

A Tale of Two Clones



Richard Freeman

WHAT'S NEXT?

It's not what you do; it's where you do it.

For some time now, policy makers have been eager to find a solution to rising inequality, but divining an answer depends on determining the underlying causes. Conventional wisdom has argued that globalization, particularly the global labor glut, and the need for more skills are at the root of America's seemingly intractable problem with inequality. And indeed, the income gap between those with a college degree and only a high school diploma has steadily widened.

But against this backdrop comes a new and very different explanation for rising inequality—one that should challenge the conventional wisdom in many ways. Richard Freeman, a distinguished economist with the National Bureau of Economic Research, argues that at the root of income inequality between individuals are large and important differences in wealth between the companies they work for.

Freeman's analysis turns a key economic precept on its head. "Conventional wisdom about inequality," he writes, "focuses largely on imbalances between the supply and demand for

skills.” If that is the underlying cause, then the solutions offered by policy makers should focus solely on increasing the skill level of the entire population. While this is important in any growth scenario, Freeman shows that this is not enough to solve the current problem with inequality. Why? Because there is a widening income gap among people who have similar, if not identical, skills.

Imagine a set of clones, posits Freeman, with one starting work at Facebook in 2005 and the other at MySpace. Their differing fortunes after a decade are emblematic of a rising trend throughout the country in the relative fortunes of companies and the people who work for them.

“The big surprise in recent decades,” writes Freeman, “is that the competitive forces that limit pay differentials failed to do so. Forty or so years of rising inequality would seem time enough for the centripetal forces of competition to pull earnings toward market-clearing levels. But that hasn’t happened. The labor market has been dominated by economic forces that pull the wages of firms further apart from each other, motivating our analysis of the role of employers in increasing inequality.”

Using a series of complex statistical operations on large data sets from the Current Population Survey and the Census, Freeman shows that the increase in inequality between workers is mirrored by the increase in inequality between companies. “Employers,” says Freeman, “matter massively in the upward trend in inequality.” In the 15 years of data Freeman studied he concludes that “establishments moved further apart in revenue per worker than in earnings and did so in every sector.”

Freeman has done the policy community a great service with his research. He has shown why the “more skills and education mantra” may not be enough to reduce the growth of inequality, and he has challenged the policy community to find ways to bring the earnings of all skilled workers closer to the market average.

Richard Freeman’s paper “A Tale of Two Clones,” is the latest in a series of ahead-of-the-curve, groundbreaking pieces published through Third Way’s NEXT initiative. NEXT is made up of in-depth, commissioned academic research papers that look at trends that will shape policy over the coming decades. In particular, we are aiming to unpack some of the prevailing assumptions that routinely define, and often constrain, Democratic and progressive economic and social policy debates.

In this series we seek to answer the central domestic policy challenge of the 21st century: how to ensure American middle class prosperity and individual success in an era of ever-intensifying globalization and technological upheaval. It’s the defining question of our time, and one that as a country we’re far from answering.

Each paper dives into one aspect of middle class prosperity—such as economic growth, inequality, education, retirement, achievement, or the safety net. Our aim is to challenge, and ultimately change, some of the prevailing assumptions that routinely define, and often constrain, Democratic and progressive economic and social policy debates. And by doing that, we’ll be able to help push the conversation toward a new, more modern understanding of America’s middle class challenges—and spur fresh ideas for a new era.

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Introduction

The pervasiveness of inequality goes far beyond that which faced previous generations of Americans. It is not just the one percent gaining a larger share of national income at the expense of the middle class. At the top of the income distribution, the upper 10% of the top one percent (the 0.1%)

increased their share of the top one percent's income, while, within the upper 0.1%, the top 10% (the 0.01%) increased their share of the top 0.1 percent's income, and so on up the income scale. Internal Revenue Service data show that in 2013, the top 400 taxpayers (the upper 0.0000027 % of taxpayers) earned 1.17% of adjustable gross income; 6.1% of taxable interest, 5.3% of dividends; and 9.8% of capital gains. ¹

Along with the rise in earnings from capital holdings, conventional wisdom about inequality focuses largely on imbalances between the supply and demand for skills. In this framework, inequality increases when demand for skills increases more than the supply of skills. Given that the number of skilled workers has increased relative to the number of less-skilled workers, many economists attribute rising inequality to an even more rapid growth of demand for skilled workers due to skill-biased technological change within industries. ² New technologies favor skilled jobs at the expense of less-skilled jobs. The natural policy response to inequality resulting from growing demand for skills are policies to increase the supply of skills. If we could get young people to invest more in education and skill, the tide of inequality would recede.

