively validated (McGuire 1999; Rudra 2005a, 2005b), but future research might approximate a cross-walk to more recent ISIC revisions that would allow an analysis of contemporary data.

That caveat notwithstanding, this analysis speaks to two central questions in the literature on globalization. The first is the degree to which economic globalization fosters international economic inequalities (Arrighi, Silver, and Brewer 2003; Clark 2011; Firebaugh 2003). For this specific metric—labor market power—it appears that globalization has a decidedly disequalizing effect, in contrast to the most comparable unweighted international income inequality (Alderson and Pandian 2018). H-O trade theory might suggest a causal link between rising international inequality in labor market power and declining international income inequality, insofar as it would predict that southern countries would grow faster if they make more copious use of their abundant low-skill labor. The GPN/GVC literature contains both sanguine and pessimistic views (Gereffi 1999, 2005; Mahutga 2014a; Schrank 2004). Per the former, GPN/GVC integration can lead to long-term development through "industrial upgrading" and "learning by doing." Per the latter, the diffusion of GPNs/GVCs erodes the returns of GPN/GVC participation or concentrates high-competition niches in the global South.

At first glance, then, theory is not immediately clear how rising between-country inequality in labor market power can coexist with declining between-country inequality in income. Moreover, Figure 6 reveals that the rising inequality observed above is due primarily to rising labor market power in the top quartile of GDP per capita coupled with fairly stagnant levels of labor market power in the lower quartiles. Future research could consider the degree to which "the pathways through which globalization shapes the growth trajectories of nations" vary (Alderson and Pandian 2018:277). In particular, future research could examine how the growth effects of economic globalization are mediated by labor market power.[6]

The second central question is the degree to which economic globalization should promote labor internationalism. These analyses suggest that both international trade and the expansion of GPNs/GVCs should undermine the *structural* basis of labor internationalism. That is, given the diverging characteristics of northern and southern labor markets observed here, workers should experience stable or declining *material incentives* to

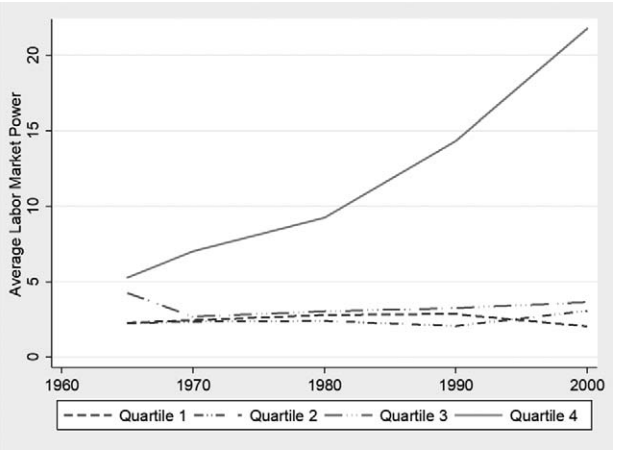

FIGURE 6. World-average labor market power by developmental quartile

Note: Quartiles refer to GDP per capita.

cooperate across the North/South divide.[7] Nevertheless, much of the growing discourse on labor revitalization in northern countries (Clawson 2003) and between southern and northern countries (Kay 2005) relates the potential for labor solidarity to new organizational and institutional processes at the national and global levels. Such processes rely less on the kinds of structural bargaining power on view here, and more on new forms of associational power and emergent political opportunities at the transnational level. These forms of associational power include social movement unionism, "community-based unionism and the corporate campaign," and other forms of activism that consciously eschew differences in structural bargaining power (Chun 2005:8; Fantasia 1988).

US labor history in fact suggests that these new forms of labor mobilization might be strong enough to overcome diverging structural factors. Against the onslaught of direct capital militancy during the immediate postwar period, ideological variation across unions became a key predictor of union "success." Here, radical unions tended to express greater militancy, racial justice, and union democracy and win better contracts than did their (primarily craft-union) moderate counterparts that had more structural power (Stepan-Norris and Zeitlin 2002). Thus, while my analyses and the emergence of right-leaning populist governments in the global North may be consistent with a straightforward falling propensity for international labor solidarity, there is both contemporary and historical precedent for alternative bases of international labor mobilization (Honey 1993). ■

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NOTES

*For incredibly helpful intellectual feedback, I thank Anthony Roberts and the hundreds of undergraduates at the University of California Riverside who viewed and critiqued lectures based on this material. I also thank the UC Institute on Global Conflict and Cooperation for funding this research.

1. In both cases, I do not weight inequality in labor market power. Unlike income, labor market power is not an individual resource; it is a characteristic of national economies. That is, the unit of analysis is the national economy, not the individual or household.

2. One anonymous reviewer suggested that a global mean that ignored national borders by calculating a global skill ratio and inverse surplus labor pool would be interesting and useful. The trend in this metric is similar to that in Figure 1 except that it declines after 1990. This decline is driven by a secular global decline in the skill ratio after 1980. The surplus labor pool shrank from 1980 to 1990, but then stabilized from 1990 to 2000. This is consistent with the expansion of a less skilled labor force in the South after the 1980s (Mahutga 2014b; Mahutga, Roberts, and Kwon 2017; Pandian 2017).

3. Mahutga used two trade networks from UNCOMTRADE, categorized according to the Standard Industrial Trade Classification, Rev. 1. The data for buyer-driven power are in category 84 (clothing), and those for producer-driven power are in category 71 (transportation equipment). The year-on-year variation in which countries reported restricted the sample to 96 countries, which account for between 95.5 and 98.6 percent of world trade and between 92.5 and 96.8 of world GDP over the period.

4. One reviewer worried about the exclusion of FDI penetration from the battery of control variables. Data on FDI stocks are available only after 1980, which reduces my sample size by about 42 percent. In the resulting models, it had no effect on labor market power. The other results are comparable but not identical to those discussed below, but the differences are explicable by the reduction in sample size/temporal coverage.

5. One anonymous reviewer was concerned that secondary education students are subtracted out of the labor force in the calculation of labor market power, while the secondary education enrollment rate appears on the right-hand side of the regressions, which could create a mechanical relationship. Thus, I also calculated labor market power without this subtraction. It correlates with the original labor market power at 0.950, and with the secondary education enrollment rate at 0.633 (compared to 0.713 for the original version). I also re-estimated my models, with broadly similar results. Trade has a positive effect on labor market power in developed countries, except when network position is controlled. Network position has a positive effect on labor market power in the network period. However, the network effects are now larger than those of secondary education, contrary to what I report above. Both trade and network position have slightly weaker effects in these models, which is consistent with the introduction of measurement error in labor market power.

6. With these data, a basic "difference of logs" regression of economic growth on labor market power, lagged GDP per capita, secondary education, trade openness and a linear time trend produced a small but significantly positive effect of labor market power ($\beta^* = 0.121$; $p < .05$).

7. A note of caution on this point. First, this analysis is limited to the manufacturing sector. While much of the northern labor force began shifting out of manufacturing and into services decades ago, the process began more recently in the global South (Evans and Staveteig 2008). Thus, including the service sector in assessments of cross-national differences in labor market power would be an important advance.