International Journal of Political Economy, 46: 169–210, 2017
Published with license by Taylor & Francis Group, LLC
ISSN: 0891-1916 print/1558-0970 online
DOI: 10.1080/08911916.2017.1407742

Routledge
Taylor & Francis Group

The New Normal: Demand, Secular Stagnation, and the Vanishing Middle Class

Servaas Storm

Department of Economics, Delft University of Technology, Delft, The Netherlands

Abstract: The U.S. economy is widely diagnosed with two "diseases": a secular stagnation of potential U.S. growth and rising income and job polarization. The two diseases have a common root in the demand shortfall, originating from the "unbalanced" growth between technologically "dynamic" and "stagnant" sectors. To understand how the short-run demand shortfall carries over into the long run, this article first deconstructs the notion of total-factor-productivity (TFP) growth, the main constituent of potential output growth and "the best available measure of the underlying pace of exogenous innovation and technological change." The article argues that there is no such thing as a Solow residual and demonstrates that TFP growth can only be meaningfully interpreted in terms of labor productivity growth. Because labor productivity growth, in turn, is influenced by demand factors, the causes of secular stagnation must lie in inadequate demand. Inadequate demand, in turn, is the result of a growing segmentation of the U.S. economy into a "dynamic" sector that is shedding jobs and a "stagnant" and "survivalist" sector that acts as an "employer of last resort." The argument is illustrated with long-run growth-accounting data for the U.S. economy (1948–2015). The mechanics of dualistic growth are highlighted using a Baumol-inspired model of unbalanced growth. Using this model, it is shown that the "output gap," the anchor of monetary policy, is itself a moving target. As long as this endogeneity of the policy target is not understood, monetary policy makers will continue to contribute to unbalanced growth and premature stagnation.

Keywords Baumol model; demand; dual economy; new normal; secular stagnation; vanishing middle class secular stagnation; vanishing middle class

MAKING AMERICA "GREAT" AND "WHOLE" AGAIN …

More than eight years after the Great Financial Crisis, U.S. growth remains anemic, even after interest rates hit the "zero lower bound" and the unconventional monetary policy arsenal of the Federal Reserve has been all but exhausted. Output growth has not returned to its prerecession trend, and this has led some commentators, including Foster and Magdoff (2009), Palley (2012),

Servaas Storm is a Senior Lecturer at the Delft University of Technology, Delft, the Netherlands. He is a Macroeconomist who works on Growth, Distribution, Crisis, Technological Change, Economic Development, and Climate Change. He is one of the Editors of the Journal *Development and Change*.

Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/mijp.

and Summers (2013, 2015a), to suggest that this insipid recovery reflects a "new normal" characterized by "secular economic stagnation" that set in *already well before* the global banking crisis of 2008 (Fernald 2014, 2016; International Monetary Fund [IMF] 2015). If true, it means that the extraordinary policy measures taken in response to the 2008 crisis merely stabilized an otherwise already comatose U.S. economy. This "new normal" is characterized not just by this slowdown of *aggregate* economic growth but also by a concurrent heightening of income and wealth inequalities and a growing polarization of employment and earnings into high-skill, high-wage and low-skill, low-wage jobs—at the expense of "middle-wage" jobs (Autor and Dorn 2013; Weil 2014; Temin 2017). Clearly, the brunt of the slowdown of U.S. economic growth has been borne by the lower- and middle-income classes (Eberstadt 2017), who had to cope with fewer (job) opportunities, stagnant wages, higher inequality, and greater (job and economic) insecurity. The stagnation has devastated all that low-wage and middle-wage workers demand, as George Orwell (1943) insightfully wrote: "… the indispensable minimum without which human life cannot be lived at all. Enough to eat, freedom from the haunting terror of unemployment, the knowledge that your children will get a fair chance." Big parts of the United States are hit by elevated rates of depression (Temin 2016, 2017), drug addiction, and "deaths of despair" (Case and Deaton 2017), as "good jobs" (often in factories and including pension benefits and health care coverage), ones that could be turned into a career, were destroyed and replaced by insecure, often temporary on-call, freelance, and precarious jobs—euphemistically called "alternative work arrangements" or the "gig economy" (Weil 2014; Katz and Krueger 2016).[1]

In line with all this, recent evidence suggests that the American Dream of intergenerational progress has begun to fade: Children's prospects of earning more than their parents has fallen from 95% for children born in 1940 to less than 50% for children born in the early 1980s (Chetty et al. 2016). America is no longer "great," as its economic growth falters, nor "whole" because, as part of the secular stagnation itself, it is becoming a *dual economy*—two countries, each with vastly different resources, expectations, and potentials, as America's middle class is vanishing (Temin 2017).

This article argues that the secular stagnation of U.S. economic growth and the vanishing of the American middle class have common roots—in the deliberate creation after 1980, through economic policies, of a structurally low-wage-growth economy that not only polarized jobs, incomes, and wealth but also slowed down capital deepening, the division of labor, and labor-saving technical progress in the dynamic segment of the economy (Storm and Naastepad 2012). My "demand-side" diagnosis of America's current plight is fundamentally at odds with dominant "supply-side" narratives on secular stagnation in the macroeconomics literature. Perhaps Summers's (2015b) account comes closest, as he originally pointed to sluggish demand as a main cause of secular stagnation—with the "under-consumption" arising from overindebtedness and heightened "political risk," which (in his view) raised savings too much relative to investment. This, however, is a minority position, as most observers including Cowen (2011), Fernald (2014, 2016), Eichengreen (2015a), Furman (2015) and Gordon (2012; 2014; 2015), hold that the slow growth is a purely supply-side problem of slow *potential growth* rather than of weak demand. Importantly, in such supply-side narratives, rising inequality, growing polarization and the vanishing middle class play no role whatsoever as drivers of slow potential growth. They simply drop out of the story.

"Demand-deficiency" explanations have been brushed aside based on evidence that the so-called output gap between *actual* GDP and its *potential* is currently quite narrow for the

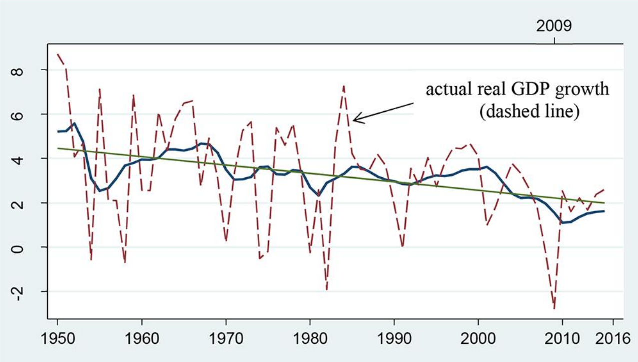

FIGURE 1 Secular Stagnation of Real Potential GDP Growth in the USA, 1950–2016
Source: Federal Reserve Economic Data (https://fred.stlouis.org). *Note*: The thick line is potential real GDP growth. The fitted linear regression line indicates that potential growth is on a downward long-term trend. The gap between potential and actual growth is the "output gap"—and post 2010 it is rather small. During 1950–1972/3, potential output growth did not exhibit a statistically significant (downward) trend. But during 1973–2016, potential output growth does exhibit a statistically significant (at less than 1%, indicated by ***) negative trend: *potential real GDP growth* = 3.29 − 0.043 Time $\overline{R}^2 = 0.52; n = 43$ (37.81)*** (6.91)***. This downward trend is becoming stronger over time—as is suggested by the regression for the period 1995–2016: *potential real GDP growth* = 5.27 − 0.129 Time $\overline{R}^2 = 0.82; n = 21$ (15.79) *** (8.83)***.

U.S. economy (see Figure 1). Potential output has come down partly as a result of demographic stagnation, due to an aging labor force (Aaronson et al. 2014). But the real problem, in this supply-side view, is the alarming faltering of total-factor-productivity (TFP) growth, which is considered the main constituent of potential output growth and "the best available measure of the underlying pace of innovation and technological change" (Gordon 2015: 54). The diminishing TFP growth is taken to reflect a structural technological stagnation, which by lowering the return on investment has pushed desired investment spending down too far. While some commentators have suggested that the slowdown of TFP growth is in part illusory, because real productivity data have failed to capture the new and better but increasingly lower-priced, high-tech products of the past decade, the empirical evidence suggests that any such mismeasurement cannot account for the actual extent of the productivity slowdown (Syverson 2016). The stagnation is real. The United States is "riding on a slow-moving turtle," and "there is little politicians can do about it," in Gordon's (2015: 191) diagnosis.

In Table 1, there appear recent accepted estimates for the United States (1950–2014), which suggest that TFP growth has been on a long-run downward trend ever since the early 1970s (although there is agreement that this decline was temporarily interrupted for a few years during the New Economy bubble of 1995–2000). Recent (postcrisis) TFP growth is said to be less than a third of average annual TFP growth during the period 1950–1972/73, the so-called golden age of capitalism. The long-term downward trend in potential growth (represented by the fitted regression line) is clearly visible in Figure 1 as well. And it looks set to get worse: Fernald's (2016) model forecast for U.S. TFP growth during 2016–2023/26 is in the range of 0.41%–0.55% per year. Secular stagnation, when interpreted as a crisis of waning TFP growth (Gordon 2015), implies a general malaise in innovation, a torpor of progress in general purpose technologies, and a lack of supply-side dynamism *tout court* (Fernald 2014; IMF 2015; Jones 2015).

TABLE 1
Evidence on the Protracted Slowdown of TFP Growth in the U.S., c. 1950–c. 2014

	Fernald (2014)	*Furman (2015)*	*Gordon (2015)*	*Jones (2015)*
c. 1950–1972/3	2.1	1.9	1.79	3.2
1972/3–1995	0.4	0.4	0.52	0.7
1995–2007/8	1.4	1.1	1.43	2.3
2007/8–c. 2014			0.54	1.1
Full period: c. 1948–2014	1.3	1.2		2.0

Notes: Estimates by Fernald (2014) are for 1947–1973, 1973–1995, and 1995–2007. Furman's (2015) periods are: 1948–1973, 1973–1995, and 1995–2014. Gordon's (2015) periodization is: 1950–1972, 1972–1996, 1996–2004, and 2004–2014. Jones (2015) estimates labor-augmenting TFP growth; his periods are: 1948–1973, 1973–1990, 1990–1995, 1995–2000, 2000–2007, and 2007–2013.

TFP growth is the key diagnostic, as Jason Furman (2015: 2), the Chairman of President Obama's Council of Economic Advisors, explains, because it "tells us how efficiently and intensely inputs are used" and "this is easily mapped to innovation of the technological and managerial sorts." To Furman (2015: 11), TFP growth measures "pure innovation"; waning TFP growth must therefore mean that the cumulative growth effects of the latest innovations (in microprocessors and computer chips, materials and biotechnology) is weaker than those of past technologies—as has been argued by Kasparov and Thiel (2012). Likewise, based on his estimates of declining TFP growth, Gordon (2015) contends that the Information and Communications Technology (ICT) revolution, after peaking in the late 1990s, must have already run its course, while there are no great inventions on the horizon—and Gordon goes on to attribute declining TFP growth and stalling business dynamism to the socioeconomic decay of the U.S., as marriage ("society's cornerstone") declines, traditional family structures are upended, and growing number of young men find themselves in prison. Technology optimists Brynjolfsson and McAfee (2014) disagree with Gordon's apocalyptic prognosis and argue instead that the ICT revolution will take decades to play out fully, as it requires parallel innovation in business models, new skills, and institutional setups to work—in their meliorist account, the stagnation of TFP growth is only a temporary blip. Economic historian Mokyr (2013) concurs, venturing, without providing much evidence to support his claim, that emerging technologies such as robotics and 3-D printing will "revolutionize" the economy, just as the steam engine and electronics did in earlier ages.

Until now, however, so the argument goes, existing labor and product-market rigidities have been limiting the ability of firms and markets to restructure and reorganize to benefit from ICT (see Furman 2015; Fernald 2016). However, while there is no agreement on what exactly is causing the secular decline of TFP growth or on how long it might last, most analysts are agreed that waning TFP growth reflects technological decline and is an exclusively supply-side problem. If so, remedying it will require a supply-side policy agenda—which could include, following Furman (2015), trade liberalization (supposedly to increase pressure on firms to innovate, while expanding their market access); further labor market deregulation; business tax reforms; and more public investment in infrastructure, education, and RD&D (Glaeser 2014; Eichengreen 2015b; Gordon 2015). It would not require sustained fiscal stimulus, higher real wages, or a restructuring of the private debt overhang, however.

"MODEST DOUBT IS CALL'D THE BEACON OF THE WISE"

This is what William Shakespeare (1602) wrote in *Troilus and Cressida*. In similar vein, this article calls for caution about interpreting declining TFP growth as a supply-side indicator of technological progress and innovation. It wishes to cast doubt on the view that the secular stagnation of U.S. growth must be attributed to supply-side factors that restrict new technologies from revolutionizing the economy and argue instead that the slowdown in TFP growth reflects a demand (management) crisis, with the "underconsumption" driven by stagnating real wages, rising inequality, and greater job insecurity and polarization.

I argue that the secular stagnation of U.S. TFP growth and the vanishing of the American middle class have common roots—and must be diagnosed together as symptoms of one underlying "disease." My "modest doubt" concerns the unstated assumption, taken for granted in the supply-side explanations of secular stagnation, that "steady-inflation potential output growth" as well as the "output gap" are tangential to aggregate demand growth (Storm and Naastepad 2012; Costantini 2015). Steady-inflation potential output growth is assumed to depend fully and structurally on the supply-side factors "technological progress and innovation" (operationalized as TFP growth) and "demographic change" (or the growth of effective labor supply).

This article argues, with a focus on the concept of TFP-growth, that this neat separation between actual and potential output growth is the Achilles' heel of supply-side explanations of secular stagnation (Storm and Naastepad 2012). My "modest doubt" stems from the mounting empirical evidence that potential output growth is *not* independent from actual—demand-determined—growth. Study after study show that the current (demand) recession is causing *permanent* damage to potential output growth in the OECD (e.g., Haltmaier 2012; Reifschneider, Wascher, and Wilcox 2013; Ball 2014; Ollivaud and Turner 2014). In what is perhaps the most comprehensive study of the issue to date, Blanchard, Cerutti, and Summers (2015) find, analyzing 122 recessions in 23 OECD countries during 1960–2010, that in one-third of all cases, the recession is followed by *permanently lower output growth* relative to the prerecession output trend—an outcome they call "super-hysteresis."

In terms of Figure 1, this means that the observable slowdown in *actual* economic growth has helped depress *potential* output growth—which is the exact claim made in this article. However, I will not scrutinize this concept of "super-hysteresis" but instead try theoretically and empirically to deconstruct the notion of "total-factor-productivity growth," as it is the cornerstone on which the mentioned supply-side explanations of secular stagnation rest. The article argues that TFP growth is not a supply-side concept, unlike what is commonly believed to be the case. However, to make the argument, we need to do some growth accounting first, because, as John von Neumann once remarked, "There is no sense in being precise, when you don't even know what you're talking about."

SOME BASIC GROWTH ARITHMETIC

To uncover the determinants of (the slowdown of) TFP growth we need to do some detective work. Let me begin this task by defining the notion of "potential output"x_P in terms of TFP growth. To do so, let us first define L_P is potential (or maximum) labor supply (defined in terms of hours of work) and $\lambda_p = x_p/L_p$ is potential labor productivity per hour of work. By definition,

$$x_p = L_p \times \lambda_p \tag{1}$$

If we logarithmically differentiate (1), we get the following expression in growth rates:

$$\hat{x}_p = \hat{L}_p + \hat{\lambda}_p \tag{2}$$

where a circumflex "^" indicates a growth rate. Potential output growth thus depends on the growth of potential labor supply (or "demography") and potential labor productivity growth (or "technology"). I assume that $\hat{L}_p = 0$ to focus on hourly labor productivity growth $\hat{\lambda}_p$. Next, to explain $\hat{\lambda}_p$ and following standard growth-accounting practice, start with the neoclassical Cobb-Douglas (constant-returns-to-scale) production function:[2]

$$x = AL^{\phi}K^{1-\phi} \tag{3}$$

where x is output (or real value added at factor cost); L is the actual number of hours worked; K is the value of the capital stock (expressed in constant dollars); and A is a scale factor. Exponent φ is typically assumed to correspond to the observed labor share in income. If one divides both sides of equation (3) by x^{ϕ} and then solves for (*x/L*), or productivity per hour of work, one obtains (Jones 2015):

$$\lambda = A^{\frac{1}{\phi}}\kappa^{\frac{-(1-\phi)}{\phi}} \tag{4}$$

where $\lambda = x/L$ is actual labor productivity per hour of work and $\kappa = x/K$ is capital productivity. Differentiation of (4) yields this expression for labor productivity growth:

$$\hat{\lambda} = \frac{1}{\phi}\hat{A} - \frac{1-\phi}{\phi}\hat{\kappa} \tag{5}$$

where $\hat{A}$ stands for TFP growth. What (5) tells us is that labor productivity growth is influenced by capital productivity growth and "this thing" called TFP growth. However, in the steady state of a neoclassical growth model, the capital-output ratio must be constant, which means capital productivity is constant ($\hat{\kappa} = 0$). Equation (5) must then be read as follows:

$$\hat{\lambda}_p = (1/\phi)\hat{A} \tag{5\#}$$

When we substitute (5#) into (2), we find that potential output growth depends on TFP growth, or $\hat{x} = (1/\phi)\hat{A}$ (while assuming $\hat{L}_p = 0$). This means (when true) that the observed slowdown of potential output growth must have been due to the secular fading of TFP growth—as is the consensus view. What then is TFP growth and how is it determined?

At this point we are stepping into murkier water. Ever since Solow (1957) began cranking the numbers six decades ago, TFP growth has been treated as a nonobservable variable that can only be quantified, under certain assumptions, as an "unexplained residual" in a growth-accounting scheme. Specifically, if we logarithmically differentiate production function (3), we get:

$$\hat{x} = \hat{A} + \phi\hat{L} + (1-\phi)\hat{K}, \tag{6}$$

from which $\hat{A}$ can be determined as a residual:

$$\hat{A} = \hat{x} - \phi\hat{L} - (1-\phi)\hat{K} \tag{6\#}$$

Eq. (6#) defines TFP growth as the unexplained “Solow residual,” an often used approach, as is attested by a Google search giving more than 129,000 hits for this term. Textbook convention interprets $\hat{A}$ as an indicator of Hicks-neutral disembodied technological progress. But as has been widely noted, equation (6#) lacks any deeper analytical insight into its structural determinants. Abramovitz (1956), fittingly, called the Solow residual a “measure of our ignorance,” and while the search for dependable and robust determinants of TFP growth has consumed the research efforts of at least two generations of (growth-accounting) economists, Abramovitz’s conclusion still rings true: “A rigorous conceptual understanding of that gap continues to elude economists even today,” concludes Furman (2015: 2). Hence, unlike the Brout-Englert-Higgs boson, an elementary building block of modern physics, which was first conceptualized in 1964, while its existence could be experimentally confirmed only in 2013, understanding the Solow residual has not so far progressed a lot. This is problematic because the residual is large: According to Solow (1957), during 1909–1949, only 13% of output growth in the United States was due to working more hours and using more machines, with TFP growth accounting for the remaining 87%. More recently, Jones (2015: 10) found that TFP growth accounts for about 80% of economic growth in the United States during 1948–2013.

Fortunately, TFP growth may be less of a mystery than Furman and others presume because there are two ways in which it can be unambiguously measured—using real observable data. The first approach to direct measurement of TFP growth is as follows (Rada and Taylor 2006). Using definitions $\hat{\lambda} = \hat{x} - \hat{L}$ and $\hat{\kappa} = \hat{x} - \hat{K}$, TFP growth in (6#) can be rewritten as:

$$\hat{A} = \phi\hat{\lambda} + (1 - \phi)\hat{\kappa} \tag{7}$$

Equation (7) is rather unsurprising, as it defines $\hat{A}$ as the weighted average of the growth rates of average labor and capital productivities (which is exactly what it should be). If we accept Kaldor’s (1957) stylized fact that the capital-output ratio does not show a systematic trend in the long run—which means $\hat{\kappa} = 0$—then (7) becomes: $\hat{A} = \phi\hat{\lambda}$. Note that the causality in equation (7) runs from labor productivity growth to TFP growth and not vice versa as in equation (5#). Labor productivity growth is the only structural determinant of TFP growth in the long run, and it follows not just that $\hat{x}_p = \hat{\lambda}_p = (1/\phi) \times \hat{A} = \hat{\lambda}$ but also that TFP growth adds no additional analytical insight and can be dropped from the economist’s growth-accounting tool kit without consequence.

The second approach is the “dual approach” (Simon and Levy 1963; Jorgenson and Griliches 1967; Shaikh 1974; Barro 1999; Rada and Taylor 2006; Felipe and McCombie 2012). It starts off from the NIPA accounting identity that real GDP at factor cost is the sum of wage income and capital income:

$$x = wL + rK \tag{8}$$

where w is the real wage rate per hour of work and r is the real profit rate on the capital stock. This condition must hold if all the GDP is attributed to one of the factors. Dividing (8) by x, we get: $1 = (wL/x) + (rK/x) = \phi + (1 - \phi)$, where ϕ is the observed labor share in income at any time and $(1 - \phi)$ is the observed capital share. Eq. (8) can be written in terms of growth rates as follows:

$$\hat{x} = [\phi\hat{w} + (1 - \phi)\hat{r}] + \phi\hat{L} + (1 - \phi)\hat{K} \tag{9}$$

It should be recognized that growth equation (9) remains an accounting identity, that its derivation uses only the NIPA condition $x = wL + rK$, and that (9) holds true even if the aggregate production does not exist (Felipe and McCombie 2012). Eq. (9) is functionally equivalent to (6)—but the latter must be read as a wrongly specified representation of the former (for reasons explained by Felipe and McCombie 2012). This isomorphism between production function (6) and NIPA value-added accounting identity (9) does not permit us to make any direct inference about "aggregate technological progress." Empirically, the only valid interpretation of TFP growth is in terms of "total-factor-payment growth":

$$\hat{A} = \phi\hat{w} + (1-\phi)\hat{r} \tag{10}$$

"Solow's measure of technical change," as Shaikh (1974: 118) noted early on, "is merely a weighted average of the growth rates of the wage w and rate of profit r." The aggregate production function, concluded Shaikh, is based on "a law of algebra, not a law of production." Given this isomorphism, statistically estimating (3) means that one is estimating an identity, and this explains why the empirical fit is generally exceptionally good for production functions, with $\overline{R}^2$ often close to unity (Felipe and McCombie 2012).

