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The Declining Worker Power Hypothesis: An Explanation for the Recent Evolution of the American Economy

ABSTRACT Rising profitability and market valuations of US businesses, sluggish wage growth and a declining labor share of income, and reduced unemployment and inflation have defined the macroeconomic environment of the last generation. This paper offers a unified explanation for these phenomena based on reduced worker power. Using individual, industry, and state-level data, we demonstrate that measures of reduced worker power are associated with lower wage levels, higher profit shares, and reductions in measures of the non-accelerating inflation rate of unemployment (NAIRU). We argue that the declining worker power hypothesis is more compelling as an explanation for observed changes than increases in firms' market power, both because it can simultaneously explain a falling labor share and a reduced NAIRU and because it is more directly supported by the data.

Since the early 1980s in the United States, the share of income going to labor has fallen, measures of corporate valuations like Tobin's q have risen, average profitability has risen even as interest rates have declined, and measured markups have risen. Over the same time period, average unemployment has fallen very substantially, even as inflation

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has stayed low with no sign of accelerating—suggesting a decline in the non-accelerating inflation rate of unemployment (NAIRU).

We argue that the decline in worker power has been the major structural change responsible for these economic phenomena. A decline in worker power, leading to a redistribution of rents from labor to capital, would predict a fall in the labor income share; increases in Tobin's q, corporate profitability, and measured markups; and a fall in the NAIRU. In this paper, we estimate the magnitude of the decline in worker rent-sharing in the United States over recent decades, show that it is large enough to be able to explain the entire decline in the aggregate labor share and a substantial fraction of the decline in the NAIRU, and demonstrate that at the state and industry level, declines in worker power are consistent with changes in labor shares, unemployment, and measures of corporate profitability. Our focus on the decline in worker power as one of the major structural trends in the US economy is in line with a long history of progressive institutionalist work in economics, sociology, and political science, exemplified by Freeman and Medoff (1984), Levy and Temin (2007), Bivens, Mishel, and Schmitt (2018), Kristal (2010), Rosenfeld (2014), and Ahlquist (2017).

As an explanation for these recent macro trends, we believe that the evidence for the declining worker power hypothesis is at least as compelling as—and likely more compelling than—the other commonly posited explanations, specifically technological change, globalization, and rising monopoly or monopsony power.[1] While it is possible that globalization or technological change caused the decline in the labor share, it is difficult to reconcile each of these purely competitive explanations with the

1. For recent papers arguing that different aspects of globalization or technological change can explain the decline in the US labor income share, see, for example, Elsby, Hobijn, and Şahin (2013), Karabarbounis and Neiman (2014), Abdih and Danninger (2017), Autor and Salomons (2018), Acemoglu and Restrepo (2018), and Autor and others (2020). For papers arguing that rising monopoly power can explain the decline in the labor share or rising corporate valuations and markups, see Barkai (forthcoming), Gutiérrez and Philippon (2017, 2019), Eggertsson, Robbins. and Wold (2018), Farhi and Gourio (2018), and De Loecker, Eeckhout, and Unger (2020). For arguments that rising monopsony power could play a role in these trends, see Council of Economic Advisers (2016), Furman and Krueger (2016), Glover and Short (2018), Benmelech, Bergman, and Kim (2018), and Philippon (2020). For work on the role of the decline in worker power in the declining US labor share, see Elsby, Hobijn, and Şahin (2013) and Abdih and Danninger (2017), who both find some role for the decline in unionization but argue that it is not the dominant factor, and Kristal (2010) and Jaumotte and Osorio Buitron (2015), who argue that differential declines in worker power across countries can explain differential patterns of change in the labor share and income inequality.

rise in Tobin's q, average profitability, and measured markups over recent decades (which suggest an increase in economic rents accruing to capital owners). Alternatively, while it is possible that rising monopoly or monopsony power caused the decline in the labor share—and these would also be natural explanations for the rise in Tobin's q, average profitability, and measured markups—it is more difficult to reconcile rising monopoly or monopsony power with the decline in the NAIRU.

What do we mean by declining worker power? We consider the American economy to be characterized by three types of power, to varying degrees: monopoly power, monopsony power, and worker power. Firms' monopoly power—arising from explicit barriers to entry or from innate features of particular product markets, such as heterogeneous production technologies or short-run fixed costs—generates pure profits or rents. Firms' monopsony power in the labor market—arising from labor market concentration or labor market frictions—results in an upward-sloping labor supply curve to the firm, enabling the wage to be marked down to some degree below the marginal revenue product. Worker power—arising from unionization or the threat of union organizing, from firms being run partly in the interests of workers as stakeholders, or from efficiency wage effects—enables workers to increase their pay above the level that would prevail in the absence of such bargaining power.[2] This power gives workers the ability to receive a share of the rents generated by companies operating in imperfectly competitive product markets and can act as countervailing power to firm monopsony power.

In this framework, therefore, a decline in worker power results in a redistribution of product market rents from labor to capital owners.

What caused this decline in worker power? The decline in worker power in the US economy over recent decades was a result of three broad shifts. First, institutional changes: the policy environment has become less supportive of worker power by reducing the incidence of unionism and the credibility of the threat effect of unionism or other organized labor, and the real value of the minimum wage has fallen. Second, changes within firms: the increase in shareholder power and shareholder activism has led to pressure on companies to cut labor costs, resulting in wage reductions within firms and the fissuring of the workplace as companies increasingly outsource and subcontract labor.[3] And third, changes in economic conditions:

2. We use *worker power* as synonymous with bargaining power, rent-sharing power, and insider-outsider power.

3. For a detailed exposition of this trend, see Weil (2014).

increased competition for labor from technology or from low-wage countries has increased the elasticity of demand for US labor or, in the parlance of bargaining theory, has improved employers' outside option. In this paper, we emphasize the relative importance of the first two factors. While globalization and technological change surely did play some role in the decline in worker power, the cross-sector and cross-country evidence suggests that they are unlikely to have been the most important factors; within the United States, unionization has declined at similar rates across both tradable and non-tradable industries, and the decline in the US unionization rate has been much more pronounced than in many other countries (all exposed, to some extent, to similar international trends in technology and globalization).

We start our analysis in section I by examining the empirical evidence of a decline in worker power. Most notable is the decline of the private sector union membership rate, from over one-third at its peak in the 1950s to 6 percent today. In addition, the private sector union wage premium has declined somewhat since the early 1980s, suggesting that unionized workers are less able to share in the rents created by firms than they were in the past.

A different type of evidence of the importance of worker power comes from the fact that even without unions, workers may receive wage premia in other settings. Workers in larger firms and in certain industries (like manufacturing, mining, telecommunications, and utilities) receive substantially higher wages relative to observably equivalent workers in smaller firms or in other industries, and evidence suggests that these large firm and industry wage differentials to a large extent reflect rents. But workers' ability to receive rents in large firms or in high-rent industries appears to have declined. Using the Current Population Survey (CPS), we show that since the 1980s there has been a decline of about one-third in the large-firm wage premium and a decline of about one-third in the dispersion of industry wage premia.

A further source of evidence that worker power has been attenuated is the apparent decline in the relationship between workers' pay and the profitability, revenues, or product market power of their firm or industry. In a classically competitive labor market, workers' pay is determined by the marginal product of labor within their labor market, and there should be no correlation between a worker's pay and their firm's or industry's performance. In practice however, there is a positive relationship (suggesting a degree of rent-sharing). We show that the strength of this relationship has diminished over time: in manufacturing industries, the degree to which

increases in revenue productivity translate into higher pay has declined since the 1960s, and we find suggestive evidence of a broad-based weakening in the relationship between industrial concentration and pay across sectors.[4]

So a large body of evidence points to a decline in worker power. But how big is this decline, in macroeconomic terms? In section II, we use our estimates of the union wage premium, large-firm wage premium, and industry wage premia to quantify the magnitude of the decline in total rents going to labor over 1982–2016. We demonstrate that labor rents are an important macroeconomic phenomenon and that they have declined substantially, from 12 percent of net value added in the nonfinancial corporate business sector in the early 1980s to 6 percent in the 2010s. (This is likely an underestimate, since we cannot quantify explicitly the decline in labor rents caused by the rise of activist shareholders.) This decline in labor rents is largely due to changes that have taken place within industries, rather than changes that have taken place across industries as employment has shifted from manufacturing to services.

The decline in labor rents could have been driven by either a destruction of rents available to be shared (as product market competition increased, perhaps as a result of globalization) or a redistribution of rents from labor to capital. Industry-level evidence tends to suggest that the decline in labor rents was largely a result of the latter: the majority of industries which saw substantial declines in rents to labor also saw substantial increases in profits to capital over 1987–2016.[5] And in manufacturing—the sector with the biggest decline in the labor share—the manufacturing industries with the greatest exposure to low-wage import competition were *not* the industries with the biggest declines in labor rents.

In section III, we demonstrate that the trends in factor shares, corporate profitability, Tobin's q, and measured markups that have sometimes been attributed to rising monopoly power can be equally or more convincingly

4. Note that this is a different issue than the one we addressed in Stansbury and Summers (2019). There we investigate the degree to which there is a relationship between changes in productivity and changes in compensation at the level of the whole economy. We find a nearly one-to-one relationship between changes in productivity and pay at the level of the whole economy over the postwar period, which has not attenuated since the 1970s and '80s. This finding could be consistent with either competitive or imperfectly competitive labor markets and is not inconsistent with our finding that the relationship between productivity and pay at the industry level has weakened (which indicates a decline in the degree of rent-sharing within different industries).

5. Our industry-level analysis spans 1987–2016, the longest period with data for consistent North American Industry Classification System (NAICS) industries.

explained by our hypothesis of declining worker power. We begin by replicating the recent decomposition exercise conducted by Farhi and Gourio (2018), who suggest that trends in factor shares, the profitability of capital, the investment-capital ratio, the risk-free rate, and other macroeconomic variables can be explained by an increase in average markups—alongside rising risk premia and increased unmeasured intangibles. In this framework, they estimate that average markups in the United States rose from 7 percent to 15 percent from the 1980s to the 2000s. While their analysis makes it clear that there are changes that cannot be explained by a perfectly competitive model, we note that there is essentially no way in their framework to distinguish between the rise in markups they posit (indicating a rise in monopoly or monopsony power) and a fall in worker power. Modifying their decomposition, we show that our hypothesis of declining worker power—holding markups constant—can explain the macro facts in the model equally well.

Next, we take our measure of the magnitude of lost labor rents (calculated in section II from union wage premia, large-firm wage premia, and industry wage premia) to the aggregate data on the nonfinancial corporate sector. We show that our estimate of the decline in labor rents—at roughly 6 percent of nonfinancial corporate sector value added since the 1980s—is big enough to (over)explain the entire decline in the net labor share. At the state level, our measure of the decline in the labor rent share is predictive of changes in the labor share over 1984–2016.

We then compare trends in labor rents, labor shares, profitability, and measures of Tobin's q for fifty-one industries.[6] We show that industries with larger declines in labor rents over 1987–2016 had much larger declines in their labor shares and increases in their average profitability. In horserace regressions, industry-level labor rents have substantially more power to explain changes in labor shares, profitability, and Tobin's q than measures of product market concentration (which have been used as indicators of a rise in monopoly power).

In section IV, we argue that the decline in worker power would be consistent with another highly salient aspect of the macro experience of recent decades: the substantial decline in both average unemployment and average inflation. The unemployment rate was below 5 percent, the level previously thought to have been the NAIRU, for nearly half of the twenty-three years

6. Where industries are defined at roughly the three-digit level of the NAICS.

from 1997 to 2019 and was at or below 4 percent from May 2018 until February 2020, at levels not reached since the 1960s. At the same time, inflation has been low and has shown little sign of accelerating. These facts suggest that there has been a quite substantial decline in the NAIRU or a flattening of the Phillips curve or both.

Almost all models of declining worker power predict a fall in the NAIRU, as the decline in the cost of labor increases firms' hiring or as wait unemployment falls. In keeping with these predictions, we show that states and industries with bigger falls in worker power over the last four decades saw bigger falls in their unemployment rate. Extrapolation from our analysis of state-level unemployment rates suggests that the aggregate change in worker power could be big enough to explain a large fraction of the decline in the NAIRU. (We further verify this conclusion with informal calculations in online appendix E, drawing on various models of the relationship between worker power and the NAIRU.)[7] We note, on the other hand, that an increase in monopoly power offers no explanation for the decline in the NAIRU. If anything, it has usually been thought to act in the other direction: in the presence of downward nominal wage rigidity, rising monopoly power would tend to predict rising prices (as firms transition to a new equilibrium of higher markups and higher prices) alongside a rise in unemployment (as the rise in monopoly power leads to a restriction in output). Increasing monopsony power would tend to be associated with less, rather than more, hiring and so does not provide a natural explanation for a declining NAIRU. And globalization and technological change, while possibly disinflationary, would tend to increase average unemployment by increasing disruption and structural change in the economy, making their implications for the NAIRU ambiguous.

In section V, we address possible objections to the declining worker power hypothesis. First, we show that the apparent weakness of investment relative to fundamentals—which has been a major motivator of the monopoly power argument—can be reconciled with our hypothesis. Second, we show that recent research emphasizing the importance of between-firm reallocation in explaining changes in factor shares is consistent with the declining worker power hypothesis. Third, we note that our measure of labor rents does not incorporate any increase in labor rents which may have accrued to the highest earners—such as executives or top

7. The online appendixes may be found at the *Brookings Papers* web page, www.brookings.edu/bpea, under "Past BPEA Editions."

earners in finance—and should be thought of as a measure of the decline in the rents accruing to the *majority* of workers.[8] Fourth, we argue that the rise in occupational licensing has likely not played a major role in the trend in aggregate labor rents over recent decades. Finally, we note that the decline in the labor share has been much more pronounced in the United States than other industrialized economies similarly exposed to globalization and technological change, and we note that the decline in the labor share has been most pronounced in US manufacturing, which (given increasing globalization) is not an industry where a large rise in monopoly power seems likely to have occurred. We also note that there is little evidence of any large increase in import-adjusted sales concentration in manufacturing or in local-level sales concentration in services and that local labor market concentration has declined over time. Together, these suggest to us that globalization, technological change, or rising monopoly or monopsony power alone lack the ability to explain recent economic developments in a unified way.

While the focus of this paper is on the distribution of rents between labor and capital, we note that the decline of labor rents has also likely increased inequality in labor incomes: the declines in unionization and the real value of the minimum wage and the fissuring of the workplace affected middle- and low-income workers more than high-income workers, and some of the lost labor rents for the majority of workers may have been redistributed to high-earning executives (as well as capital owners). Consistent with these hypotheses, we show that the decline in labor rents was larger for non-college-educated workers than for college-educated workers, and we estimate, in a back-of-the-envelope exercise, that the decline in labor rents could account for a large fraction of the increase in the income share of the top 1 percent over recent decades.

Overall, we conclude that the decline in worker power is one of the most important structural changes to have taken place in the US economy in recent decades. Our emphasis on the decline of worker power is justified both by the strength of the direct evidence and by its ability to provide a unified explanation for a variety of macroeconomic phenomena: changes in labor and capital incomes, profitability, and the NAIRU.

This raises important challenges for policy. If a major feature of the US economy were a rise in monopoly or monopsony power, reducing

8. This is because our measure of labor rents is estimated in the CPS, which is top-coded for high earners and has higher nonresponse rates for these groups.

restrictiveness and increasing competition in markets could improve *both* efficiency and equity. But if, as we argue, the major explanation of the decline in the labor share and rise in corporate profitability is a decline in worker power, then measures to restrict monopoly or monopsony power alone—or indeed, to restrict globalization or technological change—may do little to reverse this trend. More profoundly, if markets are innately characterized by some degree of imperfect competition and rents, then completely eliminating all sources of market power may not be feasible. Instead, if increases in the labor share are to be achieved, institutional changes that enhance workers' countervailing power—such as strengthening labor unions or promoting corporate governance arrangements that increase worker power—may be necessary (but would need to be carefully considered in light of the possible risks of increasing unemployment).

I. Evidence of Declining Rent-Sharing in US Labor Markets

Why do firms share rents with workers? There are three groups of reasons. First, workers may be able to lay claim to rents directly, as a result of either explicit bargaining power through unions or implicit bargaining power through the threat of union organizing (Freeman and Medoff 1984) or via some other ability to wield power within the firm. Second, some firms may be run partly in the interests of workers as stakeholders rather than solely in the interests of shareholders. Third, it may be in firms' interests to share rents with workers for efficiency wage reasons—where workers are paid an above-market wage to incentivize effort (Yellen 1984)—or to maintain morale, perhaps as a result of fairness norms, as discussed in Akerlof and Yellen (1986).[9] Efficiency wages may also play a role in reducing the cost to firms of paying above-market wages: if worker productivity increases when wages rise, then some of the extra cost of sharing rents with workers is offset by productivity benefits (Bulow and Summers 1986; Summers 1988).

Evidence from a wide range of sources has demonstrated the existence of rent-sharing in the US labor market. Unionized workers, workers at certain firms (particularly at large firms), and workers in specific industries

9. The rents received by workers may be true rents or pure profits generated by a firm's monopolistic power in the product market—or they may be quasi rents generated by sunk investments (Grout 1984; Caballero and Hammour 2005) or by the cost of recruiting new workers either in a frictional labor market or in a setting where job-specific training is required (Mortensen and Pissarides 1999; Manning 2003).

receive substantial wage premia relative to observably equivalent workers. Similar wage premia also exist for workers who switch jobs, suggesting they do not reflect unobserved worker characteristics. These wage premia tend to be positively correlated with indicators of rents at the firm and industry levels, including profits and concentration, and inversely correlated with quit rates (both of which are suggestive of rent-sharing). In addition, there is evidence of sizable pass-through of industry- or firm-level shocks to productivity and profits into workers' compensation. And there is a large body of work documenting persistent wage losses for displaced workers, which partly reflect lost rents.[10]

Over recent decades however, a number of forces have likely reduced labor rents in the United States, particularly for lower-wage workers. Most obvious have been the decline in unionization and union bargaining power and the erosion of the real value of the minimum wage. In addition, the increase in shareholder activism and the rise of the shareholder value maximization doctrine increased the power of shareholders relative to managers and workers, likely increasing pressure on firms to cut labor costs and, in particular, to redistribute rents from workers to shareholders.[11] The increased fissuring of the workplace, with outsourcing of noncore business functions, may be an outgrowth of this phenomenon (Weil 2014). In this section, we present a range of empirical evidence of this decline in rent-sharing.

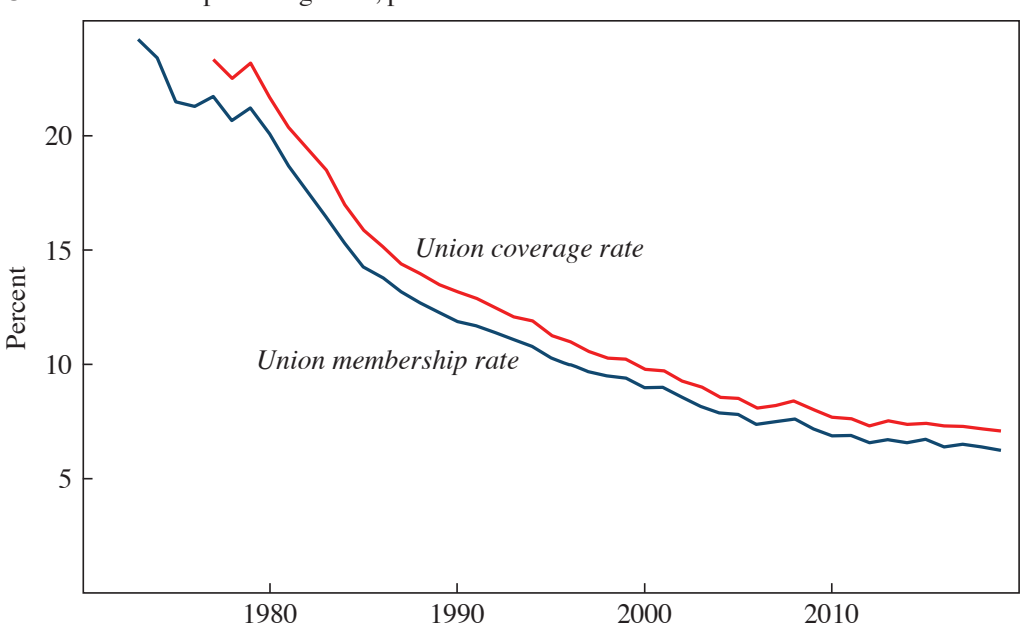
I.A. Declining Unionization Rates

Unions are the most clear-cut example of workers having rent-sharing power. Unionized workers receive significantly higher wages than observationally equivalent nonunion workers, with most estimates of the private

10. We briefly review evidence on union, industry, and firm size wage premia later in this section. For evidence on firm-specific wage premia, see Groshen (1991), Davis and Haltiwanger (1991), and the extensive literature estimating "AKM" models, starting with Abowd, Kramarz, and Margolis (1999). Estimates from the AKM literature suggest that firm effects and the covariance of worker and firm effects can explain 17–20 percent of the variance of wages (Abowd, Lengermann, and McKinney 2003; Abowd, McKinney, and Zhao 2018; Song and others 2019) and that around one-third of this reflects rents (Sorkin 2018). For evidence on wage losses for displaced workers, see Jacobson, LaLonde, and Sullivan (1993), Davis and von Wachter (2011), and Lachowska, Mas, and Woodbury (2018), among others.

11. See, for example, Shleifer and Summers (1988), who argue that a primary effect of hostile takeovers is the redistribution of value to shareholders from other stakeholders. Some evidence consistent with this mechanism can be found in Davis and others (2019), who find that wage premia in target firms were largely erased after private equity buyouts.

Figure 1. Union Membership and Coverage Rates, Private Sector



Source: Union Membership and Coverage Database from the CPS, constructed by Barry Hirsch and David Macpherson, www.unionstats.com.

sector union wage premium between 15 percent and 25 percent (Rosenfeld 2014).[12] But the ability of workers to share in rents through unions has declined substantially in recent decades. Private sector union membership gradually declined from a peak of around one-third in the 1950s to 24 percent in 1973 and then declined more rapidly, reaching 6 percent in 2019 (figure 1).[13] In addition, estimates of the union wage premium suggest that it has declined since the early 1980s.[14]

12. Empirical evidence is consistent with this wage premium representing a redistribution of rents from capital to labor. For example, Abowd (1989) finds substantial evidence to support a dollar-for-dollar trade-off between workers and shareholders in union contract settlement data. Lee and Mas (2012) show that new unionization reduces firms' equity value. If this represents a redistribution of rents from capital to labor, the magnitude of the average effect they find would be consistent with a 10 percent union wage premium.

13. The measured decline in the unionization rate may be an underestimate: as the unionization rate approaches zero, misclassification bias tends to produce inflated estimates (Card 1996; Western and Rosenfeld 2011).

14. We estimate the union log wage premium for private sector workers in the Current Population Survey, Outgoing Rotation Group (CPS-ORG), regressing the log hourly wage on a dummy variable for union membership or coverage with controls for education, demographics, geography, occupation, and industry (see online appendix A.1 for more details). Our estimate falls from 21 log points in 1982 to 15 by 2019. These are both within the historical range over the twentieth to twenty-first century as estimated by Farber and others (2018).

Note that the impact of unions on workers' ability to receive rents likely extended beyond the workers who were unionized receiving wage premia. In industries where pattern bargaining was common, nonunionized firms would match the wage increases in union contracts (with the most famous example being the 1950 Treaty of Detroit). Even without pattern bargaining, the threat effect of unionization of workers in nonunion firms likely incentivized firms to offer better wages and benefits than they otherwise would have (Leicht 1989; Farber 2005; Denice and Rosenfeld 2018).[15] And union bargaining power may have more generally supported norms of equity in pay structures (Western and Rosenfeld 2011).

The decline in unionization rates and union bargaining power was driven by a combination of institutional factors, which weakened labor law and its enforcement, and economic factors, which increased the elasticity of demand for labor and so weakened workers' ability to bargain for higher wages. Institutional factors included the breakdown of pattern bargaining in the 1980s, the expansion of the number of right-to-work states, and decreasing political support for and enforcement of labor laws.[16] Economic factors that reduced worker bargaining power included increased import competition for manufactured goods and deregulation of transportation and telecommunications, both of which reduced firms' ability to compete while paying high wages (Peoples 1998; Levy and Temin 2007; Rosenfeld 2014). Note, however, that these economic factors are unlikely to have been the main drivers in the decline in US unionization; the proportional decline in the unionization rate from the mid-1980s to the mid-2000s was almost identical across a range of sectors which had very different exposures to globalization, technological change, and

15. Unions may also raise wages for nonunion workers in frictional labor markets as employers raise wages to retain the ability to hire easily (Manning 2003). On the other hand, unions may have negative spillovers on the wages of nonunion workers if the union raises wages but restricts employment in the union sector (Oswald 1982). Overall, though, evidence suggests a positive correlation between unionization rates and nonunion wages, suggesting that union spillovers are on net positive (Farber 2005; Leicht 1989; Neumark and Wachter 1995; Denice and Rosenfeld 2018; Fortin, Lemieux, and Lloyd 2018).