But the skill explanation for rising inequality is incomplete. It does not address increased income differences among workers with the same skills nor the widening income gap between persons with capital income and persons without capital. It gives short shrift to the effect of expanded education in China and India on the global market for skills and to the effect of technological change rooted in artificial intelligence on the demand for skilled labor as well as unskilled labor. As measured skills explain only part of inequality, and as earnings disparity has increased among workers in all skill and earnings groups, including the most skilled and highest paid, something beyond the posited increased demand for skills must be contributing to the trend rise of inequality.

The You/Clone Challenge

To see what that something else might be, consider two indistinguishable workers, you and your clone. By definition, you/clone have the same gender, ethnicity, years of schooling, family background, skills, etc. In 2006 you/clone graduated with identical academic records from the same university and obtained identical job offers from Facebook and MySpace. Not knowing any more about the future than the analysts who valued Facebook and MySpace roughly equally in the mid-2000s³, you/clone flipped coins to decide which offer to accept: heads – Facebook; tails – MySpace. Clone's coin came up heads. Yours came up tails.

Ten years later, Clone is in the catbird's seat in the job market — high pay, stock options, a secure future. You struggle. Back to university? Send job search letters to close friends? Ask distant acquaintances to help? The you/clone thought experiment may seem extreme, but recent research that I have conducted with colleagues⁴ finds that the earnings of workers with near-clone similarity in attributes diverged so much by the place they worked that rising inequality in pay among employers has become the major factor in the trend rise in inequality.

This employer-based pathway to inequality differs so much from the conventional story of demand and supply for skills that the evidence for the new view deserves critical attention. What lies behind our claim that inequality is connected more to firms than to workers, and that policies orthogonal to “more education and skill” are necessary to turn back the rising tide of inequality?

Large and increasing divergence of earnings for similar workers among employers poses a challenge to understanding how the U.S. labor market, widely viewed as one of the most market-driven in the world, determines earnings. In a market-driven economy, demand and supply of labor intersect to produce a single wage for persons with the same skills, much as demand and supply for consumer goods

produces a single price for the same product in different stores. More sophisticated versions of the competitive model allow for deviations from the single wage ideal: nonpecuniary attributes of workplaces that lead some workers to accept low pay for better conditions while others demand high pay to compensate for bad conditions⁵; costs of job search and mobility that discourage workers from moving to higher-paying jobs and thus allow some pay differentials to persist.

The normal flux of economic conditions also produces a range of wages rather than a single wage.⁶ Shifts in markets impact firms differently, changing pay and employment in different ways. Even in a boom, some firms do poorly and lay off workers. In the Great Recession, some firms did well and increased employment while most reduced their work force. Some firms and workers respond quickly to market signals. Others respond slowly. About half of U.S. workers are in firms that have incentive pay plans linking pay to firm or group performance.⁷ Some firms share higher productivity or revenues per worker with employees for reasons of fairness even though the increases may be only weakly unrelated to workplace performance. In modern economics, heterogeneity, not the bird, is the word.

But markets also generate economic forces to reduce differences in pay or performance. The high-wage firm has a profit incentive to reduce its pay toward the market average. It can turn the extra money into cash for its owners or use it to hire more workers and expand its market share, possibly gaining larger profits in the future. On the other side, low-wage firms that seek additional workers to expand will have to increase pay to attract them. Reductions in pay by high-wage firms and increases by low-wage firms reduce inequality.

Worker mobility across geographic areas and firms also acts to limit inequality. If the market for electricians becomes stronger in Atlanta than in Cleveland, rising pay in Atlanta will induce mobility from Ohio to Georgia that will limit the pay rise in Atlanta and create pressures for wage increases in

Cleveland. When workers seek jobs/accept offers from high-wage firms and reject offers from low-wage firms, they pressure the low wage firms to raise pay, bounding inequality.

The big surprise in recent decades is that the competitive forces that limit pay differentials failed to do so. Forty or so years of rising inequality would seem time enough for the centripetal forces of competition to pull earnings toward market-clearing levels. But that hasn't happened. The labor market has been dominated by economic forces that pull the wages of firms further apart from each other, motivating our analysis of the role of employers in increasing inequality.

Increased Inequality Among Employers? Yes!

The claim that increased inequality among employers is the main pathway for the trend rise in inequality rests on three types of big data that are part of the ongoing transformation of economics from arm-chair theorizing about invisible hands to fact-based science:

1. **Current Population Survey** and related survey data on millions of *workers* who report earnings, years of schooling, age, gender, ethnicity, occupation, industry, and other characteristics that may impact earnings
2. **Census Bureau** surveys of hundreds of thousands of *establishments and firms* that report payroll, employment, revenues, expenditures on capital, and other factors that may impact earnings
3. **Matched longitudinal data** that link employees to their employer over time that allow researchers to differentiate the independent effects of establishment, firm, and worker attributes on the earnings of individuals and workplaces.