As a matter of accounting, the "primal" estimate of TFP growth in (7) must equal the "dual" estimate based on the share-weighted growth of factor prices in (10). The neoclassical intuition for the dual (10) is, as Barro (1999) explains, that rising factor prices can be sustained only if factor productivities in (7) are increasing in tandem. In the neoclassical steady state and assuming "perfect competition" in product and factor markets, real wage (profit) growth *must* converge to labor (capital) productivity growth, or $\hat{w} = \hat{\lambda}$ and $\hat{r} = \hat{\kappa}$; in this hypothetical case of a "perfectly competitive" economy, the primal and dual estimates fully coincide. However, there is nothing in the NIPA accounting to ensure that these conditions do actually hold—in historical time $\hat{w} \neq \hat{\lambda}$ and $\hat{r} \neq \hat{\kappa}$, and hence (7) and (10) do not coincide. The most we can infer from the previous is this. Subtracting (7) from (10), we get:

$$\phi(\hat{w} - \hat{\lambda}) + (1-\phi)(\hat{r} - \hat{\kappa}) = 0 \tag{11}$$

which is, as pointed out by Rada and Taylor (2006: 488), "a cost-side restriction on observed growth rates of average productivities and factor payments." Eq. (11) states that, for any given rate of TFP growth, the weighted sum of wage share growth $(\hat{w} - \hat{\lambda})$ and profit share growth $(\hat{r} - \hat{\kappa})$ must be zero—which underscores the zero-sum distributive conflict between workers and profit recipients underlying TFP growth.

There is one additional interpretation of TFP growth that will prove useful. If we assume that ψ is the constant capital-to-potential-output ratio, then potential output becomes $x^* = K/\psi$ and capacity utilization is: $u = x/x^*$. It follows that actual output $x = uK/\psi$. Logarithmically differentiating this expression gives:

$$\hat{x} = \hat{u} + \hat{K} \tag{12}$$

Actual output growth in (12) depends on the growth of the capital stock (which reflects structural or potential growth) and the growth of capacity utilization, which mirrors cyclical demand factors that may cause actual growth to deviate from potential growth. Combining (12) and (6) and rearranging, TFP growth becomes:

$$\hat{A} = \hat{u} + \phi(\hat{K} - \hat{L}) \tag{13}$$

TFP growth thus directly depends on capital deepening and on the growth of utilization. Equation (13) could be read as a variant of the AK-model of endogenous growth, as TFP growth rises with capital stock growth, but with a twist, because—unlike in new growth theory—I do not need to invoke microeconomic (knowledge) externalities to justify it but only to assume that ψ exists. If I next define $i = \Delta K/x$ as the investment-GDP ratio, then it follows that $i = \frac{\Delta K}{K} \times \frac{K}{x^*} \times \frac{x^*}{x} = \psi \hat{K} u^{-1}$. This gives me the following result for capital stock growth:

$$\hat{K} = (u \times i)/\psi \tag{14}$$

A higher investment-to-GDP ratio leads to faster capital stock growth—at constant capacity utilization. Since empirically investment is usually dominated by "accelerator effects" operating through aggregate demand, it follows from (13) and (14) that a structural decline in demand growth depresses TFP growth—through dithering business investment, a decline in capital deepening, and/or a decline in capacity utilization. As a result, potential output growth must decline as well. Hence, as Kaldor (1957: 595) wrote, "A society where technical change and adaptation proceeds slowly, where producers are reluctant to abandon traditional methods and to adopt new techniques is necessarily one where the rate of capital accumulation is small." As a result, the growth rate of potential output of that particular society must be low—which in turn suggests a low "speed limit" for actual growth, as inflation-adverse monetary policy makers, convinced that low TFP growth is due to a technological malaise, will keep actual growth down to sluggish potential growth (in order to keep inflation low and stable). Stagnation, while avoidable because *potential* growth can be raised by higher investment, becomes a self-fulfilling process.

SECULAR STAGNATION OF TFP IN THE U.S. ECONOMY: 1948–2015

Table 2 presents empirical estimates for the U.S. economy (1948–2015) of TFP growth, defined as (a) the "Solow residual" as per equation (6#), (b) "weighted factor productivities" growth as in (7), and (c) total factor payments growth as defined in equation (10). The analysis is based on a growth-accounting database constructed using Bureau of Economic Analysis (BEA) data on GDP at factor cost (in current and constant 2009 prices), hours worked by full-time and part-time employees, compensation of employees, and the net stock of fixed assets (in constant 2009) prices; details on the database are given in the appendix. Since the NIPA accounting condition $x = wL + rK$ holds by construction, estimates (a), (b), and (c) are similar (neglecting

TABLE 2
Alternative Measures of Aggregate TFP Growth in the United States, 1948–2015

	"Solow residual" eq. (6#)	*Weighted factor productivity growth Eq. (7)*	*Total factor payment growth Eq. (10)*
	(a)	*(b)*	*(c)*
1948–1972	1.60	1.57 (88%)	1.57
1972–1995	1.06	1.04 (80%)	1.04
1995–2008	1.35	1.34 (85%)	1.34
1948–2008	1.34	1.32 (85%)	1.32
2008–2015	0.73	0.72 (73%)	0.73
1948–2015	1.27	1.25 (84%)	1.26

Source: Author's estimates based on Bureau of Economic Analysis data; see data appendix.

Notes: The numbers in parentheses in column (b) give the percentages of weighted factor-productivity growth explained by labor productivity growth as per equation (7).

small errors due to rounding). But estimates (b) and (c) are preferable to the Solow residual, if only because these are direct measurements.

From Table 2, it is clear that both share-weighted factor productivity and factor prices started declining in the 1970s, but the process was interrupted in the second half of the 1990s as both measures exhibited significantly higher growth during the New Economy boom of the late 1990s as well as the debt-led and misunderstood Great Moderation of the early 2000s. The revival was remarkably short lived, however, and post-2008 share-weighted productivities' and share-weighted factor prices' growth reverted back to their earlier declining trend. These estimates are broadly similar to those appearing in Table 1. Column (b) of Table 2 presents the percentage share of weighted factor productivity growth explained by only labor productivity growth as in equation (7). It can be seen that labor productivity growth is of overwhelming importance to TFP growth, explaining around 84% of weighted factor-productivities growth during 1948–2015; the remaining 16% is due to capital productivity growth $\hat{\kappa}$. Going by equation (7), the secular decline in TFP growth, highlighted in Figure 1, has been driven by a (statistically significant) long-term downward drift in labor productivity growth—as illustrated in Figure 2. One further conclusion follows from the accounting and equation (10) in particular: The steady decline in labor productivity growth has been accompanied by a secular fall in the growth of factor payments and especially of real wage growth (which has a greater weight in factor payment growth than profit rate growth). The dashed line in Figure 2 represents declining hourly real wage growth over the period 1948–2015—which is closely (but not one-to-one) correlated with labor productivity growth ($R^2 = 0.59$, significant at 1%).

Table 3 presents the stylized facts on the cost-side restriction on growth rates of average productivities and factor payments, defined by (11). It can be seen that the labor income share increased during 1948–1972, i.e., when labor productivity growth was highest, but declined more or less continuously during 1972–2015, in conjunction with the secular decline in labor

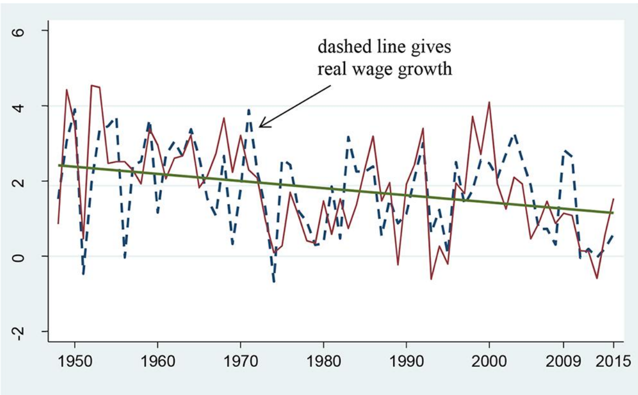

FIGURE 2 Secular Stagnation of U.S. Hourly Labor Productivity and Hourly Real Wage Growth: Total Economy, 1948–2015

Note: The fitted regression line for the total economy (1948–2015) is based on the following OLS regression (*** is statistically significant at 1%; ** is statistically significant at 5%): Labor productivity growth = 1.76 − 0.02 Time $\overline{R}^2 = 0.10; n = 68$ (12.94)*** (2.54)**. The OLS regression of productivity growth and real wage growth is as follows: growth of labor productivity = 0.78 + 0.56 real wage growth $\overline{R}^2 = 0.35; n = 68$. (4.08)*** (6.66)***.

TABLE 3
Distributional Shifts Associated with Aggregate U.S. TFP Growth, 1948–2015

	ϕ	$\hat{w}$	$\hat{\lambda}$	$\phi(\hat{w}-\hat{\lambda})$	$1-\phi$	$\hat{r}$	$\hat{\kappa}$	$(1-\phi)(\hat{r}-\hat{\kappa})$
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
1948–1972	0.60	2.68	2.32	0.21	0.40	–0.06	0.46	–0.21
1972–1995	0.60	1.15	1.38	–0.14	0.40	0.88	0.52	0.14
1995–2008	0.59	1.92	1.92	0.00	0.41	0.49	0.49	0.00
1948–2008	0.60	1.94	1.88	0.03	0.40	0.41	0.49	–0.03
1972–2008	0.60	1.43	1.57	–0.09	0.40	0.73	0.51	0.09
2008–2015	0.57	0.58	0.91	–0.20	0.43	0.93	0.46	0.20
1948–2015	0.60	1.80	1.78	0.01	0.40	0.46	0.49	–0.01

Source: Author's estimates based on BEA data; see data appendix.

Notes: ϕ = the period-average labor income share; $\hat{w}$ = average annual real wage growth (per hour); $\hat{\lambda}$ = average annual hourly labor productivity growth; $\hat{r}$ = average annual real profit rate growth; $\hat{\kappa}$ = average annual capital productivity growth; $(\hat{w}-\hat{\lambda})$ = average annual (real) wage share growth; and $(\hat{r}-\hat{\kappa})$ = average annual (real) profit share growth.

productivity growth and the recovery of the profit share. Importantly, the temporary New Economy impulse to productivity growth during 1995–2008 coincided with a revival of real wage growth and a nondeclining labor income share.

We therefore have two separate accounts of the secular stagnation of potential output growth—one centered on the slowdown of labor productivity growth and the other centered on stagnating real wage growth. How can these two explanations be aligned? A first view, firmly grounded in standard neoclassical microeconomics, is that (exogenous) labor productivity growth "causes" real wage growth in the longer run. That is, in line with the marginal productivity theory of income distribution, neoclassical "intuition" holds that real wage growth follows exogenous productivity growth because profit-maximizing firms will hire workers up until the point at which the marginal productivity of the final worker hired is equal to the real wage rate (Jorgenson and Griliches 1967; Barro 1999; Jones 2015). There is therefore nothing surprising about the co-occurrence of declining labor productivity growth and decreasing real wage growth, as the technological stagnation forces profit-maximizing firms to lower their real wage growth offer.

The simple "neoclassical intuition" does not allow for any influence of wage setting on productivity growth and treats exogenous technological progress as the driver of real wage growth as well as potential output growth. However, the problem with this simple "intuition" is that it is wrong because it fails to recognize that the relationship between wage growth and productivity growth must go both ways. "The *negative* response of labor hours to an increase in the real wage implies a *positive* response of output per hour to the same increase," writes Gordon (1987: 154), pointing out that "Substitution away from labor in response to an inexorable rise in the real wage has been at the heart of the economic growth process for centuries." Gordon's inference is corroborated by my growth accounting data. The general picture for hours worked and wages is shown in Figure 3, which indicates that both variables are on a downward trend. The (statistically significant at 1%) response of growth of hours worked to an increase in real wage growth takes a value of – 0.53. The corresponding *positive* elasticity of output per hour to higher real wages turns out to be + 0.56 (as shown below Figure 2).

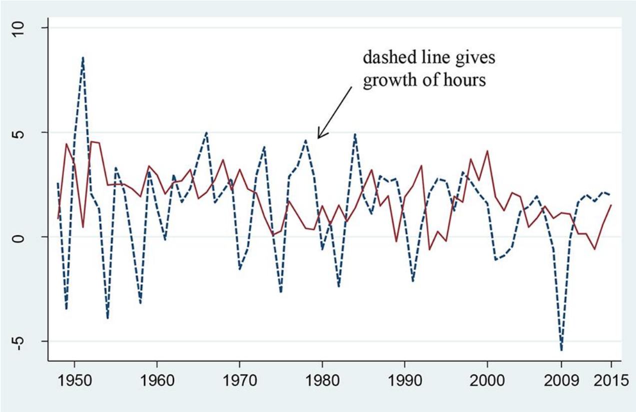

FIGURE 3 Hourly Real Wage Growth and Growth of Hours Worked: Total U.S. Economy, 1948–2015
Note: The regression line is based on the OLS regression result (** is significant at 5%; *** is significant at 1%): growth of hours worked = −0.54 − 0.53 real wage growth +0.91 real GDP growth (2.10)** (6.31)*** (15.29)***. $\overline{R}^2 = 0.84; n = 68$.

Hence, faster productivity growth may permit higher wage growth, but more importantly, higher real wages will raise productivity growth by giving firms a reason to invest in labor-saving technology. Empirical research finds that real wage growth is a major determinant of productivity growth (Gordon 1987, 2015; Foley and Michl 1999; Marquetti 2004; Basu 2010; Storm and Naastepad 2012). Theoretically, the influence of wage growth on productivity growth has been alternatively explained in terms of "induced technical change" (Hicks 1932; Funk 2002; Brugger and Gehrke 2017), "Marx-biased technical change" (Foley and Michl 1999; Basu 2010), or "directed technical change" (Acemoglu 2002)—but the key mechanism is this: Rising real wages, as during the period 1948–1972, provide an incentive for firms to invest in labor-saving machinery, and productivity growth will surge as a result; but when labor is cheap, as during most of the period 1972–2015, businesses have little incentive to invest in the modernization of their capital stock, and productivity growth will falter in consequence (Storm and Naastepad 2012).

Average annual real wage growth declined from 2.72% during 1948–1958 to 0.58% during 2009–2015. Average annual labor productivity growth declined from 2.31% during 1948–1958 to 0.92% during 2009–2015. Using the regression coefficient (0.56), the decline in real wage growth has been responsible for more than four-fifths of the decline in labor productivity growth by 1.4 percentage points between the 1950s and the period 2009–2015.

These results are similar to findings by Gordon (1987) for the period 1964–1984.

Average annual real wage growth declined from 2.72% during 1948–1958 to 0.58% during 2009–2015. Union density declined from 32.5% of the labor force during 1948–1958 to 11.1% during 2009–2015. Using the regression coefficient (0.08), declining union density has been responsible for four-fifths of the decline in real wage growth by 2.1 percentage points between the 1950s and the period 2009–2015.

The recognition that real wage growth is a major driver of labor productivity growth also holds an important insight for macroeconomic policy, as Gordon (1987: 154–155) explains: " … a stimulus to aggregate demand provides not only the direct benefit of raising output and employment, but also the indirect benefit of raising the real wage and creating substitution away from labor that boosts productivity … . With this dual benefit obtainable from demand expansion, the case against demand stimulation must rest on convincing evidence that such policies would create an unacceptable acceleration of inflation." There may be less inflation than expected, in other words, because the rate of *potential* growth would go up.

All this leads me to three conclusions. First, it is time to stop the reification of the "Solow residual" because there is no and has never been a residual to begin with (Shaikh 1974; Rada and Taylor 2006; Felipe and McCombie 2012). It makes for good practice to follow common sense and define TFP growth as the weighted average of the growth rates of average labor and capital productivities (as in equation (7)). Second, doing so, we find that TFP growth is determined overwhelmingly by labor productivity growth. This means we are back to equation (2), according to which potential growth depends on labor productivity growth—and applying Occam's razor, we can forget about TFP growth altogether. Thirdly, labor productivity growth is endogenous and at least partly determined by real wage growth. This implies that the secular stagnation of productivity growth must be attributed at least partly to the long-term steady decline in the growth rate of U.S. hourly real wages. The decline in real wage growth in turn is widely argued to be associated with the post-1980 reorientation in macroeconomic policy away from full employment and toward low and stable inflation, which paved the way for labor market deregulation, a scaling down of social protection, a lowering of the reservation wage of workers, and a general weakening of the wage bargaining power of unions (Storm and Naastepad 2012). The recent rise in persons "working in alternative work arrangements" (Katz and Krueger 2016) is merely the culmination of this earlier trend. To illustrate empirically this point, Figure 4 shows that there is a statistically significant (at 1%) positive long-run relation between the degree of unionization and real wage growth in the United States. (1948–2015).

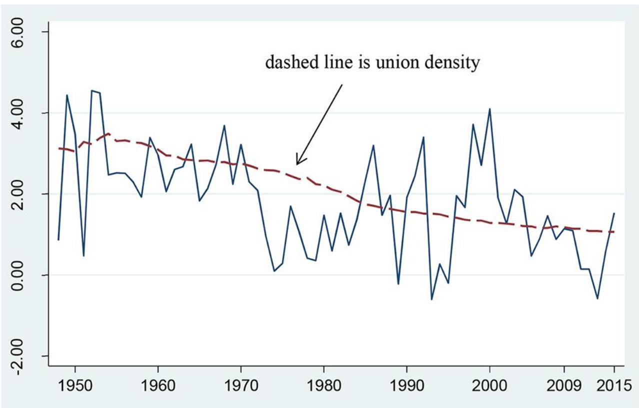

FIGURE 4 Stagnating Hourly Real Wage Growth and Declining Union Density: Total U.S. Economy, 1948–2015
Note: The dashed line represents national union density (which is defined in terms of 10 percentage points), which declines from 3 (or about 30%) in the early 1950s to 1.1 (or 11%) in 2015. Hourly real wage growth and union density are very strongly correlated; the Prais-Winsten AR(1) regression result is (*** is statistically significant at 1%): hourly real wage growth $= 0.08$ union density $\overline{R}^2 = 0.60; n = 68$ (9.62)***.

While one should not get carried away by and read too much in the simple correlation appearing in Figure 4,[3] the association is remarkably strong: All by itself, the secular decline in unionization "explains" about two-thirds of the long-term fall in real wage growth—which minimally suggests that domestic regulatory changes leading to greater job and income insecurity have contributed to real wage restraint.

The strength of the correlation suggests that declining unionization is capturing some relevant factor explaining the "atypical restraint on compensation increases [that] has been evident for a few years now and appears to be mainly the consequence of greater worker insecurity," as Alan Greenspan (1997: 254) defined the problem before Congress. Unofficially, Greenspan spoke about the traumatized U.S. worker, "someone who felt job insecurity in the changing economy and so was resigned to accepting smaller wage increases. [Greenspan] had talked with business leaders who said their workers were not agitating and were fearful that their skills might not be marketable if they were forced to change jobs" (Woodward 2000: 163). Clearly, Greenspan's "traumatized workers" must be related to the socioeconomic decay of the United States, to which Gordon (2015) attributes declining TFP growth and stalling business dynamism. Zooming in on the latter factor, dithering business investment does underlie the secular decline in capital-intensity growth and TFP growth—as is shown in Table 4. The contribution to TFP growth of capital deepening declined from 1.1% per year during 1948–1972 to 0.84%% per year during 1995–2008—a decline of 0.26 percentage points, which fully explains the fall in TFP growth from 1.6% per year in the first period to 1.35% per annum during the second period. Likewise, the decline in TFP growth by 0.62 percentage points between 1995–2008 and 2008–2015 is almost completely due to declining capital-intensity growth, which in turn is caused by a sharp, crisis-induced, drop in the investment-GDP ratio (see Table 4). Weak investment post 2008 thus caused productivity and potential output growth to collapse (cf. Ollivaud, Guillemette, and Turner 2016).

Hence, sluggish business investment in the United States has been a key factor behind the stagnation of TFP growth as well as responsible for propagating hysteresis-like adverse consequences for TFP and potential output after 2008 (cf. Hall 2014; Ollivaud, Guillemette, and Turner 2016). This conclusion becomes stronger once we acknowledge the "cumulative causation" at work: Sluggish investment weakens aggregate demand and this, in turn, weakens accumulation through the "accelerator effect"—which was Kaldor's argument. This way, (cyclical and/or structural) demand shortfalls must carry over into lower growth of potential

TABLE 4
TFP Growth, Capital Deepening, and Utilization, 1948–2015

Contribution of:	*1948–1972*	*1972–1995*	*1995–2008*	*2008–2015*	*1948–2008*	*1948–2015*
Capital deepening	1.10	0.52	0.84	0.25	0.83	0.77
Capacity utilization	0.48	0.53	0.50	0.47	0.50	0.50
TFP growth	1.58	1.05	1.34	0.72	1.33	1.26
Solow residual	1.60	1.06	1.35	0.73	1.34	1.27

Source: Author's estimates based on BEA data; see data appendix.

Note: The Table is based on equation (13). Using (13) and (14), TFP growth is posited to be influenced by the ratio of gross domestic investment to GDP. The OLS regression result for the period 1948–2015 is as follows:.

TFP growth $= -3.42 + 0.20$ (Investment/GDP) $+ 1.88$ D2010 $\overline{R}^2 = 0.09; n = 68$.

(2.50)**(3.32)***(8.02)***.

output. To summarize: The secular decline in *aggregate* U.S. TFP growth post 1972 is closely hanging together with secular declines in the growth rates of *aggregate* labor productivity, real wages, capital intensity, and aggregate demand (mostly investment demand).

D2010 is a dummy for the year 2010. The decline in the U.S. investment-GDP ratio from 23.9% on average per year during 1995–2008 to 20.7% per year during 2008–2015 has lowered TFP growth during 2008–2015 by 0.63 percentage points compared to TFP growth during 1995–2008. The declining investment rate thus "explains" more than 80% of the post-2008 decline in TFP growth in the United States (cf. Ollivaud, Guillemette, and Turner (2016) for similar evidence for the OECD). The same holds true in the long run. The slowing down of capital accumulation from 24.4% of GDP on average per year during 1948–1972 to 22.8% of GDP on average per year during 1995–2015 pushed down TFP growth by 0.3 percentage points during the latter period as compared to the period 1948–1972; the declining investment rate in the United States "explains" more than 60% of the long-run decline in U.S. TFP growth.

DUALISM, BIG TIME!