16. See, for example, Levy and Temin (2007) and Rosenfeld (2014). Workers' ability to organize was reduced both by a direct weakening of labor law and labor law enforcement and by an increased corporate use of union avoidance tactics (Bronfenbrenner 2009; McNicholas and others 2019). The fissuring of the employment relationship has also decreased workers' ability to organize: workers employed as independent contractors or in franchises often have their terms of employment to some extent dictated by the end employer or franchisor (respectively) but lack the legal ability to collectively bargain with that end employer (Paul 2016; Steinbaum 2019).

deregulation over the period in question (manufacturing, mining, transportation and utilities, retail trade, construction, and wholesale trade), and the rate of unionization has declined much more quickly in the United States than in most other industrialized economies, despite similar trends in globalization and technology (Schmitt and Mitukiewicz 2012; Denice and Rosenfeld 2018).[17]

I.B. Declining Large-Firm Wage Premium

A large body of literature shows that large firms pay workers higher wages than their otherwise equivalent counterparts at smaller firms.[18] While this firm size effect could be driven by a number of different causes—workers with higher unobserved productivity, compensating differentials, a greater propensity to pay efficiency wages, a decision to pay higher wages to fill vacancies faster—several studies have found that even when attempting to account for these possibilities a large unexplained firm size premium often remains (Brown and Medoff 1989). This implies that some substantial portion of the large-firm wage premium reflects rents to labor.[19] Over recent decades, however, the large-firm wage premium has fallen (Hollister 2004; Even and Macpherson 2012; Cobb and Lin 2017; Song and others 2019). Estimating the large-firm wage effect for observably equivalent private sector workers over 1990–2019 from the CPS Annual Social and Economic Supplement (CPS-ASEC), we find a substantial decline in wage premia for workers at firms with 500 or more employees, relative to workers at small firms (figure 2), likely indicating a decline in rent-sharing.[20] (To interpret it as something *other than* a decline in rent-sharing, there must have been either a substantial reduction in compensating differentials as small firms became relatively worse to work at or

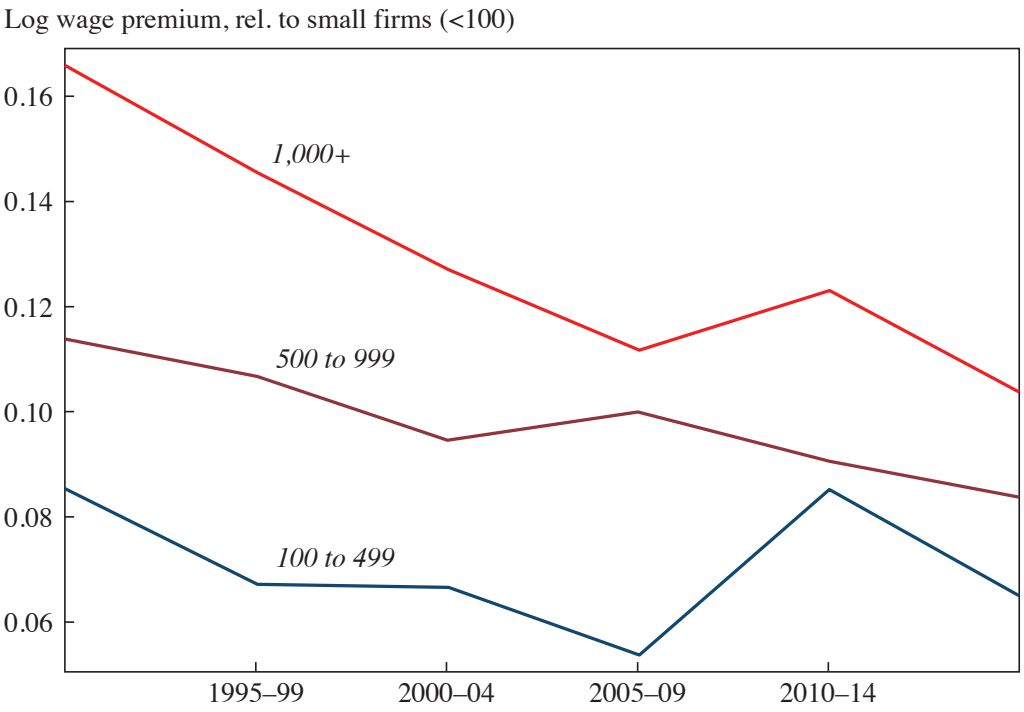
17. See online appendix C.1 for unionization rates by industry. Note also that while Acemoglu, Aghion, and Violante (2001) argue that the decline of unionization was endogenous, driven by skill-biased technological change, Farber and others (2018) find that the pattern of decline of US union membership is unlikely to be consistent with this.

18. See Brown and Medoff (1989), Bulow and Summers (1986), and Davis and Haltiwanger (1996).

19. This is consistent with large firms being more likely to have product market power—and so, rents.

20. We run log wage regressions on dummies for firm size and various demographic, occupation, and location controls. We obtain estimated for the firm size wage effects for workers at firms of 1000+, 500–999, and 100–499 workers, relative to firms with <100 workers. We regress on five-year pooled samples as the sample size is too small for precise annual estimates. See online appendix A.2 for more details.

Figure 2. Large Firm Wage Effect, Private Sector



Sources: Current Population Survey, Annual Social and Economic Supplement; authors' calculations.

Note: The large firm wage premium is estimated for firms with 100–499, 500–999, and 1,000+ employees for five-year periods over 1990–2019, controlling for education, demographics, geography, occupation, industry, and union status. More details on estimation procedures are in the text and in the online appendix A.2.

a reduction in the sorting of highly productive workers into large firms.) Note that if large firms' monopoly power had systematically increased over recent decades without any change in worker rent-sharing power, the large-firm wage premium would have been expected to increase rather than decrease.

I.C. Declining Variance of Industry Wage Differentials

A large body of work on the interindustry wage structure, over several decades, has found substantial and persistent dispersion of wages across industries for observably similar workers. Evidence suggests that industry wage differentials to a large extent reflect rent-sharing with workers: the wage differentials persist even when accounting for worker productivity differences and compensating differentials, and they are correlated with industry-level profitability, concentration, and capital-labor ratios (Dickens

and Katz 1987; Krueger and Summers 1988; Katz and Summers 1989; Gibbons and Katz 1992; Abowd and others 2012).[21]

Using the Current Population Survey, Outgoing Rotation Group (CPS-ORG), we estimate industry wage differentials for private sector workers in each year over 1984–2019. We regress log wages on a set of industry dummies at different levels of aggregation (eighteen sectors, seventy-seven industries, or 250 detailed industries) alongside controls for education, demographics, geography, occupation, and union membership or coverage.[22] This gives us a set of estimated wage fixed effects for each industry. If rent-sharing with labor has declined in recent decades, we would expect the variance of industry wage premia to have declined. As figure 3 shows, this is the case at all levels of industry aggregation.[23]

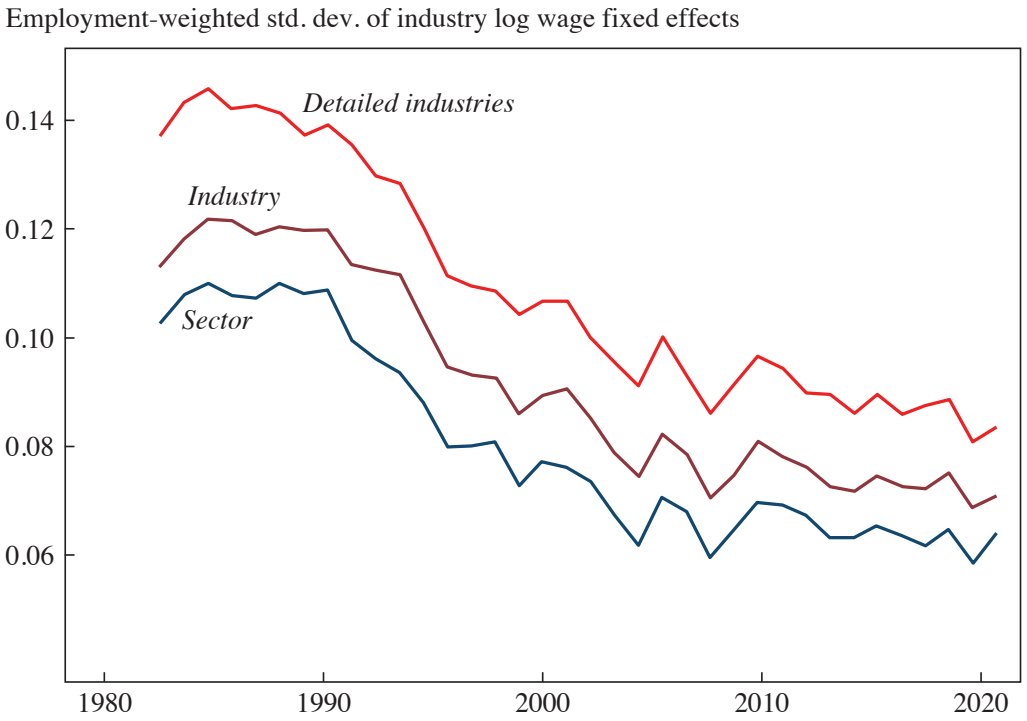
As with the decline in firm size wage effects, it is possible that the decline in the variance of industry wage effects was not a result of falling rent-sharing but was instead a result of changing compensating differentials or sorting by unobserved worker productivity. We have, however, no a priori reason to believe that there has been a substantial change in compensating differentials in the necessary direction (as it would imply that high-wage industries used to have much worse amenities but have improved over time). We can test the sorting explanation by estimating

21. Further evidence that these premia indicated the presence of rents included the fact that wage premia for workers in different occupations in the same industry were highly correlated and that industries with higher wage premia tended to have lower quit rates and higher ratios of applicants to job openings, shown in the previously mentioned studies, as well as Slichter (1950), Ulman (1965), and Holzer, Katz, and Krueger (1991). More recently, Abowd and others (2012) found that industry wage differentials were strongly correlated with firm effects in an AKM decomposition, strengthening the case that they are to some extent a function of rents.

22. These sectors correspond to NAICS sectors, the industries correspond to Bureau of Economic Analysis (BEA) industry codes (roughly NAICS three-digit), and the detailed industries correspond to Standard Industrial Classification (SIC) industries. More details on estimation are in the online appendix A.3. Note that the CPS-ORG data are top-coded, so we will not observe changes in firm size or industry wage premia for very high earners.

23. Kim and Sakamoto (2008) also find evidence of a decline in interindustry wage dispersion using the CPS-ORG, albeit with a different methodology. Note that our result does not conflict with the result of Haltiwanger and Spletzer (2020), who find that the dispersion of average log earnings across industries has risen over 1997–2013; this pattern also exists in our raw CPS data but is reversed once occupation and individual characteristics are controlled for. In addition, much of the decline in industry wage differentials we identify in the CPS occurs before 1997.

Figure 3. Standard Deviation of Industry Wage Effects



Sources: Current Population Survey, Outgoing Rotation Group; authors' calculations.

Note: Industry fixed effects are calculated as the fixed effect on industry dummies in annual log wage regressions over 1984–2019, with demographic, location, and occupation controls. "Sector" refers to eighteen aggregated NAICS sectors, "Industry" refers to seventy-seven industries (roughly NAICS three-digit level), and "Detailed industries" refers to 250 SIC industries. More details on estimation procedures are in the text and in the online appendix A.3.

industry fixed effects using the longitudinal component of the CPS, which enables us to control for worker-level unobserved productivity. The proportional decline in the variance of industry fixed effects estimated longitudinally is as large as for the cross-sectional estimates, suggesting that the decline we observe is *not* driven primarily by a change in the degree of sorting of highly productive workers into high-wage industries.[24]

24. More details on the longitudinal estimates are available in the online appendix A.4. Note also that even to the extent that industry fixed effects *do* represent rents, a decline in the dispersion of industry fixed effects could be a result of a decline in the dispersion of industry-level rents, holding constant the degree of rent-sharing. This does not appear to be the case: the cross-industry dispersion of various measures of profitability has not fallen over the period. Another possibility is that the fall in the employment-weighted standard deviation of industry fixed effects simply represents a reallocation of workers from high-rent to low-rent industries. This also does not appear to be driving the result: the non-employment-weighted standard deviation of industry fixed effects has fallen by roughly the same amount.

I.D. Decreased Pass-Through of Productivity and Profit Shocks

A different source of evidence that worker power has been attenuated is the apparent decline in the relationship between workers' pay and the profitability, revenues, or product market power of their firm or industry. A perfectly competitive labor market would imply no relationship between firm- or industry-level performance and workers' pay, but in practice there is substantial evidence that firms and industries with higher productivity or profitability do pay more to observably equivalent workers, as reviewed in Card and others (2018).[25]

There is some evidence to suggest, however, that this relationship has weakened over time. Using the National Bureau of Economic Research and the US Census Bureau's Center for Economic Studies (NBER CES) manufacturing data, which covers 473 NAICS six-digit manufacturing industries over 1958–2011, we regress the annual change in log value added per worker on the annual change in log compensation per worker.[26] We find evidence of rent-sharing over the period: in years with 10 log points higher value added per worker, average pay in a given industry was 2.5 log points higher. But the strength of that relationship fell by about half from the 1960s and '70s to 2000–2011 (figure 4). In similar work, Bell, Bukowski, and Machin (2019) find a declining relationship between profits per worker and compensation per worker in US manufacturing industries, also using the NBER CES data. Benmelech, Bergman, and Kim (2018) report a decline in the relationship between output per hour and compensation per hour at the plant level in US manufacturing over 1978–2007. Together, this evidence is strongly suggestive of a decline in rent-sharing in US manufacturing: workers in firms and industries with higher revenue productivity and higher profits appear to share in this less than they used to.

We also examine evidence on the relationship between product market concentration and wages. At the very aggregated sector level, we find a positive relationship between average product market concentration and the sector wage premium, but the strength of that relationship declined

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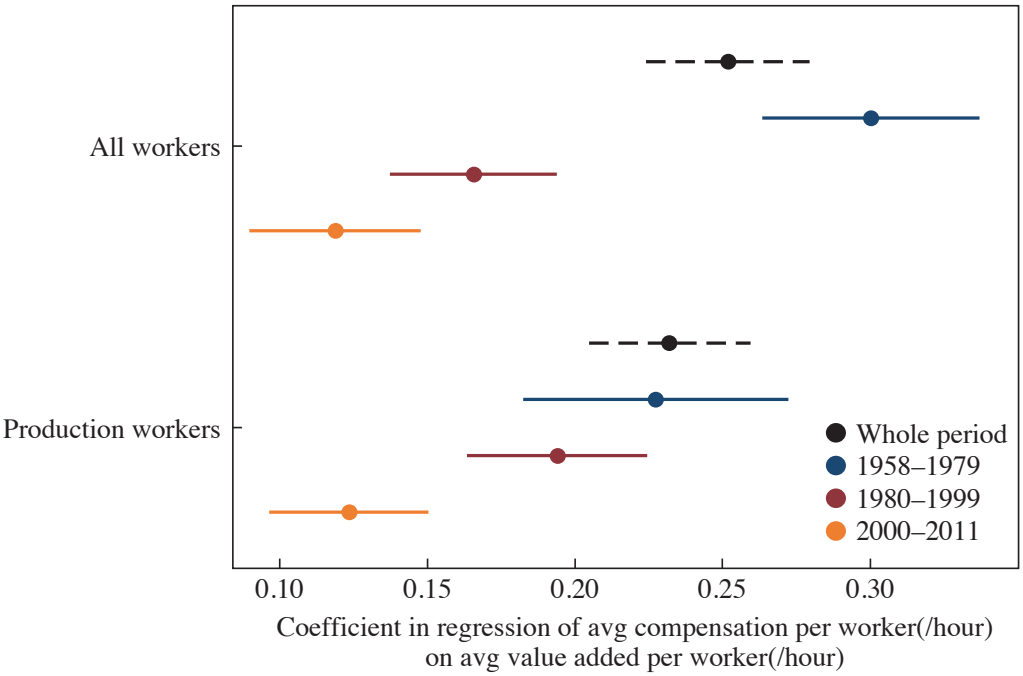
For more details, see the online appendixes A.6 and A.7. A further indication that our measure of industry labor rents *is* picking up rents is that we find that industries with higher wage premia have substantially and significantly lower quit rates, as found also by Holzer, Katz, and Krueger (1991).

25. See also the online appendix D.2 for a review of some of this evidence.

26. Following Stansbury and Summers (2019) we use a three-year moving average of each variable in the regression. Our results are robust to the choice of moving average length. Note that NAICS six-digit manufacturing industries are very narrowly defined: for example, NAICS 337110 "Wood kitchen cabinet and countertop manufacturing."

Figure 4. NAICS Six-Digit Industry-Level Regression of Average Compensation per Worker on Average Value Added per Worker, Manufacturing



Sources: NBER CES Manufacturing database; authors' calculations.

Note: Figure shows coefficients from manufacturing industry regressions: 1958–2011. "All workers" regresses the change in log compensation per employee on the change in log value added per employee, three-year moving averages, following the specification in Stansbury and Summers (2019). "Production workers" regresses the change in log average hourly production worker pay on the change in log value added per production worker hour, three-year moving averages. Regressions have NAICS six-digit industry and year fixed effects. Standard errors are clustered at the NAICS six-digit industry level. Dots represent point estimate and lines represent the 95 percent confidence interval. Each line and dot is from a separate regression.

over 1982–2012. In regressions of product market concentration on wage premia at the industry level, the general trend also suggests a weakening of the relationship between average concentration and the wage premium, but the change over time is not statistically significant.[27]

I.E. Increased Use of Domestic Outsourcing and Subcontracting

A final indicator that rent-sharing has declined is the increase in the use of outsourcing, subcontracting of business functions, and franchising; the

27. See online appendix C.2 for details of these analyses. Note that if product market concentration became a noisier measure of monopoly power over time, we might expect to see a weakening relationship between concentration and wage premia *even if* the underlying relationship between monopoly power and wage premia remained constant.

growth in independent contracting and the gig economy; and the decline in internal labor markets, often referred to jointly as the "fissuring" of the workplace (Weil 2014; Bernhardt and others 2016; Bidwell and others 2013). If workers' ability to share in firm-level rents depends on them being employed within the firm, then one would expect that this fissuring would lead to wage decreases, particularly for workers working (indirectly) for high-rent firms.[28] There is increasing evidence that outsourced workers receive wage penalties and that this is related to a loss of rents.[29] While the scale of fissuring is difficult to measure with existing data (Bernhardt and others 2016), evidence suggests that it is widespread. Weil (2019) estimates that—as a rough lower bound—19 percent of private sector workers were in industries where fissured arrangements predominate. Looking at specific occupations, the share of workers in security, cleaning, and logistics occupations who work in business services industries rose from less than 10 percent in 1970 to 35 percent, 25 percent, and 20 percent respectively in 2015 (Dorn, Schmieder, and Spletzer 2018).

II. Estimating the Magnitude of the Decline in Labor Rents

The evidence in section I paints a picture of declining rent-sharing with labor—but was it big enough to explain the macro trends we have seen? We use a back-of-the-envelope approach to estimate the total quantity of

28. Factors driving the fissuring of the workplace may have been an increase in shareholder pressure to cut labor costs, increased ability to coordinate and monitor the performance of contracted workers, increased focus on firm "core competencies," declining union presence, and an erosion of antitrust standards prohibiting nonprice vertical restraints (Weil 2014; Bernhardt and others 2016; Bidwell and others 2013; Steinbaum 2019). Factors which make rent-sharing more likely if workers are employed within the boundaries of the firm include the degree to which rent-sharing is determined by unionization or the threat of unionization and the degree to which rent-sharing depends on a sense of pay equity or internal labor markets within the firm.

29. Dube and Kaplan (2010) find that outsourced janitors and guards lose wage premia, consistent with a loss of firm-specific rents; Dorn, Schmieder, and Spletzer (2018) find evidence of a loss of wage premia for outsourced workers in food, cleaning, security, and logistics occupations; Mishel (2018) links the decline in the manufacturing wage premium to the increase in the use of staffing agencies; and Wilmers (2018) finds that workers at supplier firms which become dependent on a dominant buyer lose wages, consistent with a loss of rents. Evidence from Handwerker (2018) and Song and others (2019) is also consistent with the fissuring of the workplace leading to a loss of rents: Handwerker (2018) finds that wages are lower in firms with more concentrated occupational employment, and this concentration has increased over time; Song and others (2019) find an increase in the sorting of highly paid workers into high-paying firms (and vice versa).

labor rents in the US nonfinancial corporate sector for each year from 1982 to 2016, as follows:

$$\text{Total labor rents} = \text{union rents} + \text{industry rents} + \text{firm size rents}$$

where "union rents" refers to rents arising from union wage premia for unionized workers, "industry rents" refers to rents arising from industry wage premia, and "firm size rents" refers to rents arising from large-firm wage premia. We calculate union rents, industry rents, and firm size rents from our estimates of union, industry, and firm size wage premia as outlined below.[30] Note that our estimate is of the total quantity of labor rents for the *majority* of workers, excluding the very highest earners, since top-coding and nonresponse in the CPS mean we cannot estimate union, industry, or firm size rents for these earners.

II.A. Union Rents

For each year t, we estimate the share of total compensation in the nonfinancial corporate sector that was union rents, using estimates of the union log wage premium uwp_t, the union coverage rate in each year ucr_t, and compensation in the nonfinancial corporate sector, as follows:[31]

$$\text{Union rents}_t = \text{compensation}_t \left(1 - \frac{1}{1 + ucr_t \left(e^{uwp_t} - 1 \right)} \right)$$

II.B. Industry Rents

For each industry j and year t, we estimate the share of total compensation in that industry that was industry rents. We start with our estimated industry fixed effects from log wage regressions, at the level of nineteen NAICS sectors for 1987–2016 and nine SIC sectors for 1982–1986. To calculate the industry wage premia from the estimated fixed effects, we first rescale the estimated industry fixed effects relative to the large industry

30. Full details of the calculation are in online appendix B.1. We focus on the nonfinancial corporate sector for our baseline estimates and present estimates of labor rents for the full corporate sector in online appendix B.2.

31. We estimate the union log wage premium from the CPS-ORG for 1984–2019 and use estimates from Blanchflower and Bryson (2004) for years 1982 and 1983. We estimate the union coverage rate for workers in private industries excluding finance, insurance, and real estate for 1984–2019 from the CPS-ORG and extend these back to 1982 using data on the private sector union coverage rate from unionstats.com.

with the lowest fixed effect, which is retail trade. (This calculation assumes that there are zero labor rents on average for workers in retail trade.) We then treat *half* of the deviation of each industry's fixed effect from the retail trade fixed effect as an industry wage premium ("rents"). We only consider half of the industry wage differentials to represent rents because, even though we have controlled for as many person-level characteristics as we can, there may still be worker sorting into industries on unobserved productivity differences and because part of the estimated interindustry wage differentials may reflect compensating differentials. While we choose simply to cut industry wage effects in half for transparency, we have reason to believe this is reasonable: first, our estimates of industry wage premia from the longitudinal component of the CPS, controlling for person-level fixed effects, are very highly correlated with our cross-sectional estimates and are exactly half as big on average; and second, we benchmark our estimates against estimates of industry wage premia and the degree of rent-sharing from two papers (Abowd and others 2012; Sorkin 2018) which use the AKM estimation method developed by Abowd, Kramarz, and Margolis (1999).[32] This approach gives us an estimated industry wage premium $iwp_{j,t}$ for each industry j, allowing us to calculate industry rents as:

$$\text{Industry rents}_t = \sum_{\text{j}}^{\text{industries}} \text{compensation}_{j,t}\left(1 - \frac{1}{e^{iwp_{j,t}}}\right)$$

where "compensation" refers to our estimate of total nonfinancial corporate sector compensation for each industry.[33]

II.C. Firm Size Rents

For each firm size class s and year t we estimate the share of total nonfinancial corporate compensation that was firm size rents, using our

32. For our benchmarking procedure, we take estimates for the average firm fixed effect across different US sectors over 1990–2001 from Abowd and others (2012) and apply Sorkin's (2018) estimate that one-third of firm fixed effects on average represent rents. This gives us a rough estimate of the average log wage premium due to rents in each sector, over 1990–2001. More details on our longitudinal fixed effect estimates are in online appendix A.4 and on our benchmarking procedure in online appendix A.5.