One way the matched longitudinal data identify the effect of employers on earnings is by allowing us to compare the earnings trajectory of workers who remain with the same

employer over time (*stayers*). You took the MySpace job while Clone took the Facebook job. Say you both stay at your firms. Year by year, Clone's pay increases while yours does not. Since you and Clone are carbon copies, the change in pay must have something to do with the employer. And lo and behold, your pay moves with the MySpace average while Clone's moves with the Facebook average.

Workers who change employers (*movers*) provide another way to estimate employer effects on earnings. Monday you are at MySpace. Tuesday you get an offer to move to Airbnb at a huge pay increase. Your pay at both firms is normal for someone with your skills, so the change must have something to do with the different conditions of the firms: increasing demand at Airbnb and falling demand at MySpace. Workers who change jobs because their firm closed their workplace or laid off large numbers typically suffer 20% or so cuts in pay on average, often after a lengthy period of unemployment.⁸ Pay evidently can differ greatly across firms for the same worker at a point in time.

Another way to assess employer effects on earnings is to compare the variation in pay for narrow groups of workers with similar attributes — those with the same age, gender, ethnicity, years of schooling, work experience, occupation, industry, size of workplace, and so on⁹ — to the pay of their employers. If inequality in pay among these “pseudo-clones” increases at a similar magnitude as inequality of pay among their employers, the change in inequality is most likely due to changing employer pay premium.

Finally, comparisons of *changes* in the earnings of workers situated high or low in the distribution of earnings with the changes in their employers' premium can also illuminate the link between increased inequality among workers and among workplaces.

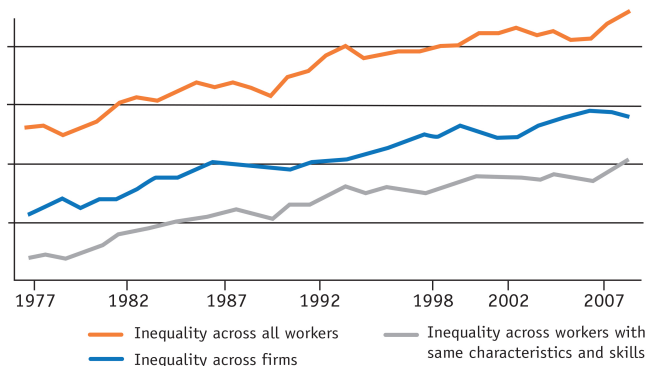
These different ways of emulating the you/clone thought experiment — comparisons among stayers and movers, among people with near identical characteristics or in different places in earnings distribution — allow us to assess

the contribution of employers to the increase in earnings inequality with some degree of confidence.

A Startling Starting Observation

The initial idea that establishment and firm wage-setting lies at the heart of the trend rise in U.S. inequality came from looking at the data in Exhibit 1. The exhibit displays the inequality of earnings for all workers and for all workers who have the same characteristics (the same years of schooling, age, gender, and so on),¹⁰ and the inequality of average earnings among all establishments that employ those workers.¹¹ All three lines measure inequality by the variance of log earnings, which is the standard measure of inequality of earnings among workers in economics.¹²

Exhibit 1: Inequality of earnings among individuals and firms, 1977-2009



Note: Inequality measures as variance of the natural log (ln) of earnings. Barth, Bryson, Davis, Freeman (2016, Figure 1A)

Each line shows the upward trend in inequality that has made inequality one of the headline issues in economics. Reflecting the role of human capital and demographic factors in earnings, the inequality among workers with the same characteristics lies below inequality of all workers. The reason is that comparisons of workers with the same characteristics eliminates the part of overall inequality associated with differences in the characteristics of workers. Reflecting the fact that establishment averages *exclude* variation among workers within establishments, inequality of establishment

earnings also lies below the variance of individual earnings. Establishment averages eliminate the part of inequality that occurs from workers being paid differently within establishments. Finally, the inequality of establishment average earnings exceeds the inequality of the earnings among workers with the same characteristics because of differences in the composition of establishment work forces.

The magnitude of the 1977–2009 *changes* in inequality in the separate measures of inequality tell a striking story.

Inequality of earnings for all workers increased by 0.170 points while inequality of earnings for workers with the same measured characteristics increased 0.147 points. This implies that 86% ($0.147 \text{ points} / 0.170 \text{ points}$) of the trend increase in inequality occurs among people with measurably the same skills, whereas just 14% of the trend increase comes from changes in earnings among workers with different skills.