The macroeconomic data in Table 2 point to the secular stagnation of *aggregate* TFP and labor productivity growth in the U.S. economy (1948–2015). However, a richer, more differentiated, picture emerges when we look into productivity growth at the industry level. Table 5 presents the TFP and labor productivity growth rates for nine industries and the public sector. The nine industries are: Agriculture and Mining, Utilities & Construction (UC); Manufacturing; Information; Wholesale, Retail & Transportation (WRT); Finance, Insurance and Real Estate (FIRE); Professional & Business Services (PBS); Educational, Health and Social Services (EHS); and the Rest, which is made up of art, entertainment, recreation, food, and other services. In 2015, more than 15% of all employees, or 22.3 million individuals, worked in this residual "Rest" in activities such as food preparation and serving (±±12 million workers), cleaning (±4 million workers), security guarding (1.5 million workers), childcare (0.6 million employees), and entertainment (0.5 million workers). The fast-food sector alone offers jobs to one in four of the "Rest" workers.

Table 5 confirms the historical pattern in which labor productivity growth is high during 1948–1972, slows down considerably during 1972–1995, but then accelerates again during 1995–2008—to fall off the cliff following the financial crisis of 2008–2009 when productivity growth rates decreased in most industries. Concentrating on the precrisis period (1948–2008), we can see that although *aggregate* productivity growth was lower during 1995–2008 than during 1947–1972, some key industries experienced an acceleration of productivity growth in the later period as compared to the period 1947–1972. Most prominently, labor productivity growth accelerated from 2.7% per year during 1947–1972 to 8.7% per year during 1995–2008 in Primary Activities following the boom in hydraulic fracking to recover oil and gas from shale rock. Labor productivity growth, however, increased as well in Manufacturing (from 2.7% during 1947–1972 to 3.2% during 1995–2008) and PBS (from 2.2% per year during 1947–1972 to 2.8% per annum during 1995–2008). The dynamic productivity growth performance of Manufacturing contradicts the claim of techno-pessimists that U.S. manufacturing and information firms had reached a plateau in technology innovation already well before the financial crisis. They haven't—as Table 5 shows.

TABLE 5
Industry-Wise TFP Growth and Hourly Labor Productivity Growth in the U.S. Economy, 1948–2015

	TFP growth (Solow residual)					
	1948–1972	*1972–1995*	*1995–2008*	*2008–2015*	*1948–2008*	*1948–2015*
Total economy	1.60	1.06	1.35	0.73	1.34	1.27
Primary Activities	−1.47	−1.02	7.44	−5.04	0.60	0.00
Utilities & construction	2.35	0.83	0.80	0.38	1.41	1.30
Manufacturing	1.88	0.94	1.19	0.87	1.40	1.32
WRT	1.74	0.74	0.80	1.16	1.15	1.15
Information	1.58	0.74	0.58	−0.26	1.04	0.90
FIRE	1.64	1.63	0.86	2.02	1.46	1.52
PBS	1.69	0.51	2.38	0.30	1.38	1.29
EHS	2.09	1.38	0.81	0.34	1.56	1.44
Rest	0.73	1.29	0.35	1.32	0.90	0.96
PM: Government	1.71	1.17	1.62	0.74	1.48	1.40
	Labor productivity growth					
	1948–1972	*1972–1995*	*1995–2008*	*2008–2015*	*1948–2008*	*1948–2015*
Total economy	2.32	1.38	1.92	0.91	1.88	1.78
Primary activities	2.69	−0.30	8.74	−4.12	2.80	2.06
Utilities & construction	3.22	1.05	0.77	1.62	1.88	1.85
Manufacturing	2.72	1.78	3.19	1.99	2.46	2.41
WRT	1.74	0.89	1.23	1.30	1.31	1.31
Information	3.77	2.75	2.77	2.01	3.17	3.05
FIRE	2.09	1.89	1.84	2.09	1.96	1.97
PBS	2.21	0.78	2.78	0.12	1.79	1.61
EHS	2.42	1.25	0.93	0.36	1.66	1.52
Rest	1.88	1.25	0.65	1.09	1.38	1.35
PM: Government	1.64	1.40	1.85	0.91	1.59	1.54

Source: Author's estimates based on *BEA* data; see data appendix.

Notes: Primary industries = agriculture & mining; UC = utilities (electricity, gas, and water supply) and construction; WRT = wholesale, retail, and transportation; PBS = professional and business services; FIRE = finance, insurance, and real estate; EHS = educational, health, and private social services; Rest = art, entertainment, recreation, and food services & other services.

Nor is there any secular stagnation of public sector productivity growth. The crisis in productivity growth appears to be concentrated in just three industries: Utilities and Construction (UC); Educational, Health, and Private Social Services (EHS); and the Rest. Compared to its productivity performance during the period 1947–1972, labor productivity growth in UC during 1995–2008 declined by 2.5 percentage points, in EHS by 1.5 percentage points, and in the Rest by 1.2 percentage points per year. This conclusion is confirmed by the results from the shift-share analysis appearing in Table 6. Aggregate labor productivity growth in the U.S. economy declined from an average of 2.32% per year during 1947–1972 to 1.92% per year during the years 1995–2008.

Using shift-share analysis, this decline in productivity growth by 0.40 percentage points between these two time periods can be decomposed into (a) *intra-industry changes* in labor productivity growth rates in each of the nine industries (plus government) considered, and

TABLE 6
Shift-Share Decomposition of the Change in U.S. Labor Productivity Growth between 1948–1972 and 1995–2008

	Labor productivity growth (%)			*Share in employment (defined as total hours worked)*			*Contribution to labor productivity change of:*		
	1948–1972	*1995–2008*	*change*	*1948–1972*	*1995–2008*	*Change*	*Intra-industry productivity change*	*Structural change*	*Total*
Total economy	**2.319**	**1.918**	**−0.402**	**1.000**	**1.000**	–	**−0.337**	**−0.065**	**−0.402 (100.0%)**
Primary Activities	2.685	8.741	6.056	0.050	0.018	−0.032	0.110	−0.085	0.025 (–6.3%)
Utilities & Construction	3.220	0.770	−2.451	0.059	0.066	0.007	−0.161	0.021	−0.140 (34.8%)
Manufacturing	2.715	3.191	0.476	0.285	0.140	−0.145	0.066	−0.394	−0.128 (81.6%)
WRT	1.739	1.232	−0.507	0.175	0.176	0.000	−0.089	0.000	−0.088 (22.0%)
Information	3.765	2.768	−0.997	0.027	0.026	−0.001	−0.026	−0.005	−0.031 (7.7%)
FIRE	2.087	1.836	−0.251	0.041	0.061	0.020	−0.015	0.041	0.026 (–6.5%)
PBS	2.206	2.782	0.576	0.043	0.122	0.078	0.070	0.173	0.243 (–60.4%)
EHS	2.418	0.925	−1.493	0.042	0.118	0.076	−0.176	0.184	0.009 (–2.1%)
Rest	1.880	0.650	−1.230	0.102	0.122	0.020	−0.150	0.037	−0.113 (28.1%)
PM: Government	1.639	1.849	0.283	0.176	0.153	−0.023	0.032	−0.037	−0.005 (1.1%)

Source: Author's estimates based on Bureau of Economic Analysis data; see data appendix.

Notes: Primary industries = agriculture & mining; UC = utilities (electricity, gas, and water supply) and construction; WRT = wholesale, retail, and transportation; PBS = professional and business services; FIRE = finance, insurance, and real estate; EHS = educational, health, and private social services; Rest = art, entertainment, recreation, and food services & other services. The shift-share analysis is based on the following decomposition of total-economy labor productivity growth: $\Delta\hat{\lambda}_{totale\ conomy} = \sum_{i=1}^{10} \xi_{1i}\Delta\hat{\lambda}_i + \sum_{i=1}^{10} \hat{\lambda}_{0i}\Delta\xi_i$, where $\Delta\hat{\lambda}_i =$ the change in average labor productivity growth in industry i between 1948–1972 and 1995–2008; $\Delta\xi_i =$ the change in the employment share of industry i between 1948–1972 and 1995–2008; $\hat{\lambda}_{0i} =$ average labor productivity growth in industry i during 1948–1972; and $\xi_{1i} =$ the employment share of industry i during 1995–2008.

(b) *structural change,* which reflects the rise (or decline) in the weight of each industry in aggregate productivity growth. This weight depends on the share in total hours worked (or the employment share) of the industry under consideration. A first point to observe from Table 6 is that more than four-fifths of the decline in aggregate U.S. labor productivity growth between 1948–1972 and 1995–2008 is due to declining *intra-industry* productivity growth rates—and less than one-fifth of it is due to structural change in favor of nondynamic industries. The slowdown of productivity growth in UC, EHS, and the Rest, when combined, depressed aggregate labor productivity growth during 1995–2008 by 0.49 percentage points compared to productivity growth performance during 1948–1972—which more than accounts for the actual decline in aggregate productivity growth.

The (weighted) increases in the growth rates of labor productivity growth in Manufacturing, PBS, and Primary Activities, while contributing positively to aggregate productivity growth, were too small to offset the productivity growth decline in UC, EHS, and the Rest. The fact that the impact on aggregate productivity growth of structural change was small on balance does not mean that shifts in employment structure (measured in terms of industry shares in total hours worked) were insignificant. As Table 6 shows, deindustrialization (measured in terms of a declining share of hours worked in manufacturing in total hours worked) depressed aggregate productivity growth during 1995–2008 by 0.39 percentage points as compared to growth during 1948–1972. As a result of technological progress and offshoring, manufacturing's share in total hours worked declined from more than 30% around 1950 to less than 10% in 2015. While around 14.4 million industrial workers toiled during 30 billion hours in 1950, their number by 2015 had declined to 12.1 million workers putting in 24.6 billion hours of work—this means that total hours worked in manufacturing declined by 0.3% on average each year during 1950 and 2015. Manufacturing has been shedding millions of jobs and reducing hours of work during a period of 65 years, when U.S. employment rose by 82.8 million workers—from 58.7 million employed workers on average per year during 1950–1959 to 141.4 million employed workers during 2010–2015.

These workers had to find jobs in services-sector activities, mostly featuring below-average labor productivity growth: 18.9 workers found work in EHS, 16.2 million persons in PBS, 14.3 million individuals in the Rest, 13.5 million persons in the public sector, and 5.7 million workers in FIRE. The declining employment share of Primary Activities, which is a feature shared by all OECD economies and nothing much to be concerned about, depressed aggregate productivity growth between 1948–1972 and 1995–2008 by another 0.09 percentage points. The productivity growth-retarding impact of deindustrialization was offset to a large extent by the increased employment shares of PBS and EHS, which taken together raised aggregate labor productivity growth during 1995–2008 by 0.36 percentage points (compared to the postwar years 1948–1972). The changes in the employment shares of UC, WRT, Information, FIRE, the Rest, and the public sector, which were all small, had negligible impacts on the productivity growth slowdown.

A major question from a macro perspective is whether stagnant industries are gaining, or losing, shares in either employment or hours worked. Figure 5 shows, using observations on growth of hours worked and labor productivity growth in the nine U.S. industries

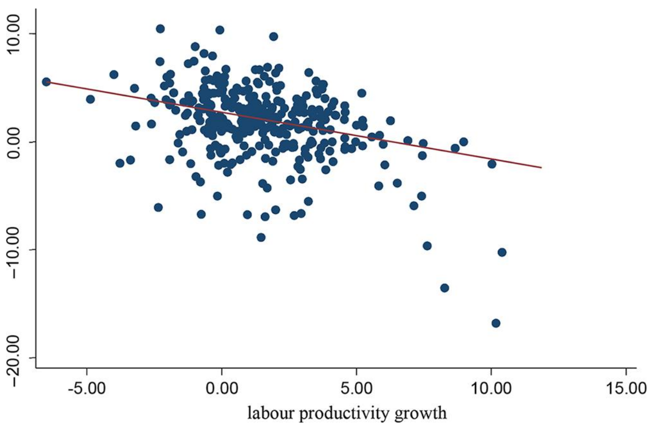

FIGURE 5 Growth of Hours and Labor Productivity:
Note: Industries featuring higher labor productivity growth feature lower growth rate of hours worked (*** is statistically significant at 1%): Growth of hours worked = 2.82 − 0.49 labor productivity growth $\overline{R}^2 = 0.16; n = 544$ (17.19)*** (7.81)***. For similar evidence, see Nordhaus (2006), Table 4 and Figure 4.

(1948–2015) included in Table 5, that industries with more rapid productivity growth tend to displace labor and show lower growth of hours. A 1 percentage-point increase in labor productivity growth is associated with a 0.49 percentage-point lower growth in hours worked (Baumol, Blackman, and Wolff 1985; Nordhaus 2006, 2015). These results suggest that "The most important factor driving differential employment growth has been differential technological change across industries," as Nordhaus (2006: 26) concludes.

What it means is that millions of workers were pushed out of employment in Primary Activities and Manufacturing, which are industries with above-average productivity growth, and into often nonstandard precarious services-sector jobs in PBS, EHS, and the Rest, which feature considerably lower productivity growth (Katz and Krueger 2016). David Weil (2014) has called this the fissuring of the workplace, while Peter Temin (2016, 2017) sees this as a sign of a dual economy. Recognizing what was happening, Paul Samuelson (1998) told a conference sponsored by the Federal Reserve Bank of Boston that "America's labor force surprised us with a new flexibility and a new tolerance for accepting mediocre jobs."[4] Samuelson unfortunately forgot to ask whether this new tolerance had anything to do with the "traumatization" of workers by labor market deregulation and monetary policy. Anthropologist David Graeber (2013) was more honest when he calls these jobs "bullshit jobs," writing that "[h]uge swaths of people […] spend their entire working lives performing tasks they secretly believe do not really need to be performed. The moral and spiritual damage that comes from that situation is profound. It is a scar across our collective soul."

The loss of "good jobs" and the polarization of the U.S. labor market (Autor and Dorn 2013) put the middle classes under severe stress. Alarmed by the loss of stable meaningful work and the vanishing middle class, sociologist Richard Sennett (1998: 148) penned a haunting warning of pending political troubles implied by the "New Capitalism": " … I do know a regime which provides human beings no deep reasons to care about one another cannot long preserve its legitimacy."

Mediocre jobs and "alternative work arrangements" mean mediocre real wages and working conditions (Weil 2014; Temin 2017)—hence the shift in the U.S. employment structure is one factor behind the slowdown of average real wage growth highlighted in Figure 4. As Table 7 shows, around one-fourth of all U.S. workers are in low-paying jobs, earning a "poverty-wage," which is about two-thirds of the *median* hourly wage (for all occupations) and only half the *mean* hourly wage (see the *Note* to Table 7). More than 73% of employees in (fast) food preparation and serving earn this poverty wage (or less), as do 57% of workers in personal care, 54% of workers in cleaning, and 45% of workers in health-care support. As shown by Table 7, poverty-wage jobs are concentrated in just 10 occupational categories. If we enlarge our definition of "mediocre" jobs (in terms of pay) to include jobs earning up to 200% of the poverty wage, these 10 occupations account for 55% of U.S. workers (in 2010). As reported by Thiess (2012), female workers hold 55.1% of the poverty-wage jobs, and African Americans are also overrepresented in the poverty-wage workforce.

The shift in employment structure also implies a greater polarization between higher-paying jobs in "dynamic" sectors such as Manufacturing and Information and lower-paying jobs in UC, EHS, and the Rest. This (wage) polarization (Autor and Dorn 2013) is illustrated in Table 8, which compares real wage growth per worker during 1948–2008 in UC, EHS, and the Rest to that in Manufacturing, Information, FIRE, and PBS (the latter two industries offer on average better-paying jobs). The growth in real wages per worker has been decomposed into its

TABLE 7
Poverty-Wage Workers in the United States, 2010 and 2020 (Projected)

	Share of workers in labor force		*Share of employment by wage multiple of poverty wage*	
	2010	*2020*	*0%–100%*	*100% to 200%*
1. Food preparation & serving related occupations	8.7%	7.5%	73.6%	23.4%
2. Personal care & service occupations	2.7%	3.9%	56.9%	33.8%
3. Building and grounds cleaning and maintenance occupations	3.3%	3.8%	53.7%	39.1%
4. Health care support occupations	3.1%	3.4%	44.8%	48.7%
5. Sales & related occupations	10.6%	10.3%	41.9%	35.5%
6. Transportation & material moving occupations	6.7%	6.3%	34.3%	49.0%
7. Production occupations	6.5%	5.5%	27.5%	53.9%
8. Protective services occupations	2.5%	2.2%	24.5%	43.2%
9. Office & administrative support occupations	16.9%	15.2%	24.4%	57.4%
10. Construction & extraction occupations	4.0%	4.7%	19.0%	49.3%
Occupations 1–10 (above)	65.2%	62.8%	25.2%	29.2%
Memo: *All occupations*	—	—	26.0%	40.8%

Source: Thiess (2012), using Bureau of Labor Statistics (BLS) data.

Note: The poverty wage is defined as the wage that a full-time, full-year worker would have to earn to live above the federally defined poverty threshold for a family of four. In 2011, this was $11.06 per hour of work. The poverty wage is about two-thirds of the *median* hourly wage (for all occupations) (which was $ 16.71 in 2012) and only half the *mean* hourly wage (which equaled $22.01 in 2012).

constituents: growth of hours worked on the one hand and growth of real wages per hour of work on the other hand. What comes out clearly is that real wages of workers in the stagnant industries UC, EHS, and the Rest have fallen drastically compared to real wages in Manufacturing, Information, FIRE, and PBS—in most case by more than 30% over 60 years in cumulative terms. The main source of the rise in wage inequality has been the decline in the relative hourly wage earned in UC, EHS, and the Rest, but in EHS and the Rest the reduction in working hours per employee (relative to hours worked in Manufacturing and FIRE) also contributed to the decline in relative wage income per employee. Hours worked per employee in EHS have

TABLE 8
Sources of Rising Wage Inequality in the U.S. Economy, 1948–2008

	Growth of real wages per employee in:			*Growth of hours worked per employee in:*			*Growth of real wages per hour of work in:*		
Relative to:	*UC*	*EHS*	*Rest*	*UC*	*EHS*	*Rest*	*UC*	*EHS*	*Rest*
Manufacturing	−0.10	−0.61	−0.17	0.06	0.01	−0.19	−0.16	−0.62	−0.03
Information	−0.55	−0.62	−0.62	0.23	−0.02	−0.02	−0.79	−0.60	−0.60
FIRE	−0.73	−0.79	−0.80	0.04	−0.18	−0.21	−0.77	−0.59	−0.59
PBS	−0.74	−0.79	−0.80	0.22	0.00	−0.03	−0.97	−0.78	−0.78

Source: Author's estimates based on BEA data; see data appendix.

Note: Growth of real wages per employee can be decomposed into (a) the growth of hours worked per employee; and (b) growth of real wages per hour worked. An average annual decline in the wage in EHS relative to the wage in FIRE by 0.79% during 1948–2008 implies a cumulative relative wage decline of 38%.

declined from around 1950 per annum in the early 1950s to less than 1,700 per year now; hours worked per employee in the Rest fell from around 1,700 hours per year in the early 1950s to about 1,450 hours now. These falls in hours worked per person point to "employment sharing": an increasing number of workers are "sharing," most likely involuntarily, a shrinking number of hours of work in poorly paid mediocre "alternative work arrangements" in EHS or the Rest.

Either way, the increase in inter-industry wage disparities has contributed to greater wage inequality, as is for instance reflected in the secular increase in the ratio of the mean (hourly) wage to the median (hourly) wage. As is illustrated in Figure 6, the increase in the mean-median wage ratio is strongly correlated with declining real wage growth—that is, along a declining trend, wage inequality has been rising. This means that average U.S. real wage growth becomes a rather meaningless concept—and by implication of equation (9), the same holds true for average U.S. TFP or labor productivity growth.

Clearly then, the U.S. productivity growth crisis is not a generalized crisis of innovation and entrepreneurship but rather located in particular segments of the U.S. economy. To see this, consider the final column of Table 6, which gives the decomposition of the decline in aggregate labor growth between 1948–1972 and 1995–2008 into its industry-specific contributions. Five industries—Primary Activities, WRT, Information, FIRE, and EHS—and the public sector play only a minor role, as their combined net contribution to the aggregate productivity growth decline of − 0.40 percentage points is just − 0.06 percentage points. In the case of Primary Activities, the positive impact of accelerating intra-industry productivity growth is largely offset by its declining employment share; in the case of EHS, the negative impact of declining intra-industry productivity growth is almost completely balanced by the increase in its employment share—from 4.2% of hours worked each year during 1948–1972 to 11.8% of hours worked each year during 1995–2008.

As the shaded cells of Table 6 indicate, the slowdown of aggregate U.S. productivity growth between 1948–1972 and 1995–2008 has three main sources: (a) deindustrialization (the decline in the employment share of an otherwise technologically dynamic manufacturing sector);

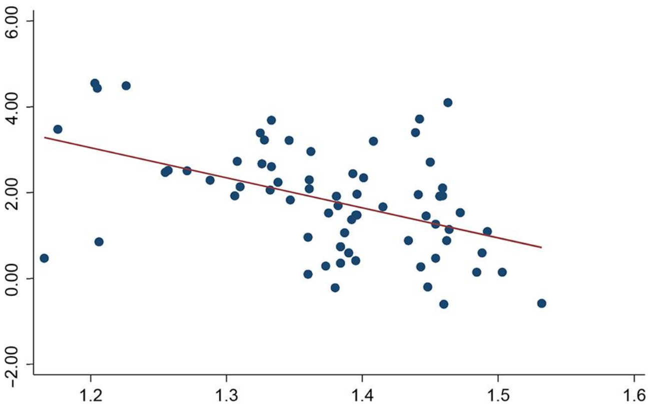

FIGURE 6 Growth of Real Wages and Wage Inequality: U.S. Economy, 1948–2015
Note: Wage inequality (measured on the horizontal axis) is defined as the ratio of the mean to the median real wage. The regression line is based on the following OLS regression (*** is statistically significant at 1%): Growth of hourly real wages = 10.77 − 6.51 wage inequality $\overline{R}^2 = 0.13; n = 68$ (2.72)*** (2.29)**.

(b) the sharp decline in labor productivity growth in Utilities & Construction; and (c) the considerable fall in productivity growth in the Rest. These atrophying changes were partly offset, however, by (d) the increase in the employment share of PBS.

With so much empirical detail, it is easy to lose sight of the forest for the trees. However, taking a step backwards, the inescapable conclusion is, it seems to me, that the U.S. economy has grown more segmented or "dualistic" over time (cf. Temin 2016, 2017). The secular decline in *aggregate* U.S. productivity growth is clearly hiding a growing divergence in productivity performance and technological zing between a "dynamic" sector (in which I include Manufacturing, Information, FIRE, and PBS) and a "stagnant" sector (in which I include UC, EHS, and the Rest). The growing segmentation, suggesting a Baumol-like pattern of "unbalanced growth" (Baumol 1967; Baumol, Blackman, and Wolff 1985), is illustrated in Table 9 and Figure 7.