33. This is calculated as total compensation in industry j, multiplied by the ratio of total compensation in the nonfinancial corporate sector to total compensation in all private industries. We make this adjustment because we want to estimate only the labor rents going to workers in the nonfinancial corporate sector, but we do not have data on compensation by industry broken down by corporate versus noncorporate sector.

firm size wage fixed effect estimates from the CPS for 1990–2016. As with the industry wage premia, to estimate the firm size premium $fsp_{s,t}$ for each firm size class s we halve our estimated firm size (log) wage fixed effects to account for possible compensating differentials or unobserved productivity differences. The firm size premium is estimated for firms of 500+ workers or 100–499 workers, relative to firms with 1–99 workers. We impute firm size rents for the years 1982–1989 using data on compensation share by firm size class and estimated firm size log wage premia from Levine and others (2002).[34] This gives us the following expression for firm size rents:

$$\text{Firm size rents}_t = \sum_{s}^{\text{firm size classes}} \text{compensation}_{s,t}\left(1 - \frac{1}{e^{fsp_{s,t}}}\right)$$

where "compensation" refers to our estimate of nonfinancial corporate sector compensation by firm size class.[35]

Using this method, we think it likely that we will *underestimate* the true decline of labor rents over recent decades. First, because our estimates are based on union, industry, and firm size wage premia calculated relative to a baseline sector (nonunionized firms for union rents, retail trade for industry rents, and firms of under 100 employees for firm size rents), our calculation of total labor rents will miss any decline in rent-sharing that has occurred commonly across industries, firm size classes, or union status. This could include a generalized increase in shareholder activism and more ruthless corporate management practices, a generalized increase in the use of domestic outsourcing, or a generalized decrease in the threat effect of unions. Second, in each calculation we assume that there are no rents in the baseline sector: workers receive the wage that would prevail in the absence of worker power. Our calculation will therefore miss any decline in rent-sharing that is specific to these baseline sectors—with the most obvious candidate being a decline in rents arising from the erosion in the real value of the minimum wage. Third, our estimates of labor rents are based on union, industry, and firm size *earnings* premia. Total rents, however, are estimated as a share of *compensation*. The union and large-firm premia for

34. Full details on the imputation procedure are available in online appendix B.1.

35. This is estimated as total compensation in the nonfinancial corporate sector, multiplied by the payroll share of each firm size class (from the Census Bureau Statistics of US Businesses [SUSB] data).

nonwage benefits are likely greater than for wages, making our calculation of total union and firm size rents an underestimate.[36]

There are, on the other hand, some factors which could make our estimate of the decline in labor rents an overestimate. First, while we cut our estimated industry wage fixed effects and firm size fixed effects in half to account for unobserved productivity or compensating differentials, it is possible that they remain overestimates of the degree of rents (though our benchmarking exercise should assuage this concern). Second, we assume that there are zero rents in the baseline sectors (nonunionized firms, retail trade, and firms of under 100 employees), but in some models, worker power in one sector lowers pay in other sectors (by restricting employment in the high worker power sector, leading workers to spill over into the low worker power sector, reducing wages). If this is the case, we would overestimate total labor rents.[37] On net, we think these concerns are outweighed by the factors pushing our estimate to be an underestimate.

II.D. Labor Rents in the Nonfinancial Corporate Sector, 1982–2016

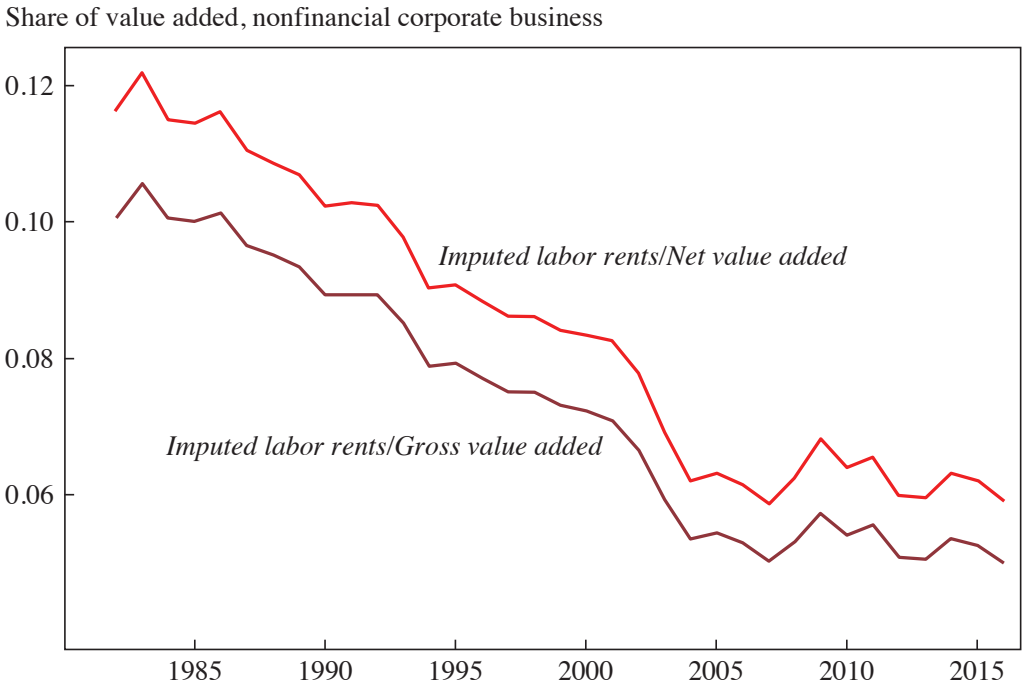
Our measure of labor rents, as a share of net value added in the nonfinancial corporate business sector, declined from around 12 percent in the early 1980s to around 6 percent in the 2010s (figure 5, table 1). Union rents fell by 2.1 percentage points as the unionization rate and union wage premia fell. Industry rents fell by 2.4 percentage points as industry wage premia fell and employment fell in high-rent industries. Firm size rents fell by 1.2 percentage points as firm size premia fell.

A set of simple counterfactuals illustrates that the decline in total labor rents is primarily due to changes in the ability of workers to lay claim to rents *within* any given industry, rather than changes in sectoral composition of the economy. First, if unionization within each sector had *not* fallen (and union wage premia had not fallen), but the sectoral composition of compensation had changed as it did over 1987–2016, union rents would have

36. Mishel and others (2012) show that the union premium is greater for nonwage benefits than for wages. Hollister (2004) finds that large firms are more likely to provide health and pension benefits, controlling on observables, but this differential has fallen over time, exacerbating the fall in the large-firm wage premium.

37. A further concern might be that we estimate union and industry wage effects in the CPS-ORG without controlling for firm size (which is not available in the CPS-ORG). As a robustness check, we estimate union, firm size, and industry wage premia all together in the CPS-ASEC over 1990–2019. The estimated falls in the size of the union wage premium and industry wage premia are very close to those estimated from the CPS-ORG data.

Figure 5. Estimated Labor Rents as Share of Value Added, Nonfinancial Corporate Sector



Sources: BEA NIPA, BEA industry accounts, CPS, SUSB, unionstats.com, authors' calculations.

Table 1. Estimated Labor Rents as Share of Value Added, Nonfinancial Corporate Sector

	1982	*1986*	*1996*	*2006*	*2016*
Shares of net value added (%)					
Total labor rent share	11.7	11.7	8.9	6.2	5.9
Union rent share	3.0	2.6	1.7	1.2	0.9
Firm size rent share	3.7	3.5	2.9	2.3	2.5
Industry rent share	5.0	5.6	4.2	2.6	2.6
Shares of gross value added (%)					
Total labor rent share	10.1	10.2	7.8	5.3	5.0
Union rent share	2.6	2.3	1.5	1.1	0.7
Firm size rent share	3.2	3.0	2.6	2.0	2.1
Industry rent share	4.3	4.9	3.7	2.2	2.2

Sources: BEA NIPA, BEA industry accounts, CPS, SUSB, unionstats.com, authors' calculations.

fallen from 2.4 percent to 1.9 percent over 1987–2016 (rather than falling from 2.4 percent to 0.9 percent).[38] On the other hand, if the sectoral composition of compensation had not changed, but unionization rates within each sector, and union wage premia, had fallen to the levels they were at in 2016, union rents would have fallen by essentially the same amount that they fell in reality: from 2.4 percent to 0.9 percent over 1987–2016.[39] For industry rents, if industry wage premia had not declined but the sectoral composition of compensation had still changed over 1987–2016, the industry rent share would have declined only by around one-tenth of a percentage point.[40] If industry wage premia had fallen but the sectoral composition of compensation had stayed the same, the industry rent share of net value added would have fallen from 5.2 percent in 1987 to 3.4 percent in 2016 rather than from 5.2 percent to 2.6 percent. Finally, for firm size rents, the share of workers in large firms has actually grown over the period, both in aggregate and within almost every sector, such that the decline in firm size rents reflects exclusively the decline in the firm size premium rather than compositional shifts.

Note that our analysis of the role of union rents only considers the *direct* effect of the decline in unionization: the loss of wage premia for unionized workers. To the extent that union power also increased the compensation of nonunion workers in certain industries or large firms through threat effects, our estimates of the decline in industry or firm size rents could also be capturing effects of the decline of unions.[41]

While our analysis in this paper is primarily focused on shifts in income between labor and capital, rather than inequality in labor incomes, we note that the decline in labor rents appears to have disproportionately affected workers with less formal education. Over 1984–2016, labor rents as a share of compensation fell by 8 percentage points for workers with no college or

38. We carry out our counterfactual over 1987–2016 rather than 1982–2016 because it means we are able to use consistently defined NAICS industries. This is the period over which the majority of the fall in labor rents happened.

39. This is because by 2016 the unionization rate in manufacturing had fallen to almost the level that it was in services. So shifting the sectoral composition from services back to manufacturing in 2016 would have made little difference to aggregate unionization.

40. This is due to two offsetting forces. The decline of the share of total compensation in manufacturing—which has a high average wage premium—exerted downward pressure on the industry rent share, but this was offset by increases in the compensation share of professional, scientific, and technical services and by health care and social assistance, which had high and medium-sized wage premia in the late 1980s (respectively).

41. Supporting this, there is a very strong relationship between the decline in industry, firm size, and union rents at the state and industry level. See online appendix C.8 for details.

some college education, and by 5.6 percentage points for workers with a four-year college education or more. This differential was driven by significantly larger declines in unionization rates and firm size rents for non-college-educated workers.[42] There is a large body of work documenting the effect of the decline in unionization on the rise in income inequality in the United States; see, for example, DiNardo, Fortin, and Lemieux (1996), Card (1996), Rosenfeld (2014), Farber and others (2018), and Fortin, Lemieux, and Lloyd (2018).

II.E. Were Labor Rents Redistributed or Destroyed?

One natural explanation for the steep decline of labor rents is that it represents greater market pressures on particular industries, coming from technology, globalization, or some other extrinsic forces. If this were the case, one would expect that returns to capital would fall alongside rents to labor and that the total rents in the industry—profits, plus labor rents—would be falling. It is striking, however, that for the industries in which the majority of the decline in labor rents took place, this was *not* the case—suggesting there was a very important element of redistribution of rents from labor to capital.

In twenty-nine industries—which employed around 30 percent of the private sector workforce in 2018—returns to capital rose even while rents to labor fell over 1987–2016. Together, these industries were responsible for 73 percent of the decline in labor rents over the period. Of these industries, those responsible for the largest shares of the total decline in labor rents were several manufacturing industries, wholesale trade, telecoms, utilities, and trucking. In the majority of these industries—twenty-one industries, employing around 24 percent of the private workforce in 2018—returns to capital rose by more than rents to labor fell over 1987–2016, implying that the total underlying profits generated by these industries rose, even as rents to labor fell. These industries were responsible for 38 percent of the total decline in labor rents over 1987–2016.[43]

We also take a closer look at manufacturing industries. The manufacturing sector can account for the majority of the decline in the labor share since

42. See online appendixes B.3 and C.5 for the detail underlying these calculations. We start in 1984 as we cannot estimate union membership and wage premia by education group before 1984.

43. See online appendix B.6 for details of these calculations. We study fifty-one industries at roughly the NAICS three-digit level, over 1987–2016 (since consistent industry-level data through 2016 are not available before 1987).

the 1980s. It is a sector which saw particularly large declines in unionization and in our estimates of industry wage premia. And it is the sector that has been the most exposed to global competition over recent decades. This raises the question: Were labor rents destroyed most in the manufacturing industries that were most exposed to global competition? Using changes in import penetration from low-wage countries as our measure of exposure to global competition, we investigate this for eighteen manufacturing industries over 1989–2007.[44] Contrary to the predictions of the globalization thesis, labor rents declined the most in the industries with the smallest increases in low-wage import penetration over the period (figure 6). This evidence, while not dispositive, casts further doubt on the argument that the decline in labor rents in manufacturing since the late 1980s was primarily a result of globalization.

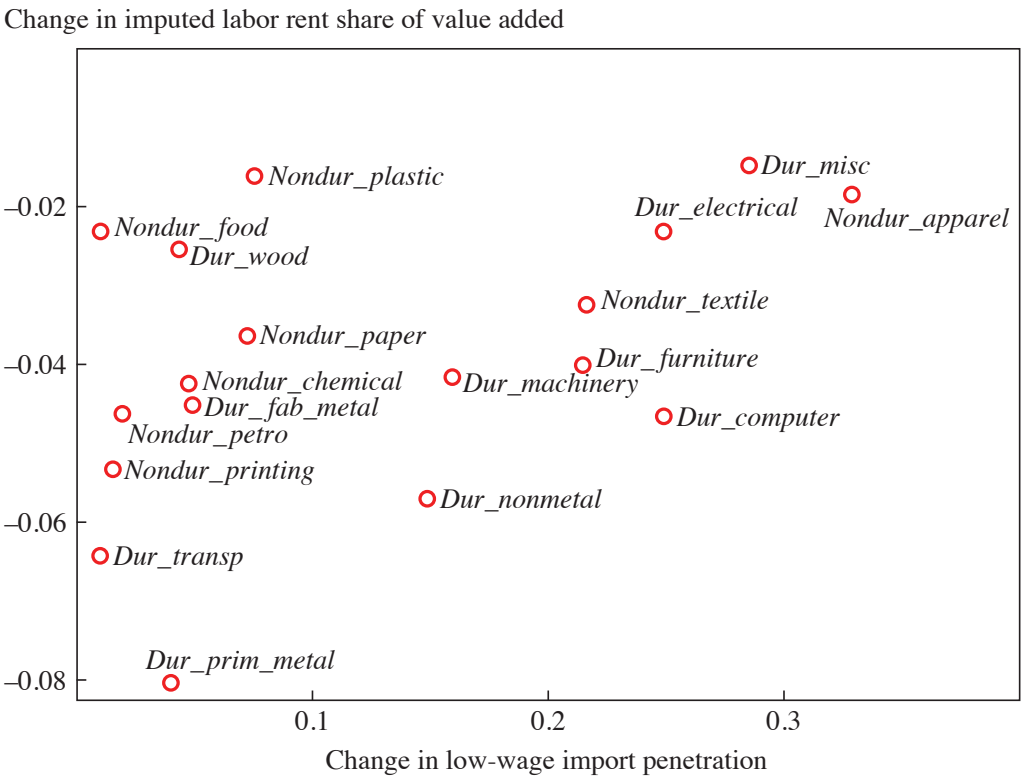
Overall, these results suggest that a large share of the decline in labor rents was a result of a redistribution of rents from labor to capital, rather than a destruction of rents as a result of increased competition or market pressure. This informs our approach in the rest of the paper.

III. Factor Shares, Profits, and Measured Markups

The labor share of income has declined since the 1980s, with a corresponding rise in the capital share (Elsby, Hobijn, and Şahin 2013; Karabarbounis and Neiman 2014). The Tobin's q of publicly listed corporations—the ratio of their stock market value to the replacement cost of their capital

44. We use low-wage import penetration data from Bernard, Jensen, and Schott (2006), updated by Peter Schott in 2011. Low-wage import penetration is calculated as the share of domestic sales within each industry represented by imports from low-wage countries, defined as countries with GDP per capita less than 5 percent of the US level. We study 1989–2007 as this is the period for which we have consistently defined data on low-wage import penetration (see online appendix B.7 for more details). Our sample period covers the period after the accession of China into the WTO, as well as the large increases in global trade in the 1990s. However, our sample period does not cover the effects of globalization in the 1970s and early to mid-1980s. Competition from low-wage countries would have been relevant for only a few industries during this period: in 1989, imports from low-wage countries only made up more than 1 percent of the US market in three manufacturing industries: apparel, textiles, and miscellaneous durable goods (Bernard, Jensen, and Schott 2006). On the other hand, competition from high-wage countries may have destroyed rents in other manufacturing industries earlier in the postwar period, and this is not captured in our sample. Borjas and Ramey (1995), for example, argue that increased foreign competition in durable goods manufacturing over 1976–1990 destroyed rents in that sector, reducing the wage premia paid to workers.

Figure 6. Low-Wage Import Penetration and Labor Rents in Manufacturing, 1989–2007



Sources: CPS-ORG; BEA; Bernard, Jensen, and Schott (2006); authors' calculations.
Note: Manufacturing industries at BEA industry code level.

stock—has risen from around 1.0 in 1970 to 1.75 by 2015, alongside an increase in the value of financial assets relative to the value of productive capital (Eggertsson, Robbins, and Wold 2018). The average profitability of capital has risen, even as the risk-free rate has declined. And, by a range of measures, several authors have found that markups have risen (De Loecker, Eckhout, and Unger 2020; Eggertsson, Robbins, and Wold 2018; Covarrubias, Gutiérrez, and Philippon 2019).[45]

A number of explanations have been proposed for the decline in the labor share of income. Many of these have centered on certain aspects of globalization or technological change—such as the increase in offshoring, the declining price of capital goods, or rising automation—as the major

45. The magnitude of the rise in measured markups depends on the method used. See Traina (2018), Karabarbounis and Neiman (2018), Edmond, Midrigan, and Xu (2018), and Baqaee and Farhi (2020). All measures that we are aware of show some increase in markups over recent decades.

cause of the decline in the labor share. Papers that focus on the United States include Elsby, Hobijn, and Şahin (2013), Abdih and Danninger (2017), Acemoglu and Restrepo (2018), and Autor and others (2020); those taking a cross-country perspective include Karabarbounis and Neiman (2014), Dao and others (2017), and Autor and Salomons (2018).

More recently, a growing body of research argues that these trends can be explained by a rise in the market power of corporations. Rising monopoly power in product markets would lead firms to increase their markups, reducing the labor share of income and increasing corporate profitability. This would in turn increase Tobin's q and the value of financial assets relative to physical capital. Different aspects of this argument have been made by Barkai (forthcoming), Brun and González (2017), Covarrubias, Gutiérrez, and Philippon (2019), De Loecker and Eeckhout (2019), De Loecker, Eeckhout, and Unger (2020), Eggertsson, Robbins, and Wold (2018), Farhi and Gourio (2018), González and Trivín (2019), Grullon, Larkin, and Michaely (2019), Gutiérrez and Philippon (2017, 2019), Hall (2018), and Philippon (2020). Some authors have also argued that these trends could be rationalized by a rise in companies' monopsony power in labor markets (CEA 2016; Furman and Krueger 2016; Glover and Short 2018; Benmelech, Bergman, and Kim 2018; Philippon 2020).

It is difficult to rationalize the trends in corporate valuations, corporate profitability, and measured markups in a model of perfect competition. In this sense, we agree with the monopoly/monopsony power arguments that the explanation of these macro trends must involve some degree of rents created by imperfect competition (in contrast to explanation based solely on technological change or globalization).

Our preferred explanation for these macro trends, however, focuses on a *redistribution* of existing rents rather than a *creation* of new rents. That is, the decline in the labor share—and the rise in corporate valuations, profitability, and measured markups—could have been caused by a decline in worker power.

To see this, consider an economy characterized by three types of power, to varying degrees: monopoly power, monopsony power, and worker power.

Firms have monopoly power in the product market, created by a combination of monopolistic competition and restrictions to entry. They set their price at a markup above marginal cost and make some pure profits, or rents, which are not fully competed away by new entrants. These rents may arise as a result of explicit barriers to entry, regulatory or otherwise. But they may also arise from heterogeneous production technologies, with new entrants unable to perfectly replicate incumbents' products or production

techniques. And in the short run, there may be rents because of the presence of fixed costs due to previously installed capital and prices in excess of variable costs.[46]

Firms may also have monopsony power in the labor market, by which we mean the wage-setting power firms derive from an upward-sloping labor supply curve. This can arise either from employers' size in their local labor market (conventional monopsony) or from labor market search frictions, switching costs, or different worker preferences for different employers (dynamic monopsony). In a monopsonistically competitive labor market, the wage a firm pays is a markdown from the marginal revenue product of labor at the firm.[47]

Finally, there is also worker power. By worker power, we mean workers' ability to increase their pay above the level that would prevail in the absence of such bargaining power. In this framework, worker power not only acts as countervailing power to firm monopsony power but also gives workers an ability to receive a share of the rents generated by companies operating in imperfectly competitive product markets. We use the term *worker power* as synonymous with worker bargaining power, worker rent-sharing power, and insider-outsider power of the kind that was used in earlier work to explain increases in unemployment.[48]

In this framework, if workers' ability to receive some of the rents generated by their firms has fallen over time, we would expect to see a decline

46. Note that in the latter two cases the existence of rents does not necessarily signal a market imperfection that can be corrected through antitrust or competition policy. In this framework the presence of rents is therefore, to some extent, an innate feature of the structure of particular product markets.

47. Our definition of monopsony power follows the modern monopsony literature. In the presence of monopsony, the size of the wage markdown is an inverse function of the elasticity of labor supply to the firm. The perfectly competitive case occurs where the elasticity of labor supply to the firm is infinite. Labor market concentration and search frictions both therefore create monopsony power because they both generate upward-sloping labor supply curves to the firm—but their welfare and policy implications can be different, as highlighted by Manning (2003).

48. Note that monopsony power and worker power are distinct concepts in our framework. The term *monopsony power* is sometimes used to refer to a broader conception of employer power than we use here; for example, in some bargaining models, firm monopsony power might be considered the exact inverse of worker power (the wage is partly determined by the firm's and worker's relative bargaining power over the match surplus). We distinguish between monopsony power and worker power for two reasons. First, in our framework, worker power is not necessarily simply the inverse of employer wage-setting power; worker power enables workers to claim a share of the rents produced within the firm, potentially raising their wage above the marginal product in their labor market. This can occur even in a world of no labor market concentration or search frictions, where labor supply to the firm is completely elastic. Second, the source of the change in wage-setting power matters for

in the labor share—as rents going to workers fall and rents going to shareholders rise (holding constant the total quantity of rents generated). We would also expect to see a divergence between the average profitability of capital and the risk-free rate, as profits to shareholders rise, and a rise in Tobin's q and the ratio of financial wealth to physical capital, as the rise in profits to shareholders increases the net present value of the claim shareholders have over corporate profits (even as the asset value of firms does not change). Indeed, Greenwald, Lettau, and Ludvigson (2019) find that a reallocation of income from labor to shareholders can account for a large share of the rise in equity valuations from 1989 to the present.[49]

In addition, while a fall in worker rent-sharing power should not have any implication for firms' underlying markups (which are determined by their product market power), it does have implications for *measured* markups. This is because measures of aggregate markups used in recent literature depend on firms' costs, including firms' labor costs—even if the labor costs partly represent rents accruing to labor as well as the true marginal cost of production.[50] This implies that markups, as they have

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diagnosis and policy solutions; a decline in worker power caused by a decline in unionization implies a different policy solution as compared to a rise in employer power caused by an increase in labor market frictions or concentration. The two concepts of worker power and monopsony power are, however, linked in the sense that worker power operates as countervailing power to firm monopsony power. As worker power declines, firms' ability to exercise their monopsony power rises without the underlying elasticity of labor supply to the firm having changed, as described in, for example, Erickson and Mitchell (2007).

49. Specifically, they find that a series of "factor share shocks" have reallocated rewards to shareholders and away from labor compensation, accounting for 43 percent of the increase in equity valuations since 1989. They do not take a stance on the cause of these factor share shocks but note that they could be due to changes in industrial concentration, worker bargaining power, offshoring and outsourcing, or technological change.

50. The production function approach used by De Loecker, Eeckhout, and Unger (2020) estimates markups as a function of the (estimated) elasticity of output with respect to variable inputs and the ratio of sales to variable costs—which include some labor costs. The rise in measured markups in the United States is mostly due to an increasing ratio of sales to variable costs, which could be a result of falling labor costs as labor rents fell. The user cost approach of Gutiérrez and Philippon (2017) estimates markups as the ratio of sales to costs, which are calculated as operating expenses plus an imputed cost of capital. Operating expenses include labor costs. Again, this means that changes in measured markups could be due to changes in labor costs as a result of falling labor rents (see online appendix F for more details on this). It would in theory be feasible to take these approaches and apply them only to nonlabor costs to estimate markups, but there are no publicly available data of sufficiently good quality to do this across the entire set of industries over a long time period. One example of this approach is Anderson, Rebelo, and Wong (2019) who study the retail trade industry, estimating the markups of the price of each good sold over its replacement cost, *not* including labor costs.

been measured in recent papers, cannot be used to distinguish between a story of rising product market power and a story of falling worker power: a rise in measured markups could reflect a fall in worker rent-sharing power just as much as it could reflect a rise in true markups and firms' monopoly power.

III.A. Accounting Decomposition

This implies that rising monopoly power, rising monopsony power, and falling worker power could each in theory account for the changes in factor shares, profits, and markups. But is the magnitude of the decline in labor rents consistent with these trends? To calibrate the plausibility of the declining labor rents explanation, we build on the accounting decomposition in Farhi and Gourio (2018). Farhi and Gourio extend the neoclassical growth model to account for six major recent macroeconomic trends, including the decline in the labor share, increases in valuation ratios, and moderate increases in profitability alongside a declining risk-free rate. Using this model, they identify a role for rising monopoly power in explaining these macro trends (alongside roles for unmeasured intangibles and rising risk premia). They estimate that average economy-wide markups rose from 8 percent to 15 percent over 1984–2016.