The big surprise in the exhibit is that the inequality of average earnings among establishments increased by the same 0.147 points as did inequality among workers with the same characteristics. This suggests that *all* of the increase in inequality among similar workers comes from the increase in earnings at their workplaces. I use the word suggest because the data on inequality for individuals is from CPS surveys of workers that have no information on their employers, while the data on the inequality of establishment earnings is from establishment reports of *total* payroll and employment that have no information on individual workers. Given the different sources and type of data, it is possible that much of the similarity in the increase in inequality among persons with the same skill and the increase in inequality among establishments is happenstance.

To see if the Exhibit 1 pattern is a real phenomenon rather than happenstance, we analyzed matched establishment–employee data that relate earnings to *both* the worker who gets paid and the employer who pays. With information on earnings of every worker in an establishment, we calculated average establishment earnings as the average earnings of its

workers and *divided arithmetically* the inequality of earnings among all workers and establishments into a part associated with inequality of earnings within establishments and a part associated with inequality in earnings across establishments.

Within-establishment inequality reflects the varying skills of workers and their pay in the same workplace. Between-establishment inequality reflects employers paying comparable workers differently. Total inequality is the sum of the within-workplace inequality and the between-workplace inequality in the log variance statistic that we use to measure inequality. If Exhibit 1's startling starting observation is correct, most of the increased inequality in our analysis will come from the between-workplace component.

Decomposition Analysis

We applied one of the fundamental tools of statistics, Analysis of Variance (ANOVA),¹³ to divide inequality into its within-establishment part and its between-establishment part. To see how ANOVA works in our case, consider two firms: F (Facebook) and M (MySpace), each of whom employs one skilled worker and one unskilled worker. In period 1, F and M pay the market wage W to the low-skill worker and a higher market wage $(1+\gamma)W$ to the high-skill worker, where γ is the skill premium. Since firms pay the same wages, there is no difference in pay across the firms. Pay inequality comes entirely from the skill premium within firms. When the market skill premium increases, it increases inequality within both firms. The increase in total inequality is due solely to the higher skill premium— a pattern that fits perfectly the skill story of rising inequality.

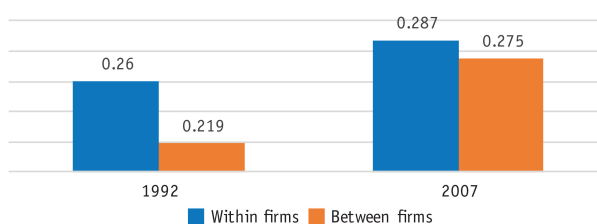
But what if the skill premium did not change, and that changes in the economic situation of firm F relative to that of firm M led F to raise its pay above that of M? This creates an employer premium, ε , that goes to both the unskilled and skilled worker in F: the unskilled worker earns $(1+\varepsilon)W$ while the skilled worker earns $(1+\varepsilon)(1+\gamma)W$. But in M, the unskilled worker still earns W while the skilled worker earns $(1+\gamma)W$.

Inequality in this case increases because the employer premium created inequality between F and M—our “employers matter” story of rising inequality.

Both skill premium and employer premiums exist in the real economy, and changes in either change overall inequality. Using ANOVA, we determined the importance of changes of between- employer inequality (the employer premium above), and of within-establishment inequality (the skill difference above, though other factors beyond skills can also affect within-establishment differences) in the observed increase in total inequality.

Exhibit 2 summarizes results from an analysis of earnings in the subset of states for which the Census provided matched data ¹⁴ from 1992 to 2007—a period shorter than that in Exhibit 1 but long enough to capture the trend increase in inequality. ¹⁵ The first line shows inequality in earnings for workers in each year and its change between the years. The second line shows inequality *between* establishments and its change. The third line shows inequality *within* establishments and its change. By construction of the variance measure, the between- and within-establishment inequalities sum to the total inequality.

Exhibit 2: Wage inequality within firms and between firms



Note: Drawn from the Census Bureau’s Longitudinal Employment and Household Dynamics 9-state data set, which included 26 million workers and 1.8 million firms in 2017. Included states are California, Colorado, Idaho, Illinois, Maryland, North Carolina, Oregon, Washington, and Wisconsin. Inequality measured as variances of the natural log (ln) of earnings. Barth, Bryson, Davis, Freeman (2016, Table 1).

In our data and in other analyses with which we are familiar ¹⁶, the within-establishment inequality exceeds between-establishment inequality for establishments in the

same line of work. Within-establishment inequality are typically larger because establishments employ a diverse mixture of skilled workers, less-skilled workers, and management and pay them accordingly. But while within-establishment inequality is more important in the level of inequality, the opposite holds for changes in inequality. The increase in between-establishment inequality (0.056) is over twice the increase in within establishments inequality (0.027). In these data, 67.5% ($=0.056/(0.056+0.027)$) of the increased inequality of worker earnings is associated with increased inequality among establishments.¹⁷ Employers matter massively in the upward trend in inequality. Why?