A first point to note is that the "dynamic" and "stagnant" sectors have a rather stable employment share (share in total hours worked in the U.S. economy) of around 60%–65%, when taken together. However, the "dynamic" sector had an employment share of 40% in the 1950s and was *twice* as large (in terms of hours worked) as the "stagnant" sector with an employment share of just 20%. In terms of output, the "dynamic" sector was *thrice* the size of the "stagnant" sector in 1950—and hence "dynamic" sector labor productivity was 1.5 times higher than that in the "stagnant" sector (Table 8). Over time, the employment share of the "dynamic" sector has come down to 32% on average per year during 2005–2015 and, as with communicating vessels, the employment share of the "stagnant" sector has risen to 33% on average per annum in the same period. In recent times, employment growth in the "dynamic" sector has come to a standstill, as the average annual growth rate of hours worked in the "dynamic" sector equaled a mere 0.15% during 1995–2015—which is likely due not just to recent advances in automation, robotics, and artificial intelligence (e.g., Acemoglu and Restrepo 2017) but also to the permanent "fissuring of the workplace" (Weil 2014; Katz and Krueger 2016).

TABLE 9
Rising Dualism in the U.S. Economy, 1950–2015

Average annual growth rate of:		*1948–1972*	*1972–1995*	*1995–2015*
$\boldsymbol{x}$d and $\boldsymbol{x}$s		4.39 / 4.87	3.39 / 3.71	2.46 / 2.68
$\boldsymbol{h}$d and $\boldsymbol{h}$s		1.42 / 2.26	1.43 / 2.60	0.15 / 1.90
λd and λs		2.92 / 2.55	1.94 / 1.08	2.31 / 0.76
$\boldsymbol{w}$d and $\boldsymbol{w}$s		2.66 / 2.93	1.29 / 1.13	2.05 / 1.13
κd and κs		2.52 / 2.53	1.52 / −0.13	2.01 / 1.01
ratios:	1950	1972	1995	2015
$\boldsymbol{x}$d/$\boldsymbol{x}$s	312%	274%	256%	245%
$\boldsymbol{h}$d/$\boldsymbol{h}$s	207%	174%	134%	94%
λd/λs	151%	157%	191%	260%
$\boldsymbol{w}$d/$\boldsymbol{w}$s	135%	128%	133%	159%
κd/κs	248%	251%	366%	491%

Source: Author's estimates based on BEA data; see data appendix.

Notes: The "dynamic" sector includes Manufacturing, Information, FIRE, and PBS. The "stagnant" sector includes UC, EHS, and the Rest. *Symbols*: $\boldsymbol{x}$d/$\boldsymbol{x}$s = the ratio of real GDP of the dynamic sector to real GDP of the stagnant sector $\boldsymbol{h}$d/$\boldsymbol{h}$s = the ratio of hours worked in the dynamic sector to hours worked in the stagnant sector; λd/λs = the ratio of hourly labor productivity in the dynamic sector to hourly labor productivity in the stagnant sector; $\boldsymbol{w}$d/$\boldsymbol{w}$s = the ratio of the hourly real wage earned in the dynamic sector to the hourly real wage in the stagnant sector; and κd/κs = the ratio of capital intensity in the dynamic sector to capital intensity in the stagnant sector.

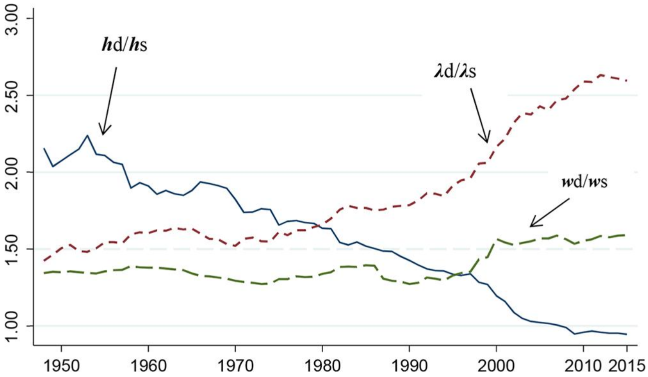

FIGURE 7 Growing Dualism in the U.S. Economy, 1948–2015

Note: The "dynamic" sector includes Manufacturing, Information, FIRE, and PBS. The "stagnant" sector includes UC, EHS, and the Rest. *Symbols*: See *Note* to Table 8. Using the data of Table 8, the following Prais-Winsten AR(1) regressions results have been obtained (where *** is statistically significant at 1%): $\boldsymbol{h}\text{d}/\boldsymbol{h}\text{s} = 0.95 - 0.63\ \boldsymbol{w}\text{d}/\boldsymbol{w}\text{s} + 0.54\ \boldsymbol{x}\text{d}/\boldsymbol{x}\text{s} - 0.01$ Time $\overline{R}^2 = 0.98; n = 68$ (4.55)*** (5.19)*** (7.37)*** (8.29)*** $\lambda\text{d}/\lambda\text{s} = 1.00\ \boldsymbol{w}\text{d}/\boldsymbol{w}\text{s} + 018\ \boldsymbol{x}\text{d}/\boldsymbol{x}\text{s} + 0.02$ Time $\overline{R}^2 = 0.97; n = 68$ (8.42)*** (2.93)*** (7.02)***.

"Stagnant" sector output did grow faster than output in the "dynamic" sector: The ratio of "dynamic" to "stagnant" sector output came down from 312% in 1950 to 245% in 2015. Relative output growth of the "stagnant" sector was based on working more hours however—not on higher labor productivity growth. As a result, value added creation per hour of work in the "stagnant" sector, which was about one-third less than that in the "dynamic" sector in 1950, declined to less than two-fifths of the "dynamic" sector productivity level by 2015. This productivity divergence was driven by a doubling in capital intensity in the "dynamic" sector relative to the "stagnant" one—from 248% in 1950 to 491% in 2015. Unsurprisingly, the growing segmentation has also pushed up real wage disparity between the "dynamic" and "stagnant" sectors: The difference between the hourly real wages in the "dynamic" and "stagnant" sectors, which amounted to 35% in 1950, increased to almost 60% in 2015.

Part of this must be due to the fact that more workers had to find jobs in the "stagnant" sector, which structurally increased employers' monopsony power and forced down real wage growth in these activities, particularly following the labor market deregulation of the 1980s and 1990s. Under these circumstances, "dynamic" sector workers also found it hard to claim higher real wage growth and, as a result, the "dynamic/stagnant sector" wage ratio increased much less than the relative "dynamic/stagnant" labor productivity (Table 8). This implies the profit share of the "dynamic" sector must have increased relative to that of the "stagnant" sector—which in turn must have contributed to the increasing divergence in capital intensities. Figure 7 brings out the structural divergence in sharp relief. As the "dynamic" sector is declining relative to the "stagnant" sector in terms of hours worked, it is taking off in terms of (faster) productivity growth—while offering an increasingly smaller proportion of workers an increasingly higher real wage.

This is dualism, big time. The phenomenon of secular stagnation of (potential) growth has to be understood in the context of this dualization of the U.S. economy, because—as I will argue in the next section—the technological dynamism in the one segment is causally related to the productivity growth stagnation in the other segment. The (simple) regressions reported below Figure 7 illustrate this point: Higher real wages in the "dynamic" sector (relative to the "stagnant" sector) reduce hours worked and raise labor productivity in the "dynamic" sector (relative to the "stagnant" sector). A 1 percentage-point rise in *wd*/*ws* leads to a 0.63 percentage-point decline in the ratio *hd*/*hs*, while being associated with a 1 percentage-point rise in relative productivity λd/λs. The causal interactions between the two segments will be analyzed and explored in the next section.

"BAUMOL REVISITED": STAGNATION IN TIMES OF ROBOTIZATION AND AI

Baumol's (1967) model of unbalanced growth is known for its prediction of a "cost disease": The inevitable rise in relative unit costs and prices in the nonprogressive tertiary activities arising from two stylized facts: Productivity growth is structurally lower in these activities than in manufacturing, and the demand for these services is hardly price-elastic (which means consumers are willing to pay the higher prices). More controversial is the "secular stagnation," induced by "nonprogressive" structural change, which Baumol's model also implies: Since aggregate productivity growth is a weighted average of the industry-wise productivity growth rates (with the weights provided by the nominal value added shares), Baumol predicted that the rate of aggregate productivity growth will come down over time as the weight of the nonprogressive industries with low productivity growth does rise (Nordhaus 2006; Hartwig 2013). However, unlike Baumol's prediction and as shown in Tables 6 and 8, the secular stagnation of productivity growth in the United States after 1972 was not so much due to "nonprogressive" structural change but to a drop in intra-industry productivity growth in what I called the "stagnant" sector.

Moreover, whereas Baumol assumed that real wages grow at the same rate in the two segments of the economy, Figure 7 shows a continuous decline in the "stagnant-sector" wage relative to the wage earned in the "dynamic" sector. In other words, Baumol's "cost disease," thought likely to occur, did not happen as "stagnant-sector" wages fell relative to "dynamic-sector" wages. Any theoretically plausible and empirically convincing explanation of the secular stagnation of *aggregate* labor productivity growth in the United States must explain these facts.

This is the intention of the two-sector model of unbalanced growth summarized in Table 10. Variables are defined as (logarithmic) growth rates indicated by a circumflex. Unlike Baumol

TABLE 10
A Model of Unbalanced Growthh

	"Dynamic" sector		*"Stagnant" sector*
M1.	$\hat{x}_D = \hat{\Theta}_D + \gamma_D(\hat{w}_D + \hat{\ell}_D) + \gamma_S(\hat{w}_S + \hat{\ell}_S)$	M5.	$\hat{x}_S = \hat{\Theta}_S + \varepsilon_D(\hat{w}_D + \hat{\ell}_D) + \varepsilon_S(\hat{w}_S + \hat{\ell}_S)$
M2.	$\hat{\lambda}_D = \kappa\hat{x}_D + \hat{\lambda}_0,\ 0 < \kappa < 1$	M6.	$\hat{\lambda}_S = \hat{x}_S - \hat{\ell}_S$
M3.	$\hat{\ell}_D = \hat{x}_D - \hat{\lambda}_D = (1-\kappa)\hat{x}_D - \hat{\lambda}_0$	M7.	$\hat{\ell}_S = -\vartheta\hat{\ell}_D = -\vartheta(1-\kappa)\hat{x}_D + \vartheta\hat{\lambda}_0,\ 0 < \vartheta = \ell_D/\ell_S < 1$
M4.	$\hat{w}_D = \hat{w}_D$	M8.	$\hat{w}_S = \hat{w}_0 - \pi\hat{\ell}_S,\ \pi > 1$

Note: The parameterization, based on the preceding empirical analysis for the U.S. economy, is as follows: $\kappa = 0.5$ (see Note to Figure 7); $\pi \approx 2$ (see Note to Figure 3); $\vartheta = 1$ (during 2010-15, see Figure 7). If I assume that the wage-income elasticities of demand are unity, then $\gamma_D = \varepsilon_D \approx 0.7$ and $\gamma_S = \varepsilon_S \approx 0.3$ (based on the ratio ***x***d/***x***s in 2015, see Table 8). It then follows that $\gamma_D - \gamma_S\vartheta(1-\pi) = 1$ (see main text for elaboration).

(1967), output in each sector is determined by demand. The technologically dynamic sector is indicated by subscript *d,* while the technologically stagnant sector has subscript *s*. The model operates on the assumption of full employment[5].—because in the absence of unemployment insurance and social security worth the name, workers must find jobs, if not in the better remunerated core, then in a poorly paid job in some peripheral activity. Equation (M1) specifies dynamic-sector output growth $\hat{x}_D$ as a function of demand for its output, which in turn depends on real wage incomes earned in the dynamic and the stagnant sector and autonomous demand growth for dynamic-sector goods (or $\hat{\Theta}_D$), which includes investment demand. Real wage-income growth in the dynamic sector is by definition equal to the sum of the growth rate of hours worked $\hat{\ell}_D$ and the growth rate of the hourly real wage $\hat{w}_D$; the same holds true for real wage income growth in the stagnant sector. As explained in the appendix, γ_D is the dynamic-sector income elasticity of demand for dynamic-sector output, multiplied by the weight of the dynamic sector in GDP; likewise, γ_S is the stagnant-sector income elasticity of demand for dynamic-sector output, multiplied by the weight of the stagnant sector in GDP. It should be noted that I have omitted from equation (M1) the impact on demand of a change in the dynamic-sector price relative to the stagnant-sector price, as is usual in two-sector models—for reasons explained in the appendix.

Equation (M2) defines dynamic-sector labor productivity growth $\hat{\lambda}_D$ as a function of $\hat{\lambda}_0$, which represents, in Schumpeterian fashion, exogenous labor productivity growth due to "technology-push" innovation based on public spending on basic research, private RD&D, and entrepreneurship, both private and public (Lazonick 2009, 2014; Mazzucato 2013). Importantly, however, part of $\hat{\lambda}_D$ is endogenous and depends on dynamic-sector demand growth through the Kaldor-Verdoorn coefficient κ. This link, which forms the heart of Adam Smith's interpretation of the British Industrial Revolution, reflects the fact that a greater division of labor allows for greater specialization and differentiation of production, which raises productivity directly and indirectly—in the latter case, by promoting learning by doing and leading to process and product innovation (Young 1928; Kaldor 1966; Basu and Foley 2013; Storm and Naastepad 2012). At the firm level, the Kaldor-Verdoorn effect captures the impact of what Jacob Schmookler (1966) labelled "demand-pull" innovations. Equation (M3) defines dynamic-sector hourly employment growth $\hat{\ell}_D$ as the difference between output growth and labor productivity growth. An increase in the technology-push factor $\hat{\lambda}_0$ leads to labor shedding from the dynamic core, as $\hat{\ell}_D$ declines. To simplify the analysis, dynamic-sector (hourly) real wage growth is assumed exogenous in equation (M4); the point is not that real wages in the dynamic sector do not respond to higher productivity growth but that if they increase, they are likely to increase less than labor productivity increases (cf. Section 4).

Analogous to (M1), equation (M5) specifies stagnant-sector output growth as determined by autonomous demand growth and dynamic-sector and stagnant-sector real wage income growth. ε_D is the dynamic-sector income elasticity of demand for stagnant-sector output, multiplied by the weight of the dynamic sector in GDP; likewise, ε_S is the stagnant-sector income elasticity of demand for stagnant-sector output, multiplied by the weight of the stagnant sector in GDP. Equation (M6) defines stagnant-sector labor productivity growth as the difference between stagnant-sector output and employment growth (determined in (M7)). This is the first structural difference between the two sectors: Stagnant-sector labor productivity growth is not influenced by "technology-push" factors but adjusts passively to, and absorbs, any changes in $\hat{x}_S$ and $\hat{\ell}_S$. Employment growth in the stagnant sector, in turn, is determined (in M7) by employment growth in the dynamic sector, on the assumption that aggregate labor supply is constant. Hence, if dynamic-sector employment growth goes down (because of faster productivity growth in the dynamic core), more workers have to find "mediocre" jobs in the stagnant services industries—when $\hat{\ell}_D$ goes down, $\hat{\ell}_S$ goes up, and $\hat{\lambda}_S$ must decline (ceteris paribus).

This implies a structural interdependence between stagnant and dynamic sectors: In the absence of social security, the stagnant sector constitutes "the employer of last resort," absorbing redundant workers from the dynamic core, by lowering wage and labor productivity growth in stagnant activities. Put differently, the stagnant sector hosts the "reserve army of the underemployed" (see footnote 5). In equation (M8), which completes the model, real wage growth in the stagnant sector is a negative function of labor supply growth, which is based on a downward sloping labor demand curve and a vertical—exogenous—labor supply curve (for its derivation, see the appendix). Assuming a "buyers' market," as all workers searching for a job must find one (in order to survive), the stagnant-sector real wage must be "market-clearing." The model thus operates as a "Lewis model in reverse" (Lewis 1954; Storm 2015). Note further that since π takes a value of about 2 (see the appendix), an increase in peripheral labor supply growth of, say, 1%, depresses peripheral real wage growth by about 2%. The term $\hat{w}_0$ stands for exogenous (subsistence) real wage growth in the stagnant sector, which would materialize if $\hat{\ell}_S$ is zero.

"Balanced Growth" Occurs Only as a "Happy Incident"[6]

"Balanced growth" between the two sectors is possible in principle but highly improbable given that there is no mechanism to bring it about—just as there is no mechanism in Harrod's growth model to ensure steady-state growth at full employment. Such "balanced growth" between dynamic and stagnant sectors requires that $\hat{\ell}_D = 0$ because then sectoral shares in total employment (hours worked) are constant, stagnant-sector real wages grow at $\hat{w}_0$, and there are no pressures for productivity growth in dynamic and stagnant sectors to change. The balanced-growth scenario is illustrated in Figure 8. If $\hat{\ell}_D = 0$, then from M3 we get the "balanced growth" rates of output and productivity (the vertical line in Figure 8):

$$\hat{x}_D^* = \hat{\lambda}_D^* = \frac{\hat{\lambda}_0}{(1-\kappa)} \tag{15}$$

Balanced output and productivity growth in the dynamic sector depend on the exogenous rate of technology-push innovation $\hat{\lambda}_0$ and the Kaldor-Verdoorn coefficient. Equation (15) requires, in turn, that the corresponding growth rate of stagnant-sector real wages is:

$$\hat{w}_0^* = \frac{\hat{\lambda}_0}{(1-\kappa)\gamma_S} - \left[\frac{\hat{\Theta}_D + \gamma_D \hat{w}_D}{\gamma_S}\right] \tag{16}$$

Note that $\hat{\Theta}_D$ and $\hat{w}_D$ are exogenous. $\hat{w}_0^*$ is the growth rate of stagnant-sector real wages that "warrants" balanced growth (see Figure 8). The condition for balanced growth could alternatively have been expressed in terms of $\hat{w}_D$ or of $\hat{\Theta}_D$ if one assumes that autonomous demand growth is influenced by fiscal and monetary policy. However, I chose $\hat{w}_0^*$ as the "numéraire" because it is stagnant-sector wage growth that is bearing the brunt of the process of unbalanced growth—as shown in Table 8 and Figure 7 in contrast to Baumol (1967). $\hat{w}_0^*$ depends on the difference between $\hat{\lambda}_0$ and autonomous demand growth for dynamic-sector goods. Keeping all other factors constant, higher $\hat{\lambda}_0$ means that hours worked in the dynamic sector go down;

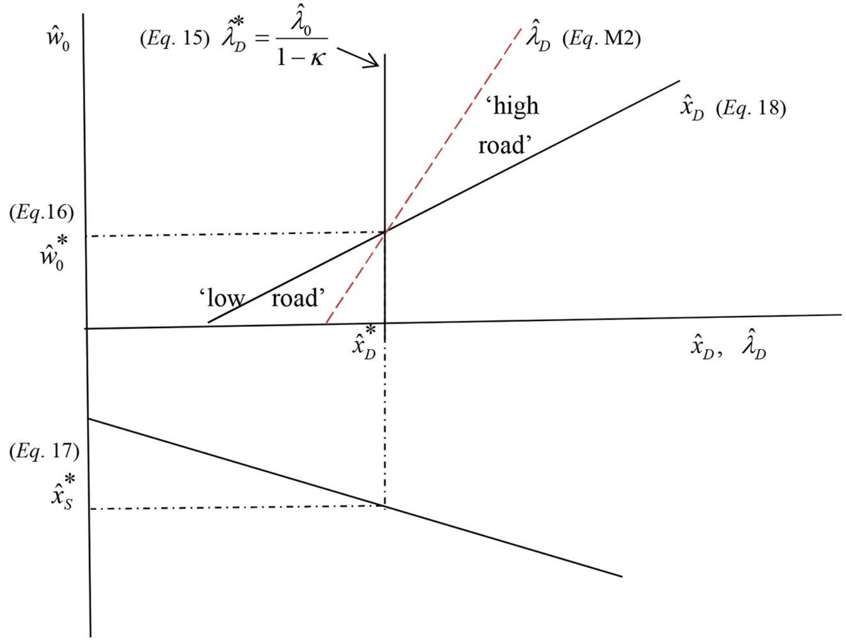

FIGURE 8 Balanced Growth

this can be prevented from happening by higher $\hat{w}_0^*$, which raises demand and output for dynamic-sector goods. At $\hat{w}_0^*$ and because $\hat{\ell}_D = \hat{\ell}_S = 0$, stagnant-sector output and labor productivity grow at the following rate:

$$\hat{x}_S^* = \hat{\lambda}_S^* = \hat{\Theta}_S + \varepsilon_D \hat{w}_D + \varepsilon_S \hat{w}_0^* \tag{17}$$

This "balanced growth" outcome is illustrated in the lower panel of Figure 8. The structure of the growing economy would be constant in terms of hours worked, while relative output levels, productivity levels, and (exogenous) real wages would likely diverge. In this balanced growth scenario, there is no secular stagnation of aggregate productivity growth, however, because sector-wise productivity growth rates are constant in (15) and (17), and there is no structural change in hours worked (see the appendix for details). But "balanced growth" is improbable, as the model lacks a built-in mechanism to keep stagnant-sector wage growth rate at $\hat{w}_0^*$; the norm is "unbalanced growth." If actual $\hat{w}_0 > \hat{w}_0^*$, then $\hat{x}_D > \hat{\lambda}_D$ and the dynamic sector will pull in extra workers from the stagnant sector; this is the "high road" (see Figure 8). But the realistic scenario is that $\hat{w}_0 < \hat{w}_0^*$, and hence $\hat{x}_D < \hat{\lambda}_D$ and the dynamic sector will shed workers; the result is the "low road" featuring lower growth overall, depressed stagnant-sector productivity growth, and stagnant-sector wage growth $\hat{w}_S$ dropping below $\hat{w}_0$.

The long-run (asymptotic) properties of this process of structural change are predictable and in line with Baumol (1967): Aggregate labor productivity growth declines because the GDP and employment shares of stagnant activities (in low-wage services) rises at the cost of the GDP and employment shares of dynamic activities in the (manufacturing) core. But this is not my main point. The implication of the model here is that the secular stagnation of labor productivity is due not simply to such regressive "structural change" but also to a prior slowdown of aggregate demand, which by putting a limit on the "extent of the market" unduly constrains labor productivity growth in both stagnant and dynamic industries. In other words, the secular decline in aggregate productivity growth is not the asymptotic long-run result but is in process long before the economy has become fully deindustrialized.