Their model, however, assumes competitive labor markets with no rent-sharing. We replicate their accounting decomposition, with one alteration: we hold the degree of monopoly power (markups) fixed and instead introduce a rent-sharing parameter to allow workers to share in monopoly profits. We incorporate this in the simplest way possible: the monopolistic representative firm maximizes profits as before but then shares the rents, or pure profits, with share π_L going to labor. This reduced-form approach is similar to that adopted in much of the literature on rent-sharing, as reviewed in Card and others (2018). It can be microfounded with a strongly efficient bargaining model where workers, seeking to maximize total pay to labor, and shareholders, seeking to maximize their profits, jointly bargain over the firm's production decisions (MacDonald and Solow 1981).

Farhi and Gourio (2018) carry out their decomposition targeting nine empirical moments for the US private sector over 1984–2016: gross profitability, the gross capital share, the investment-capital ratio, the risk-free rate, the price-dividend ratio, population growth, total factor productivity (TFP) growth, the growth rate of investment prices, and the employment-population ratio. They estimate nine parameters: the discount factor, the probability of a disaster, the depreciation rate of capital, the Cobb-Douglas parameter in the aggregate production function, population growth rate,

TFP growth, the growth rate of investment-specific productivity, labor supply, and the markup.

We target the same nine moments and estimate eight of the same nine parameters—but, instead of estimating the markup, we estimate the rent-sharing parameter with labor, holding the markup fixed at the level that Farhi and Gourio estimate for the period 2001–2016 (1.15). Identification is nearly recursive in the Farhi and Gourio decomposition, with many parameters estimated tightly by their near-equivalent moments. Identification in our approach is therefore nearly identical to that in Farhi and Gourio: it has different implications for only two of the nine empirical moments—the gross capital share $\frac{\Pi}{Y}$ and gross profitability $\frac{\Pi}{K}$ (equivalent in the Farhi and Gourio model to the marginal product of capital). The equations below show the difference between the two approaches: in the Farhi and Gourio model, the rent-sharing parameter π_L is implicitly set to be constant at zero, and the markup μ is allowed to vary. In contrast in our model, the markup μ is set to be constant at 1.15, and π_L is allowed to vary.

$$\text{Capital share } \frac{\Pi}{Y} = \frac{\alpha + (1 - \pi_L)(\mu - 1)}{\mu}$$

$$\text{Profitability of capital } \frac{\Pi}{K} = \frac{\alpha + (1 - \pi_L)(\mu - 1)}{\alpha}\left(r^* + \delta + g_Q\right)$$

By construction of the recursive identification process in the decomposition, our model returns exactly the same parameter estimates as Farhi and Gourio for six of the nine parameters estimated. Table 2 shows only the parameter estimates that differ between the Farhi and Gourio model ("FG") and our model ("SS"). To fit the data best, Farhi and Gourio estimate a rise in the average economy-wide markup from 1.08 to 1.15 over the period. When we hold the markup constant at 1.15, but allow the rent-sharing parameter to vary, we estimate instead that the rent-sharing parameter fell from 0.44 to 0.02 over the period.[51] Our model also has slightly different implications for the Cobb-Douglas parameter α and TFP growth g_Z: our model suggests a somewhat smaller slowdown in TFP growth over the period, and a slight fall in the Cobb-Douglas parameter α (implying a small degree of labor-complementing technological change).

51. A rent-sharing parameter of 0.44 is quite plausible when compared to the range of estimates from studies of rent-sharing. See online appendix D.2 for details.

Table 2. Estimated Parameters and Changes over Time

Parameter		*Model*	*First sample (1984–2000)*	*Second sample (2001–2016)*	*Difference*
Markup	μ	FG	1.079	1.146	0.067
		SS	1.15	1.15	—
Rent-sharing with labor	π_L	FG	0	0	—
		SS	0.441	0.022	–0.419
Cobb-Douglas parameter	α	FG	0.244	0.243	–0.001
		SS	0.260	0.244	–0.016
TFP growth	g_Z	FG	1.298	1.012	–0.286
		SS	1.233	1.010	–0.223

Source: Farhi and Gourio (2018); authors' calculations.

Note: Only parameters where our estimates differ from Farhi and Gourio's (2018) estimates are shown. In the "SS" estimation, markup μ is held constant at 1.15. In the "FG" estimation, the rent-sharing parameter π_L is implicitly held constant at zero. The "FG" estimates in this table correspond to the baseline parameter estimates in table 2 of Farhi and Gourio (2018).

What does the estimated fall in the rent-sharing parameter imply for total labor rents? The rise in markups estimated by Farhi and Gourio, from 1.08 to 1.15, implies a rise in the pure profit share of output from 7.3 percent in the 1980s and '90s to 12.8 percent in the 2000s and 2010s. Since we hold the markup at 1.15 through these four decades in our estimation, the pure profit share of our economy is, by construction, 12.8 percent throughout 1982–2016. The estimated fall in the rent-sharing parameter therefore implies that the share of gross private sector output that was labor rents fell by 5.3 percentage points, from 5.6 percent to 0.3 percent, over the period. This is quite similar to our estimate of the decline of labor rents in section II; we estimated that labor rents fell by 5.1 percentage points of gross value added in the nonfinancial corporate sector over 1982–2016 (corresponding to a fall of 4.1 percentage points of gross business sector value added).[52] There is no necessary reason why these two estimates should line up so closely: the estimate of the fall in labor rents from the Farhi and Gourio model comes from the best fit of nine parameters to nine macro moments in each of the two periods, while our estimate of the fall in labor rents comes from our estimated union, industry, and firm size wage premia using CPS data. (Note that to match Farhi and Gourio's results we set up

52. Nonfinancial corporate sector value added was 72 percent of total business sector value added in 1982 and 65 percent in 2016 (BEA NIPA tables 1.3.5 and 1.14). This calculation assumes that the only change in labor rents occurred in the nonfinancial corporate sector, that is, that there was no change in labor rents elsewhere in the business sector.

our calibration such that labor rents must equal zero in the second period. Therefore, the percentage point change in the share of output represented by labor rents is a more appropriate comparator than the levels.)

We see this accounting exercise as suggesting that (1) the degree of the fall in rent-sharing with labor which is required to be consistent with a number of key macro moments over 1982–2016 is both relatively consistent with our empirical estimates of the actual fall in rent-sharing with labor, and relatively consistent with estimates of rent-sharing elasticities from the micro literature; and (2) despite the differential implications for investment of a rise in monopoly power versus a fall in rent-sharing, when incorporated into a full general equilibrium model it is possible to reconcile a fall in labor rent-sharing (in an efficient-bargain type framework) with the data on capital and investment, without implausible implications for other macro variables.

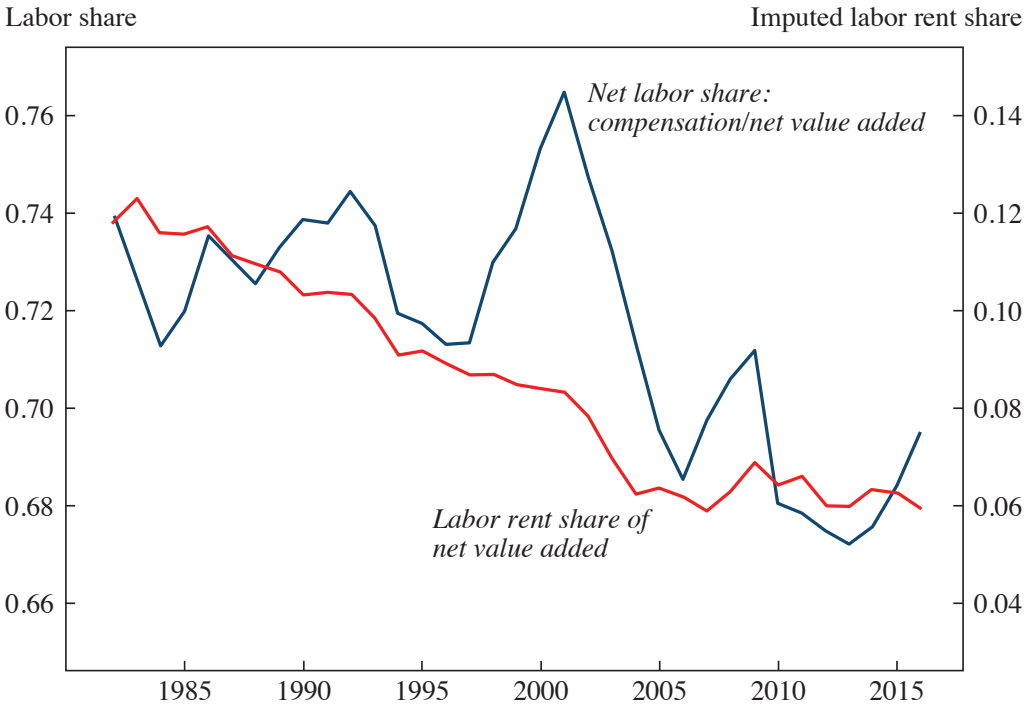
III.B. Aggregate and State-Level Evidence: Factor Shares

Next, we compare our estimates of the decline in the labor rent share of value added with aggregate changes in factor shares. The net labor share in the nonfinancial corporate sector (compensation over net value added) fell by 4.4 percentage points over 1982–2016.[53] Our measure of the labor rent share of net value added in the nonfinancial corporate sector fell by almost 6 percentage points over the same period. This suggests that the decline in imputed labor rents as estimated from industry, union, and firm size wage premia can more than fully explain the decline in the net labor share over the period (as shown in figure 7); that is, the entirety of the shift in the functional income distribution in the nonfinancial corporate sector could be explained by a redistribution of rents from labor to capital.

The other side of the coin of the fall in the labor share is the rise in the capital share. Since our measure of labor rents can be interpreted as a measure of the firm's profits which go to labor, with the rest of the firm's profits going to capital, we can define the total profit share of value added as the share of value added accounted for by capital income *plus* labor rents. While the capital share of net value added has risen over 1982–2016, our imputed measure of the total profit share has stayed roughly constant or even fallen slightly (figure 8)—consistent with the interpretation that the

53. Following Bridgman (2018) and others, for our main results at the aggregate and industry levels we use the labor share of value added net of depreciation, as the depreciation rate has risen over the period.

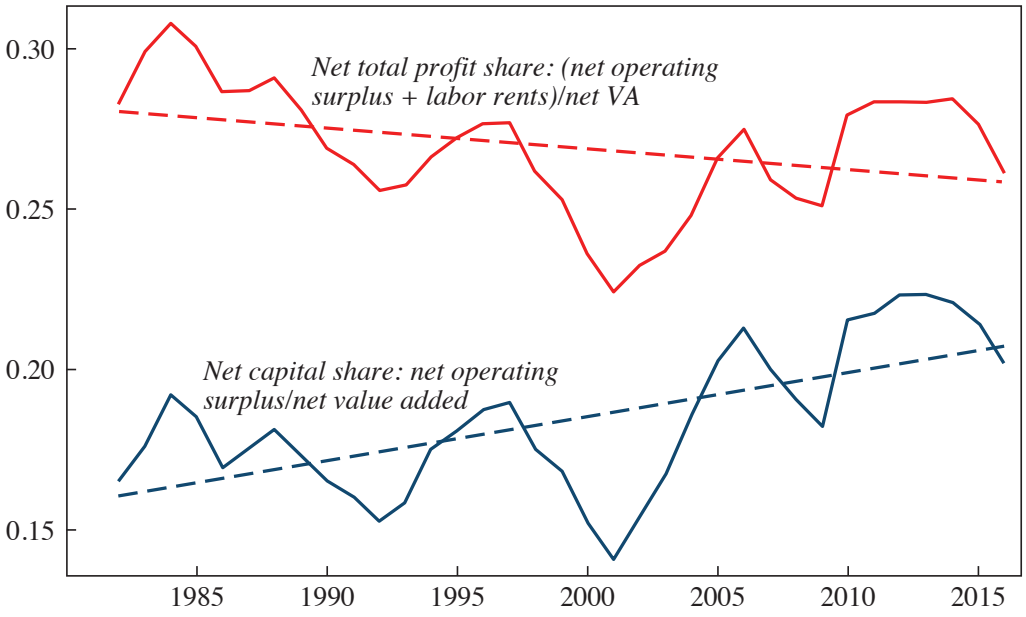
Figure 7. Net Labor Share and Imputed Labor Rent Share, Nonfinancial Corporate



Sources: BEA NIPA; authors' calculations.

Note: Labor share refers to the compensation share of net value added in the nonfinancial corporate sector. Our measure of the imputed labor rent share of net value added is calculated as described in section II.

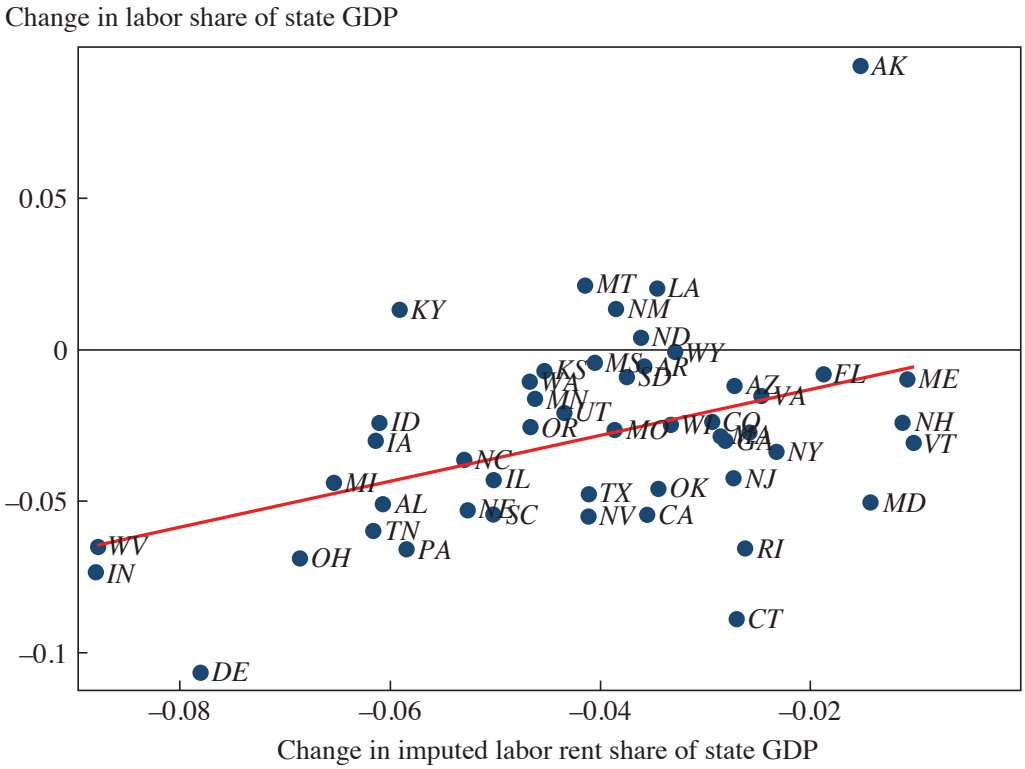
Figure 8. Net Capital Share and Imputed Profit Share, Nonfinancial Corporate



Sources: BEA NIPA; authors' calculations.

Note: Net capital share in the nonfinancial corporate sector is calculated as net operating surplus over net value added. Measure of the net total profit share is calculated as the net operating surplus plus our measure of imputed labor rents (explained in section II), divided by net value added. Dashed lines are lines of best fit.

Figure 9. Changes in State-Level Labor Share and Labor Rent Share, 1984–1988 to 2012–2016



Sources: BEA regional economic accounts; authors' calculations.

Note: Imputed labor rent share of state GDP is calculated from estimated union, firm size, and industry wage premia; state-level unionization rates; and compensation by industry. Labor share of state GDP is defined as state-level compensation over GDP.

total profitability of firms (and their monopoly power) has not risen over the period but that these profits have instead partly been redistributed from labor to capital.

We observe a similar pattern with state-level data. Estimating state-level labor rent shares in the same way as we estimate the aggregate labor rent share, we show that states with bigger declines in their imputed labor rent share also saw bigger declines in their labor share over 1984–2016 (figure 9).[54] This strong relationship persists in regressions at the annual level,

54. The coefficient in a regression of the change in the state labor share over 1984–1988 to 2012–2016 on the change in the labor rent share over the same period is 0.76, with a p value of 0.002 and an R^2 of 0.19. We calculate the labor share as state-level compensation over GDP and calculate labor rents as a share of state GDP, using data from the BEA Regional Economic Accounts. We start in 1984 because it is the first year for which we can estimate state-level unionization and union wage premia. More details are in online appendix B.4.

Table 3. State-Level Regressions of Labor Share on Measures of Labor Power

Regression of labor share of state GDP on imputed labor rent share of state GDP, 1984–2016				
Imputed labor rent share	0.94**	1.09**	0.69**	0.52**
	(0.14)	(0.28)	(0.06)	(0.13)
Fixed effects	None	Year	State	Year, State
Observations	1,650	1,650	1,650	1,650
State-level regression of labor share on imputed union rent share of state GDP, 1984–2016				
Imputed union rent share	1.76**	1.46*	1.98**	1.04*
	(0.48)	(0.68)	(0.24)	(0.40)
Fixed effects	None	Year	State	Year, State
Observations	1,650	1,650	1,650	1,650

Source: Authors' calculations.
Note: Robust standard errors, clustered at state level, in parentheses.
*$p < 0.05$, **$p < 0.01$

with year and state fixed effects, as shown in table 3 (both for the labor rent share and for the union rent share component of it).[55]

III.C. Industry-Level Evidence

Next, we estimate labor rents at the level of fifty-one industries over 1987–2016.[56] We analyze the relationship between industry-level changes in labor rents and changes in the labor share, profitability, and Tobin's q. Since a number of recent papers have highlighted the link between industrial concentration and changes in labor shares and profitability, we also incorporate product market concentration, using measures of industry-level top twenty import-adjusted sales concentration calculated from Compustat and census data by Covarrubias, Gutiérrez, and Philippon (2019).[57]

55. Similarly, Hazell (2019) finds that right-to-work laws (which reduce union power) reduce state-level labor shares.

56. Our industry definitions are very close to the BEA industry codes (roughly NAICS three-digit; see online appendix G for more details on industry definitions). For consistency with the previous section, we do not analyze industries in finance, insurance, and real estate. We also follow Covarrubias, Gutiérrez, and Philippon (2019) in omitting the industry "management of companies and enterprises." Our calculation of industry rents and union rents follows the description in section II closely, with the exception that it is comprised only of union rents and industry rents (and not firm size rents), as we do not have data on compensation shares by firm size class and industry (see online appendix B.5 for more details). Note that for industry rents, the wage premium is estimated relative to the lowest-wage large industry, which is food services and drinking places.

57. We are grateful to Germán Gutiérrez and Thomas Philippon for sharing with us the measures of concentration they constructed for Covarrubias, Gutiérrez, and Philippon (2019). They construct the top four, eight, twenty, and fifty import-adjusted sales concentration ratios

Our analysis shows that over 1987–2016 industries with larger falls in their imputed labor rent share also saw substantially larger falls in their labor share (figure 10).[58] There is a negative, though somewhat weaker, relationship between changes in the labor share and average top twenty import-adjusted sales concentration (figure 11).

We regress the gross and net labor share on the imputed labor rent share of industry value added and on product market concentration at the annual level over 1987–2016, including different combinations of year and industry fixed effects (table 4). Coefficients on the labor rent share are large, positive, and highly significant, and coefficients on concentration are negative and mostly significant.

What is the explanatory power of the decline in labor rents relative to the rise in concentration? Over 1997–2012 (the period for which we have the more accurate census-based concentration data, and in which Covarrubias, Gutiérrez, and Philippon (2019) argue concentration has led to rising monopoly power) the average industry saw a fall in its labor share of 5.2 percentage points. Using the coefficient from the specification with industry and year fixed effects, the average industry's fall in their labor rent share over 1997–2012 was associated with 4.3 percentage points fall in the labor share. The average industry-level increase in import-adjusted top twenty sales concentration was associated with a 0.5 percentage point fall in the labor share.[59] This suggests that declining labor rents can explain the

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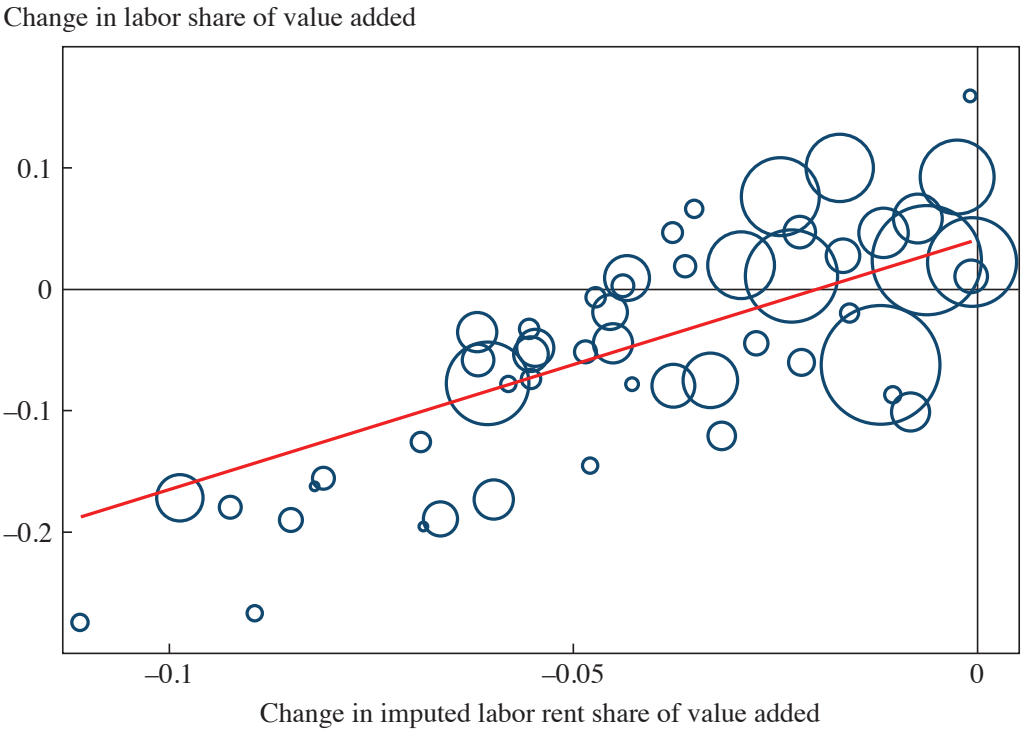
for each of the fifty-three BEA industries. They use two data sources: Compustat data on publicly listed companies, reweighted to reflect the composition of the underlying economy, and census data on all firms. The Compustat concentration ratios are available annually for our whole sample period (1987–2016). The census concentration ratios are available for the years 1997, 2002, 2007, and 2012. They adjust for imports by multiplying the domestic sales concentration ratio by the share of US-produced goods in total domestic sales in that industry. More details on the construction of these variables are available in Covarrubias, Gutiérrez, and Philippon (2019). Note that the Compustat measure only covers publicly traded firms, and trends in publicly traded firms have not always been representative of aggregate trends within individual industries (Davis and others 2006). Concentration is an imperfect measure of firms' market power (Berry, Gaynor, and Scott Morton 2019; Syverson 2019). We use concentration in this paper because recent literature has noted the rise in concentration, alongside rising markups and falling labor shares, and has often interpreted this as rising monopoly power.

58. A similar relationship exists for changes in the industry-level unionization rate. See online appendix C.7.

59. The average industry's labor rent share declined by 1.6 percentage points over 1997–2012. Multiplying this by 2.67 suggests a decline in the labor share of 4.3 percentage points. The average industry's import-adjusted top twenty sales concentration rose by 1.8 percentage points over 1997–2012. Multiplying this by –0.28 suggests a decline in the labor share of 0.5 percentage points.

Figure 10. Change in Labor Share and Imputed Labor Rent Share, by Industry, 1988–1992 to 2012–2016



Sources: BEA industry accounts; authors' calculations.