One possibility is that the skill composition of firms' work forces, which we held fixed in our F and M model example, actually changed. A firm's average earnings could change because the firm shifted its work force to more skilled workers or to less-skilled workers while maintaining its same firm premium. If this was the reason for employers mattering so much, there would no need for new economics. Changes in the wages of an employer that changes its skill mix is standard in any model. But if all that happened was that high-skilled and low-skilled workers sorted themselves differently among firms over time, total inequality would have remained the same. Since inequality increased, more must be going on than simple sorting.

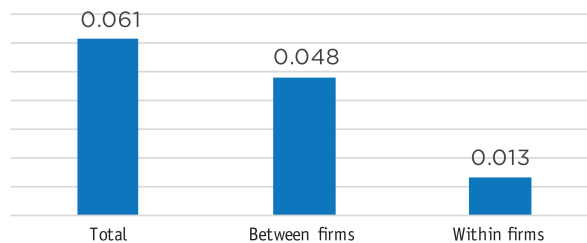
A second possibility, which we pursue, is that firms adjusted their pay to changes in their market situations, either through explicit profit-sharing or employee ownership practices that automatically increase worker earnings when the firm does well or decrease earnings when the firm does poorly or through management decisions regarding pay or bonuses. This behavior is what our establishment premium analysis captures: changes in establishment earnings due to changes in actual pay to workers rather than in the mix of workers within an establishment.

The earnings of workers who remain at the workplace over time—the *stayers* noted earlier—helps differentiate these

possibilities. Because stayers are the same workers over time, inequality of earnings among them cannot reflect changes in their composition¹⁸. For stayers, there are only two possible ways for inequality to change: when employer differentials change and/or when employers change the pay of different stayers at different rates. The question is: did changes in differentials between employers or changes in within-establishment differentials among stayers contribute more to the increase in inequality among them?

Exhibit 3 shows that from 1992 to 2007 inequality of earnings among stayers increased largely because inequality of establishment earnings increased.¹⁹ Of the estimated 0.061 point increase in inequality among stayers, 0.048 points, or 79%, is associated with changes in establishment earnings premium. The remaining 21% of the increase in inequality occurs through increased inequality within establishments.

Exhibit 3: Growth of inequality for stayers, 1992-2007



Note: Inequality measures as variance of the natural log (ln) of earnings. LEHD data. Barth, Bryson, Davis, Freeman (2016, Table 2)

What's going on:

Workers who remain at the same firm over time—stayers—have seen only a small increase in wage inequality with their coworkers. But when you look at stayers across firms, wage inequality has increased more dramatically.

The earnings of workers who change employers, the *movers*, provides a different way to measure the employer effect on

earnings. It comes closer to the clone thought experiment by comparing the same worker at two jobs in close time proximity. Modest differences in the pay of movers between their old and new jobs would indicate that employer differentials are small and thus unlikely to have contributed much to the trend in inequality. In fact, as noted earlier for job losers, comparison of earnings for the same worker at two employers in a short period show substantial changes. And much of the change in earnings, up or down, of movers is associated with differences in the average earnings among employers.²⁰

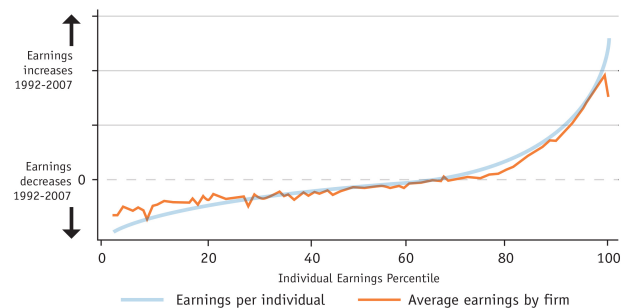
Economists have long known that the pay of workers differs with the measured characteristics of the employer, of which industry is the most prominent factor differentiating earnings of workers in the same occupation or workers with the same education, gender, or age.²¹ Employers in industries with high labor productivity almost always pay more than employers in industries with low labor productivity. Employers with higher amounts of capital per worker pay more than those with less capital. And employers with more employees also invariably pay more and provide better benefits than those with few workers.

In addition to measured characteristics, however, characteristics of employers that standard data sets do not measure can also determine how much they pay workers. One firm may be owned by a family committed to paying workers as high as possible as long as the firm turns a profit. Another firm may squeeze worker pay as much as possible to pay more to management or shareholders. We use matched employee-employer earnings over time to measure this heterogeneity in terms of employer “fixed effects,” defined as levels of earnings persistently high or low that cannot be attributed to the measured characteristics of the firm or workers. Increased inequality in those fixed effects underlies much of the contribution of employer differentials to rising inequality.