Premature Stagnation in the Dynamic Core

To see this, consider the reduced-form for dynamic-sector output growth (using M1 to M4):

$$\hat{x}_D = \frac{\hat{\Theta}_D + \gamma_D \hat{w}_D + \gamma_S \hat{w}_0 - [\gamma_D - \gamma_S \vartheta(1-\pi)]\hat{\lambda}_0}{1-(1-\kappa)[\gamma_D - \gamma_S \vartheta(1-\pi)]} \tag{18}$$

Dynamic-sector output growth is driven by $\hat{\Theta}_D$, $\hat{w}_D$, $\hat{w}_0$, and by "technology-push" factors captured by $\hat{\lambda}_0$. To make economic sense, the ratio $1/[1-(1-\kappa)(\gamma_D - \gamma_S\vartheta(1-\pi))]$ must be positive so as to reflect the (positive) multiplier impact of higher (autonomous) demand and higher real wage growth on dynamic-sector output growth. Hence, the denominator $1-(1-\kappa)[\gamma_D - \gamma_S\vartheta(1-\pi)] > 0$, which means that "higher-rounds" increases in dynamic-sector demand growth coming from an increase in dynamic-sector real wage income (captured by the term $(1-\kappa)\gamma_D$) and an increase in stagnant-sector real wage income (given by $-(1-\kappa)\gamma_S\vartheta(1-\pi)$) must be smaller than the original demand shock to $\Delta\hat{\Theta}_D = 1$. This makes good sense if only because not all income accrues to wages and not all income is spent—and it also holds true for empirically realistic values for γ_D, γ_S, ϑ, π, and κ.

What is clear from (18) is that dynamic-sector output growth does *not* depend on output or job growth in the stagnant sector—on the assumption that $\hat{w}_0$ is exogenous. Dynamic-sector output growth increases in response to higher autonomous demand growth and real wage growth but *declines* due to faster technology-push innovation. To understand the latter effect, let me differentiate $\hat{x}_D$ with respect to $\hat{\lambda}_0$:

$$\frac{d\hat{x}_D}{d\hat{\lambda}_0} = \frac{-[\gamma_D - \gamma_S\vartheta(1-\pi)]}{1-(1-\kappa)[\gamma_D - \gamma_S\vartheta(1-\pi)]} < 0 \tag{19}$$

Because the denominator is positive, and since $\pi > 1$, $\gamma_D - \gamma_S\vartheta(1-\pi) > 0$, the sign of (19) is negative. Perhaps the easiest way to understand this is by interpreting "technology-push" innovation as robotization and increased use of AI. The term γ_D captures the negative real-income effect of robotization on the demand growth for dynamic-sector goods, which is due to the fact that the loss of dynamic-sector jobs is not offset by higher dynamic-sector wages. Likewise, the expression $-\gamma_S\vartheta(1-\pi)$ captures the negative impact of robotization in the "dynamic core" on real income growth in the stagnant sector: As more workers are pushed into "mediocre" jobs, this depresses stagnant-sector real wage growth. Since $\pi > 1$, the decline in stagnant-sector real wage growth is larger (in absolute terms) than the increase in employment growth, and as a result stagnant-sector demand growth for dynamic-sector products is lowered. Figure 9 illustrates the impact of robotization on dynamic-sector growth: Due to higher $\hat{\lambda}_0$, the curve for output growth shifts to the left, from $\hat{x}_{D-OLD}$ to $\hat{x}_{D-NEW}$. For the same $\hat{w}^*_{0-OLD}$, dynamic-sector output turns out to be lower than before.

Let us turn to the impact of robotization—permanently higher $\hat{\lambda}_0$—on dynamic-sector *productivity performance*. It is clear from (M2) that a higher $\hat{\lambda}_0$ raises $\hat{\lambda}_D$ one-to-one. But this

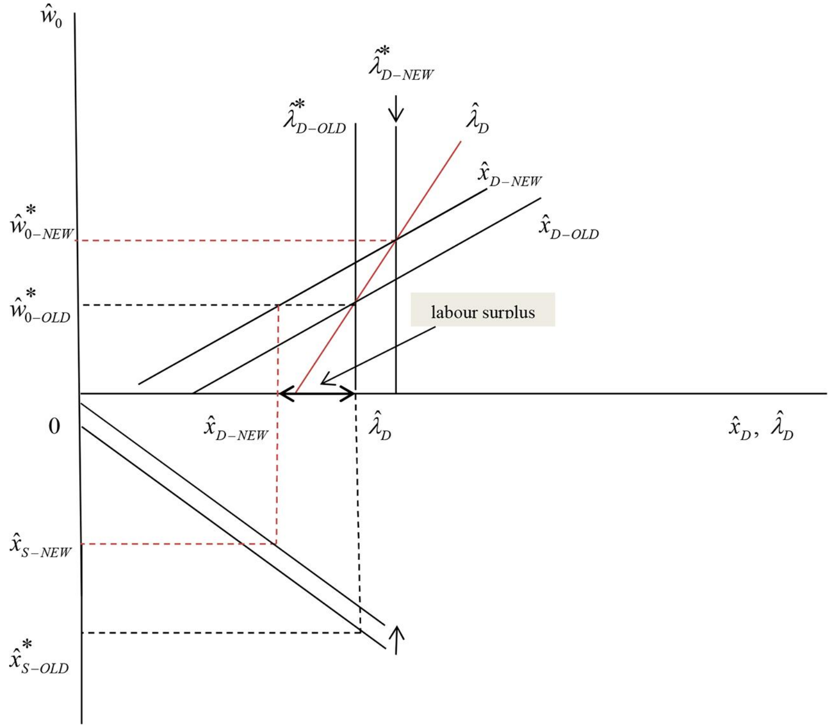

FIGURE 9 "Lewis-In-Reverse": Unbalanced Growth due to Robotization and AI

is not the full impact, since part of $\hat{\lambda}_D$ depends on the "division of labor" as determined by demand growth. Dynamic-sector demand growth falls—from (19)—and this, in turn, restricts the scope for harvesting productivity gains from specialization, learning by doing and economies of scale. The full impact of higher $\hat{\lambda}_0$ on $\hat{\lambda}_D$ therefore is less than one-to-one:

$$\frac{d\hat{\lambda}_D}{d\hat{\lambda}_0} = \kappa \frac{d\hat{x}_D}{d\hat{\lambda}_0} + 1 \tag{20}$$

The more robotization depresses dynamic-sector demand growth, the smaller will be its impact on dynamic-sector labor productivity growth. Using (M2) and (19), it can be shown that if $\gamma_D - \gamma_S\vartheta(1-\pi) = 1$, then $d\hat{\lambda}_D/d\hat{\lambda}_0 = 0$, and faster robotization does *not* show up in higher dynamic-sector productivity growth. The reason is that the "technology-push" to dynamic-sector productivity growth is completely offset by a negative "demand-pull" impact, caused by the real income losses due to declining working hours in the dynamic core and declining real wage growth in stagnant-sector jobs (Table 8 and Figure 7).

This particular outcome is not unlikely—using parameter values that are realistic for the U.S. economy, I find that $\gamma_D - \gamma_S\vartheta(1-\pi) = 1$ (see note to Table 8). It also squares with Robert Solow's (1987) aphorism that "You can see the computer age everywhere but in the productivity statistics." The momentous consequence is that if $\hat{\lambda}_D$ does not increase, there is also no reason for $\hat{w}_D$ to rise. An even more extreme outcome would be that $d\hat{\lambda}_D/d\hat{\lambda}_0 < 0$, because $1 < \gamma_C - \gamma_P\vartheta(1-\pi) < 1/(1-\kappa)$, in which case faster robotization would actually backfire, resulting in a slowdown of dynamic-sector productivity growth (keeping all other variables constant). This outcome is based, in Schmooklerian fashion, on a large negative "demand-pull" impact on dynamic-sector productivity growth—which is more likely, the higher are the (weighted) income elasticities of demand and the more stagnant-sector real wage growth is depressed by the inflow of redundant workers from the "dynamic core."

The key insight is that there is no guarantee that more "technology-push" innovation translates into faster dynamic-sector productivity growth—as Solow's "productivity paradox" implies. Either way, robotization does lead to a shedding of dynamic-sector workers:

$$\frac{d\hat{\ell}_D}{d\hat{\lambda}_0} = (1-\kappa)\frac{d\hat{x}_D}{d\hat{\lambda}_0} - 1 < 0 \tag{21}$$

The sign of (21) is negative because $d\hat{x}_D/d\hat{\lambda}_0 < 0$ in (19) and given that $0 < \kappa < 1$. Dynamic-sector workers, made redundant by robotics, are pushed into lower-waged stagnant-sector jobs—and the share of the dynamic sector in total hours worked goes down. The macroeconomic impacts of higher $\hat{\lambda}_0$ are illustrated in Figure 9. Faster robotization shifts the higher $\hat{\lambda}_D^*$ to the right—as it raises the rate of "balanced" productivity and output growth in the dynamic sector. Actual productivity growth, however, remains unaffected because $\gamma_D - \gamma_S \vartheta(1-\pi) = 1$. As we saw previously, the curve for demand-determined output growth $\hat{x}_D$ shifts to the left, since robotization depresses demand at given $\hat{w}_0^*$. As a result, the dynamic sector sheds labor—in Figure 9 the negative rate of dynamic-sector employment growth is indicated and labeled "labor surplus." The decline in $\hat{x}_D$ in turn depresses stagnant-sector output growth and stagnant-sector productivity and real wage growth declines as well—as will be shown next.

Secular Stagnation in the Stagnant Sector

To gauge the impacts of a permanent increase in $\hat{\lambda}_0$ on stagnant-sector performance, we start by considering the semireduced form expression for $\hat{x}_S$:

$$\hat{x}_S = \hat{\Theta}_S + \varepsilon_D \hat{w}_c + \varepsilon_S \hat{w}_0 - [\varepsilon_D - \varepsilon_S \vartheta(1-\pi)]\hat{\lambda}_0 + (1-\kappa)[\varepsilon_D - \varepsilon_S \vartheta(1-\pi)]\hat{x}_D \tag{22}$$

The asymmetry is obvious: While dynamic-sector output growth does *not* depend on output growth in the stagnant sector, the growth of stagnant-sector activities does hang on dynamic-sector performance—an unmistakable case of dependency. Stagnant-sector output growth is negatively affected by increases in $\hat{\lambda}_0$, or "technology-push" in the dynamic sector:

$$\frac{d\hat{x}_S}{d\hat{\lambda}_0} = -[\varepsilon_D - \varepsilon_S \vartheta(1-\pi)] + (1-\kappa)[\varepsilon_D - \varepsilon_S \vartheta(1-\pi)]\frac{d\hat{x}_D}{d\hat{\lambda}_0} < 0 \tag{23}$$

The sign of (23) is negative because $[\varepsilon_D - \varepsilon_S \vartheta(1-\pi)] > 0$ (as $\pi > 1$) and $d\hat{x}_D/d\hat{\lambda}_0 < 0$ from (19). The result is due to the assumptions that (a) real wage growth in the dynamic sector stays constant (which is reasonable if $\hat{\lambda}_D$ stays unchanged), while hours worked in the dynamic sector decline; and (b) real wage growth in the stagnant sector declines more in response to faster robotization than that stagnant-sector employment increases (which is due to $\pi > 1$). In Figure 9, the change is reflected by the upward shift of the curve for $\hat{x}_S$ in the lower panel and the drop in growth $\hat{x}_{S-OLD}$ from to $\hat{x}_{S-NEW}$.

Stagnant-sector labor productivity growth also declines, which is not surprising as surplus workers from the "dynamic core" are finding employment at a time when stagnant-sector output growth is slowing down. Hence, stagnant-sector productivity growth is squeezed from both sides:

$$\frac{d\hat{\lambda}_S}{d\hat{\lambda}_0} = \frac{d\hat{x}_S}{d\hat{\lambda}_0} + (1-\kappa)\vartheta\frac{d\hat{x}_D}{d\hat{\lambda}_0} - \vartheta < 0 \tag{24}$$

Stagnant-sector productivity growth declines more than output growth, since $d\hat{x}_S/d\hat{\lambda}_0 < 0$ from (23) and $d\hat{x}_D/d\hat{\lambda}_0 < 0$ from (19)—as the sector absorbs additional workers. It follows from M8 that the inflow of laid-off dynamic-sector workers causes stagnant-sector real wage growth to fall; as a result, the real wage inequality between the dynamic and the stagnant sector rises, as Figure 7 shows has happened in the U.S. economy.

Does the technology-push in the "dynamic core" lead to the "cost disease" predicted by Baumol (1967)? The answer is: It depends on the value of the constant-output own wage elasticity of labor demand, or $(1/\pi)$. If $\pi = 1$, stagnant sector real wage growth declines one-to-one with the rise in stagnant-sector labor force growth, or $d\hat{w}_S/d\hat{\lambda}_0 = -d\hat{\ell}_S/d\hat{\lambda}_0 < 0$, which is a smaller drop (in absolute terms) than the decline in productivity growth $d\hat{\lambda}_S/d\hat{\lambda}_0 = (d\hat{x}_S/d\hat{\lambda}_0) - (d\hat{\ell}_S/d\hat{\lambda}_0)$ because of outcome (23). In this case, unit labor cost in the stagnant sector would rise. But for higher values of π, real wage growth may get depressed more than productivity growth—and Baumol's cost disease would not occur. The latter scenario seems likely, also because it implies a rise in the stagnant-sector profit share, which would provide motivation to stagnant-sector firms to hire the additional workers.

The long-run outcome of this process of unbalanced growth and regressive structural change is stagnation. But I note that the short-run outcome is a decline in the potential rate of growth—due to the fact that dynamic-sector productivity growth stays unchanged (notwithstanding the rise in $\hat{\lambda}_0$) and stagnant-sector productivity growth declines (see the appendix). This outcome could well be called *premature stagnation*.

How can one prevent such premature stagnation due to an increase in $\hat{\lambda}_0$? One obvious first step is to break the downward spiral in which declining wage growth feeds into declining demand growth. This could be done by turning $\hat{w}_0^*$ into a wage (growth) floor; this means that $\pi = 0$ in the model. This changes (19) into (19#):

$$\frac{d\hat{x}_D}{d\hat{\lambda}_0} = \frac{-(\gamma_D - \gamma_S\vartheta)}{1-(1-\kappa)(\gamma_D - \gamma_S\vartheta)} < 0 \tag{19}$$

The fall in dynamic-sector demand growth due to robotization is now smaller (in absolute terms) than before (in eq. 19). This, in turn, means that the dynamic sector will be shedding fewer workers than before. However, while this helps to slow down the process of unbalanced growth, it does not stop it. To have balanced growth, the stagnant-sector wage growth floor needs to be raised in tandem with the rise in $\hat{\lambda}_0$:

$$\frac{d\hat{w}_0^*}{d\hat{\lambda}_0} = \frac{1}{(1-\kappa)\gamma_S} > 0 \tag{25}$$

This would be difficult to do, however, because it would mean that the "productivity-growth dividend" of higher dynamic-sector $\hat{\lambda}_0$ fully accrues to stagnant-sector workers in the form of higher wages. A more realistic and fair solution is to link dynamic-sector real wage growth $\hat{w}_D$ to $\hat{\lambda}_0$ and to fix the floor $\hat{w}_0^*$ in turn to $\hat{w}_D$ (see also Duke 2016). This comes close to Baumol's assumption of a fixed relative wage ratio between the two sectors. What it does imply is that there is a need for a permanent incomes policy as part of aggregate demand management along lines proposed by Nicholas Kaldor (1996) in his 1984 *Mattioli Lectures*.[7]

Implications for Monetary and Fiscal Policy

Faster robotization sets in motion a process of unbalanced growth even if $\hat{w}_0^*$ is turned into a wage (growth) floor. Can we use macroeconomic policy to prevent or mitigate the process of unbalanced growth leading to premature stagnation? The answer is that fiscal and monetary policy can in principle prevent the demand shortfall, consequent upon robotization, and thereby stop the unbalanced growth process. Let me assume that fiscal and monetary policies influence the economy through autonomous demand growth in the usual way: Fiscal stimulus and/or lower interest rates raise $\hat{\Theta}_D$ and vice versa. Higher $\hat{\Theta}_D$ in turn raises output, productivity, and employment growth in the dynamic sector, since:

$$\frac{d\hat{x}_D}{d\hat{\Theta}_\mathrm{D}} = \frac{1}{\Omega} > 0; \; \frac{d\hat{\lambda}_D}{d\hat{\Theta}_\mathrm{D}} = \frac{\kappa}{\Omega} > 0; \; \frac{d\hat{\ell}_D}{d\hat{\Theta}_\mathrm{D}} = \frac{1-\kappa}{\Omega} > 0 \tag{26}$$

where $\Omega = 1 - (1-\kappa)[\gamma_D - \gamma_S \vartheta(1-\pi)]$. Dynamic-sector employment growth rises in response to macro stimulus, which raises output growth more than labor productivity growth. In combination with a wage growth floor $\hat{w}_0^*$ and higher $\hat{w}_D$, fiscal and/or monetary stimulus should be effective in maintaining "balanced growth" following the increase in $\hat{\lambda}_0$, as it allows dynamic-sector and stagnant-sector firms and workers to share the benefits of the productivity-growth dividend. Depending on the exact balance between productivity growth and wage increases, there may be some additional inflation—quite in line with Baumol's cost disease prediction. But recalling Gordon's (1987: 154–155) insight (mentioned earlier), because the rate of potential growth goes up, there may be less inflation than expected—and "the case against demand stimulation must rest on convincing evidence that such policies would create an acceptable acceleration of inflation." This appears unlikely.

The problem is that the proposed stabilization policy runs counter to the "rule-based" policy orthodoxy that recommends adjusting policy instruments only in response to changes in the "output gap." As explained previously, robotization will not just depress *actual* growth (due to the ensuing demand shortfall) but also reduce (aggregate) *potential* growth—because stagnant-sector productivity growth goes down, while dynamic-sector productivity growth stays unchanged. The response by central bankers and fiscal policy makers will be muted because they observe what looks like a small increase in the gap between potential and actual growth (as both growth rates go down)—and this will lock in the economy into a path of unbalanced growth. (I note here that model parameter $\vartheta = \ell_\mathrm{D}/\ell_\mathrm{S}$ goes down as a result of robotization, which reinforces the underconsumptionist tendency, as it structurally lowers the contribution of demand coming from stagnant-sector wages). The risk of self-inflicted damage, due to mistaken policy responses, is higher because deflationary monetary policy and/or fiscal austerity will always drive $\hat{x}_D$ down more than $\hat{\lambda}_D$. This forces surplus workers from the dynamic sector into stagnant-sector jobs, thereby kick-starting a cumulative process of unbalanced growth in which the dynamic sector sheds labor and the deregulated stagnant sector absorbs labor, but at the cost of depressed wage and productivity growth, which in turn depresses $\hat{x}_D$ more than $\hat{\lambda}_D$.

This way, a *temporary* policy of intentional disinflation by the central bank, pursued to bring higher actual growth down to lower potential growth, can create *long-term* damage in terms of a structural fall in the growth rate of potential output—a real-life phenomenon called "super-hysteresis" by Ball (2014) and Blanchard, Cerutti, and Summers (2015).

Caveat Lector: What the Model is Not Saying

Let me explicitly state (in seven points) what the article is not saying, lest the preceding argument be misunderstood. First, the argument of the article is not that simply raising wage growth for stagnant-sector workers is the magic bullet against unbalanced growth, rising inequality, "bullshit" jobs, and secular stagnation of potential growth in the United States (Duke 2016). I wish it were. No, the actual argument on wages is twofold. One, if we intentionally create a segmented economy featuring high and rising inequalities and structurally low wages, it should come as no surprise at all that aggregate productivity growth and potential growth will stagnate—either through slowing down "wage-cost-induced technical change," depressing investment growth and embodied technological progress, and/or reducing the scope for "demand-pull" innovation. Next, the argument is that a coordinated wage policy could help to keep the economy close to "balanced growth"—where "coordination" means keeping dynamic and stagnant-sector real wage growth in line with dynamic-sector "technology-push" $\hat{\lambda}_0$, which is the model's major dynamic. There is no simple golden rule to bring this about, but rather what is needed is the institutionalization of the kind of consultative process as proposed by Kaldor (1996), which should lead to agreement on a fair distribution of national income that is consistent with growth, full employment, and monetary stability (see footnote 7).

Second, the outlook of this article is not Luddite, and the argument is not that "artificial intelligence is taking American jobs." Technical progress is problematic only when it is left unmanaged—when macro policy is not preventing a demand shortfall and halting the unbalanced growth process in its tracks. The lesson from the model analysis is not that the robots should be stopped but that we will need to confront the political problems of maintaining demand at the full-employment level, engendering a fair distribution of (wage) incomes across industries (and occupations) necessary for balanced growth, and creating sufficient numbers of "good" middle-class jobs—in turbulent times of technological upheaval (Mishel and Shierholz 2017).

Third, the plea for supportive fiscal policy is not a brief for Big Government, large public deficits, and unsustainable public debts. There is nothing in the model to support this inference. Rather, the argument is that we need to make sure that governments carry out their proper macroeconomic role—namely, actively managing aggregate demand to keep the economy close to "balanced growth," which is critical in the absence of spontaneous self-correction by the system when it is perturbed by faster robotization. Clearly, for such demand management to be effective, the government needs to be solvent, and hence the spending ambitions of the state need to be matched by adequate fiscal revenues. Keynes (1936) appositely called this "the socialization of investment": the scaling up of (progressive) income taxation to enable effective demand management by public spending at the macro level. This would mean taxing dynamic-sector profits—which may be sold as "taxing the robots." Keynes's insight has lost none of its relevance—given the unsettling impacts of dynamic-sector technological progress in the United States and other advanced economies.

Fourth, the article does not analyze the impacts of trade and financial globalization on jobs, wages, growth, and technical progress (Eichengreen 2015b; IMF 2015). This does not mean that I believe that "globalization" is unimportant and inconsequential. It is clear that the decline in U.S. manufacturing jobs is related to the outsourcing and offshoring of production and greater import competition (Autor, Dorn, and Hanson 2013; Pierce and Schott 2016). But the biggest influence of "globalization," captured in the model of this article, has been to traumatize workers by raising job insecurity and making them resign themselves to smaller wage increases, as Greenspan (1997) noted early on. Globalization thus enabled the establishment of a structurally low-wage-growth regime, in combination with domestic labor market deregulation and deunionization, which hurt workers in stagnant-sector activities most. Financial globalization, in addition, enabled the rich to have their cake (profits) and eat it (by channeling them to offshore tax havens and/or into newly created derivative financial instruments). This way, trade and financial globalization have been essential building blocks of the dual economy (Temin 2017).