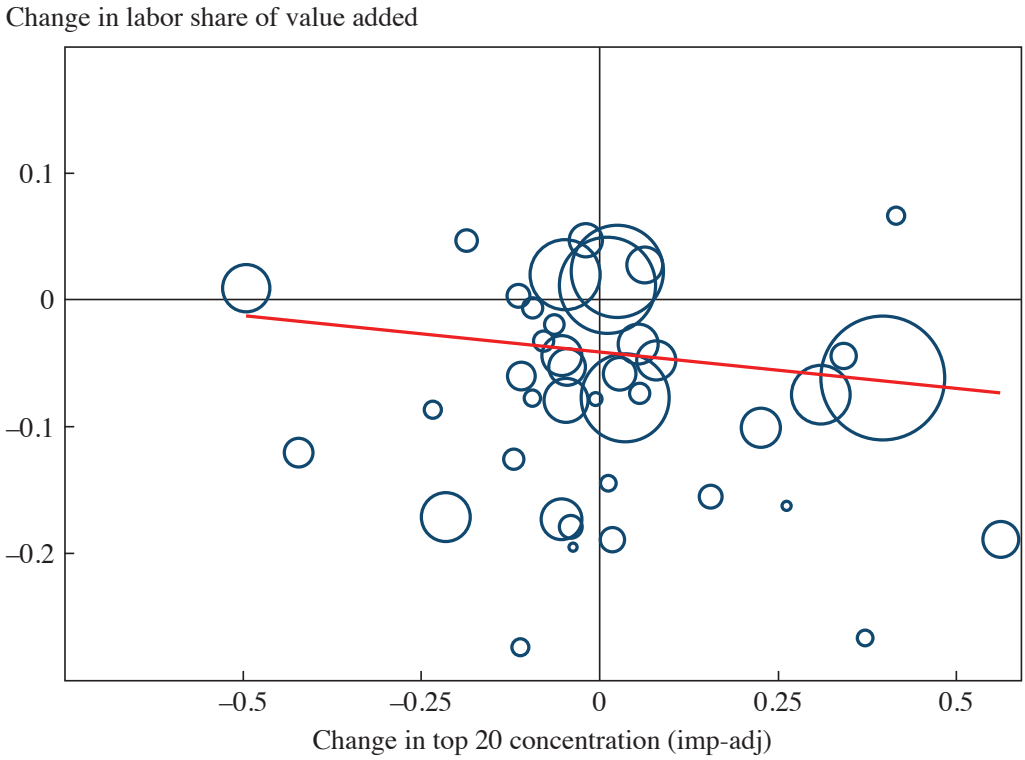
Note: Each bubble is an industry (at BEA industry code level). Bubble size represents industry average employment over 2012–2016. The solid line is an employment-weighted line of best fit.

majority of the average fall in labor shares at the industry level, whereas the average increase in concentration can explain only around 10 percent.[60]

Next, we analyze our measures of labor power alongside three measures of profitability at the industry level over 1987–2016: the gross profit rate (defined as gross operating surplus over fixed assets), as well as two measures of Tobin's q calculated from firm-level Compustat data by Covarrubias, Gutiérrez, and Philippon (2019): the weighted average Tobin's q across publicly listed firms within an industry ("aggregate q"),

60. The relative explanatory power of the worker power measures versus concentration measures is similar if we use other measures of concentration (top four, eight, or fifty sales ratios, and using measures from the census versus Compustat). The comparison of coefficient magnitudes is even starker over 1987–2016: the average fall in the labor rent share was associated with a 10.1 percentage points fall in the labor share, while the average increase in import-adjusted top twenty sales concentration over this period was associated with a 0.1 percentage point fall in the labor share. The average industry's fall in the labor share over this period was 5.2 percentage points.

Figure 11. Change in Labor Share and Top Twenty Sales Concentration (Import-Adjusted), by Industry, 1988–1992 to 2012–2016



Sources: Labor share computed from BEA industry accounts; concentration calculated from Compustat data by Covarrubias, Gutiérrez, and Philippon (2019).

Note: Each bubble is an industry (at BEA industry code level). Bubble size represents industry average employment over 2012–2016. The solid line is an employment-weighted line of best fit.

and the median firm q.[61] Figures 12 and 13 illustrate that over the whole period, falling labor rent shares were associated with rising gross profitability, while rising concentration was associated with rising profitability. In horse-race regressions of profitability measures on our measures of imputed labor rents and industrial concentration (table 4), coefficients on the imputed labor rent share are almost all negative and, for the 1987–2016 regressions, mostly statistically significant.[62] Coefficients on the concentration measures, on the other hand, are mostly not significant and often

61. Results are very similar when we use the simple average Tobin's q across firms, rather than the weighted average.

62. This is consistent with Salinger (1984), who argued that in the 1980s, Tobin's q was low in industries with high monopoly power because unionized workers received the monopoly rents.

Table 4. Industry-Level Regressions—Labor Shares, Profitability, and Investment-to-Profits

Regressions of labor shares and investment-profit on labor rent share and Compustat concentration. N = *1,189 (forty-one industries, 1987–2016)*

Dependent variable	*Labor share of gross value added*				*Labor share of net value added*				*Investment-to-profit ratio*			
Imputed labor rent share of gross value added[a]	2.24** (0.50)	2.44** (0.64)	1.81** (0.16)	2.22** (0.26)	2.40** (0.39)	2.62** (0.47)	2.56** (0.32)	3.65** (0.44)	3.12** (1.12)	3.78* (1.47)	2.26** (0.68)	5.74** (1.30)
Average top twenty sales concentration imp-adj. (Compustat)	–0.23** (0.06)	–0.23** (0.07)	–0.05 (0.05)	–0.05 (0.05)	–0.19* (0.08)	–0.21* (0.08)	–0.06 (0.09)	–0.07 (0.07)	0.25 (0.19)	0.24 (0.20)	–0.15 (0.22)	–0.16 (0.20)
Fixed effects	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind

Regressions of profitability on labor rent share and Compustat concentration. N = *1,189 (forty-one industries, 1987–2016)*

Dependent variable	*Gross profit rate*				*Aggregate Q*				*Median Q*			
Imputed labor rent share of gross value added	–0.80 (0.55)	–1.03 (0.71)	–0.60* (0.28)	–1.93** (0.55)	–3.66** (1.14)	–3.16* (1.33)	–3.17** (0.93)	1.58 (1.51)	–3.22** (0.99)	–2.46* (1.16)	–4.43** (0.86)	–1.24 (1.36)
Average top twenty sales concentration imp-adj. (Compustat)	–0.11 (0.10)	–0.10 (0.10)	0.02 (0.13)	0.04 (0.12)	0.02 (0.12)	0.01 (0.13)	–0.31 (0.32)	–0.31 (0.30)	0.19 (0.13)	0.18 (0.13)	0.15 (0.20)	0.16 (0.20)
Fixed effects	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind

Regressions of labor shares and investment-profit on labor rent share and census concentration. N = *174 (forty-five industries for 1997, 2002, 2007, 2012)*

Dependent variable	*Labor share of gross value added*				*Labor share of net value added*				*Investment-to-profit ratio*			
Imputed labor rent share of gross value added[a]	1.88**	1.95**	2.18**	2.67**	2.45**	2.56**	3.14**	3.76**	4.32*	4.52*	5.29^{+}	7.24^{+}
	(0.65)	(0.72)	(0.37)	(0.42)	(0.49)	(0.54)	(0.43)	(0.48)	(1.76)	(1.91)	(2.89)	(4.29)
Average top twenty sales concentration imp-adj. (census)	–0.51**	–0.52**	–0.24*	–0.28*	–0.45**	–0.46**	–0.40*	–0.45**	0.49	0.48	–0.85	–0.88
	(0.09)	(0.09)	(0.11)	(0.11)	(0.12)	(0.12)	(0.18)	(0.16)	(0.42)	(0.42)	(0.68)	(0.78)
Fixed effects	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind

Regressions of profitability measures on labor rent share and census concentration. N = *174 (forty-five industries for 1997, 2002, 2007, 2012)*

Dependent variable	*Gross profit rate*				*Aggregate Q*				*Median Q*			
Imputed labor rent share of gross value added	–0.75	–0.84	–1.35*	–2.84**	–1.79	–2.15	0.52	–2.22	–0.79	–0.22	–3.25*	–1.56
	(0.81)	(0.85)	(0.58)	(0.55)	(1.52)	(1.62)	(2.20)	(3.06)	(1.16)	(1.14)	(1.48)	(1.95)
Average top twenty sales concentration imp-adj. (census)	–0.45	–0.44	0.35	0.45	–0.47*	–0.43^{+}	–1.49^{+}	–0.89	–0.09	–0.10	–0.91^{+}	–0.39
	(0.33)	(0.33)	(0.29)	(0.31)	(0.22)	(0.22)	(0.86)	(0.71)	(0.16)	(0.16)	(0.47)	(0.42)
Fixed effects	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind	None	Year	Ind	Yr, Ind

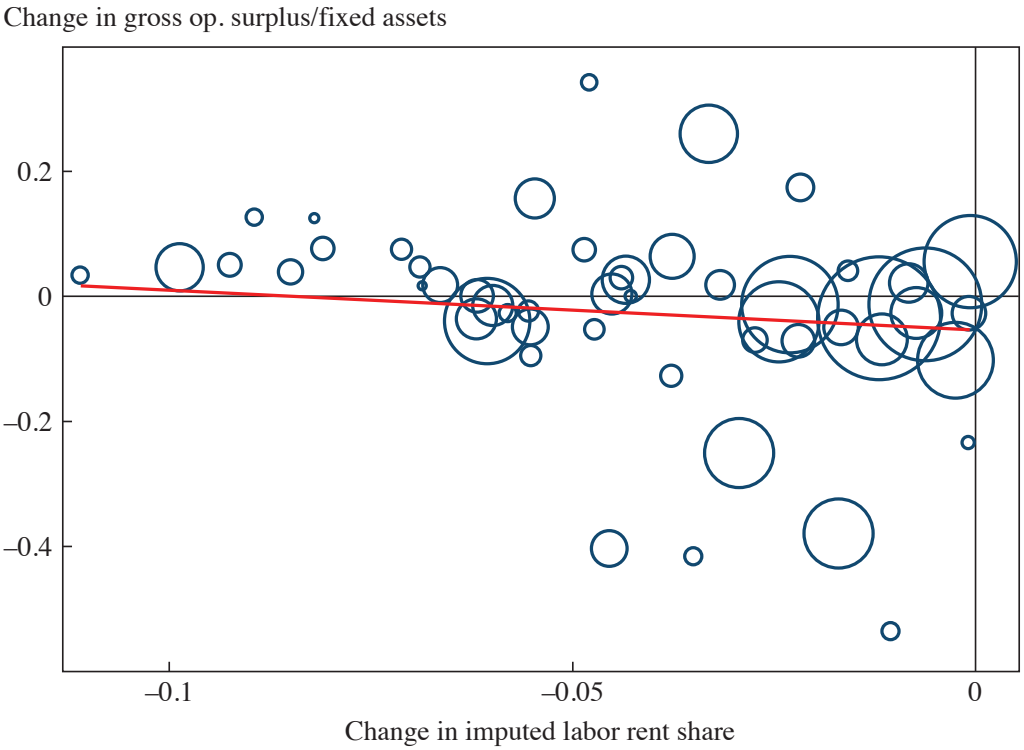
Source: Authors' calculations.

Note: Robust standard errors, clustered at industry level, in parentheses. Investment-profits are 98 percent Winsorized. Regressions are for forty-one or forty-five industries because we do not have concentration data for all fifty-one nonfinancial industries.

a. Imputed labor rent share of gross value added is used for gross labor share and investment-profit regressions. Imputed labor rent share of net value added is used for net labor share regressions.

$^{+}p < 0.10$, $*p < 0.05$, $**p < 0.01$

Figure 12. Change in Gross Profitability and Imputed Labor Rent Share, by Industry, 1988–1992 to 2012–2016



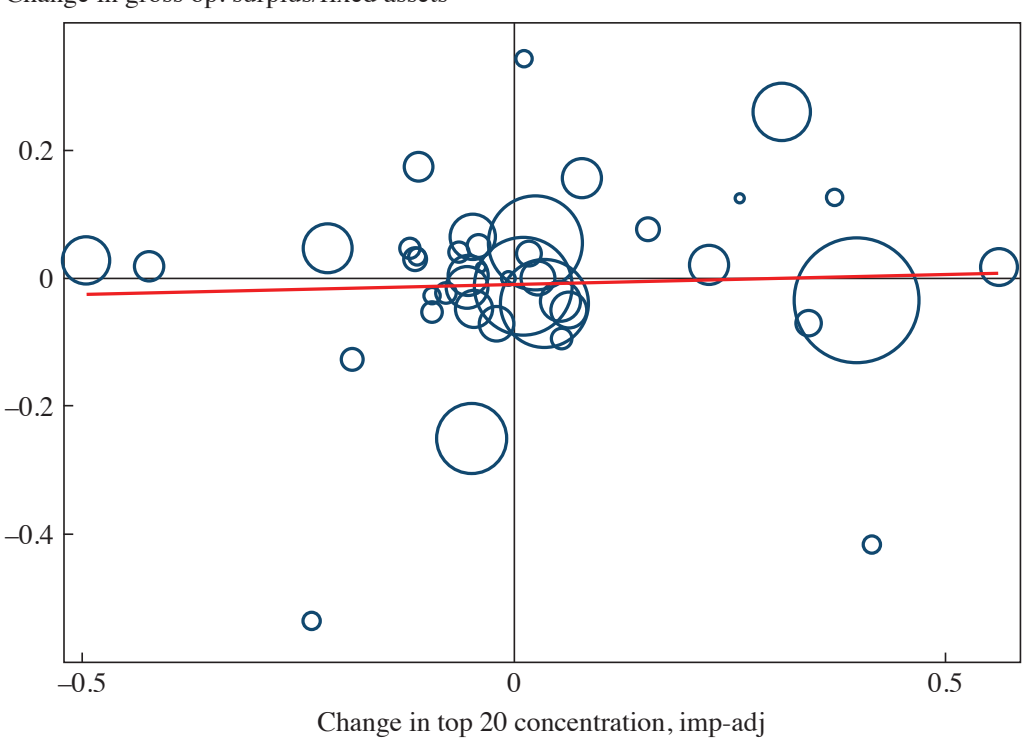
Sources: BEA industry accounts; authors' calculations.

Note: Each bubble is an industry (at BEA industry code level). Bubble size represents industry average employment over 2012–2016. The solid line is an employment-weighted line of best fit.

negative (the opposite sign than would be predicted if rising monopoly power was causing higher profitability). The coefficients from the regression over 1987–2016 with industry and year fixed effects suggest that the average increase in top twenty import-adjusted sales concentration over 1987–2016 was associated with 0.003 points increase in the median firm q at the industry level, while the average fall in the labor rent share was associated with 0.06 points increase in median firm q (although neither of these coefficients are statistically significantly different from zero in the specification with full industry and year fixed effects).[63] The median industry saw

63. The average industry's increase in import-adjusted top twenty sales concentration over 1987–2016 was 1.7 percentage points. Multiplied by the estimated coefficient of 0.16, this suggests an increase in median firm q of 0.003 points. The average industry's decline in the labor rent share over 1987–2016 was 4.6 percentage points. Multiplied by the estimated coefficient of –1.24, this suggests an increase in median firm q of 0.06 points.

Figure 13. Change in Gross Profitability and Top Twenty Sales Concentration (Import-Adjusted), by Industry, 1988–1992 to 2012–2016



Sources: BEA industry accounts; concentration data calculated from Compustat by Covarrubias, Gutiérrez, and Philippon (2019).

Note: Each bubble is an industry (at BEA industry code level). Bubble size represents industry average employment over 2012–2016. The solid line is an employment-weighted line of best fit.

an increase in its median firm q of 0.34 over the period—suggesting again that the decline in worker power has more explanatory power than the rise in concentration for changes in industry-level profitability.

IV. Unemployment and Inflation

Recent decades in the United States have seen a substantial decline in the trend unemployment rate, without inflationary pressure. The unemployment rate was below 5 percent, the level previously thought to have been the NAIRU, for nearly half of the twenty-three years from 1997 to 2020, and was below 4 percent from May 2018 until February 2020, at levels not reached since the 1960s. At the same time, inflation has been low and has shown little sign of accelerating. These facts suggest that there has been a fall in the NAIRU (Crump and others 2019; Tüzemen 2019; Blanchard,

Cerutti, and Summers 2015). In this section of the paper, we argue that falling worker power could account for these broad features of the unemployment and inflation experience.

On a theoretical level, the fall in the NAIRU could be explained by a fall in worker power. Almost all models of worker insider power or rent-sharing power would predict that as worker bargaining power falls, the NAIRU would also fall. The mechanisms—and their welfare implications—vary according to the model. First, a fall in worker bargaining power may reduce the marginal cost to a firm of increasing its employment, reducing unemployment (Mortensen and Pissarides 1999; Figura and Ratner 2015). Blanchard and Giavazzi (2003) model the implications of worker power *and* monopoly power jointly; in their model falling worker power leads to lower unemployment as the incentive for firms to hire rises, while rising monopoly power leads to higher unemployment as firms reduce their output.[64] Second, this effect may be reinforced or magnified by a reduction in the distinction between insiders and outsiders in wage setting (Blanchard and Summers 1986; Calmfors and Driffill 1988; Galí 2020). Third, a reduction in the availability of high wage jobs at, for example, unionized firms may reduce the incentives for wait unemployment, where unemployed workers search for longer to try to get a high-wage job, or rest unemployment, where unemployed workers in high-rent sectors with temporary downturns wait for jobs to return (Hall 1975; Bulow and Summers 1986; Alvarez and Veracierto 1999; Alvarez and Shimer 2011).[65] Past empirical evidence suggested that areas and industries with higher rates of unionization have tended to have higher unemployment rates, and unionized firms have tended to see lower employment growth.[66] More recently, Erickson and Mitchell (2007), Figura and Ratner (2015), and Krueger (2018) have argued that the fall in labor power would lower the NAIRU, and Leduc and Wilson (2017) and Ratner

64. More specifically, their model predicts that in the short run (with no entry of firms), falling worker power reduces the labor share with no effect on unemployment, but in the long run (where all firms pay entry costs and there are no positive rents), falling worker power reduces unemployment with no effect on the labor share. If the world is always somewhere between the pure short run and pure long run—there is some entry, but there are still some positive rents—then falling worker power in their model would predict a falling labor share *and* falling unemployment.

65. On the other hand, in very frictional labor markets where a low elasticity of labor supply to the firm enables a large wage markdown, aggregate unemployment could fall as worker bargaining power rises (Manning 2003).

66. See Freeman and Medoff (1984), Summers (1986), Montgomery (1989), Blanchflower, Millward, and Oswald (1991), and Leonard (1992).

and Sim (2020) have argued that a fall in worker bargaining power could have caused the flattening of the Phillips curve.[67]

It is less clear how to reconcile trends in the NAIRU with rising globalization, technological change, or monopoly power—the other main explanations for the trends in the labor share and corporate profitability we examine in this paper. While increased globalization and technological change may have led to disinflationary pressure in the US economy, their effect on the NAIRU would be ambiguous; disinflationary pressure as a result of lower input costs may reduce the NAIRU, but the job displacement associated with both of these phenomena may increase it.[68] And it is not possible to explain the substantial fall in the NAIRU as a result of an increase in aggregate monopoly power. While theoretical models differ on whether rising monopoly power should increase unemployment or leave it constant, there is no a priori reason to believe that an increase in monopoly power would reduce unemployment, and at the same time, an increase in monopoly power may be a source of inflationary pressure.[69] Neither of these appear obviously compatible with the trends of falling unemployment and low and stable inflation that have characterized the last three to four decades (Van Reenen 2018; Basu 2019; Syverson 2019).[70]

IV.A. State-Level Evidence

The theory discussed above suggests that falling worker power could explain the aggregate decline in unemployment seen in the United States in recent decades. State-level trends in unemployment and labor rents are

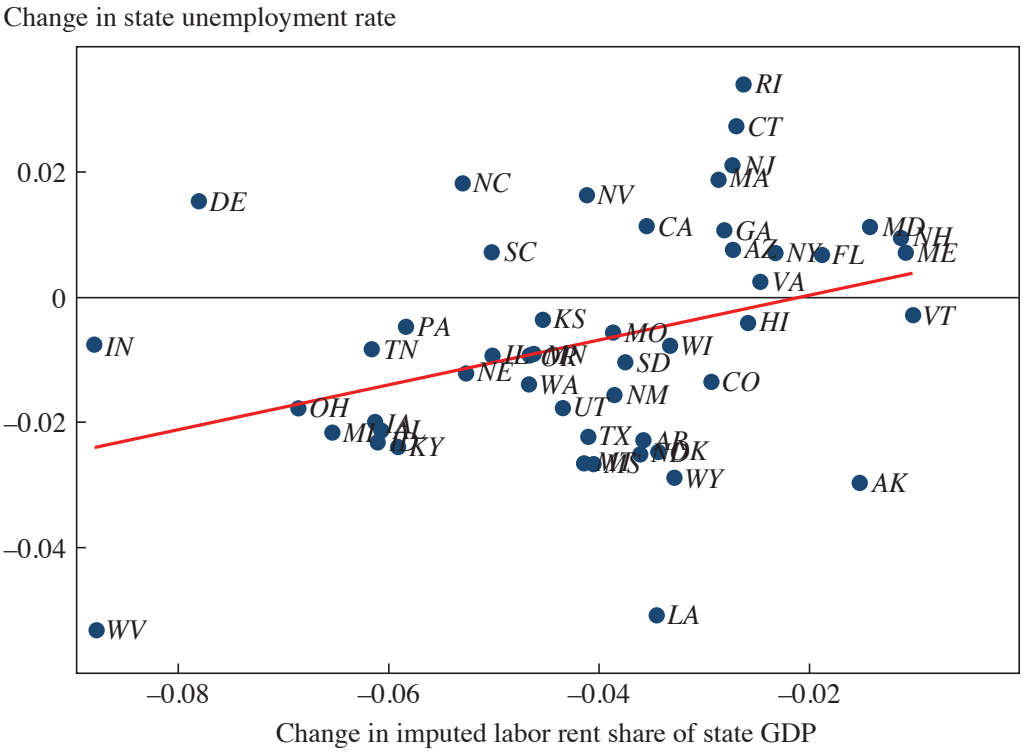
67. A number of other drivers have been posited for the fall in the NAIRU, including the changing demographic composition of the workforce (Shimer 1998; Tüzemen 2019), changes in productivity growth (Ball and Mankiw 2002), improvements in job matching (Katz and Krueger 1999), and, most recently, the decline in job destruction and reallocation intensity and the aging of workers and firms (Crump and others 2019).

68. See, for example, Kohn (2005).

69. In some models of monopoly power, the employment rate is reduced with no effect on the unemployment rate. In other models, rising monopoly power leads to rising unemployment. Blanchard and Giavazzi (2003), Geroski, Gregg, and Van Reenen (1995), and Ebell and Haefke (2009), for example, show that monopoly power plus some nonzero worker bargaining power can lead to higher unemployment. Manning (1990) demonstrates that increasing returns to scale plus monopoly power can generate high unemployment equilibria. In terms of inflation, higher markups would likely imply a higher price level (in the presence of some downward nominal wage rigidity) and therefore an increase in the inflation rate during the transition from one steady state to a new, higher-markup steady state (Phelps 1968). An increase in markups, acting as a cost-push shock, would tend to imply a higher level of inflation for a given degree of labor market slack.

70. Note also that increasing monopsony power would tend to be associated with less hiring and increased labor market frictions and so also does not provide a natural explanation for a declining NAIRU.

Figure 14. State-Level Changes in Unemployment and Labor Rents, 1984–1988 to 2012–2016



Sources: CPS; authors' calculations.
Note: The solid line is a line of best fit.

consistent with this. Figure 14 shows that states with bigger falls in their imputed labor rent share over 1984–2016 also had bigger falls in their state unemployment rate.[71] Regressing the state unemployment rate on the state imputed labor rent share at the annual level, with various combinations of state and year fixed effects, we find a consistently large, positive, and significant relationship between the two variables: higher state labor rent shares are associated with higher unemployment, with the coefficient in the specification with year and state fixed effects suggesting that a 1 percentage point lower labor rent share of GDP is associated with 0.15 percentage point lower unemployment (as shown in table 5).[72]

71. The coefficient on the line of best fit is 0.36, and the p value is 0.01. The R^2 is 13 percent.

72. Disaggregating the unemployment rate by age and gender, the large, statistically significant relationship between state-level labor rents and unemployment rates holds for workers age 25–54, and 16–24, for both men and women, but not for workers age 55–65. The estimated coefficients are particularly large for all workers age 16–24 and for women age 25–54, consistent with Bertola, Blau, and Kahn's (2007) cross-national findings.