Percentile Distribution and High Earner

Inequality in U.S. earnings increased along the entire distribution of earnings. Persons in the top end of the distribution had larger percentage gains in wages than those in the middle of the distribution, who in turn had larger gains than those in the bottom of the distribution. To see if the changes in earnings along the entire distribution are linked to changes in the earnings in the establishments where people work, we computed changes in the earnings of individual workers and the changes in average earnings of their employers by percentile of the individual earnings distribution.

Exhibit 4: Changes in earnings by percentile



Source: Barth, Bryson, Davis, Freeman (2016, figure 4). The horizontal axis is the percentile of the distribution of individual earnings. The vertical axis is the differential in ln earnings between 2007 and 1992)

The light blue line in Exhibit 4 shows a near monotonic pattern of larger increases in earnings for workers higher in the percentile distribution. The orange line shows a similar pattern for changes in *average establishment premium* for workers in each percentile.²² The two lines lie virtually on one another, differing only at the lower and upper ends of the distribution. At the lower end, the increases for individuals fall short of increases in the establishments where they work. To have an exceptionally small change in earnings, a worker had not only to be in an establishment with small pay increases but to have themselves received smaller increases than others in the establishment. At the upper end of the distribution, the story is the opposite: increases for individuals that exceed increases at the establishments where they work, as their earnings increased more than the establishment average.

Turning to the changes in earnings between persons at the top of the distribution and the rest of the work force, my colleagues and I analyzed the gap between the top 5% and the bottom 95% of workers. From 1992 to 2007 the differential between the top 5% and the 95% increased by 0.208 points in ln units, which by itself accounts for 40% of increased inequality among all workers over that period. *What happens to the few at the top greatly affects the trend inequality.* Our decomposition of the change in earnings shows that 0.174 points of the increase is due to increase in average establishment effects, which is 84% of the 0.208 change between the mean earnings of the two groups. Part of this is likely due to the concentration of high earners in corporate headquarters or other specialized facilities, where earnings were especially high and increasing.

In sum, changes in the distribution of earnings among establishments affect the change in earnings along the entire earnings distribution and the increased advantage of top earners compared to other workers.

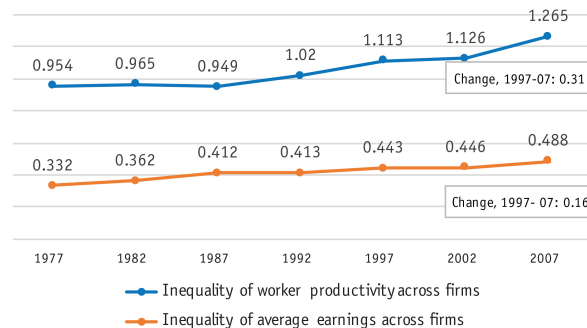
Divergence of Labor Productivity

It would be strange if earnings were the only economic variable that diverged among establishments. Establishments that pay workers more than average generally need to have higher revenues per worker (productivity measured in dollar terms) to fund the pay. If not, they risk losing money and going belly up. At the other end, low productivity establishments generally lack the revenue to pay workers as much as more productive establishments. Over time, they have to raise pay and improve productivity or risk losing workers and being forced to close down.

Exhibit 5 records inequality of productivity per worker (measured as the variance in log revenues per worker) among establishments from 1977 to 2007 and the corresponding inequality of average earnings paid to workers among establishments. In terms of levels, inequality in revenues is

2-3 times inequality in earnings. Part of this reflects differences in capital per worker among establishments. An employer with substantial capital per worker must have higher revenues to cover the cost of the investment compared to other employers. Part also reflects investments in intangible capital such as research and development or advertising. Part may also reflect differences in the quality of materials that the firm uses to produce its goods or services, with the firm needing additional revenues to afford higher quality materials. The inequality in revenues associated with labor in a full total factor productivity analysis that includes physical and intangible capital and materials as separate inputs would be smaller than the inequality in revenue per worker in the table.

Exhibit 5: Inequality of Productivity Per Worker and in Average Earnings of Establishments, 1997-2007



Source: Calculated from Barth, Bryson, Davis, and Freeman 2016, table 6. Inequality of productivity is variance of the natural log (ln) establishment revenues per worker. Inequality in earnings is variance of ln establishment payroll/worker.