Fifth, the argument is not that people should get more pay for "mediocre" or even "bullshit" jobs. The argument is that higher wages should help create decent, meaningful, stable, and less insecure employment in the so-called stagnant sector. The point is not just to create "full employment" but rather to create higher-waged "good jobs," ones that could be made into a career. These nonmediocre jobs may be labor-intensive and therefore low-productive, but "low-productive" does by no means imply "socially unimportant." Actually, most of the work in education, health, social services, public infrastructure building, and maintenance (including renewable energy systems to safeguard a nonwarming future), and cleaning are underpaid relative to the considerable positive external effects these jobs generate (Thiess 2012).

Sixth, the argument here is not that there is some "optimal" solution to the current dual-economy predicament. The argument instead is that the system is inherently unstable and lacks built-in mechanisms to achieve "balanced growth." One thing is clear though: Left to itself, our market economy generates unbalanced growth that undermines, rather than promotes, societal goals that correspond to our values and morals (Temin 2017). Unbalanced growth is the system's default—and the sensible response to this is to coordinate demand so as to move the economy toward outcomes that are superior to the unmanaged default position.

Finally, I may be accused of being politically naïve and utopian, as the argument seems to suggest that such outcome-improving coordination and demand management will be politically possible in the United States. If this is the accusation, I plead guilty, if only because I think that on present dualizing trends the system cannot preserve its social and political legitimacy for long, which is exactly what Sennett (1998) argued before. There will be change, and we had better proactively and democratically manage it for the common good—rather than going down the road to a dual economy governed by an "illiberal technocracy" consisting of more, or less, enlightened (Fin-Tech) billionaires.[8] I do recognize, of course, that, as before, the economics profession is likely to remain motivated "by the internal logic, intellectual sunk capital and aesthetic puzzles of established research programmes rather than by a powerful desire to understand how the economy works" (Buiter 2009). It will be hard to change this outlook, which is deeply Panglossian and hostage to TINA—with members of the profession providing sophisticated arguments why the current derailment into unsustainable unbalanced growth is actually still the "best of all possible worlds."

SECULAR STAGNATION IN A DUAL ECONOMY

The secular stagnation of the U.S. economy must be understood as a corollary of the underlying process of dualization. The intentional creation of a structurally low-wage-growth economy, post 1980, has not just kept inflation and interest rates low and led to "traumatized workers" accepting "mediocre jobs" in the stagnant sector—it has also slowed down capital deepening, the further division of labor, and the rate of labor-saving technical progress in the dynamic core (Storm and Naastepad 2012). Household loans and corporate debt, obtained at low interest rates, helped to keep up autonomous demand growth during 1995–2008 and thereby temporarily masked the fact that the U.S. economy was on a long-term downward trend (Charles, Hurst, and Notowidigdo 2016). A second factor helping to hide the secular stagnation was the "technology push" originating from the rapid advancement of ICT, AI, and robotics—but the technological revolution reinforced the dual nature of the growth process, as it led to labor shedding by the dynamic sector, forced "surplus workers" to find jobs in the stagnant sector, and depressed productivity growth in the stagnant sector. Fiscal and monetary policies were far from supporting a shift back to balanced growth—and de facto helped the United States turn into a dual economy. As the gap between downward structural trend (and deepened dualism) and debt-financed mass spending bubble became unsustainable, the façade of "The Great Moderation" fell away, and the structural problems could no longer stay hidden (Temin 2017).

The model's main message is that demand growth is likely to be weighed down by "robotization" as it shifts employment from dynamic to stagnant activities, depresses productivity and real wage growth in stagnant activities, and raises (wage) inequality. Demand growth, when lowered during a long enough period of time, in turn depresses dynamic-sector productivity growth—and hence potential growth comes down. The short run demand shortfall carries over into the long run, and the output gap, the anchor of monetary policy, becomes a moving target. As long as monetary policy makers remain unaware of the endogeneity of their policy anchor, their decisions will contribute to unbalanced growth and premature stagnation. I believe these mechanisms underlie both the secular stagnation and the dualization of U.S. economic growth. The U.S. economy may well be "riding on a slow-moving turtle" (Gordon 2014), but that is because its (monetary) policy makers and politicians have put it there. The secular stagnation is a consequence of "unbalanced growth," and it signals a persistent failure of macroeconomic demand management.

The economy's *potential* rate of growth is influenced by both supply-side variables (including most prominently dynamic-sector "technology-push" innovation, $\hat{\lambda}_0$) and aggregate demand—which in turn depends on real wage growth and employment growth, income distribution (between sectors), monetary policy, and public and private investment. The secular decline in U.S. labor productivity growth does not constitute an exclusively supply-side problem, as demand and distribution play key roles as well. It is easier to diagnose the problems of "unbalanced growth" and "secular stagnation" than to treat them effectively. I have tried to argue the need for active demand management to keep the economy close to "balanced growth," which is key, since the system does not self-correct when perturbed by faster technical progress. One more thing is clear from the analysis: Unless real wages are growing appreciably, it is unlikely that TFP growth and hence *potential growth* will be high. Higher real wage growth will mean higher inflation—but knowing the societal cost of the "low wage/low inflation regime," Baumol's "cost disease" should be considered a sign of good health rather than a *pathosis*. What is needed, as argued previously, is the establishment of decent minimum wages, the reinstitution of "normal work arrangements," and sufficient linkage of wage growth in stagnant-sector activities to wage growth in dynamic-sector activities. Precisely these reforms, implemented during the New Deal era, propelled the U.S. economy into the "golden age" of growth and (almost) full employment of the 1950s and 1960s (Gordon 2015). Hence, we need to "manage" and "guide" the process of technical advance in ways that keep the system "balanced." This can only be done when workers have sufficient "countervailing power" vis-à-vis the powerful vested interests in the dynamic (FinTech) sector (Mishel and Shierholz 2017). In a way, we are back to the times when workers and citizens began to fight back against the excesses of the First Industrial Revolution and for representation—Percy Shelley's (1819) powerful expression (in "The Mask of Anarchy") of the task ahead rings true again today:

> Rise like lions after slumber
> In unfathomable number
> Shake your chains to earth like dew
> That in sleep have fallen on you
> Ye are many, they are few.

Tellingly, the measures proposed to make robotization work for the common good are the exact opposite of the trade liberalization, labor market deregulation, and business tax reductions proposed by supply-side economists (Glaeser 2014; Eichengreen 2015b; Furman 2015), who all believe that potential output is determined by the inexorably exogenous factors of "technology" and "demography." It is high time to write off the intellectual sunk capital invested in this—mistaken—belief. To make America "great" again, it needs to be made "whole" as well.

ACKNOWLEDGMENTS

Comments and suggestions by Thomas Ferguson have considerably sharpened the argument.

NOTES

1. Weil (2014) called this the "fissuring of the workplace" as large corporations from Google to Walmart outsourced functions and activities that used to be managed internally to small subcontracting companies that compete fiercely with one another. Often 20% to 50% of the workforce has been outsourced with companies like Bank of America, Procter & Gamble, FedEx Corporation, and Verizon using thousands of contractor firms each. Predictably, the result has been declining wage growth, inadequate health and safety conditions, and widening inequality. See Lauren Weber, "The end of work," *The Wall Street Journal,* February 2, 2017.

2. The analysis is, for reasons of exposition, restricted to two factors of production—but it can easily be extended to include human capital, ICT capital, or energy without affecting the main conclusions (in a qualitative sense).

3. The U.S. South has always been averse to minimum-wage standards and unions, featuring much lower degrees of unionization than the U.S. North. See Mayer (2004).

4. The reference to Samuelson is due to Perelman (2012).

5. In reality, many "discouraged" workers drop out of the labor force in recessions or times of crisis, as happened in response to the crisis of 2008–2009, and many of them do not return if job opportunities remain weak or absent. Six years after the crisis, the Economic Policy Institute counted more than 3 million "missing workers" who, due to weak job opportunities, are neither employed nor actively looking for a job. See: http://www.epi.org/publication/missing-workers/

6. Cf. Hahn and Matthews (1964).

7. To Kaldor (1996: 90), this meant "a system of continuous consultation between the social partners—workers, management and the Government—in order to arrive at a social consensus concerning the distribution of the national income that is considered fair and which is consistent with the maintenance of economic growth, reasonable full employment and monetary stability."

8. See Ferguson, Jorgenson, and Chen (2017) for a sophisticated econometric analysis of how "political money" is helping finance and big telecom to secure their privileged positions.

FUNDING

The author is grateful to the Institute for New Economic Thinking for financial support (under individual grant #INO 1600007).

REFERENCES

Aaronson, S., T. Cajner, B. Fallick, F. Galbis-Reig, C. Smith, and W. Wascher. 2014. "Labor Force Participation: Recent Developments and Future Prospects." *Brookings Papers on Economic Activity* 2014: 261–71.

Abramovitz, M. 1956. "Resource and Output Trends in the United States since 1870." NBER Occasional Paper 52. http://www.nber.org/chapters/c5650.pdf.

Acemoglu, D. 2002. "Directed Technical Change." *Review of Economic Studies* 69, no. 4: 781–809.

———., and P. Restrepo. 2017. "Robots and Jobs: Evidence from U.S. Labor Markets." MIT Department of Economics. http://pascual.scripts.mit.edu/research/robots_jobs/robots_and_jobs_2017.pdf.

Autor, D. H., and D. Dorn. 2013. "The Growth of Low-Skill Service Jobs and the Polarization of the U.S. Labor Market." *American Economic Review* 103, no. 5: 1553–97.

———, D. Dorn, and G. H. Hanson. 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review* 103, no. 6: 2121–68.

Ball, L. M. 2014. "Long-Term Damage from the Great Recession in OECD Countries." NBER Working Paper No. 20185. http://www.nber.org/digest/nov14/w20185.html.

Barkai, S. 2016. "Declining Labor and Capital Shares." New Working Paper Series No. 2, Stigler Center for the Study of the Economy and the State. University of Chicago Booth School of Business.

Barro, R. J. 1999. "Notes on Growth Accounting." *Journal of Economic Growth* 4, no. 1: 119–37.

Basu, D. 2010. "Marx-Biased Technical Change and the Neoclassical View of Income Distribution." *Metroeconomica* 61, no. 4: 593–620.

———, and D. Foley. 2013. "Dynamics of Output and Employment in the U.S. Economy." *Cambridge Journal of Economics* 37, no. 5: 1077–06.

Baumol, W. J. 1967. "The Macro-Economics of Unbalanced Growth: The Anatomy of the Urban Crisis." *American Economic Review* 57, no. 3: 415–26.

———, S. A. B. Blackman, and E. N. Wolff. 1985. "Unbalanced Growth Revisited: Asymptotic Stagnancy and New Evidence." *American Economic Review* 75, no. 4: 806–17.

Blanchard, O., E. Cerutti, and L. Summers. 2015. "Inflation and Activity: Two Explorations and Their Monetary Policy Implications." NBER Working Paper No. 21726. http://www.nber.org/papers/w21726.

Brugger, F., and C. Gehrke. 2017. "The Neoclassical Approach to Induced Technical Change: From Hicks to Acemoglu." *Metroeconomica* 68, no. 4: 730–76.

Brynjolfsson, E., and A. McAfee. 2014. *Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W.W. Norton.

Buiter, W. 2009. "The Unfortunate Uselessness of Most 'State of the Art' Academic Monetary Economics." *The Financial Times*, March 3. http://blogs.ft.com/maverecon/2009/03/ the-unfortunate-uselessness-of-most-state-of-the-art-academic-monetary-economics/ #axzz4f4gk2Q4P.

Case, A., and A. Deaton. 2017. "Mortality and Morbidity in the 21st Century." https://www.brookings.edu/wp-content/uploads/2017/03/case-deaton-postconference-april-10–2017-with-appendix-figs.pdf.

Charles, K. K., E. Hurst, and M. J. Notowidigdo. 2016. "The Masking of the Decline in Manufacturing Employment by the Housing Bubble." *Journal of Economic Perspectives* 30, no. 2: 179–200.

Chetty, R., D. Grusky, M. Hell, N., Hendren, R., Manduca, J. Narang. 2016. "The Fading American Dream: Trends in Absolute Income Mobility since 1940." NBER Working Paper No. 22910. http://www.nber.org/papers/w22910.

Cooper, M. 2016. "Overcharged and Underserved: How a Tight Oligopoly on Steroids Undermines Competition and Harms Consumers in Digital Communications Markets." Roosevelt Institute Working Paper. http://rooseveltinstitute.org/wp-content/uploads/2017/02/Overcharged-and-Underserved.pdf.

Costantini, O. 2015. "The Cyclically Adjusted Budget: History and Exegesis of a Fateful Estimate." Working Papers Series No. 24, Institute for New Economic Thinking, New York.

Cowen, T. 2011. *The Great Stagnation: How America Ate All the Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better*. New York: Dutton.

Duke, B. V. 2016. "To Raise Productivity, Let's Raise Wages." Center for American Progress. September 2. https://www.americanprogress.org/issues/economy/reports/2016/09/02/142040/to-raise-productivity-lets-raise-wages/.

Eberstadt, N. N. 2017. "Our Miserable 21st Century." *Commentary,* February 15. https://www.commentarymagazine.com/articles/our-miserable-21st-century/.

Eichengreen, B. 2015a. "Secular Stagnation: The Long View." *American Economic Review* 105, no. 5: 66–70. https://www.aeaweb.org/articles.php?doi=10.1257/aer.p20151104.

Eichengreen, B. 2015b. *Hall of Mirrors*. New York: Oxford University Press.

Felipe, J., and J. S. L. McCombie. 2012. "Aggregate Production Functions and the Accounting Identity Critique: Further Reflections on Temple's Criticisms and Misunderstandings." Levy Economics Institute of Bard College Working Paper No. 718.

Ferguson, T., P. Jorgenson, and J. Chen. 2017. "Fifty Shades of Green: High Finance, Political Money, and the U.S. Congress." Roosevelt Institute. http://rooseveltinstitute.org/wp-content/uploads/2017/05/FiftyShadesofGreen_0517.pdf.

Fernald, J. G. 2014. "Productivity and Potential Output before, during, and after the Great Recession." In *NBER Macroeconomics Annual 2014*, vol. 29, ed. J.A. Parker and M. Woodruff, 1–51. Chicago: University of Chicago Press.

———. 2016. "Reassessing Longer-Run U.S. Growth: How Low?" Federal Reserve Bank of San Francisco Working Paper 2016-18. http://www.frbsf.org/economic-research/publications/working-papers/wp2016-18.pdf.

Foley, D. K., and T. R. Michl. 1999. *Growth and Distribution*. Cambridge, MA: Harvard University Press.

Foster, J. B., and F. Magdoff. 2009. *The Great Financial Crisis: Causes and Consequences*. New York: Monthly Review Press.

Funk, P. 2002. "Induced Innovation Revisited." *Economica* 69, no. 273: 155–71.

Furman, J. 2015. "Productivity Growth in the Advanced Economies: The Past, the Present, and Lessons for the Future." Remarks at Peterson Institute for International Economics, July 9. https://www.whitehouse.gov/sites/default/files/docs/20150709_productivity_advanced_economies_piie.pdf.

Glaeser, E. L. 2014. "Secular Joblessness."In *Secular Stagnation: Facts, Causes, and Cures*, ed. C. Teulings and R. Baldwin, 69–82. Paris: CEPR Press.

Gordon, R. J. 1987. "Productivity, Wages, and Prices Inside and Outside of Manufacturing in the U.S., Japan, and Europe." *European Economic Review* 31, no. 3: 685–733.

Gordon, R. J. 2012. "Is U.S. economic growth over? Faltering innovation confronts the six headwinds." NBER Working Paper 18315. National Bureau of Economic Research.

———. 2014. "U.S. Economic Growth Is Over: The Short Run Meets the Long Run." In *Think Tank 20: Growth, Convergence and Income Distribution: The Road from the Brisbane G-20 Summit*, vol. 20, 173–80. https://www.brookings.edu/wp-content/uploads/2016/07/TT20-Nov-7-FINAL-Web-v2.pdf.

———. 2015. "Secular Stagnation: A Supply-Side View." *American Economic Review* 105, no. 5: 54–59. https://www.aeaweb.org/articles.php?doi=10.1257/aer.p20151102.

Graeber, D. 2013. "On The Phenomenon of Bullshit Jobs: A Work Rant." *Strike Magazine*, Issue 3. http://strikemag.org/bullshit-jobs/.

Greenspan, A. 1997. "Statement before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate, February 26, 1997." *Federal Reserve Bulletin* 83, no. 4: 254.

Hahn, F. H., and R. C. O. Matthews. 1964. "The Theory of Economic Growth: A Survey." *Economic Journal* 74, no. 296: 779–902.

Hall, R. E. 2014. "Quantifying the Lasting Harm to the U.S. Economy from the Financial Crisis." In *NBER Macroeconomics Annual 2014,* ed. J. A. Parker and M. Woodford. Chicago: University of Chicago Press.

Haltmaier, J. 2012. "Do Recessions Affect Potential Output?" International Finance Discussion Paper #1066, Board of Governors of the Federal Reserve System. https://www.federalreserve.gov/pubs/ifdp/2012/1066/ifdp1066.pdf.

Hartwig, J. 2013. "Structural Change, Aggregate Demand and Employment Dynamics in the OECD, 1970–2010." https://www.boeckler.de/pdf/v_2013_10_24_hartwig.pdf.

Hicks, J. R. 1932. *The Theory of Wages*. London: MacMillan.
International Monetary Fund (IMF). 2015. "The New Normal: A Sector-Level Perspective on Productivity Trends in Advanced Economies." IMF Staff Discussion Notes No. 15/3. https://www.imf.org/external/pubs/ft/sdn/2015/sdn1503.pdf.
Jones, C. I. 2015. "The Facts of Economic Growth." NBER Working Papers 21142. http://web.stanford.edu/ chadj/facts.pdf.
Jorgenson, D. W., and Z. Griliches. 1967. "The Explanation of Productivity Change." *Review of Economic Studies* 34, no. 99: 249–83.
———, M. S. Ho, and J. Samuels. 2012. "A Prototype Industry-Level Production Account for the United States, 1947–2010." Paper presented at the Second World KLEMS Conference, Harvard University, August 9.
Kaldor, N. 1957. "A Model of Economic Growth." *Economic Journal* 67, no. 268: 591–624.
———. 1966. *Causes of the Slow Rate of Economic Growth of the United Kingdom: An Inaugural Lecture*. Cambridge: Cambridge University Press.
———. 1996. *Causes of Growth and Stagnation in the World Economy*. Cambridge: Cambridge University Press.
Kasparov, G., and P. Thiel. 2012. "Our Dangerous Delusion of Tech Progress." *The Financial Times*, November 8. https://www.ft.com/content/8adeca00–2996-11e2-a5ca-00144feabdc0.
Katz, L. F., and A. B. Krueger. 2016. "The Rise and Nature of Alternative Work Arrangements in the United States, 1995–2015." https://krueger.princeton.edu/sites/default/files/akrueger/files/katz_krueger_cws_-_march_29_20165.pdf.
Keynes, J. M. 1936. *The General Theory of Employment, Interest and Money*. London: Palgrave Macmillan.
Lazonick, W. H. 2009. *Sustainable Prosperity in the New Economy?: Business Organization and High-Tech Employment in the United States*. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research.
———. 2014. "Profits without Prosperity." *Harvard Business Review* 92, no. 9: 46–55.
Lewis, W. A. 1954. "Economic Development with Unlimited Supplies of Labour." *Manchester School* 22, no. 2: 139–91.
Lichter, A., A. Peichl, and S. Siegloch. 2014. "The Own-Wage Elasticity of Labor Demand: A Meta-Regression Analysis." IZA Discussion Paper No. 7958, Forschungsinstitut zur Zukunft der Arbeit, Bonn.
Marquetti, A. 2004. "Do Rising Real Wages Increase the Rate of Labor-Saving Technical Change? Some Econometric Evidence." *Metroeconomica* 55, no. 4: 432–41.
Mayer, G. 2004. *Union Membership Trends in the United States*. Washington, DC: Congressional Research Service. http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article = 1176&context = key_workplace.
Mazzucato, M. 2013. *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*. London: Anthem.
Mishel, L., and H. Shierholz. 2017. "Robots, or Automation Are Not the Problem. Too Little Worker Power Is." Economic Policy Institute, February 21. http://www.epi.org/publication/robots-or-automation-are-not-the-problem-too-little-worker-power-is/.
Mokyr, J. 2013. "Technopessimism Is Bunk." K*nowledge Problem* (blog), July 30, http://knowledgeproblem.com/2013/07/30/joel-mokyr-technopessimism-is-bunk/.
Nordhaus, W. 2006. "Baumol's Diseases: A Macroeconomic Perspective." NBER Working Paper No. 12218. http://www.nber.org/papers/w12218.
Nordhaus, W. D. 2015. "Are we approaching an economic singularity? Information technology and the future of economic growth." NBER Working paper 21547. National Bureau of Economic Research.
Ollivaud, P., and D. Turner. 2014. "The Effect of the Global Financial Crisis on OECD Potential Output." OECD Economics Department Working Papers, No. 1166. http://dx.doi.org/10.1787/5jxwtl8h75bw-en.
———, Y. Guillemette, and D. Turner. 2016. "Links between Weak Investment and the Slowdown in Productivity and Potential Output Growth across the OECD." OECD Economics Department Working Papers No. 1304, OECD, Paris.
Orwell, G. 1943/1968. "Looking back on the Spanish War (1943)." In *The Collected Essays, Journalism and Letters, My Country Right or Left, 1940-1943*, vol. 2, 244. New York: Harcourt Brace and World.
Palley, T. I. 2012. *From Financial Crisis to Stagnation: The Destruction of Shared Prosperity and the Role of Economics*. Cambridge: Cambridge University Press.
Perelman, M. 2012. "Sado-Monetarism: The Role of the Federal Reserve System in Keeping Wages Low." *Monthly Review* 63, no. 11: 27. https://monthlyreview.org/2012/04/01/sado-monetarism/#en18.
Pierce, J. R., and P. K. Schott. 2016. "The Surprisingly Swift Decline of U.S. Manufacturing Employment." *American Economic Review* 106, no. 7: 1632–62.