Table 5. State-Level Regressions of Unemployment on Measures of Labor Power

State-level regression of unemployment on imputed labor rent share of state GDP, 1984–2016				
Imputed labor rent share	0.14*	0.22*	0.08^{+}	0.15*
	(0.06)	(0.09)	(0.04)	(0.06)
Fixed effects	None	Year	State	Year, State
Observations	1,650	1,650	1,650	1,650
State-level regression of unemployment on imputed union rent share of state GDP, 1984–2016				
Imputed union rent share	0.56**	0.60*	0.50**	0.54*
	(0.18)	(0.24)	(0.16)	(0.24)
Fixed effects	None	Year	State	Year, State
Observations	1,650	1,650	1,650	1,650

Source: Authors' calculations.
Note: Robust standard errors, clustered at state level, in parentheses.
$^{+}p < 0.10$, $*p < 0.05$, $**p < 0.01$

IV.B. Industry-Level Evidence

Industry-level patterns in unemployment and labor rents are also consistent with the hypothesis that declining worker power has lowered the NAIRU. As we found at the state level, industries that saw larger declines in their imputed labor rent share saw larger declines in their industry-level unemployment rate (figure 15).[73] Regressions of the annual industry-level unemployment rate on the imputed labor rent share and imputed union rent share, with industry and year fixed effects, have positive and significant coefficients (table 6), with the magnitude in the specification with industry and year fixed effects suggesting that a 1 percentage point lower imputed labor rent share is associated with a 0.1 percentage point decline in industry unemployment.[74]

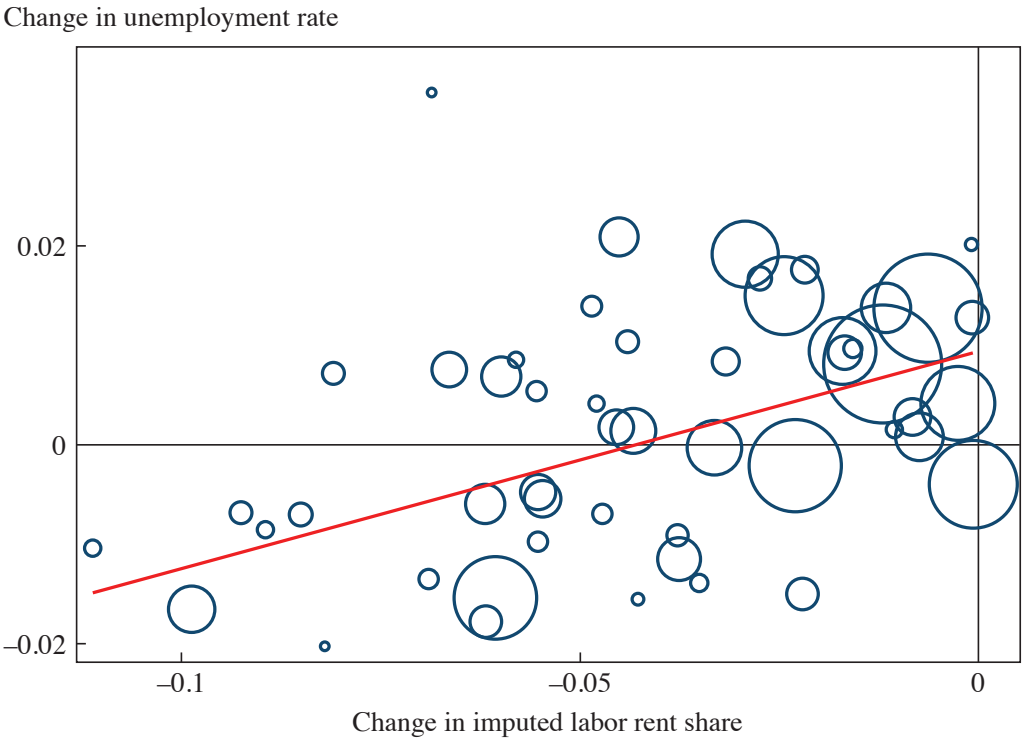
IV.C. Unemployment for College-Educated and Non-College-Educated Workers

In section II.D, we decomposed the decline in labor rents for workers with and without a college degree (bachelor's or more) over 1984–2016 and showed that while both groups saw a decline in their labor rents,

73. We measure industry unemployment in the CPS, defining it as the unemployment rate among all workers who reported having worked in a given industry in their current job (if employed) or most recent job (if unemployed).

74. Supplementing this analysis, we also show in online appendix C.9 that there is a significant relationship between industry-level unemployment and unionization rates and between industry-level labor market tightness, labor rent shares, and unionization rates. Note that, in contrast, regressions of the annual industry-level unemployment rate on measures of industrial concentration show no significant relationship, and the coefficients are positive.

Figure 15. Change in Unemployment and Imputed Labor Rent Share, by Industry, 1988–1992 to 2012–2016



Sources: CPS; authors' calculations.

Note: Each bubble is an industry (at the BEA industry code level), where the size of the bubble represents industry average employment over 2012–2016. The solid line is an employment-weighted line of best fit.

Table 6. Industry-Level Regressions of Unemployment on Measures of Labor Power

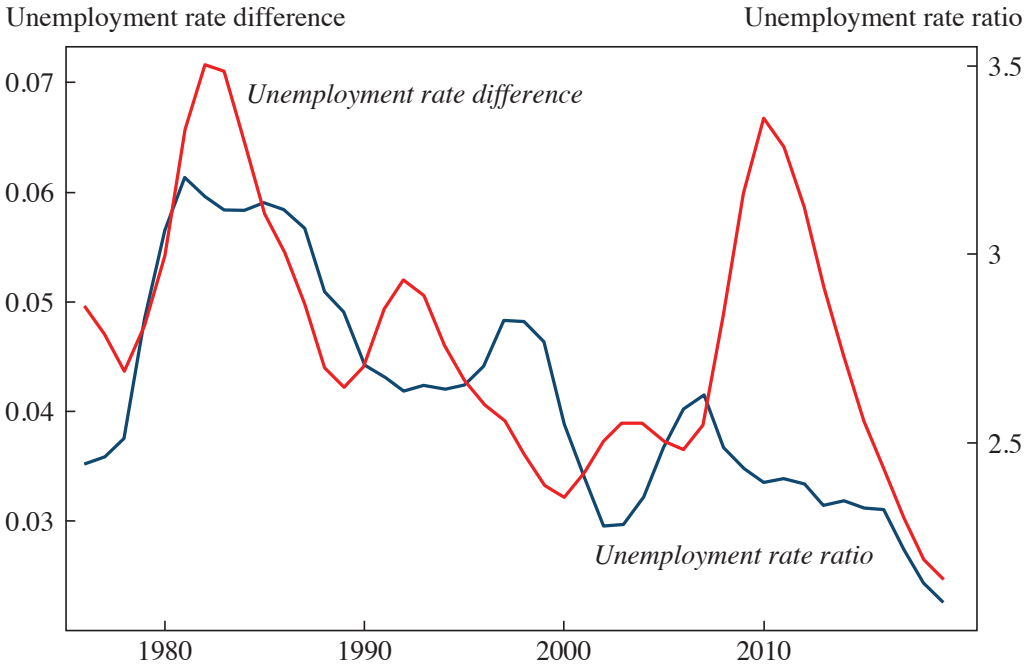
Industry-level regression of unemployment on imputed labor rent share of gross value added, 1987–2016 (fifty-one industries)				
Imputed labor rent share	–0.16**	–0.16**	–0.03	0.10**
	(0.05)	(0.05)	(0.03)	(0.03)
Fixed effects	None	Year	Ind	Year, Ind
Observations	1,530	1,530	1,530	1,530
Industry-level regression of unemployment on imputed union rent share of gross value added, 1984–2016 (fifty-one industries)				
Imputed union rent share	–0.27*	–0.23^{+}	–0.21*	0.20**
	(0.10)	(0.12)	(0.08)	(0.06)
Fixed effects	None	Year	Ind	Year, Ind
Observations	1,530	1,530	1,530	1,530

Source: Authors' calculations.

Note: Robust standard errors, clustered at industry level, in parentheses.

$^{+}p < 0.10$, $*p < 0.05$, $**p < 0.01$

Figure 16. Relative Unemployment Rates of Workers with and without a College Degree, 1976–2019



Source: CPS.

Note: Unemployment rate difference is defined as unemployment rate for workers without a bachelor's degree ("non-college") minus unemployment rate of workers with a bachelor's degree or better. The ratio is defined as non-college-educated unemployment rate divided by unemployment rate of workers with a bachelor's degree or better. Data points are three-year moving averages.

the decline was substantially larger for non-college-educated workers. If declining labor rents leads to a lower NAIRU, one might expect to see larger declines in average unemployment for non-college-educated workers than for college-educated workers over the same period. This has been the case: the unemployment rate of workers without a four-year college degree has fallen substantially relative to the unemployment rate of workers with a bachelor's degree, as shown in figure 16.

IV.D. Quantitative Implications for the NAIRU

Can we say anything about whether the magnitude of the decline in worker power is big enough to account for the decline in the NAIRU? One recent study on this topic is Figura and Ratner (2015), who study the decline in worker power as proxied for by the decline in the labor share of income. They show that industries and states with bigger falls in their labor share over 2001–2014 saw bigger increases in their vacancy-to-unemployment ratio (labor market tightness). They argue that this

is consistent with a decline in worker bargaining power increasing the incentive for firms to create jobs and that the decline in the labor share of income could have led to a two-thirds of a percentage point fall in the NAIRU.[75] We can similarly use our state-level and industry-level estimates to back out a naive extrapolation of the aggregate relationship between worker power and unemployment. Applying the coefficients from the state-level regressions in table 5 to our estimate of the fall in labor rents in the nonfinancial corporate sector over 1982–2016 (a fall of 5.1 percentage points) would have predicted a fall of three quarters of a percentage point in the NAIRU.[76] We have reason to believe that both the Figura and Ratner (2015) estimate and our estimate of the effect of the decline of worker power on the NAIRU may be underestimates of the true effect, since they are based on state- and industry-level variation which may miss some aggregate effect, and since the imperfection of the labor share (in the case of Figura and Ratner) or the imputed labor rent share (in our case) as proxies for the decline in worker power is likely to cause attenuation bias.[77]

V. Possible Objections and Further Considerations

In this section, we examine trends in aggregate investment, firm-level labor shares and markups, rising top-end labor compensation, and occupational licensing in light of the declining worker power hypothesis. We also evaluate the evidence for alternative explanations of the declining labor share and rising corporate valuations—globalization, technological

75. More formally, they argue that the negative relationship they find between the labor share and the vacancy-to-unemployment ratio is consistent with a counterclockwise rotation in the job creation curve in a standard DMP search model. After estimating the slope of the Beveridge curve, they can then estimate the degree to which a decline in worker bargaining power may affect equilibrium unemployment.

76. Our state-level estimates of the labor rent share—which we use to generate the estimated relationship between changes in the labor rent share and unemployment—calculate labor rents as a share of private sector value added. In this calculation we use our estimate of the decline in labor rents as a share of nonfinancial corporate value added. This calculation therefore implicitly assumes that the decline in the labor rent share of gross value added in the financial sector and in the nonfinancial noncorporate sector was also 5.1 percentage points. Our estimates of labor rents in the entire corporate sector (including finance) were very similar to our estimates of labor rents in the nonfinancial corporate sector; they can be found in online appendix B.2.

77. While a full model-based investigation of the degree to which the decline in worker power may have affected the NAIRU is beyond the scope of this paper, we carry out four back-of-the-envelope exercises in online appendix E. These illustrate that, in simple models with plausible parameter values, it is possible for the decline in worker power that we have seen to generate very large changes in the NAIRU.

change, and rising monopoly power—in light of cross-national and cross-industry evidence.

V.A. Investment

Investment has been falling over recent decades relative to measures of corporate profitability such as operating surplus and Tobin's q, as well as relative to GDP and fixed assets (Gutiérrez and Philippon 2017; Alexander and Eberly 2018; Crouzet and Eberly 2019). These trends have been a major motivator of the monopoly power argument (Gutiérrez and Philippon 2017; Eggertsson, Robbins, and Wold 2018). One might argue these trends in investment are hard to reconcile with our argument that there has been a macroeconomically important decline in worker power: some models predict that a decline in worker power, reducing the marginal cost of production, would lead to an increase in investment.[78] To what extent are the facts on investment compatible with our argument of declining worker power?

First, we note that it is not clear that investment, properly measured, *has* declined substantially relative to value added or fixed assets. The relative price of investment goods has declined, meaning that while there has been a decline in net investment relative to net value added in nominal terms, there has been no decline in net real fixed investment relative to net real value added in the nonfinancial corporate sector (as shown in figure 17).[79] And Crouzet and Eberly (2019, 2020) show that a rise in intangible investment could account for the majority of the apparent decline in investment relative to fixed assets.

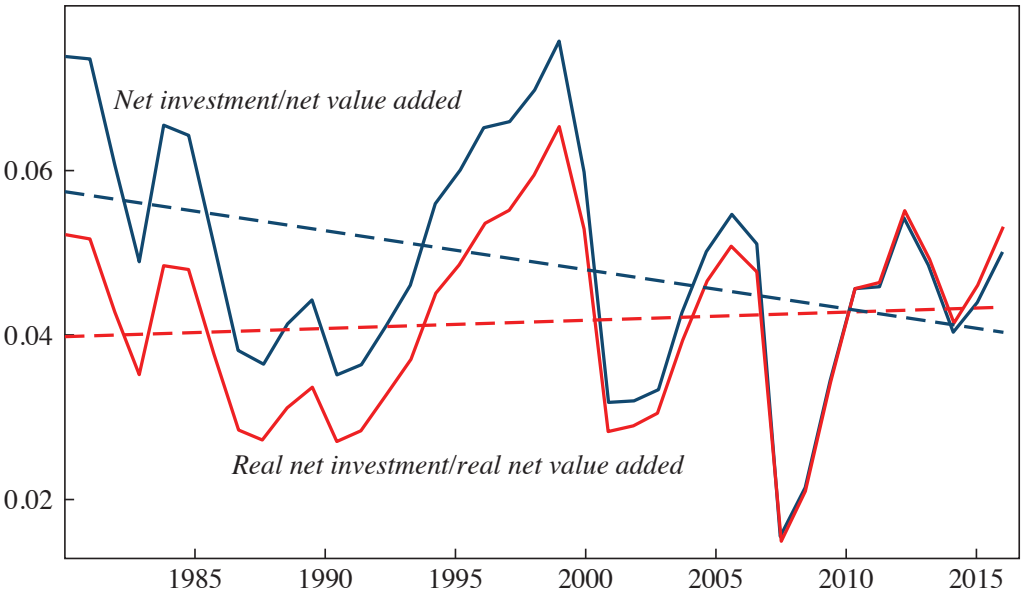
Second, we note that the theoretical predictions of declining worker power for investment are actually ambiguous. It is possible that a decline in worker power leads to less investment: by reducing the marginal cost of labor to firms, declining worker power may lead to the substitution of labor for capital (or at least, less substitution of capital for labor), reducing investment relative to a scenario where worker power had not declined.

Third, the fall in investment relative to measures of corporate profits can be explained by our declining worker power hypothesis. In efficient bargain

78. As argued by Eggertsson, Robbins, and Wold (2018), for example.

79. Net investment to net value added is calculated using data on gross nonresidential investment and the consumption of nonresidential fixed capital by nonfinancial corporate business, from the Federal Reserve's Financial Accounts of the United States, Z.1, and gross value added in the nonfinancial corporate business sector from BEA NIPA. For the ratio of real net investment to real net value added, investment is deflated by the implicit price deflator for nonresidential fixed private sector domestic investment from the BEA, and value added is deflated by the implicit price deflator for nonfinancial corporate business from the Bureau of Labor Statistics.

Figure 17. Real and Nominal Net Investment over Net Value Added, Nonfinancial Corporate Sector



Sources: Federal Reserve Financial Accounts of the United States, Z.1; BEA NIPA.

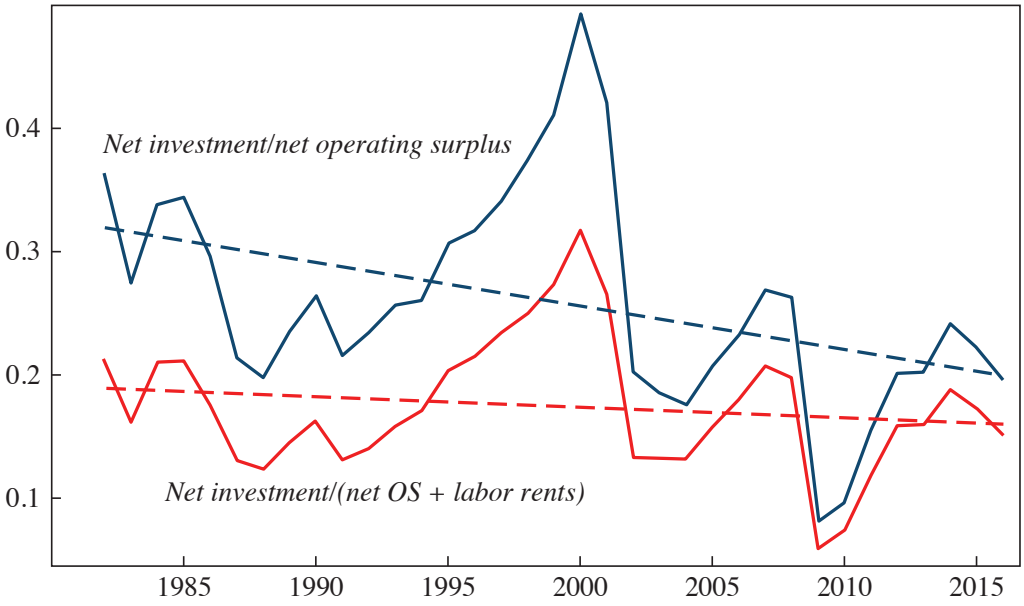
models of worker rent-sharing (our model in section III.A, for example) the degree of worker power does not affect the firm's investment decision. The firm makes its investment decisions in order to maximize total profits, then distributes the rents between labor and capital. To understand if investment has fallen relative to the underlying profitability of firms, we must therefore measure both profits to capital and profits to labor. Defining the ratio of investment to total profits as follows:

$$\frac{\text{Investment}}{\text{Total profits}} = \frac{\text{Investment}}{\text{Net operating surplus} + \text{imputed labor rents}}$$

we show in figure 18 that while net investment over net operating surplus (profits *to capital*) has fallen substantially over the last thirty years in the nonfinancial corporate sector, average net investment over our measure of net *total profits* has declined only very slightly. That is, even nominal investment has not weakened much relative to our measure of firms' total profitability.[80] The relationship between labor power and investment-to-profits

80. Crouzet and Eberly (2020) attribute a share of the growing weakness of investment relative to Tobin's q to product market rents. Our explanation could be compatible with this: instead of the product market rents arising from increased monopoly power, they may have been rents that were previously paid to labor so did not show up in Tobin's q.

Figure 18. Net Investment to Profits to Capital and Imputed Total Profits, Nonfinancial Corporate



Sources: Federal Reserve Financial Accounts of the United States, Z.1, Flow of Funds Accounts; BEA NIPA; authors' calculations.

Note: Investment is measured as gross fixed investment in nonresidential structures, equipment, and intellectual property products for nonfinancial corporate business. We obtain net investment by subtracting the consumption of fixed capital for the nonfinancial corporate sector from gross investment. The labor rents measure is constructed as described in section II.

also holds at the industry level: industries with larger declines in their imputed labor rent share saw larger declines in the ratio of investment to operating surplus, even in annual regressions when controlling for a variety of industry and year fixed effects (table 4).[81]

V.B. Firm-Level Dynamics: Labor Shares and Markups

Our analysis in this paper is primarily at the industry and aggregate level. Recent research has emphasized the role of firm-level dynamics in trends in labor shares, markups, and wages. First, several papers find a large role for between-firm reallocation in the decline of the labor share and rise in measured markups. Second, research with matched employer-employee data suggests that the dispersion of average earnings at the firm

81. In contrast, coefficients on average top twenty sales concentration are noisy (see table 4), and there is no apparent relationship between the change over 1988–2016 in the average top twenty sales concentration ratio and the ratio of investment to gross operating surplus (see online appendix C.10).

level has risen. Can we reconcile our results with this firm-level evidence on labor shares, markups, and wages?

LABOR SHARE AND MARKUPS Autor and others (2020) find that two-thirds of the decline in the aggregate labor share can be explained by between-firm reallocation, with one-third explained by within-firm falls in the labor share. The median firm saw no decline in their labor share, while firms with initially low labor shares saw their labor shares fall still further. Kehrig and Vincent (2020) find similar dynamics in manufacturing, showing that the decline in the labor share is driven by establishments which are growing in size and at the same time see falling labor shares. De Loecker, Eeckhout, and Unger (2020) find that the rise in the aggregate measured markup results largely from a reallocation of activity to high-markup firms, the median markup did not change, and markups for already high-markup firms increased.

It is clear that our proposed mechanism—a fall in labor rent-sharing power—could explain *within-firm* declines in labor shares and increases in measured markups. It is also possible to reconcile our proposed mechanism with the portion of the decline in the labor share (or rise in measured markups) that results from the *reallocation* of economic activity across firms. First, it could simply be the case that firms which experienced bigger falls in worker power also grew faster for some exogenous reason. Second, it is possible that this faster growth itself is at least partly a result of falling worker power. To see this, note that if workers receive a competitive wage plus some portion of a firm's rents, then unit labor costs are higher at high-rent firms than at low-rent firms, but unless workers' share of rents in high-rent firms is higher than the aggregate labor share, high-rent firms will still have lower labor shares than low-rent firms. Therefore, as workers' rent-sharing power declines, unit labor costs fall disproportionately more at high-rent, low-labor-share firms than at low-rent, high-labor-share firms. This improves the competitive advantage of high-rent firms, creating an incentive for them to expand. This would lead to a reallocation of economic activity from high-labor-share to low-labor-share firms.

FIRM WAGE EFFECTS There has been an increase in the dispersion of average wages at the firm level over recent decades, which has led to suggestions that this could indicate a divergence in firm-level rents (Barth and others 2016). This might be seen as supporting the hypothesis of rising monopoly power, rather than declining worker power. In fact, the evidence is more consistent with declining worker power. Song and others (2019) use matched employer-employee data to decompose the variance of US

wages into firm effects, worker effects, and the covariance of the two, following Abowd, Kramarz, and Margolis (1999). The firm effects indicate the firm-specific pay premium, holding worker quality constant, and can be interpreted as some combination of rent-sharing and compensating differentials (Sorkin 2018; Card and others 2018). Song and others (2019) show that the increase in the variance of firm-level average wages over 1980–2013 was entirely due to an increase in the *sorting* of high-wage workers into high-wage firms and not an increase in the dispersion of the firm premia paid to equivalent workers. In fact, they find a small decline in the variance of firm effects over the period. These trends are consistent with a decline in rent-sharing: the decline in the variance of firm fixed effects could reflect declining wage premia in formerly high-wage firms, and the increase in the sorting of high-wage workers into high-wage firms (and vice versa) could reflect the fissuring of the workplace. On the other hand, if an increase in monopoly power had caused total rents to increase, holding constant the initial degree of rent-sharing with workers, one would have expected firm effects to become more dispersed rather than less (if rents increased more for already high-rent firms).

Note that the decline in the variance of *firm* fixed effects estimated by Song and others (2019) has been substantially smaller than the decline we estimate in the variance of *industry* fixed effects. There are two ways to reconcile this. First, note that a large decline in the variance of industry wage premia, but a small decline in the variance of firm wage premia, would be consistent with an aggregate decline in labor rents as a result of the fissuring of the workplace, as an increasing share of workers work at firms with low rents (and fewer at firms with high rents).[82] Second, evidence from Lachowska and others (2020), who carry out an AKM decomposition in Washington State over 2002–2014, suggests that the underlying secular decline in the variance of firm fixed effects over recent decades may have been larger than that estimated by Song and others (2019), both because the decline in the variance of firm fixed effects for *hourly wages* may have been larger than that for annual earnings (where Song and others focus on the latter), and because the endpoint of the analysis by Song and others (2019) appears to have been at a point

82. Following the suggestion of Christina Patterson in her remarks at the Spring 2020 BPEA meetings, we note that the relationship between firm and industry effects can be written as $\gamma_{ind} = \sum_j \frac{E_j}{E_{ind}} \gamma_j$, where γ_{ind} and γ_j denote industry and firm wage effects, respectively, and E_{ind} and E_j denote industry and firm employment, respectively.

where the variance of firm fixed effects may have been particularly high for cyclical reasons.[83]

V.C. Labor Rents to the Highly Paid: Executive Compensation and Finance

There has been roughly a doubling of the share of national income accruing to executives, managers, and supervisors in nonfinancial firms since 1979 (Bakija, Cole, and Heim 2012). High-earning financial sector workers have also seen large rises in their compensation. Could these reflect rising labor rents?[84]

First, note that we estimate labor rents from the CPS, where the earnings data are top-coded and nonresponse is high for people in the top tail of the income distribution. This means that our estimate of the decline in labor rents should be considered to be the decline in rents for the majority of workers but not including the highest paid—and so, not including top executives, managers, or many financial sector workers.[85]

It is therefore plausible that some of the lost labor rents we measure were redistributed to top management and executives, rather than to shareholders. Indeed, this could be consistent with our evidence, since we estimate that the decline in the labor rent share of value added in the nonfinancial corporate sector (for the majority of workers) was greater than the actual decline in the labor share (which includes executive compensation). Note, though, that the majority of the increase in executive compensation (as a share of total income) over this period accrued to executives and managers who receive self-employment, S-corporation, or partnership income (Bakija,

83. Song and others (2019) find that over 1980–87 to 2007–13 there was a decline of about 3.5 percent in the variance of firm fixed effects. While they use different data sets, Lachowska and others (2020) and Song and others (2019) find very similar declines in the variance of firm fixed effects for annual earnings over the period they study in common (2002–2014), suggesting the two studies may be comparable. Lachowska and others (2020) find a much larger decline in the variance of firm fixed effects for hourly wages than for annual earnings over this period, and they find large countercyclicality in the variance of firm fixed effects; their estimates suggest that the variance of firm fixed effects will have been particularly high during the 2007–2013 period, the endpoint of the comparison in Song and others (2019).

84. See Bivens and Mishel (2013) for evidence on the existence of rents in executive pay, and Philippon and Reshef (2012) for evidence on rents in financial sector compensation.

85. Specifically, our baseline estimate of labor rents for the nonfinancial corporate sector will omit high-paid executives and managers because of CPS top-coding or nonresponse and will omit all financial sector workers by construction. Our estimate of labor rents for the entire corporate sector will include many financial sector workers but will omit increases in pay for the highest-paid financial sector workers because of CPS top-coding. See online appendix B.2 for more details.