The key to the employer-based explanation of changes in wages is not, however, the level of inequality in earnings and productivity but their changes over time. Here, the exhibit shows a remarkable difference between the increase in inequality in revenues per worker and in average earnings. From 1992 to 2007, inequality of revenues per worker increased at twice the increase in inequality of earnings (0.311 points versus 0.156 points). *In every sector establishments moved further apart in revenue per worker than in earnings.*

If firms increase or decrease worker earnings in response to increases or decreases in revenues, the increased inequality in revenues per worker could explain the increased inequality in earnings via the “rent-sharing” behavior of firms. A firm that did very well in a particular period would pass on some of its higher revenue or profits to workers; while a firm that did poorly would reduce pay commensurately. When we began our analysis, we hoped to explain much of the increased inequality of earnings in just this way. Given that inequality of revenues per worker increased at about twice inequality of earnings, we estimated that if the firms increased earnings by 0.7% for every 1.0% increase in revenues, the increased inequality of revenues per worker would account for all of the increased inequality of earnings among establishments.²³ But when we estimated the effect of revenues per worker on average establishment earnings in a rent-sharing model, the estimated elasticity of earnings to revenues was far below the 0.7% level.²⁴ Our evidence suggested that increased revenue per worker due to an outside shock accounted for just 5-6% of the increased inequality of establishment earnings.²⁵

In sum, the pulling away of earnings among establishments was accompanied by even greater pulling away of revenues per worker among establishments. While increased inequality of productivity is arguably necessary for rising inequality of earnings, it is not sufficient to explain the earnings pattern. And it offers no clue as to the failure of market forces to rein in the increased inequality in both earnings and productivity.

Conclusion

The finding that rising employer differentials for similar workers is the main factor behind the upward trend in inequality challenges the skill-based narrative and its mantra that all that is necessary to reduce inequality is more education and skills. Our work directs attention instead at wage-setting and employment issues that the conventional analysis neglects: the potential impact of the weak recovery from the Great Recession and the growth of new work arrangements—temporary help agency workers, on-call

workers, contract workers, and independent contractors²⁶ —on the ability of market forces to re-establish the same wage for the same work; and the resultant danger that the U.S. evolves a new economic feudalism, in which a few large firms owned by the barons and baronesses of wealth dominate the economy, surrounded by a mass of workers struggling to make ends meet.

Taking the results of this essay as correct, business, government, unions, and citizens who believe that inequality has gotten excessive for the economic health of the country should think about ways to strengthen the centripetal market forces that bring earnings closer to the market average and policies to raise the productivity of the least productive establishments or firms. The invisible hand needs help if the U.S. is to avoid evolving a new dual economy with a small number of giant multinationals with great knowledge capital but few employees at its core and an increasingly informal labor market at the periphery.

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Richard B. Freeman holds the Herbert Ascherman Chair in Economics at Harvard University. He is currently serving as Faculty co-Director of the Labor and Worklife Program at the Harvard Law School. He directs the National Bureau of Economic Research / Sloan Science Engineering Workforce Projects, and is Senior Research Fellow in Labour Markets at the London School of Economics' Centre for Economic Performance.

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His recent publications include: *Can Labor Standards Improve Under Globalization* (2004), *Emerging Labor Market Institutions for the 21st Century* (2005), *America Works: The Exceptional Labor Market* (2007), *What Workers Want* (2007 2nd edition), *What Workers Say: Employee Voice in the Anglo American World* (2007), *International Differences in the Business Practices & Productivity of Firms* (2009), *Science and Engineering Careers in the United States* (2009), *Reforming the Welfare State: Recovery and Beyond in Sweden* (2010), and *Shared Capitalism at Work: Employee Ownership, Profit and Gain Sharing, and Broad-based Stock Options* (2010). His forthcoming IZA Prize book is *Making Europe Work: IZA Labor Economics Series* (2012).

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END NOTES

- 1.** Statistics of Income Division, Research, Analysis and Statistics, Internal Revenue Service, December 2015, <https://www.irs.gov/pub/irs-soi/13intop400.pdf>
- 2.** Employment in skill-intensive industries increased more rapidly than in less skill-intensive industries but not by enough for a shift in industry mix to explain the shift in demand.
- 3.** Annual valuations: MySpace: \$580M (2005), \$12B (2007); Sold for \$35M (2011). Facebook \$100M (2005), \$525M (2006); \$15B (2007); \$10B (2008); \$14B; 2010. Source <http://www.theatlantic.com/technology/archive/2011/06/as-myspace-sells-for-35-million-a-history-of-the-networks-valuation/241224/> and <http://www.fastcompany.com/1706359/facebook-valuation-timeline-do-we-hear-10-billion-50-billion-1-trillion>
- 4.** Barth, et al 2016
- 5.** Per Alfred Marshall's classic compensating differential example of a worker laying bricks in a palace vs in a sewer.
- 6.** There is variation in prices for identical goods even on the Internet, as anyone who searches for airplane tickets or hotel reservations or books quickly finds out. Most firms and workers seek to differentiate themselves from competitors, to gain some economic advantage, which produces a world closer to monopolistic than pure competition.
- 7.** Blasi, Freeman, Kruse (2014)
- 8.** For estimates of loss of earnings after displacement see Krolkowski 2015.