Rada, C., and L. Taylor. 2006. “Empty Sources of Growth Accounting, and Empirical Replacements à la Kaldor and Goodwin with Some Beef.” *Structural Change and Economic Dynamics* 17: 486–500.
Reifschneider, D., W. L. Wascher, and D. Wilcox. 2013. “Aggregate Supply in the United States: Recent Developments and Implications for the Conduct of Monetary Policy.” Paper presented at the 14th Jacques Polak Annual Research Conference, Washington, DC, December 7–8.
Samuelson, P. A. 1998. “Summing up on Business Cycles: Opening Address.” In *Beyond Shocks: What Causes Business Cycles*, ed. J. C. Fuhrer and S. Schuh, 33–36. Boston: Federal Reserve Bank of Boston.
Schmookler, J. 1966. *Invention and Economic Growth*. Cambridge, MA: Harvard University Press.
Sennett, R. 1998. *The Corrosion of Character: The Personal Consequences of Work in the New Capitalism*. New York: W.W. Norton.
Shaikh, A. 1974. “Laws of Production and Laws of Algebra: The HUMBUG Production Function.” *Review of Economics and Statistics* 56, no. 1: 115–20.
Simon, H. A., and F. K. Levy. 1963. “A Note on the Cobb-Douglas Function.” *Review of Economic Studies* 30, no. 2: 93–94.
Solow, R. M. 1957. “Technical Change and the Aggregate Production Function.” *Review of Economics and Statistics* 39, no. 3: 312–20.
———. 1987. “We’d Better Watch Out.” *New York Times Book Review*, July 12, p. 36. http://www.standupeconomist.com/pdf/misc/solow-computer-productivity.pdf.
Storm, S. 2015. “Structural Change.” *Development and Change* 46, 4: 666–99.
———, and C. W. M. Naastepad. 2012. *Macroeconomics beyond the NAIRU*. Cambridge, MA: Harvard University Press.
Summers, L. 2013. Speech at the IMF Economic Forum, 14th Annual IMF Research Conference: Crises Yesterday and Today, Washington, DC, November 8.
———. 2015a. “Demand Side Secular Stagnation.” *American Economic Review: Papers & Proceedings* 105, no. 5: 60–65.
———. 2015b. “My Views and the Fed’s Views on Secular Stagnation.” http://larrysummers.com/2015/12/22/my-views-and-the-feds-views-on-secular-stagnation/.
Syverson, C. 2016. *Challenges to Mismeasurement Explanations for the U.S. Productivity Slowdown*. NBER Working Paper Series WP 21974.Cambridge, MA: National Bureau of Economic Research.
Temin, P. 2016. “The American Dual Economy: Race, Globalization and the Politics of Exclusion.” *International Journal of Political Economy* 45, no. 2: 85–123.
———. 2017. *The Vanishing Middle Class: Prejudice and Power in a Dual Economy*. Cambridge, MA: The MIT Press.
Thiess, R. 2012. “The Future of Work: Trends and Challenges for Low-Wage Workers.” EPI Briefing Paper #341. http://www.epi.org/publication/bp341-future-of-work/.
Weil, D. 2014. *The Fissured Workplace: Why Work Became So Bad for So Many and What Can Be Done to Improve It*. Cambridge, MA: Harvard University Press.
Woodward, B. 2000. *Maestro: Greenspan’s Fed and the American Boom*. New York: Simon & Schuster.
Young, A. 1928. “Increasing Returns and Economic Progress.” *Economic Journal* 38, no. 152: 527–42.

APPENDIX

Sources and Methods

The U.S. Economic Accounts, compiled and published by the Bureau of Economic Analysis (BEA) (https://www.bea.gov/), constitute the source of aggregate and industry-wise data required for the construction of the growth-accounting database for the U.S. economy (1947–2015). The BEA provided time-series information on the following variables: nominal GDP at factor cost; real GDP at factor cost (at constant 2009 U.S. dollars); nominal compensation of employees; and net real capital stock (at constant 2009 U.S. dollars). The BEA also provided aggregate and industry-wise data for the period 1948–2015 on “hours worked” and “full-time & part-time employees.” The number of “hours worked” for the base-year 1947 was imputed using industry-wise data on hours worked in Jorgenson, Ho and Samuels (2012). For the years 1947-1999, the “hours worked” in WRT, Information, PBS, EHS, and the Rest were estimated based on BEA data on “full-time & part-time employees” for these industries; the assumption is that the average number of hours worked per employee did not change significantly differently across these industries over this period. All other variables, including real compensation of employees, real profit income, the wage share, the profit share, labor productivity per hour worked, capital productivity per unit of net real capital stock, capital-intensity, and TFP were calculated using the BEA numbers—based on the definitions given in the main text. Note that all factor incomes were deflated using the GDP deflator, as per equation (8). This not just ensures additivity of productivities across industries, it is also consistent with the fact that the only empirically meaningful interpretation of TFP growth is in terms of factor payments growth (as per equations 9 and 10; see Shaikh 1974; Rada and Taylor 2006). Figure 4: Data on union membership (1948–2003) as a percent of employed workers are from Mayer (2004); data on union membership for recent years are from Bureau of Labor Statistics.

Notes on the Equations

Derivation of Equation M1

In equations M1 it is assumed that the demand growth for dynamic-sector goods and services $\hat{x}_D$ is a linear positive function of aggregate real wage-income growth. Aggregate real wage-income consists of real wage-incomes earned in the dynamic sector and the stagnant sector, or $y = y_D + y_S = w_D\ell_D + w_S\ell_S$. In growth rates this gives:

$$\hat{y} = \Phi_D(\hat{w}_D + \hat{\ell}_D) + \Phi_S(\hat{w}_S + \hat{\ell}_S) \tag{A.1}$$

where Φ_D = the share of dynamic-sector real wage-income in aggregate real wage income, and Φ_S = the share of stagnant-sector real wage-income in aggregate real wage income. Using (A.1) and assuming that $\hat{x}_D$ is a linear function of $\hat{y}$ (with income elasticity of demand θ_D):

$$\hat{x}_D = \theta_D\hat{y} = \gamma_D(\hat{w}_D + \hat{\ell}_D) + \gamma_S(\hat{w}_S + \hat{\ell}_S) \tag{A.2}$$

where $\gamma_D = \theta_D\Phi_D$ = the dynamic-sector wage-income elasticity of demand for dynamic-sector goods, weighed by Φ_D; and $\gamma_S = \theta_S\Phi_S$ = the stagnant-sector wage-income elasticity of demand for dynamic-sector goods, weighed by Φ_S. Equation M5 can be derived in a similar manner.

Derivation of π

Let me denote the constant-output own wage elasticity of labor demand by $(1/\pi)$ and define the following standard labor demand function (in growth rates):

$$\hat{\ell}_{DEMAND} = c - (1/\pi)\hat{w}_S \tag{A.3}$$

According to my estimates (under Figure 3), $(1/\pi) = 0.5$ (see also Gordon 1987; Lichter, Peichl and Siegloch 2014) and hence $\pi = 2$, if we assume that all workers have to find a job and labor supply must equal labor demand, then we can rewrite (A.3) as follows:

$$\hat{w}_S = \pi c - \pi\hat{\ell}_S == \hat{w}_0 - \pi\hat{\ell}_S \tag{A.4}$$

This is equation (M8).

Aggregate Labor Productivity Growth Under Balanced Growth

Total output is the sum of dynamic-sector output and stagnant sector output, or $x = x_D + x_S$. If one divides both sides of this identity by the total labor force ℓ one obtains aggregate labor productivity:

$$\lambda = \frac{x}{\ell} = \eta_D\lambda_D + \eta_S\lambda_S \tag{A.5}$$

where $\eta_D = \ell_D/\ell$ and $\eta_S = \ell_S/\ell$. Under balanced growth ℓ_D and ℓ_S are constant, and hence the employment share η_D and η_S are constant as well. This means that aggregate labor productivity growth is defined as:

$$\hat{\lambda} = \eta_D^*\hat{\lambda}_D + \eta_S^*\hat{\lambda}_S \tag{A.6}$$

where $\eta_D^* = \eta_D/\lambda$ and $\eta_S^* = \eta_S/\lambda$. Since both dynamic-sector and stagnant-sector labor productivity growth are constant under balanced growth (see equations 15 and 17), aggregate productivity growth is constant as well.

A Note on Relative Price Change

In (M1) the impact on demand of a change in the dynamic-sector price (p_D) relative to the stagnant-sector price (p_S) was omitted. A first reason to do so is that p_D is unlikely to change in response to an increase in $\hat{\lambda}_0$ since empirically $\gamma_D - \gamma_S\vartheta(1-\pi) = 1$ (see Note to Table 10). p_S may decline in response to an increase in $\hat{\lambda}_0$ if stagnant-sector real wage growth declines more than stagnant-sector labor productivity growth. In that case, the relative price (p_D/p_S) would rise and depress the growth of $\hat{x}_D$. This would mean the stagnationist tendencies triggered by the increase in $\hat{\lambda}_0$ would become even stronger than the model now "predicts." There is a further reason why the relative price impact of an increase in $\hat{\lambda}_0$ is difficult to predict—namely, dynamic-sector firms operate under conditions of monopolistic competition and have the market power to raise their markups. Barkai (2016) and Cooper (2016) provide empirical evidence on raising markups. These findings underscore the fact that even if dynamic-sector firms manage to reduce their unit labor costs, this does not necessarily show up in lower prices.

International Journal of Political Economy

ISSN: 0891-1916 (Print) 1558-0970 (Online) Journal homepage: http://www.tandfonline.com/loi/mijp20

A Comment on Servaas Storm's "The New Normal"

James K. Galbraith

To cite this article: James K. Galbraith (2017) A Comment on Servaas Storm's "The New Normal", International Journal of Political Economy, 46:4, 211-216, DOI: 10.1080/08911916.2017.1407734

To link to this article: https://doi.org/10.1080/08911916.2017.1407734

Published online: 02 Jan 2018.

International Journal of Political Economy, 46: 211–216, 2017

ISSN: 0891-1916 print/1558-0970 online
DOI: 10.1080/08911916.2017.1407734

A Comment on Servaas Storm's "The New Normal"

James K. Galbraith

The Lyndon B. Johnson School of Public Affairs, The University of Texas at Austin, Austin, Texas, USA

Abstract: Accepting Professor Storm's demolition of total factor productivity growth and production function-based reasoning, this article argues that to understand the great financial crisis and its aftermath requires an evolutionary perspective that goes beyond hysteresis and secular stagnation, that escapes the reification of potential output, and that recognizes how structural forces and not merely deficient demand have affected actual economic growth. It also requires a commonsense understanding of actual American social conditions—no, the middle class has not vanished—and an appreciation that raising living standards under present conditions requires social balance—a new emphasis on collective economic security and public consumption goods.

Keywords end of normal; evolutionary economics; financial crisis; secular stagnation; social balance

I share Professor Storm's frustration with economic narratives that invoke the sterile concept of Total Factor Productivity Growth as an exogenous determinant of … well, of anything. I do not share his patience. Nor his sense of necessity to work through the Cobb-Douglas math, which Shaikh (1974) long ago demonstrated to be pointless. Reiteration of these issues may engage the attention of neoclassical economists and so impart legitimacy in their circles; sadly, tolerance will end once the conclusions interfere with the prejudice that has kept production functions in the textbooks for at least 60 years past their sell-by date. Meanwhile, the effort interferes with the attention of the general reader and also with the necessary next steps. So I propose here to pocket Storm's demolition of TFP-based models and the Solow Residual and to proceed from there.

As a first question, are we in a "New Normal"—or at "The End of Normal"? This is the distinction between equilibrium and evolutionary thinking. The former speaks of hysteresis and the displacement of equilibria from one position to another, of a feedback loop from actual to potential growth but with potential still acting as a lid over actual output in the conventional way. This is secular stagnation as the phrase is understood today. Actual growth in this view is governed by demand. The implication is that if actual growth had been boosted in good time by sufficient stimulus, the apparent present barriers to growth present now would have melted away, and the previous equilibrium would have held. Secular stagnation is therefore a self-inflicted wound.

The evolutionary viewpoint posits laws of process and structural impediments to actual economic growth.[1] These stem from (a) a changing real resource environment; (b) the changing

James K. Galbraith holds the Lloyd M. Bentsen, Jr. Chair in Government/Business Relations at the Lyndon B. Johnson School of Public Affairs, The University of Texas at Austin. His most recent book is *Welcome to the Poisoned Chalice: The Destruction of Greece and the Future of Europe*.

character of technological change; (c) institutional failures; and (d) their effects on long-term profit and investment expectations. All of these affect *actual* growth; thus the conceptual distinction between demand-side and supply-side effects fades away. Certainly "potential output" is merely a statistical projection with no independent existence. But sustainable actual output depends on changing structural factors and not merely on the pressure of demand.

In Galbraith (2014), I make the following arguments. First, the end of cheap energy in the run-up to the financial crisis (notwithstanding the low supply price that has prevailed since) means that a capital stock geared to a different environmental era becomes devalued, and in many cases unprofitable to operate, while (at the same time) the transfer of income from the large consuming sector to the small producing sector creates both inequality and a demand squeeze.

Second, the new digital technologies lower the cost of business investment, substitute imports for domestic investment spending (since digital age equipment is produced largely overseas), and remove information transfers from the market sphere, replacing an increasing array of service, entertainment, and communications activities with low-cost (or, indeed, zero marginal cost) digital fare, delivered over fixed fiber-optic cables. All of these effects reduce measured growth of GDP and productivity, even though they also improve living standards for those who still have jobs and income.

Third, the U.S. banking system has not since the year 2000 been capable of financing a sustained business expansion. The megabanks that dominate American capitalism since the millennium devoted themselves after the NASDAQ crash largely to mortgages and now to consumer credit and student debt. Infected by vast frauds, the first of these crashed in 2000, and the others will crash in due course. This fact is known already; debt burdens rise until they collapse. The expectation of credit cycles and low average growth rates is self-fulfilling, so that (among other things) low long-term interest rates lose their appeal to the business borrower.

The distinction between equilibrium and evolution affects the policy menu directly. For those who favor the hysteresis view, the solution appears to be steady pressure on the demand front; more gas in the engine, more pressure on the accelerator, and ultimately actual growth will push potential back toward its previous value.[2] In the evolutionary view, the engine is broken and may or may not be possible to repair. There are limits that require either major institutional reform (as of the banks), fortuitous technological change (changing the effect of technology on labor); without these the limits may not be surpassed at all. The policy challenge then becomes how to live sustainably within the limits and not how to break through them in the illusory pursuit of a "return to normal."

The next issue is Storm's characterization of actual conditions in the United States; this is important in part because it bears on the social acceptability of different policy choices. Has the middle class vanished? Actually it has not—indeed, as Rose (2016) has shown, a significant fraction has migrated to the "upper middle class" by any reasonable standard. The American Left, together with many economists, has tangled itself in a nonsense narrative on this point, in what appears to be a confusion between the 21st-century United States and (say) the antebellum South. That the median wage has stagnated is proof of nothing; a major source of drift in the median is the introduction of new workers and new jobs, less well paid than factory work but better than not working at all.[3] The pillars of middle-class America created by the New Deal, the Great Society, and Henry Ford—Social Security, Medicare, Medicaid, veterans' benefits, public schools and universities, homeownership, suburbs, freeways and shopping malls—have been stressed and clipped in various ways, but they still exist, and their real wages are held up by the ready availability of low-cost imported goods, cheap labor from an immigrant underclass, and that staple of American life, undertaxed gasoline.

What has happened—as Storm describes—is a vast seven-decade growth in service jobs, notably in Business and Professional Services and in Education and Health, while the absolute size of the manufacturing sector (measured by employment) has shrunk, and its relative share has become quite small. This is important because the manufacturing sector showed *accelerating* productivity growth from 1995 to 2008 as compared to the earlier period, while the three most stagnant sectors—the two aforementioned plus Utilities and Construction—have seen sharp declines.

Storm argues that about 80% of the changing productivity growth occurs "within sectors" and not "between sectors." Such a claim depends on how sector boundaries are drawn; it is a mistake to take those boundaries as ex ante fixed. In *Created Unequal* (Galbraith, 1998) I developed a method for organizing disaggregated industrial and sector data into organic units, in particular illustrating the heterogeneity of the manufacturing sector and the linkage between certain parts of manufacturing and economic activities classed as services.[4] It seems very likely that Storm's judgments would be revised were such a classification in use; we would see that the *composition* of the manufacturing sector has shifted toward high-wage, high-technology industries while low-wage, old-technology sectors have been outsourced and offshored. In services the picture is less clear, but it could be that the fall in productivity growth stems from adding new (and better?) types of service activity rather than in a slowdown in the productive powers of existing institutions.[5]

Storm claims that globalization "hurts workers in the stagnant sectors most." But the stagnant sectors are nontraded; it is hard to see how the arrival of cheap imported consumption goods hurts the living standards of workers who themselves do not produce such goods or compete directly with the Asian or Mexican wage earners who do. Instead, globalization culled the less-dynamic elements of the dynamic (traded-goods) sectors, thus spurring the differential between the surviving dynamic elements and the so-called stagnant ones. That said, even the idea that nominal wages (let alone real) are low in professional and business services in America seems contrary to fact. The legal or accounting office is not a sweatshop; nor is the American hospital or medical clinic. Indeed, loss of these jobs via the introduction of digital technology would not be the concern that it is if the workers were cheap.

Are these new service jobs, then, actually "bullshit jobs" that should not exist? Or are they the result of the preferences and social and corporate structure of a high-income country with substantial hegemony in the world and thus the capacity to get other countries to do the dirty work of low-wage manufacturing? The latter seems substantially closer to the truth.

What about that other stagnant sector—Utilities and Construction? A moment's thought might suggest the possibility that slow productivity growth in utilities stems from the rising real cost of energy, while in construction higher standards of quality, safety, and (in residential construction) of scale and amenities might be to "blame." American houses grow bigger by the decade, and their bathrooms and kitchens grow even more rapidly than the houses. And as the Grenfell Towers fire has probably persuaded most citizens of London, productivity growth in construction can come at a price.

Storm correctly argues that wage growth *can* lead to productivity growth, a fact that emerges from the mathematics of production functions but even more strongly from experience. Curiously, he does not mention the experience of Sweden under the guidance of the

Meidner/Rehn (LO) model, as described by Martin (1981). It was precisely wage egalitarianism and high minimum-wage standards that worked to induce the growth of advanced industry in Sweden, converting the country from one of many poor European countries in the 1930s to one of the richest in the world by century's end. Sweden did not come to afford the welfare state because it was rich; it became rich because it created the welfare state. By the same token, Storm correctly criticizes the neoliberal formulas of Furman et al. since labor market deregulation, depressing wages, discourages productivity growth.

However, a strategy for advanced industrialization and a strategy for living well once rich are two different things. There is an Engel Curve for advanced consumption; as populations grow rich and as they grow old, their needs and preferences change. Living well necessarily implies large spending on health, education, environment (and on construction standards), infrastructure, administration, and the employment of large numbers at modest wages if these sectors are to be afforded and tolerated by the population that pays for them. It is unlikely that higher wages would lead to more productivity in either education or health care, and since quality in these sectors depends on high labor content (and so, low productivity), it would not be desirable if it did.

What is the solution? Higher wages at the very bottom of the scale would help. This would affect not teachers and nurses but minimum-wage workers in fast food joints and poultry-processing plants and orange groves—the true American sweatshops. Higher wages at this ultralow end would stabilize those jobs, substitute older workers for teenagers, send the latter back to school, and raise quality in a range of low-end activities (notably food service), as well as fostering productivity growth in the few places where low wages are found in mechanized settings. All of these would be constructive. But what nurses and teachers and office workers need is not so much more pay as affordable transport to work, secure health insurance, and plausible pensions.

For the "stagnant sectors" generally, the correct approach therefore is to *socialize consumption* and *improve economic security* as much as possible, thereby raising living standards without raising money wages. The twin pillars of such a strategy are public and publicly provided consumption goods of all types and social insurance to ease the vagaries of health, aging, financial-system instability, and other risks of existence. In this way, even stagnant-sector working people can live well without bankrupting their employers or bringing the wrath of an austerity policy down on their heads. Galbraith (1958) termed this the problem of social balance, of overcoming the American plague of "private affluence and public squalor."

And it is with the *quality* of services in these areas—public schools, health care, traffic and transport, urban services, parks, and amenities of all kinds—that American *voters* appear to be most concerned. The critical issue in the upper Midwest in 2016—the region whose defection from the Democrats elected Donald Trump—was not so much low wages or unemployment. Instead it was the decline of community life, the physical and social decay of cities and regions formerly supported by manufacturing plants but now, in the absence of a proper tax base, left largely to rot. People wanted the manufacturing to return—and voted for Trump's promises, however empty—not because they expected to work in factories themselves, but because in their living experience the factories had once supported the entire economic life of their region. The experience of the poisoned water supply in the city of Flint, Michigan, was only the extreme case of what happens when that support disappears. These things are obvious except, apparently, to economists.

In the greater scheme of political struggle, I trust, Professor Storm and I are on the same side. We agree that stagnation has brought the system to the brink of crisis. If that were not true, then Donald Trump would not be President of the United States. But to construct the good society in difficult times—to design a plausible program for a post-Trump world—is a challenge. If you bog down in the stale mathematics of a century past, it becomes a bigger challenge, and it also may be that our economic statistics—constructed for the purposes of that century—are not well suited to understanding the problems that we face now. Indeed if one leans on them too hard, reifying not only Total Factor Productivity but such slippery constructs as the median wage and the disappearing middle, then one risks running afoul of the proverbial maxim of the Man from Maine: "You can't get there from here."

In my view, even under difficult conditions, with appropriate thought and imagination, with a program that responds not to shallow statistical visions but to the actual needs of the community, making use of resources in full recognition of their physical, economic, environmental, and social limits—you can, in fact, build a better society than we have now. As the pragmatists averred more than a century ago, such a belief is the prerequisite to effective action. Working out what the needs are, and how exactly to reach them, is a matter of building a more effective democratic process. It must be a process not dominated by money and not by entitled experts—but one open to all. That is a major task for the years ahead.

NOTES

1. In his great methodological essay "Why is Economics Not an Evolutionary Science?" Veblen (1898) made the point in these terms: "If we are getting restless under the taxonomy of a monocotyledonous wage doctrine and a cryptogamic theory of interest, with involute, loculicidal, tomentous, and moniliform variants, where is cytoplasm, centrosome, or theory of karyokinetic process to which we may turn, and in which we may find surcease from the metaphysics of normality and controlling principle?".

2. At least, this is my understanding of the view taken by Summers, Krugman, and others. If the concept of potential is so elastic, it's difficult to see what purpose it serves. But the failure of inflation to rise when actual growth approaches current estimates of potential reinforces this position; in practice potential is reestimated whenever the estimate is surpassed.

3. That "intergenerational mobility" is less in recent decades than in the 1950s is also proof of nothing: The postwar improvement was a direct consequence of the bad conditions in the Depression.