Cole, and Heim 2012; Smith and others 2019).[86] Since it is ambiguous whether income from these sources should be considered capital or labor income, it is unclear whether to consider the rising income of executives and managers of S-corporations and partnerships as a redistribution of rents from workers' labor income to managers' labor income or simply from labor to capital.[87]

It is also plausible that some of the lost labor rents we measure were redistributed to high-paid financial sector workers. When estimating labor rents for the entire corporate sector (including finance), we find a very similar decline in labor rents as we do for the nonfinancial sector—meaning that the inclusion of the majority of financial sector workers does not affect our conclusions. However, since the CPS earnings data are top-coded, our calculation will miss any increase in rents accruing to very highly paid professionals in finance. In our CPS-ORG data, the share of workers in finance, insurance, and real estate who had top-coded earnings rose from 2 percent in 2000 to 9 percent by 2019. It is possible that these workers saw their labor rents increase over the period where the majority of workers saw labor rents decrease—but note that since this is a relatively small group of workers, even rather drastic increases in rents for the top 5–10 percent of financial sector workers would not have made a major difference in the overall trend in labor rents for the entire corporate sector.[88]

V.D. Occupational Licensing

While unionization, industry wage premia, and firm size wage premia have fallen over recent decades, the extent of occupational licensing has

86. Bakija, Cole, and Heim (2012) estimate that the increase in the income share of managers, executives, and supervisors in the top 1 percent of all income earners who work for closely held businesses was around 2.2 percentage points over 1979–2005, while the increase in the income share of salaried managers, executives, and supervisors in the top 1 percent of all income earners was only around 0.4 percentage points.

87. Note also that Smith and others (2019) argue that the decline in the labor share has been overstated because of the increase in income accruing to the top 1 percent of earners which comes from pass-through enterprises. This income is booked as capital income but some may more appropriately be considered labor income. While the degree of the decline in the aggregate labor income share may be ambiguous as a result of the difficulties of imputing pass-through income to labor or capital (and imputing self-employment income), what is *not* ambiguous is that the share of total income going to the vast majority of workers has declined since the 1980s. For example, Piketty, Saez, and Zucman (2018) estimate that for the bottom 99 percent of people, for example, the share of total national income accounted for by labor compensation declined from 69 percent in 1978 to 59 percent in 2014.

88. See online appendix B.2 for our estimates of labor rents in the entire corporate sector and a discussion of the effect of top-coding of earnings on our calculation of labor rents in finance.

risen. Have we overestimated the decline in labor rents by failing to consider occupational licensing?

We believe that accounting for the rise of occupational licensing would not substantially change our results. First, note that for many professions in which occupational licensing has increased in recent years, occupational licenses are less likely to transfer rents from workers to capital owners than they are to transfer rents from unlicensed workers to licensed workers or from consumers to workers (for example, hairdressers, manicurists, and cosmetologists, real estate agents, or self-employed workers in the building trades). Recent work by Kleiner and Soltas (2019) estimates that 70 percent of the welfare loss of marginal occupational licensing is borne by workers. Even if we were to assume that *all* rents accruing to workers as a result of occupational licensing were obtained at the expense of capital, a back-of-the-envelope calculation suggests that the rise of occupational licensing could only have resulted in an increase in labor rents of 0.2–0.7 percentage points of value added; the share of the US labor force required to have an occupational license is estimated to have risen by around 7–12 percent from the 1980s to 2008 (Kleiner and Krueger 2013; CEA 2016), and the wage premium for licensed workers in the United States appears to be in the range of 4–8 percent (Gittleman, Klee, and Kleiner 2018; Bryson and Kleiner 2019).

V.E. Further Evidence on Alternative Hypotheses for Trends in Labor Shares and Corporate Profits

In this section, we address a number of empirical trends which point to weaknesses in the arguments that globalization, technological change, or monopoly and monopsony power were the predominant drivers of the falling labor share and rising corporate profits.

First, we note that while technological change and globalization are ubiquitous, the extent of increases in inequality—both between capital and labor incomes and within labor incomes—differ substantially across countries (Gutiérrez and Piton forthcoming). This would tend to suggest a substantial role for country-specific factors in explaining the decline in the labor share—as argued by Philippon (2020) among others—pointing up the monopoly power or worker power explanations as candidates.

A large proportion of the decline in the US labor share can be accounted for by the manufacturing sector. The centrality of the manufacturing sector in the decline in the US labor share would tend to favor the declining worker power hypothesis over the rising monopoly power hypothesis; given the increases in international trade driven by the opening of

low-wage economies to international markets and reductions in transport costs and trade barriers, it seems unlikely that US manufacturing has seen a substantial increase in product market power over recent decades. In contrast, the manufacturing sector saw large declines in unionization over recent decades and can account for a large share of our estimated decline in labor rents.

Our hypothesis, which emphasizes the relative power of labor and capital, can therefore fit the combination of cross-country and cross-industry facts better than hypotheses based on globalization, technological change, or monopoly power (given far more empowered shareholders and weaker unions in the United States than in the rest of the industrial world). In keeping with this, cross-country evidence from Kristal (2010) and Jaumotte and Osorio Buitron (2015) suggests that countries with bigger declines in unionization saw bigger declines in their labor shares and bigger increases in income inequality.[89]

Second, while monopoly power and monopsony power are without doubt present in certain parts of the US economy—and our baseline framework in fact assumes the existence of both types of power—we also note that the direct evidence of a large aggregate increase in either monopoly power or monopsony power is unclear.[90]

The large rise in industry-level sales concentration over recent decades has frequently been invoked as a likely driver of rising monopoly power (Grullon, Larkin, and Michaely 2019; Gutiérrez and Philippon 2017, 2019). Yet industrial organization economists point up a number of reasons to be skeptical that this increase in concentration reflects a large increase in aggregate monopoly power (see, for example, Shapiro 2018; Berry, Gaynor, and Scott Morton 2019; Basu 2019; Syverson 2019). First, it is

89. Bental and Demougin (2010) also argue that cross-country trends in the labor share may have been driven by an erosion of worker bargaining power, but as a result of improved monitoring technologies. Earlier work studying cross-country trends in labor shares includes Bentolila and Saint-Paul (2003).

90. Several recent studies demonstrate the presence of monopoly and monopsony power in the US economy. In terms of monopoly power, Covarrubias, Gutiérrez, and Philippon (2019) and Philippon (2020), for example, document that since 2000, rising concentration has been associated with slower turnover of lead firms and rising prices, particularly in telecoms, airlines, and banking; they present case studies of several products where prices are substantially higher in the United States than in Europe. In terms of monopsony power, Berger, Herkenhoff, and Mongey (2019) estimate welfare losses of 5 percent of lifetime income arising from employers' power in the labor market (as indexed by workers' elasticity of labor supply); and Schubert, Stansbury, and Taska (2020) and Arnold (2020) find sizeable negative effects on wages for workers in highly concentrated labor markets. See Sokolova and Sorensen (2020) for a review of the empirical evidence on the elasticity of labor supply to the firm.

not clear whether this large aggregate increase is still present when defining markets appropriately; import-adjusted measures of sales concentration in manufacturing have fallen or risen only marginally since the 1980s (Covarrubias, Gutiérrez, and Philippon 2019), and in many service industries, where the relevant market is often smaller than the entire US market, local-level sales concentration is actually falling, possibly even reflecting increased local-level competition as large firms spread their business into new markets (Rossi-Hansberg, Sarte, and Trachter forthcoming). Second, industries may become more concentrated as efficient firms compete and win market share: several authors have documented a relationship between rising product market concentration and rising productivity in certain sectors (Peltzman 2018; Autor and others 2020; Ganapati forthcoming; Crouzet and Eberly 2019). Third, even where concentration ratios have increased in well-defined markets, they are usually below levels which typically raise profit concerns (Shapiro 2018).[91] In addition, we note that the substantial decline in the large-firm wage premium is the opposite of what one would expect to see if large firms were gaining more monopoly power.

Similarly, there is less direct evidence of a rise in labor market monopsony power—in terms of an increasingly inelastic labor supply curve to firms—than there is of a fall in worker power. It does not seem plausible that monopsony power has increased as a result of an increase in labor market concentration (Bivens, Mishel, and Schmitt 2018); local labor market concentration is low for most workers, particularly when considering the availability of jobs in other occupations or industries (Schubert, Stansbury, and Taska 2020) and has actually fallen, not risen, for most workers over recent decades (Rinz 2018). Berger, Herkenhoff, and Mongey (2019) estimate that the fall in local labor market concentration since the 1970s was large enough to predict a 3 percentage point *increase* in the labor share. And while the proliferation of noncompete clauses and occupational licensing requirements may have increased switching costs for some workers, the rise of the Internet at the same time should have substantially reduced the costs of job searches for workers and employers,

91. In recent years some authors have also argued that the rise in common ownership across firms, as documented by Azar, Schmalz, and Tecu (2018) among others, has led to reduced competition and increased monopoly power (Azar and Vives 2019). More research would be valuable in this regard; the theoretical links between common ownership concentration and monopolistic behavior by firms remain debated, and there does not yet appear to be a clear empirical consensus on the relationship between common ownership and industry-level outcomes like investment, prices, markups, and production (Schmalz 2018; Backus, Conlon, and Sinkinson 2019).

so the net change in the degree of labor market frictions is unclear.[92] One piece of evidence which might indicate a rise in monopsony power is Webber (2018), who estimates a decline in the firm-level elasticity of quits to the wage over 2003–2011; more research would be valuable to identify whether this reflects a long-term trend or the slow labor market recovery following the Great Recession.

VI. Concluding Remarks

The evidence in this paper suggests that the American economy has become more ruthless, as declining unionization, increasingly demanding and empowered shareholders, decreasing real minimum wages, reduced worker protections, and the increases in outsourcing domestically and abroad have disempowered workers—with profound consequences for the labor market and the broader economy. We argue that the reduction in workers' ability to lay claim to rents within firms could explain the entirety of the change in the distribution of income between labor and capital in the United States in recent decades and could also explain the rise in corporate valuations, profitability, and measured markups, as well as some of the decline in the NAIRU. We believe the declining worker power hypothesis has been substantially underemphasized as a cause of these macroeconomic trends, relative to other proposed causes: globalization, technological change, and rising monopoly or monopsony power.

An important set of issues which we do not explore in detail relate to inequality in labor income. It seems plausible that the same kinds of situations that encourage rent-sharing also encourage the compression of compensation relative to productivity: unions, generous benefit structures, formalized wage-setting processes, and so forth. Consistent with this, in section II.D we find that the decline in labor rents has been greater for workers without college degrees than for those with college degrees.[93] It is also plausible that the decline in the rent-sharing power of the majority

92. On noncompete clauses and no-poaching agreements, see Kleiner and Krueger (2013), Krueger and Ashenfelter (2018), Furman and Krueger (2016), and Starr, Prescott, and Bishara (2019). On the Internet and job searches, see Stevenson (2009), Kuhn and Mansour (2014), and Bhuller, Kostøl, and Vigtel (2020). There has been a decline in the job-switching rate over time; this may either suggest an increase in the costs of job switching, consistent with higher monopsony power, or a decrease in the dispersion of job-specific rents, reducing workers' incentive to switch jobs (Molloy and others 2016).

93. There is a large body of work consistent with this. Several authors document an important role for declining unionization in the rise in wage inequality (DiNardo, Fortin, and Lemieux 1996; Card 1996; Farber and others 2018); others document a role for the rise in outsourcing and the fissuring of the workplace (Weil 2014).

of workers could explain some of the increase in the income share of the top 1 percent. Over 1979–2014, the income share of the top 1 percent is estimated to have risen by between 4.9 and 9 percentage points (Auten and Splinter 2019; Piketty, Saez, and Zucman 2018). If we assume that all of the decline in labor rents we estimate in this paper represented redistribution from the bottom 99 percent to the top 1 percent (whether as labor or capital income), it could explain between 41 percent and 76 percent of the entire increase in the top 1 percent income share over the last forty years. If we assume instead that labor rents were redistributed as capital income across the entire income distribution, but in proportion to the actual distribution of capital income arising from firm ownership, then our estimated decline in labor rents could still account for 24–45 percent of the increase in the income share of the top 1 percent.[94]

In future research it would be valuable to more explicitly consider alternative bargaining models and their implications for wages and employment and for total output and investment. A further promising avenue is distinguishing between the degree of product market monopoly power versus labor market power in the US economy by estimating markups on different types of inputs. With sufficiently detailed data on input costs, markups could be estimated on nonlabor inputs and on labor inputs separately. Markups over labor and nonlabor inputs following the same path would be consistent with a rise in monopoly power; markups over nonlabor inputs staying constant while markups over labor rise would be more consistent with a fall in worker power or a rise in monopsony power.[95]

A fair question about the labor rents hypothesis regards what it says about the secular stagnation hypothesis that one of us has put forward (Summers 2013). We believe that the shift toward more capital income, which occurs as labor rents decline, operates to raise saving and reduce demand. The impact on investment of reduced labor power seems to us ambiguous, with lower labor costs encouraging expanded output on the one hand and on the other encouraging more labor-intensive production, as discussed in section V. So decreases in labor power may operate to promote the reductions in demand and a rising gap between private saving and investment that are defining features of secular stagnation.

Finally, it is worth highlighting that the declining worker power hypothesis is perhaps more deeply threatening to existing thinking than the other prominent hypotheses for the causes of the decline in the labor share. The

94. For details of our calculations, see online appendix C.11.

95. However, finding differential trends in markups on labor inputs versus nonlabor inputs would not be conclusive evidence because this could also be driven by technological change (Baqaee and Farhi 2020).

globalization or technological change perspectives would imply that any adverse distributional consequences have come alongside greater efficiency, which would have made Pareto-improving redistribution possible (at least in principle). The monopsony and monopoly perspectives suggest that the rise in inequality has come alongside the economy becoming less efficient, which puts economists in the congenial position of arguing for policies that simultaneously perfect markets, increase efficiency, and promote fairness. In contrast, the declining worker power perspective would imply that the increased inequality we have seen over recent decades may not have come alongside greater efficiency. And the policy implication if these trends are to be reversed—doing more to preserve rent-sharing—interferes with pure markets and may not enhance efficiency on at least some measures.[96]

More profoundly, if the decline in worker power has been a major cause of increases in inequality and lack of progress in labor incomes, if policymakers wish to reverse these trends, and if these problems cannot be addressed by making markets more competitive, this raises questions about capitalist institutions. In particular, it raises issues about the effects of corporate governance arrangements that promote the interests of shareholders only versus a broader set of stakeholders—a constantly simmering debate that has gained new prominence with the Business Roundtable's embrace of stakeholder capitalism. And it suggests that institutions that share rents with workers are likely to be necessary as a form of countervailing power, of the sort initially proposed by Galbraith (1952).

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96. The degree to which labor market rent-sharing institutions promote or reduce aggregate efficiency depends on the underlying degree of competition in the labor market, the availability of rents in the product market, and the nature of the rent-sharing institutions, as discussed by Manning (2003) and others.

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Comments and Discussion

COMMENT BY

STEVEN J. DAVIS Anna Stansbury and Lawrence Summers advance the thesis that worker power fell in recent decades, leading to a loss of labor rents. As explanations for the fall in worker power, they stress two factors: first, institutional forces such as the shrinking role of private sector unions and second, increases in shareholder power and shareholder activism that drove firms to cut wages, outsource labor, and rely more heavily on contract workers.

The authors cover a lot of ground, and I will remark only on parts of their study. They make a strong case that labor rent premiums fell for many American workers. They also show that falling worker power and labor rents can potentially explain major developments that other authors have attributed to rising product market power or rising monopsony power—including labor's falling share of national income, the rise of measured markups, increased market valuations of publicly traded firms, and a fall in the non-accelerating inflation rate of unemployment (NAIRU). These are important contributions.

Less persuasive are their headline claims about the magnitude of falling labor rents, especially when understood as a redistribution of rents from labor to capital. I make several points in this regard and conclude that we do not yet have a confident quantification of what happened to aggregate labor rents (as a share of value added) in recent decades. I also offer some remarks on the role of technological developments and globalization in driving declines in unionization and the average rent premium.

THE MAGNITUDE OF FALLING LABOR RENTS Stansbury and Summers estimate that labor rents fell "from 12 percent of net value added in the nonfinancial corporate business sector in the early 1980s to 6 percent in the 2010s." Figure 5 plots the estimated labor rent share from 1982 to 2016,

and table 1 reports the separate contributions of union rents, firm size rents, and industry rents.

These estimates are key inputs into their later analyses. They derive them in two steps. First, they use Current Population Survey (CPS) micro data to estimate average log wage premia associated with union status, employer size, and industry (conditional on various controls). For each category of rents, they designate a reference sector or group with zero rents by assumption, and they interpret one-half of the log wage premium relative to the reference sector or group as a rent premium. Second, they combine these sectoral and group-level rent premium estimates with data on the share of compensation in the nonfinancial corporate sector, the industry distribution of compensation, the union coverage rate, and the distribution of compensation by firm size as spelled out by the formulas in section II. My remarks below pertain to their first step.

At the outset, it's useful to distinguish between two empirical objects: (a) the average rent premium among workers in a given sector or group, and (b) the natural log of labor rents divided by (compensation minus labor rents) in the sector or group. Stansbury and Summers estimate (a) by fitting equal-weighted log wage regressions to CPS micro data by year. When they plug their sectoral and group rent premium estimates into their formulas, they implicitly equate (a) to (b). However, these two objects have the same value only under special circumstances—for example, when all workers in the sector or group receive the same rent premium. Likewise, changes over time in (a) and (b) are identical only under special circumstances.

Of course, objects (a) and (b) are roughly the same under a broader range of circumstances. So, the issue is whether (a) and (b) are roughly the same—and changed by roughly the same amount over time—in the circumstances that unfolded in the US economy in recent decades.

There are good reasons to think not. First, Stansbury and Summers show in online appendix figure B.4 that the rent premium fell almost twice as much from 1984 to 2016 for workers with a noncollege education as for those with a college education. The rent premium was about 15–16 percent for both groups in 1984. Because they earn more, each college-educated worker contributes more to total labor rents than each noncollege worker. Likewise, each college-educated worker properly gets a larger weight in quantifying the fall in labor rents over time. In contrast, the approach taken by Stansbury and Summers weights workers equally in the quantification of labor rents and their changes over time. This aspect of their approach overstates the fall in labor rents—that is, object (b)—when high-wage workers experience smaller declines in rent premia.

Second, online appendix figure B.4 also says that college-educated workers have enjoyed a higher rent premium than noncollege workers since the early 1990s. Because the college versus noncollege wage gap has expanded over time, the appropriate weight on each college-educated worker in the calculation of total labor rents is increasing over time.[1] But, as already noted, Stansbury and Summers maintain equal weights across workers. Equal weighting overstates the fall in object (b) when workers with higher rent premia experience more rapid growth in the non-rent component of their compensation. That pattern has unfolded in recent decades for college-educated workers relative to noncollege workers.

Third, other studies point to rising rent premia in recent decades for senior executives, managers, and highly compensated professionals—especially in the financial sector. Stansbury and Summers take note of several such studies in section V.C. These other studies, when combined with the authors' evidence that rent premia fell in recent decades for the average worker, strongly suggest that labor rents were redistributed from the bottom and middle of the wage distribution to the top of the wage distribution. In these circumstances, the average rent premium can fall substantially even when labor rents as a share of total compensation are unchanged. That is, object (a) aggregated over sectors and groups can fall substantially, even when object (b) (also aggregated) remains unchanged. More generally, a redistribution of labor rents from the majority of workers to those at the top end yields a fall in (a) relative to (b).

Stansbury and Summers acknowledge in section V.A that some of what they measure as lost labor rents could instead be a redistribution of rents from the majority of workers to top management, executives, and highly compensated workers in the financial sector. They go on to argue in online appendix B.2 that the "degree to which the exclusion of top-earning workers in finance might affect our calculations is relatively limited." But the calculation they offer to support that claim involves a counterfactual change in the equal-weighted average rent premium—object (a)—whereas the impact on object (b) turns on how the exclusion of top earners affects the pay-weighted average rent premium. Since highly compensated financial professionals earn much more than average workers, the evolution of their rent premium over time has a much bigger impact on (b) than on (a). The same point applies to the labor rents of top managers, executives, and other highly compensated persons.

1. The college versus noncollege wage gap has increased more than the college versus noncollege gap in rent premiums. Thus, the non-rent part of wages has risen for college-educated workers relative to noncollege workers.

In principle, one can recover estimates of object (b) by fitting pay-weighted regressions to the CPS micro data instead of the equal-weighted regressions that underlie figure 5 and table 1 in their paper. Stansbury and Summers report selected results using wage-weighted regressions in their online appendix figures A.7 and A.8. Comparing figure A.7 and figure 3 shows that the cross-industry variance of labor rents evolves similarly over time whether estimated from a wage-weighted regression or an equal-weighted regression. This comparison suggests that objects (a) and (b) moved similarly over time for industry rent premia. Unfortunately, the comparison is distorted by serious weaknesses in the CPS micro data.

That brings me to the limitations of CPS data as a tool for quantifying total labor rents and their evolution over time. As Stansbury and Summers note, CPS data are top-coded and nonresponse rates are high for persons in the top tail of the earnings distribution. That may not matter much for estimating object (a), but it potentially matters a great deal for estimating object (b) because persons in the upper part of the earnings distribution account for a large and growing share of overall labor compensation in recent decades.

To appreciate the dimensions of the issue, consider some particulars of top coding and nonresponse in the CPS. Stansbury and Summers report that the share of wage earners with top-coded earnings in their sample varies from 1 percent to 5 percent, depending on the year. They also report that the share of workers with top-coded earnings in the finance, insurance, and real estate (FIRE) sector rose from 2 percent in 2000 to 9 percent by 2019. Based on US tax records, Smith, Zidar, and Zwick (2020, fig. 3.G) report that the top 1 percent of wage earners accounted for about 15 percent of aggregate wages in 2016, roughly double its share in 1980. The top 10 percent of wage earners accounted for about 42 percent of aggregate wages in 2016, up by about 10 percentage points since 1980. These statistics underscore the scope for rising labor rents at the upper end of the earnings distribution to go undetected in the CPS.

Philippon and Reshef (2012) combine CPS micro data for the bottom 90 percent of the wage distribution with BEA data on total compensation by sector to back out the average wage for top-decile earners by sector. They find that the average wage in the top decile of finance went from parity with the top-decile average wage in the nonfarm private economy in 1980 to a premium of more than 80 percent in 2010. Other evidence in Philippon and Reshef (2012) indicates that much of the rise in relative wages of top-decile finance workers reflects an increase in their rent premium. They also estimate that the finance sector accounts for 6–25 percent of the overall increase in US wage inequality since 1980, with larger

percentages for measures that give more weight to inequality in the upper parts of the distribution.

Nonresponse is another key feature of the CPS (and other household surveys) that hampers estimation of labor rent premia, especially in the upper parts of the earnings distribution. Unit nonresponse rates in the CPS-ASEC range from 16 to 20 percent in the period from 1997 to 2011 (Meyer, Mok, and Sullivan 2015, fig. 1). Item nonresponse rates on earnings questions in the CPS-ASEC rose from about 9 percent in 1987 to about 24 percent in 2015 (Bollinger and others 2019, fig. 1). The total earnings nonresponse rate in CPS-ASEC data—encompassing those who decline to participate in the ASEC and those who participate but fail to answer the earnings questions—rose from about 18 percent in 1987 to 43 percent in 2015. Item nonresponse rates to earnings questions in the CPS-ORG data exceed 35 percent in recent years (Bollinger and others 2019).

Working with CPS-ASEC data for 2006–2011 linked to Social Security earnings records, Bollinger and others (2019) examine item nonresponse rates across the whole distribution of earnings as measured in the Social Security records. They find a *U*-shaped nonresponse pattern, which they characterize as "trouble in the tails." Among full-time full-year workers, they find 30 percent nonresponse rates to CPS earnings questions at the top end of the earnings distribution. Moreover, nonresponse rates continue to exhibit a *U*-shaped relationship to earnings after conditioning on a rich set of controls for demographic characteristics and employment status. Put differently, they reject the hypothesis that nonresponse is random, and they still reject it when controlling for the types of observables available in the CPS.

These facts about high, rising, and nonrandom nonresponse rates in the CPS micro data raise concerns even about the Stansbury and Summers estimates of empirical object (a).[2] These facts about nonresponse rates and my earlier remarks about top coding lead me to the conclusion that CPS data do not provide a sound basis for estimating empirical object (b) and its evolution in recent decades.

To summarize, I see the evidence provided by Stansbury and Summers as showing that the equal-weighted average rent premium fell for private sector American workers in recent decades.[3] I see the question of what

2. Quite sensibly, Stansbury and Summers do not use imputed CPS earnings data.

3. In contrast to the fall in the average rent premium among private sector workers, the average rent premium among public sector employees has increased substantially since the early 1980s (Gittleman and Pierce 2011).

happened to aggregate labor rents as largely open. Moreover, I do not think that CPS micro data are adequate for developing a persuasive analysis of this second question, that is, for how object (b) has moved in recent decades.