- 9.** Some data sets contain data on workers scores on cognitive and non-cognitive tests so one can compare the variation of pay of persons identical in those measures of skill as well as other personal attributes. (Devroye and Freeman 2001; Freeman and Ganguli, 2015)
- 10.** Based on residuals from a regression of log earnings on characteristics.
- 11.** Weighted by establishment employment for comparability with the variances for individuals.
- 12.** The logs transform differences in earnings roughly into percentage differences: when one person earns \$50,000 and another earns \$60,000 the relative difference in their log earnings – the inequality between them – is 0.18 (= $\log 60,000 - \log 50,000$). Labor economists analyze earnings in the log form to estimate returns to schooling and gender and racial differences in pay. Variance is the central statistical measure of the spread of numbers around their mean so that variance of log earnings is an appropriate measure of inequality among large numbers of persons.
- 13.** ANOVA is one of Stigler (2016)'s seven "pillar" ideas in statistics. It decomposes the variation of one variable into its constituent components. The decomposition is exact but can be misleading if you ignore some components.
- 14.** The limitation to some states reflects the availability of data but is unlikely to bias any conclusions as the pattern of inequality in the covered states mirrors that in the country as a whole.

- 15.** The earnings come from the Bureau of Census's Longitudinal Employment and Household Dynamics (LEHD) data set, which links workers and employers based on the unemployment insurance (UI) payments that firms make for every worker. Employers pay the UI tax, which identifies where the employee works and the worker and their earnings. When a worker moves to a new establishment, employer contributions go into the workers account with the ID of the new employer, telling us that the worker changed jobs. The Bureau of Census makes this data available to researchers in confidential Census Data Research Centers that protect the privacy of employees and employers.
- 16.** See, for instance, Card et al 2016 and references therein.
- 17.** The 67.5% falls short of 87% estimated establishment share in the 1977-2009 trend in exhibit 1 possibly because the 1992-2007 period differs from the longer period or because the covered states differ in some ways from the country as a whole as well as because the single data set decomposition is more accurate than the exhibit 1 calculations.
- 18.** While this holds completely for the demographic composition of workers, it is possible the composition of stayers by skill changed between the two periods due to differential investments in training, which might affect a small number.
- 19.** The exhibit displays the change in inequality for stayers from year $t-1$ to t summed over the period in a "rolling sample". Since workers who stay at an establishment differ from one year to the next we maximize the number of persons in the computation by calculating log earnings for stayers in years $t-1$ and t , computed the variance in both years and then took the change in variances from $t-1$ to t to measure the change.
- 20.** Employer differentials are not the only factor for large changes in pay among movers. Some workers may be more productive at a different employer than their own, filling in a particular niche. And, as noted in the discussion of mass layoffs, the impetus for a change in job is associated with large variation in pay for a mover.

- 21.** Slichter (1950) for manual workers by employer; Dunlop (1957) for unionized truck drivers associated with industry.
- 22.** The calculations assign to each person the establishment effects of their workplace in 1992 or 2007 and computes the mean establishment effect for all individuals at a given percentile. If 100 workers were at the 10th percentile in 1992, the establishment effect for the 10th percentile would be the average establishment effects for those workers. Similarly, for the establishment effect for the 10th percentile in 2007. The change in establishment effects by percentile is the difference between the 1992 and 2007 average establishment effects.
- 23.** Why 0.7? Because an elasticity of 0.7 linking changes in earnings to changes in revenues per worker translates into a link of the changes in variances by $(0.7)^2$ because variances are in squared units. Since the variance in the change in revenues per worker is about twice the variance in the change in earnings, the equation would yield changed variance in earnings equal to $\frac{1}{2} \times 2$ changed variance in revenues per worker.
- 24.** We used an instrumental variable technique developed by Card, Deicienti, and Maida (2010) that took revenues outside of the region of the observed establishment as the instrument. See Barth, Bryson, Davis, and Freeman (2016).
- 25.** The link between increased variance in revenues per worker and earners per worker could be due to incentive pay as profit-sharing or employee ownership incentives induce workers to greater productivity and reward them with higher earnings (Kruse, Blasi, Freeman, 2014). The LEHD has no data on compensation policies to measure this potential relation.
- 26.** Katz and Kreuger (2016) estimate that 15% of US workers in late 2015 fit into these alternative work arrangements up from 10% in 2005.