To be sure, questions about the evolution of rent premiums for the average worker (or the majority of workers) are interesting and important. But answering questions about changes in rent premiums for the average worker is not sufficient to determine what happened to total labor rents or labor rents as a share of value added. Nor is it sufficient to discern whether, and how much, the loss of rents for the average worker reflects a redistribution of rents to capital owners.

ON THE ROLE OF TECHNOLOGICAL DEVELOPMENT AND GLOBALIZATION What drove the decline in rent premia for the majority of American workers in recent decades? Here, I see a greater role for globalization and technological changes than Stansbury and Summers. I will briefly sketch some reasons why, but my remarks only scratch the surface of a complex set of issues that warrants more research.

Consider developments in the US manufacturing sector. Historically, manufacturing workers had high unionization rates and earned high wages compared to observationally similar workers in other sectors. As of 1977, the union membership rate was 35.5 percent in manufacturing and 17.6 percent in the nonmanufacturing part of the nonfarm private sector. The corresponding coverage rates were 37.6 percent and 19.2 percent.[4] Unionization rates were higher yet among manufacturing production workers. Tabulations in Freeman (1980, table 1) using CPS data from 1973 to 1975 imply that 55 percent of blue-collar male workers in the manufacturing sector were union members. Alternatively, under the assumption that nonproduction workers in manufacturing had the same unionization rate as the nonmanufacturing part of the private sector, the implied membership rate for manufacturing production workers is 43.2 percent.

These high-wage, heavily unionized jobs became a steadily shrinking share of aggregate employment over time, largely because of automation, foreign outsourcing, and greater competition from foreign producers. Production workers in the manufacturing sector fell from 16.3 percent of all

4. Membership and coverage rates are from Hirsch and Macpherson (2003), as updated at unionstats.com. I back out the rates in the nonmanufacturing part of the nonfarm private sector using the fact that manufacturing accounted for 25.1 percent of nonfarm private sector employees in 1977.

nonfarm employees in 1977 to 6 percent in 2016.[5] Now consider a counterfactual in which 10.3 percent of nonfarm employees shift from production jobs in manufacturing to nonmanufacturing jobs while the unionization rate stays unchanged for each category of jobs. This counterfactual yields a drop in the private sector unionization rate of 2.6 to 3.8 percentage points, which amounts to 17–25 percent of the overall 1977–2016 drop in the union membership rate among nonfarm private sector employees. This counterfactual suggests that globalization and automation played significant roles in shrinking the private sector unionization rate in recent decades. By design, the counterfactual speaks only to the potential effects of globalization and automation working through the share of overall employment accounted for by manufacturing production workers. These same forces may also affect unionization and rent premia through other channels.

Stansbury and Summers remark that stronger foreign competition may have eroded the market power of US manufacturers in recent decades. If correct, this characterization points to another channel through which globalization potentially drove a shrinking unionization rate: when there are fewer monopoly profits to share, workers have less to gain by opting for unions that exist partly to extract monopoly profits. In these circumstances, it becomes more challenging for unions to win the certification elections that grant collective bargaining rights, and it becomes less attractive for national union organizations to invest in certification elections. In this connection, note that unionization fell at a faster rate from 1984 to 2019 in the manufacturing sector than in any other industry sector except for mining. See online appendix figure C.2 in Stansbury and Summers. The relatively rapid fall of unionization within manufacturing—from a high initial level—reinforces the view that globalization was a significant factor behind falling unionization.

Stansbury and Summers also remark that unions can lead to rents for workers at nonunion employers through threat effects. If union threat effects outweigh the countervailing effects of unionism on pay in nonunion jobs, then any external force that causes a decline in unionization leads to falling rent premia for nonunion workers. Those external forces may be policy-oriented or institutional in nature, or they may reflect other forces

5. I computed these statistics by combining data on manufacturing and nonfarm employment from the Current Employment Statistics with data on the production worker share of manufacturing employment from the Annual Survey of Manufactures. The corresponding figures for all manufacturing workers (inclusive of nonproduction workers) are 22 percent of nonfarm employees in 1977 and 8.6 percent in 2016.

such as greater foreign competition. In other words, threat effects amplify the impact of declining unionization on labor rents regardless of what drives the decline.

Finally, it's worth remarking that—for any given unionization rate—stronger foreign competition is likely to erode the rent premium among union and nonunion employees of affected firms. The reason is simple: when employers have lower profits, there is less to share with workers in the form of labor rents. This is yet another channel through which stronger foreign competition lowers the average labor rent premium.

In short, my remarks suggest that automation and foreign competition reduced the average rent premium among American workers in the private sector by (1) lowering the share of employment accounted for by manufacturing production workers, a heavily unionized group that had enjoyed high rent premiums; (2) making unionization less attractive within the manufacturing sector; (3) lowering rent premiums among nonunion workers through diminished union threat effects; and (4) reducing the profitability of firms facing more intense foreign competition.

I turn now to another development that may contribute to the fall in the average labor rent premium: advances in employee monitoring technologies and their deployment in the workplace. An important class of efficiency-wage models attributes labor rents to the difficulties that employers face in monitoring worker performance. In these models, improvements in the ability of employers to detect subpar worker effort (shirking) leads to a fall in the equilibrium rent premium. See, for example, the one-sector model of Shapiro and Stiglitz (1984) and the multisector model of Bulow and Summers (1986).

Technologies for tracking vehicles and workers have become common in trucking, delivery services, and field service operations in recent decades (Dutta 2012). Tracking covers vehicle location, speed, idle time, fuel consumption, customer contact, delivery items, and more. The web and social media apps have also made it easier for customers to provide instantaneous feedback about the performance of remote employees and for firms to track that performance. Cheap surveillance cameras have made it easier to detect theft, sabotage, and other forms of bad conduct in the workplace. The spread of electronic payment mechanisms probably reduces opportunities to embezzle cash. These developments make it easier for employers to detect and deter shirking and other worker conduct that harms productivity and profitability. As a result, the labor rent premium falls according to efficiency-wage models founded on concerns about shirking and other hard-to-detect forms of worker misconduct.

Much anecdotal evidence points to the increased use of monitoring technologies to detect and deter shirking. My Google search of "employee monitoring technologies" on May 22, 2020, returned 139 million results. In the summary to its "Market Guide for Employee-Monitoring Products and Services," Gartner Research (2015) states that employee-monitoring tools "can protect sensitive information and generate positive ROI by increasing the productivity and efficiency of systems and employees. Security officers seek products and services in this market focusing on insider threat mitigation, regulatory compliance and employee productivity." While ubiquitous now, these technologies did not exist twenty years ago, or they existed only in more primitive and less capable forms. To my knowledge, however, economists have not studied their impact on rent premiums and wage structures. As I remarked above, the shirking-class of efficiency-wage models predicts that the spread of such technologies lowers rent premia.

It is also plausible that advances in monitoring technologies facilitate fissuring of the workplace by making it easier for firms to outsource noncore labor activities to other firms that specialize in those activities. This type of outsourcing relaxes internal pay equity constraints, leading to a loss of rents for low-pay workers. Fissuring also makes it easier for firms with market power and monopoly profits to de-link the compensation of noncore workers from firm-level profitability. The likely effect is to the reduce the rent premia of noncore workers and perhaps to raise them for core workers. The impact of advances in monitoring technologies on fissuring and labor rent premia is another topic that is ripe for research.

In closing, let me note that my remarks are not intended to deny a role for policy shifts and institutional forces in the decline of average labor rent premia. They may well play major roles, but the fall in unionization, for example, is not sufficient to make that case. As my foregoing remarks suggest, it seems likely that globalization and technological developments played important roles in driving the fall in unionization and average rent premia in recent decades. I also note that policies and institutions can affect how product market developments, globalization, automation, and advances in monitoring technologies have an impact on labor rent premia. So, similar exogenous developments may play out quite differently across countries with different policies and institutions.

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COMMENT BY

CHRISTINA PATTERSON Anna Stansbury and Lawrence Summers provide a great and thought-provoking paper bringing together an array of results that paint a compelling case for the importance of the fall in labor rents in explaining several of the trends in the macroeconomy over the past several decades. The list of these important trends include a fall in the labor share, a rise in Tobin's q, a fall in measured markups, weak investment relative to profits, and a fall in steady-state unemployment. This paper posits that a fall in worker bargaining power is the major structural change that is responsible for all of these movements. The paper has two main parts—first, the authors measure the decline in the rents going to labor and demonstrate that the fall is large enough to explain many of these aggregate trends. Second, the authors present several cross-industry results that lend

support for the predictive power of the fall in labor rents for all of these phenomena.

The paper has an abundance of evidence supporting the link between the fall in worker bargaining power and each of the macroeconomic phenomena mentioned above. I will focus on the relationship between the fall in labor rents and one of these trends—the fall in the labor share—to highlight some features that make the fall in labor rents a compelling explanation for this phenomenon.

From my reading of the literature, there are several features of the fall in the labor share that any explanation must accommodate. First, the fall in the labor share is largest for manufacturing, and it began several decades before the fall in other sectors (Gutiérrez and Piton forthcoming). Second, the fall in the labor share occurred mostly within sectors and is not primarily the artifact of a reallocation of economic activity from manufacturing to services (Elsby, Hobijn, and Şahin 2013). Third, some elements of the fall in the labor share are international in scope, although there is important variation across countries and the fall is particularly pronounced within the United States (Karabarbounis and Neiman 2014). Fourth, the fall in the labor share did not reflect a fall in the labor share at the median firm but rather is the result of a reallocation of economic activity within sectors to large firms with lower and potentially falling labor shares (Autor and others 2020).

A particularly compelling and exciting feature of the Stansbury and Summers explanation for the fall in the labor share is that it is consistent with all of these empirical findings. For example, we know that the decline in union membership was particularly pronounced in manufacturing, where the fall in the labor share was the largest. The authors show in the paper that the fall in labor rents occurred predominately within sector, consistent with a within-sector fall in the labor share. We also know that declines in union membership and the rise in domestic outsourcing are widespread in the developed world, suggesting perhaps that the fall of worker bargaining power is as well. And, as the authors note in section V, big firms generally have more rents and so they may disproportionately benefit from falling worker power, making the fall in worker bargaining power potentially consistent with the between-firm reallocation patterns that characterize the fall in the labor share.

The rest of this discussion will focus primarily on the authors' measurement of labor rents since this measurement of the decline in labor rents is at the core of the analysis and unpacking this measure will shed light on why labor rents have fallen and what it could mean for policy. The authors mea-

sure total rents going to labor as the sum of industry rents, union rents, and firm size rents. They get these estimates by jointly estimating the following regression relating the hourly wage (w_{it}) to individual i's characteristics and a set of industry, union, and firm size fixed effects:

$$\log(w_{it}) = \underbrace{X'\beta}_{\text{individual}} + \underbrace{\gamma_{ind} + \gamma_{union} + \gamma_{size}}_{\text{job}} + \epsilon_{it}. \tag{1}$$

The basic intuition is that rents are differences in worker earnings that are not explained by the demographics or occupation of the worker ($X'\beta$) but are explained by the characteristics of the job in which the individual works (γ_{ind}, γ_{union}, and γ_{size}). This strategy is quite reasonable and builds on a long line of literature using related estimates to infer the amount of rent-sharing in the economy (Katz and Summers 1989). This regression is also closely related to more recent literature estimating the importance of firms in explaining worker earnings. Firm fixed effects in these papers are derived from a very similar regression to the one that Stansbury and Summers run in their paper, but disaggregating the industry, union, and firm size fixed effects into a firm fixed effect:

$$\log w_{ijt} = \underbrace{X'\beta + \gamma_i}_{\text{individual}} + \underbrace{\gamma_j}_{\text{job}} + \epsilon_{it}, \tag{2}$$

where j is the firm and i is the individual. Under a similar logic to the analysis above, wherein a fall in the variance of the job-level fixed effects in equation (1) signals a fall in labor rents, a fall in the variance of firm fixed effects in equation (2) would also suggest a fall in worker rents. Song and others (2019) use data from the IRS to provide estimates for the variance of firm fixed effects over time in the United States. They document that the total variance of earnings rose from 1980 to 2013 but that the variance of firm fixed effects was relatively flat and fell only slightly, from 0.084 to 0.081, over this period. Rather, they find that the rise in the variance in worker earnings was largely explained by a rise in the variance of individual fixed effects and a rise in the covariance between worker fixed effects and firm fixed effects.

Initially, the findings of Song and others (2019) seem at odds with the steep fall in industry fixed effects and worker bargaining power in figures 3 and 5 in Stansbury and Summers's paper. What might reconcile a fall in the variance of industry fixed effects in this paper with a relatively stable variance of firm fixed effects? Of course, one answer to this question is that these are different data sets; Stansbury and Summers's estimates are

derived from a monthly survey with a short rotating panel while the estimates in Song and others (2019) are from annual tax return data, and thus issues with measurement error, variable definitions, or sample selection could be driving the differences. Indeed, in recent work, Haltiwanger and Spletzer (2020) use administrative census data and find a rising variance of industry fixed effects, suggesting that a careful examination of the relationship between these data sets and estimates is warranted.

However, there is another more fundamental and, I would argue, more interesting explanation for the seemingly disparate patterns in the variance of firm fixed effects and industry fixed effects. Since all of the estimates here are log-additive, there is a simple relationship wherein the industry fixed effect (γ_{ind}) is simply the weighted sum of all the fixed effects (γ_j) of the firms within that industry (i.e., $\gamma_{ind} = \sum_j \frac{E_j}{E_{ind}} \gamma_j$). The industry fixed effect can fall either because the firm fixed effects fall or because there are more workers at the low fixed effects firms; in other words, the variance of industry fixed effects could be falling not because the fixed effects of the firms are falling (i.e., each firm is changing the rents that it gives to its workers) but rather because more workers are at the firms with the low fixed effects. This mechanism, wherein workers are being concentrated in low fixed effects firms, echoes the importance of reallocation in explaining the fall in the labor share, as I discussed above.

Aside from reallocation being a mechanism that reconciles the disparate estimates in the literature, there is also direct evidence that the fall in labor rents is at least partially the result of workers reallocating across firms. In particular, the evidence demonstrates that the reallocation of workers was nonrandom, meaning that in addition to a falling total amount of rents going to workers, there was also a meaningful reallocation of these rents *across* workers. One piece of evidence suggesting this reallocation of labor rents can be seen in the finding by Song and others (2019) that the covariance between worker effects and firm effects played an important role in explaining the rise in the variance of worker earnings, suggesting that high-ability workers are now more likely to be in the higher-rent firms. Additionally, recent work by Kline and others (2019) shows that, within the firm, rent-sharing is concentrated in the top half of the earnings distribution. Evidence in this paper and from Bloom and others (2018) shows that the large firm wage premium has fallen for low-education workers but has stayed the same or possibly even risen for higher-education workers. And last, we know that there has been a growth in domestic outsourcing, which is concentrated among the lower-skill

occupations and results in significant wage losses for those who are displaced (Goldschmidt and Schmieder 2017). Taken together, this evidence strongly supports the authors' finding in section II.A that labor rents have fallen substantially farther for non-college-educated workers than for college-educated workers. Moreover, it suggests to me that a potential mechanism behind the fall in labor rents that they measure in this paper is that low-skill workers are concentrating in low-rent firms. This force leads to both a fall in the total rents going to workers and a reallocation of those rents across workers.

Understanding the mechanism behind the decline in labor rents is a very important next step in understanding the importance of the decline in worker rents for several reasons. First, this is a paper about providing a unified explanation for several macro phenomena, and this reallocation mechanism extends the analysis to directly link the fall of labor rents to the rise in income inequality, another salient feature of the economy over the past decades. The current analysis highlights inequality stemming from differences in capital and labor income, but we know that a large component of the rise in income inequality comes from changes in the distribution of labor income (Smith and others 2019). A fall in labor rents that is driven by a reallocation of low-skill workers to low-rent firms intrinsically links the fall in total labor rents to the reallocation of labor rents across workers.

Second, recognizing that the fall in labor rents is concentrated among some groups of workers strengthens the connection that the authors make between the overall reallocation of rents and several labor market trends, many of which we know are also concentrated among the low-skill workers. This is evidenced by the authors' finding in section IV.C that the natural rate of unemployment has fallen farther for workers without a college degree than for those with a college degree, which echoes the patterns in Crump and others (2019). Similar cross-demographic patterns are likely also true for the decline in labor force participation or the growth in real wages.

Third, understanding the mechanism that produced the estimated fall in labor rents is important because it suggests some candidates for *why* labor rents have fallen and thus what policies are best suited to addressing this phenomenon. A fall in labor rents that is driven by a fall in the share of workers at high-rent firms or by a concentration of rents within the firms that employ high-skill workers suggests that some explanations are more likely than others. The authors posit that the decline in worker power could be the result of institutional changes, the result of changes

in priorities within firms, or the result of a change in economic conditions that make it harder for workers to bargain. However, a fall in labor rents driven by reallocation suggests that a simple fall in the bargaining power of workers within the firm may be incomplete. Perhaps it is not that the workers at Apple, for example, are not sharing in rents but rather that at Apple there are few workers relative to their share of aggregate value-added and most of the workers are high-skill. Moreover, the janitors at Apple may now technically work for a different firm, and that firm may not have any rents over which to bargain. In this case, policies that give the low-wage workers more bargaining power may not result in the workers getting more rents. And finally, if the fall in worker rents really is driven by the reallocation of workers or rents across firms, this could also suggest that rather than the fall in rents being the structural force that *caused* these many phenomena, it could itself be the *consequence* of some technological process that changed the nature of production and reallocated workers and economic activity across firms. Exploring this pattern is an important area for future research.

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GENERAL DISCUSSION Valerie Ramey started the discussion off by praising the paper and relating it to her work with Borjas which studied the increase in the college wage premium relative to the high school wage premium.[1] Their argument was that because US companies had more market power worldwide in the '50s and '60s, labor unions were more powerful since there were more rents that could be shared. As a result, workers with high school degrees earned relatively higher wages. Furthermore, she explained that they had linked this explanation to the durable goods industries and to the interindustry wage differentials explored by Krueger and Summers.[2]

Furthermore, Ramey pointed out that when she and Borjas published their paper there was far less competition from workers in other countries. In contrast, there is far more competition from workers from other countries today, and this has led to a decline in worker bargaining power. She concluded by emphasizing the importance of Stansbury and Summers's documentation of this more recent development.

John Haltiwanger noted that a key finding in the paper is a declining interindustry earnings differential. The analysis in the paper uses the Current Population Survey (CPS). However, his recent work with James Spletzer shows that this result is not robust to matched employer-employee administrative data.[3] In fact, they attribute most of the rising overall

1. George J. Borjas and Valerie A. Ramey, "Foreign Competition, Market Power, and Wage Inequality," *Quarterly Journal of Economics* 110, no. 4 (1995): 1075–1110.

2. Alan B. Krueger and Lawrence H. Summers, "Efficiency Wages and the Inter-Industry Wage Structure," *Econometrica* 56, no. 2 (1988): 259–93.

3. John C. Haltiwanger and James R. Spletzer, "Between Firm Changes in Earnings Inequality: The Dominant Role of Industry Effects," Working Paper 26786 (Cambridge, Mass.: National Bureau of Economic Research, 2020).

variance of earnings across individuals to sharply rising interindustry wage differentials. He then asked the authors how they had addressed the limitations of industry codes in household surveys and whether using survey data introduced measurement problems in their study.

Bob Hall discussed some of the implicit policy recommendations he believed could be found in the paper, such as encouraging unionization; banning activist shareholders, layoffs, and outsourcing; raising the minimum wage; and giving labor a voice in management. He agreed with Patterson's remarks during the discussion that while this package of reforms addresses some real problems, it doesn't recognize a deeper problem in the labor market: the appalling condition of workers with low education. Policies such as the minimum wage create poverty traps by excluding low-skill individuals from employment.

Henry Aaron noted the conspicuous absence of any explicit reference to unionization in their presentation. In his view, the most striking fact from recent history is not so much the decline of previously unionized industries but the failure of unionization to proceed at all in emerging industries. Therefore, he asked the authors and discussants for their opinion on the extent to which hostility toward unionization is a political factor in addition to the economic trends they had discussed already.

Katharine Abraham commended the paper and posed another measurement question. She observed that the authors' measure of labor rents was constructed from information on the effects of being a union member, working in a particular industry, and working for a firm of a particular size. Another relevant feature of the labor market is occupational licensing, something that has grown in importance in recent decades. Abraham pointed to research suggesting that occupational licensing may lead to labor rents for workers in those occupations.[4] She asked the authors how accounting for this would impact their conclusions.

Daron Acemoglu found the paper intriguing and remarked that the issue of worker power is very interesting. However, he expressed concern about omitted variable bias stemming from the association of worker power with technological changes, offshoring, outsourcing, and automation. In particular, each of these factors directly impacts the labor share and wage

4. Morris M. Kleiner and Alan B. Krueger, "Analyzing the Extent and Influence of Occupational Licensing on the Labor Market," *Journal of Labor Economics* 31, no. 2 (2013): S173–S202; Maury Gittleman, Mark A. Klee, and Morris M. Kleiner, "Analyzing the Labor Market Outcomes of Occupational Licensing," *Industrial Relations* 57, no. 1 (2018): 57–100; Marc T. Law and Mindy S. Marks, "The Labor-Market Effects of Occupational Licensing Laws in Nursing," *Industrial Relations* 56, no. 4 (2017): 640–61; Robert J. Thornton and Edward J. Timmons, "Licensing One of the World's Oldest Professions: Massage," *Journal of Law and Economics* 56, no. 2 (2013): 371–88.

inequality—especially for low-wage workers. Given that their measure of imputed rents is a realized measure, any of the factors impacting the labor share he mentioned would simultaneously influence the variable that their paper tried to explain and their measure of imputed rents. Therefore, he wondered whether their approach exaggerated the importance of worker power and suggested that they try to put bounds on this issue.

Larry Katz said that while he found their paper to be very insightful, he noted that despite showing a strong difference for the firm size wage premium by education, the authors didn't make this distinction for their analysis at the industry level. He suggested that they decompose their results on labor rents by educational group, since he believed this could lead them to more granular insights on the decline in the labor share. Furthermore, he remarked that the authors' findings could help explain the decline in labor force participation, since it may be that the decline in rents for less-educated workers has decreased unemployment by leading workers to drop out of the labor market.

Greg Mankiw wondered whether declining worker power is a problem that needs to be addressed. Mankiw stated that worker power is synonymous with monopoly on the part of labor and alluded to the various problems economists have linked to monopoly power. He suggested that if it is true that worker power has declined, perhaps instead of reversing this trend we should applaud it as it might signal that labor markets have become more competitive. If the main concern with this trend is related to inequality, he suggested that it might be better to implement redistribution through tax policy rather than by increasing worker power.

Hall replied to Mankiw's comment by emphasizing that he didn't have a policy agenda that responds to these problems and that he thought the paper was not very specific on this point either. In his view, a lot of the discussion alluded to a national crisis related to the conditions of workers with low education. He found it surprising that this paper implicitly suggested that embracing old-fashioned continental European policies is the answer. However, he stated that making labor markets completely competitive in every regard has not worked very well either and has done a particularly terrible job for low-income people. He wished to make it very clear that in his view, Thatcherism is not the answer to these problems.

Larry Summers thanked the participants and stated that he couldn't remember a more thoughtful set of comments on a paper he had presented at Brookings. One phrase that was very present in his mind which was not mentioned in the paper was "ruthless economy," which refers to the idea that workers were being driven increasingly to marginal productivity

because of external competition and declining unionization. He sympathized with the comments that went beyond the scope of their paper on the implications of declining worker power for workers with different education backgrounds and workers in different industries. However, he also agreed that a better understanding of the causal mechanisms behind this would be very helpful. In addition, he agreed that they definitely need to look into the measurement concerns that were brought up.

He acknowledged that the changes in the legal framework that complicated union organizing were an important part of understanding what has happened regardless of one's view on whether this has been good or bad. Moreover, he admitted that they had been intentionally vague about drawing policy implications from their paper because they wished to be highly cautious of embracing a continental European or Thatcherite agenda. He concluded by saying that while their paper didn't fully resolve our understanding of the plight of less-educated American workers, he believed their contribution was still valuable as it put movements in various aspects of labor power high up in the agenda for research on major economic trends.

Anna Stansbury added that the measurement issues raised were very helpful. With regards to Haltiwanger's comment, her understanding was that the rise in wage differentials between industries was related to increased sorting of high-wage workers into higher wage industries and firms, and therefore the industry and firm fixed effect hadn't increased over time. Nevertheless, she was eager to follow up with the commenters on how they could reconcile their estimates with these measurement problems as interindustry wage differentials are a central part of their analysis.

While the main focus of their paper was not to study educational divides, she replied to Katz's suggestion by saying that they started looking into this more recently. She also noted that their online appendix does include a short section showing how these trends have hit low-education workers especially hard. Moreover, they found that the decline in unionization in the private sector has been concentrated on workers with no college degree and some evidence that the fall in the dispersion of industry rents was greater for lower-education workers.

Last, she agreed that the reallocation between firms is a very important part of their story but suggested that it could also be the case that the decline in worker power could be partly causing some of the reallocation toward high markup firms. She reasoned that a decline in worker power would disproportionately reduce labor costs for high-rent firms—since there were more rents being shared ex ante—enabling them to expand relatively more quickly.