4. For instance, auto manufacturing and auto dealerships, pharmaceutical companies and drugstores, and many others.

5. A mundane example, given by Rose, is the proliferation of high-end coffee shops across the country, providing a service (consumption of exotic coffee drinks in a comfortable setting) that did not exist previously.

ORCID

James K. Galbraith http://orcid.org/0000-0003-0203-176X

REFERENCES

Galbraith, J. K. 1958. *The Affluent Society*. Cambridge, MA: Houghton Mifflin Company.
Galbraith, J. K. 1998. *Created Unequal: The Crisis in American Pay*. New York: Free Press.
Galbraith, J. K. 2014. *The End of Normal: The Great Crisis and the Future of Growth*. New York: Free Press.

Martin, A. 1981. “Economic Stagnation and Social Stalemate in Sweden.” In *Monetary Policy, Selective Credit Policy and Industrial Policy in France, Britain, West Germany and Sweden*, ed. James K. Galbraith, 136–211. Washington, DC: Joint Economic Committee.

Rose, S. A. 2016. *The Growing Size and Incomes of the Upper Middle Class*. Washington, DC: Urban Institute, Income and Benefits Policy Center.

Shaikh, A. 1974. “Laws of Production and Laws of Algebra: The HUMBUG Production Function.” *Review of Economics and Statistics* 56, no. 1: 115–20.

Veblen, T. 1898. “Why Is Economics Not an Evolutionary Science?” *The Quarterly Journal of Economics* 12, no. 4: 373–397.

International Journal of Political Economy, 46: 217–226, 2017

ISSN: 0891-1916 print/1558-0970 online
DOI: 10.1080/08911916.2017.1407736

The New Normal is "Maximizing Shareholder Value": Predatory Value Extraction, Slowing Productivity, and the Vanishing American Middle Class

William Lazonick

The Academic-Industry Research Network, University of Massachusetts Lowell, Lowell, Massachusetts, USA

Abstract: In the United States, concentration of income and wealth among the very richest households have become extreme, while middle-class employment opportunities have disappeared. Building since the late 1970s, the instability and inequity in the economic system is now undermining productivity growth. The important contribution of Servaas Storm, "The New Normal: Demand, Secular Stagnation, and the Vanishing Middle Class," demonstrates the integral relation between the sources of slowing productivity growth and the downward mobility into low-productivity service jobs that characterizes the vanishing U.S. middle class. In this comment, I focus on the "financialization" of the U.S. business corporation, a phenomenon that is consistent with Storm's general argument. From this perspective, I ask whether Storm's contention that demand-side factors are stifling productivity growth and causing the middle class to disappear cannot better be viewed as a supply-side problem of corporate resource allocation. My perspective integrates Storm's important findings on intersectoral differences in productivity growth with an analysis of how, since the 1980s, the financialization of the business corporation has destroyed middle-class career employment, pushing an increasing proportion of the U.S. labor force into low-productivity and low-paid service jobs. In the spirit of Storm's analysis of the vanishing middle class and the failure of neoclassical economists to deal with this critical question, I call for a focus on the governance of the innovative business enterprise, with a view to reducing, and ideally eliminating, the power of "predatory value extractors" to enrich themselves while leaving most Americans worse off.

Keywords financialization; middle class; predatory value extraction; productivity; stock buybacks; stock-based pay

---

William Lazonick is Professor of Economics at University of Massachusetts Lowell and President of the Academic-Industry Research Network (www.theAIRnet.org). His book *Sustainable Prosperity in the New Economy? Business Organization and High-Tech Employment in the United States* won the 2010 Schumpeter Prize. He received the HBR McKinsey Award for outstanding article in *Harvard Business Review* in 2014 for "Profits without Prosperity: Stock Buy-backs Manipulate the Market and Leave Most Americans Worse Off." The Institute for New Economic Thinking, Gatsby Foundation, European Commission, and Ford Foundation have funded his recent research on innovation, financialization, and development. For recent papers and op-eds, see www.ineteconomics.org/research/experts/wlazonick.

UNSTABLE EMPLOYMENT, INEQUITABLE INCOME, SLOWING PRODUCTIVITY

A decent society wants *stable and equitable economic growth,* or what I have called "sustainable prosperity" (Lazonick 2009). Unfortunately, that is not the type of economy that the United States now has. Ever-growing numbers of Americans experience unstable employment and are on the losing end of a highly inequitable income distribution. The concentration of income and wealth among the very richest households has become extreme, while middle-class employment opportunities have disappeared. As the middle class has shrunk, the once-hoped-for upward mobility of Blacks and Hispanics has been stifled, and a downwardly mobile White working class has become more numerous and more desperate. The instability and inequity in the economic system, which has been building since the late 1970s, is now undermining productivity growth. With the election of 2016 giving the nation's leading economic predators unprecedented political power, sustainable prosperity has become an increasingly elusive dream.

What accounts for this dismal performance of the U.S. economy, even in a period of ostensible economic boom? The important contribution of Servaas Storm, "The New Normal: Demand, Secular Stagnation, and the Vanishing Middle-Class," reveals that the sources of slowing productivity growth are integrally related to the very real phenomenon of the vanishing U.S. middle class. My own "supply-side" research on the questions of the acceleration of income inequality and the disappearance of the middle class in the United States focuses on the "financialization" of the business corporation. My supply-side perspective on changes on governance and employment in major U.S. business corporations contrasts with Storm's contention that it is demand-side factors that are stifling productivity growth and causing the middle class to disappear. My constructive reinterpretation of Storm's argument integrates his important findings on intersectoral differences in productivity growth with an analysis of how, since the 1980s, the financialization of the business corporation has destroyed middle-class career employment and, through downward mobility, has pushed an increasing proportion of the U.S. labor force into low-productivity service jobs. I conclude with a call for an approach to the issues of stable and equitable growth that, in the spirit of Storm's analysis of the vanishing middle class and the failure of neoclassical economists to deal with this critical question, focuses on the governance of the innovative business enterprise, with a view to reducing, and ideally eliminating, the power of "predatory value extractors" to enrich themselves while leaving most Americans worse off.

FROM RETAIN-AND-REINVEST TO DOWNSIZE-AND-DISTRIBUTE

In the United States, business-sector employment represents about 81% of all nonfarm civilian employment. Within the business sector, a relatively small number of very large firms account for a highly disproportionate share of establishments, employees, payrolls, and receipts, as shown in Table 1.

Companies with 500 or more employees, of which there were 18,219 in 2012, had an average of almost 3,300 employees and accounted for over half of all nonfarm business employment in the United States and substantially larger shares of payrolls and revenues. The 1,909 companies

TABLE 1
Size of Firms (Establishments, Employees, Payroll, Receipts) in the U.S Business Sector, 2012

	Firms, millions	*Establishments, millions*	*Paid employees, millions*	*Annual payroll, $billions*	*Receipts, $billions*	*Mean number of employees*
All firms	5.7	7.4	115.9	5,414	32,638	20
Percent of all firms	%	%	%	%	%	
500 + employees	0.318	16.1	51.6	58.1	63.8	3,286
5,000 + employees	0.033	10.7	33.5	38.2	44.1	20,366
10,000 + employees	0.017	9.0	27.9	31.4	35.8	33,542

Source: United States Census Bureau, "Statistics of U.S. Businesses," for 2012: https://www.census.gov/programs-surveys/susb/data/tables.2012.html.

that had 5,000 or more employees had one-third of all business-sector employees, and the 964 companies with 10,000 or more employees, 28%. The resource-allocation decisions of large companies have profound impacts on the performance of the economy as a whole, both directly in terms of the goods and services that these large companies produce and the people whom they employ and indirectly because the revenues of millions of smaller firms depend on selling goods and services to the large firms and their employees.

The domination of the economy by large firms is certainly not new in American history. As documented by the business historian Alfred Chandler, by the 1920s "the managerial revolution in American business" had taken place in an array of mass-production industries in which a small number of firms grew to be dominant by building formidable organizations that could develop and utilize the latest technologies (Chandler 1977; Lazonick 2012). By the late 1920s, however, a growing imbalance between productive capacity and spending power in the U.S. economy triggered a chain reaction that resulted in massive cutbacks of blue-collar employment at the dominant corporations, pushing the national unemployment rate as high as 25% in 1933. It took U.S. entry into World War II to rid the nation of the Great Depression. For a quarter century after World War II, the resource-allocation decisions of large corporations in combination with massive government spending on infrastructure and knowledge enabled the U.S. economy to experience relatively stable and somewhat equitable growth.

During this postwar generation, the employment and governance norms of the large business corporations supported an upwardly mobile and economically secure middle class (Lazonick 2009, 2015b). The employment relations that prevailed in these companies manifested the norm of a "career-with-one company" (CWOC) (Lazonick et al. 2014). Blue-collar workers (with, at most, high school educations) achieved CWOC by virtue of membership in labor unions that protected seniority, while white-collar workers (an increasing proportion of whom had university educations) secured CWOC by the desire of the company that trained them to retain them.

Enabling CWOC was the prevailing corporate governance norm of "retain-and-reinvest": By retaining people and profits and reinvesting in the company's productive capabilities, and in particular those of its white-collar labor force, a company could maintain large market shares in existing lines of business and enter new lines of business. Adhering to the CWOC norm, a retain-and-reinvest company in effect shared profits with employees in the forms of higher earnings, employment security, superior work conditions, and health and retirement benefits.

The beneficiaries of CWOC were overwhelmingly White males, but in the 1960s and 1970s Blacks and women began to access CWOC because of strong labor demand, the upward mobility of White males, and the equal employment opportunity mandates of the Civil Rights Act of 1964 (Lazonick, Moss, and Weitz 2016b). A more diverse group of upwardly mobile blue-collar and white-collar workers joined an expanding middle class. From the beginning of the 1980s, however, the CWOC employment norm began to unravel at U.S. business corporations, and by the 2000s it was virtually extinct. The demise of CWOC has been central to the erosion of the American middle class, with the devastation to employment stability and income equity that this erosion has entailed.

Why did CWOC disappear? In my research, I have identified three forces for the corporate dismantling of CWOC that I label *rationalization, marketization,* and *globalization*. From the early 1980s, rationalization, characterized by plant closings and permanent layoffs, terminated the jobs of high-school-educated blue-collar workers, many of them well-paid union members. From the early 1990s, marketization, characterized by the explicit eradication of a career with one company as an employment norm, placed the job security of middle-aged white-collar workers, most of them college educated, in jeopardy. From the early 2000s, globalization, characterized by an acceleration of the movement of employment offshore to lower-wage nations and the movement to the United States of foreign workers, vast numbers of whom were college-educated, left all members of the U.S. labor force vulnerable to displacement, whatever their educational credentials and work experience (Lazonick 2015b).

Initially, each of these structural transformations in employment represented a U.S. business response to a major change in industrial conditions related to technologies, markets, and competitors. During the onset of the rationalization phase in the early 1980s, plant closings and permanent layoffs were a reaction to the superior productive capabilities of Japanese competitors in consumer-durable and related capital-goods industries in which U.S. companies employed significant numbers of unionized blue-collar workers (Lazonick 2010). Challenging the United States in industries such as autos, consumer electronics, machine tools, and steel, in which U.S. companies had been world leaders, the Japanese won by investing in organizational-learning processes that integrated the skills and efforts of blue-collar operatives with those of white-collar engineers. U.S. companies typically excluded most blue-collar workers from organizational-learning processes and hence were generally unable to compete with the innovative Japanese (Lazonick 1990, 1998).

During the onset of the marketization phase in the early 1990s, the erosion of the CWOC norm among white-collar workers was a response to the dramatic technological shift from proprietary systems to open systems, integral to the microelectronics revolution. This shift favored younger workers with the latest computer skills, acquired in higher education and transferable across companies, over older workers with many years of company-specific experience with proprietary technologies and systems integration. Kicking off the marketization phase in a highly visible way was IBM, which had been the iconic American CWOC company (bragging coming into the 1990s that it had not laid off an employee involuntarily since 1921), but whose "Wintel" PC standard was central to the open-systems environment. As part of its deliberate corporate strategy to rid itself of CWOC, IBM reduced its employment from 374,000 in 1990 to 220,000 to 1994 (Lazonick 2009, 83–89). Other established firms then followed suit.

During the onset of the globalization phase in the early 2000s, the sharp acceleration in the offshoring of jobs was a response to the emergence of large supplies of highly capable, and lower-wage, labor in developing nations such as China and India, linked to the United States through inexpensive communications systems and global value chains (Lazonick 2009, chs. 2–5). The globalization of information and communication technology (ICT) had begun in the 1960s when U.S. semiconductor companies offshored the testing and assembly of chips, with South Korea, Taiwan, Singapore, and Hong Kong as favored locations and with Malaysia becoming a destination of choice for foreign direct investment in microelectronics manufacturing from the 1970s. The indispensable foundation of Asian success was investment in the education of the labor force ahead of demand, often resulting in "brain drain" at first but "brain gain" in the following decades (Lazonick 2009, ch. 5). Although India was an unsuitable location for global manufacturing, its college-educated population enabled it to become a global powerhouse in information technology services.

Having abandoned the CWOC norm, U.S. corporations often pursued rationalization, marketization, and globalization to cut current costs rather than to reposition themselves to produce competitive products. That is, they closed manufacturing plants, terminated experienced workers, and offshored production to low-wage areas of the world simply to increase profits, often at the expense of the companies' long-term competitive capabilities and without regard for displaced employees' long years of service. As this financialized approach to corporate resource allocation became the new governance norm, business corporations failed to reinvest their profits in new, higher-value-added capabilities on a sufficient scale to create middle-class employment opportunities that could provide a new foundation for stable and equitable growth in the U.S. economy. Intent on avoiding taxes to boost corporate profits, the leaders of these financialized companies made little attempt to encourage federal, state, and local governments to upgrade the U.S. labor force for the new world of global competition (Lazonick 2015b, 2017a).

On the contrary, from the mid-1980s, with superior corporate performance defined as meeting Wall Street's expectations for ever-higher quarterly earnings per share, companies turned to massive stock repurchases to "manage" their own corporations' stock prices (Lazonick 2014b, 2015c). Trillions of dollars that could have been spent on innovation and job creation in the U.S. economy over the past three decades have instead been used to buy back stock for the purpose of manipulating stock prices. For the decade 2007–2016, U.S. corporations' total net equity issues—new share issues less shares taken off the market through buybacks and merger and acquisition deals—averaged *minus $412 billion per year* (Board of Governors 2017). For 2007–2016, the 461 companies in the S&P 500 Index in January 2017 that were publicly listed over the decade expended $4.0 trillion on stock buybacks, representing 54.5% of net income, plus another 39.3% of net income on dividends (Lazonick 2017a). Much of the remaining 6.2% of profits was held abroad, sheltered from U.S. taxes. Many of America's largest corporations routinely distribute more than 100% of net income to shareholders, generating the extra money by reducing cash reserves, selling off assets, taking on debt, or laying off employees (Lazonick 2015b, 2016a).

In the process, U.S. business corporations transitioned from a resource-allocation regime of "retain-and-reinvest" to one that is best described as "downsize-and-distribute" (Lazonick and O'Sullivan 2000). For the sake of increasing so-called "free" cash flow that could be used for buybacks and dividends, an established U.S. corporation might lay off thousands of experienced employees, both white collar and blue collar, and reduce the wages and benefits of the rest. Legitimizing this financialized mode of corporate resource allocation has been the ideology, itself a product of the 1980s and 1990s, that a business corporation should be run to "maximize shareholder value" (Lazonick 2014a, 2017b).

Through their stock-based compensation in the forms of stock options and stock awards, corporate executives who make these decisions are themselves prime beneficiaries of the focus on "total shareholder return" (dividend yield plus stock price appreciation) as the sole measure of corporate performance. Over the decade 2006–2015, the average total annual remuneration of the 500 highest-paid corporate executives in the United States ranged from a low of $14.7 million in 2009, when the stock market was down and stock-based pay made up 66% of the total, to a high of $32.2 million in 2015, when stock-based pay came to 84% of the total (Hopkins and Lazonick 2016; Lazonick and Hopkins 2016; Lazonick 2016c). For the sake of this stock-based remuneration, these executives have been engaged in downsize-and-distribute resource allocation that, given its magnitude and persistence, amounts to nothing less than the looting of the U.S. business corporation.

The paucity of secure and well-paid employment opportunities in the U.S. economy is not because of automation, a common refrain of economists who view "skill-biased technical change" (SBTC) as the most plausible explanation for the disappearance of good jobs for members of the U.S. labor force who have only a high school education (Acemoglu 2002; Autor, Katz, and Kearney 2006; Goldin and Katz 2010; Brynjolfsson and McAfee 2014; for a critique, see Lazonick et al. 2014). SBTC focuses on labor-market supply and demand to determine employment outcomes. But, especially where the adoption of new technologies is involved, employment outcomes in terms of pay and promotion are determined within the employing organizations, not on labor markets.

In the United States, the roots of the employment problem are systemic changes in employment relations related to rationalization, marketization, and globalization. The concomitant financialization of the resource-allocation decisions of U.S. business corporations has deepened the job-destroying impacts of rationalization, marketization, and globalization, while it has ensured that these U.S. business corporations would not invest in a sufficient quantity of the new high-value-added employment opportunities required for masses of Americans to maintain high living standards in the new global economy. Nor would senior corporate executives, eager to avoid corporate taxes to inflate profits and personal taxes to inflate their bank accounts, demand that the government help to do so. On the contrary, since the 1980s the influence of corporate money on U.S. politics has been for the sake of policies that facilitate downsize-and-distribute, not retain-and-reinvest (Ferguson, Chen, and Jorgenson 2017).

Given the dramatic changes in technology, markets, and competitors that have occurred in the world economy since the 1970s, it would be foolish to think that the secure and well-paid employment opportunities available to members of the U.S. labor force in the three decades or so after World War II could have been sustained without substantial changes in educational attainment and employment relations. Nevertheless, the disappearance of previously existing middle-class jobs does not explain why, in a world of technological change, U.S. business corporations have failed to use their substantial profits to invest in new rounds of innovation that can create the quantity of new high-value-added jobs that a prosperous economy requires.

In short, the fundamental problem for creating middle-class employment opportunities is the obsessive focus of the top executives of U.S. corporations on their companies' stock prices. While the old structures of secure and well-paid employment were being undermined by rationalization, marketization, and globalization, U.S. business corporations became afflicted with financialization. The prime manifestations of financialization have been, and remain, the distribution of corporate cash to shareholders through stock repurchases, often in addition to generous cash dividends and, incentivizing these distributions, the stock-based explosion of the remuneration of top corporate executives. And, especially since the early 2000s, corporate raiders known a "hedge-fund activists," with their multibillion-dollar "war chests," have joined in and accelerated this feeding frenzy (Lazonick, Hopkins, and Jacobson 2016a; Lazonick and Shin 2017).

The U.S. corporate economy has entered an era of predatory value extraction (Lazonick and Shin 2017). With its academic justification of shareholder-value ideology, agency theory, as an application of the neoclassical theory of the market economy, has both advocated and helped to implement the downsize-and-distribute governance regime (Lazonick 2017b). Reversing the regime of downsize-and-distribute and returning the U.S. economy to a regime of retain-and-reinvest means confronting the modes of corporate financialization and incentives of corporate executives to engage in them while limiting the value-extracting power of corporate raiders who vastly enrich themselves at the expense of the eroding and would-be American middle class.

WHAT'S THE "NEW NORMAL"?

Servaas Storm's analysis of the "new normal" that is resulting in a vanishing middle class makes no mention of the financialization of the business corporation. Storm (2017: 169–210) states that "'good jobs' (often in factories and including pension benefits and health care coverage), ones that could be turned into a career, were destroyed and replaced by insecure, often temporary on-call, freelance and precarious jobs—euphemistically called 'alternative work arrangements' or the 'gig economy.'" But why did U.S. business corporations once provide these good jobs, and why, with U.S. real GDP per capita about double now compared with four decades ago, have these corporations been unwilling or unable to sustain good jobs? Citing his important 2012 book *Macroeconomics Beyond the NAIRU* (Storm and Naastepad 2012), Storm (2017: 169–210) states that "the secular stagnation of U.S. economic growth and the vanishing of the American middle class have common roots—in the deliberate creation after 1980, through economic policies, of a structurally low-wage-growth economy that not only polarized jobs, incomes and wealth, but also slowed down capital deepening, the division of labor, and labor-saving technical progress in the dynamic segment of the economy." I contend that, by advocating and legitimizing the shift from retain-and-reinvest to downsize-and-distribute, neoclassical agency theory with its shareholder-value ideology had a major role to play in this "deliberate creation" of economic policies that have resulted in the vanishing middle class.

Storm's research makes an important contribution to analyzing the sources of slowing productivity growth by disaggregating the U.S economy into industrial sectors. He calculates that slow productivity growth from 1995 to 2008 was largely the result of the crowding of the downwardly mobile U.S. workforce into low-productivity service industries related to fast food and mass retailing, while technologically dynamic sectors were absorbing a declining proportion of the labor force. This sectoral change in employment of the U.S. labor force is consistent with the arguments that I have made. Why did the U.S. government permit this downward mobility to take place, virtually unchecked, over the past four decades? Complementing the research of (Ferguson, Chen, and Jorgenson 2017) on the political influence of money, my research on the financialization of the business corporation follows the money to the workplaces where, every day, tens of millions of people create value in their attempts to earn a living while the financialized regime of corporate governance enables a small number of powerful predators to extract that value for themselves.

This perspective of predatory value extraction as the prime cause of unstable employment, inequitable income, and slowing productivity raises questions concerning Storm's argument (as indicated in the subtitle of his paper) that it is demand-side deficiencies that are the prime causes of slow productivity growth and the vanishing middle class. He correctly associates the downward pressure on the wages of blue-collar workers with the decline of industrial unionism, but that is a supply-side, not a demand-side, problem, which is direct result of what I have called rationalization, exacerbated by marketization, globalization, and financialization. Obviously, if wages were higher, there would be more demand in the economy. The current problem in the U.S. economy is not, however, a paucity of jobs but rather, as Storm recognizes, a plethora of poorly paid jobs. Is the crowding of the U.S. labor force into these low-productivity, low-wage jobs the result of inadequate demand? At certain points in the paper, Storm implies that a secular decline in business investment adversely affects productivity growth, but from the perspective of the financialized corporation that too is a supply-side problem. For the sake of maximizing shareholder value, those who control corporate resource allocation decide not to invest in the firm's productive capabilities.

Storm states (2017: 169–210): "My 'demand-side' diagnosis of America's current plight is fundamentally at odds with dominant 'supply-side' narratives on secular stagnation in the macroeconomics literature." He goes on to say: "Importantly, in such supply-side narratives, rising inequality, growing polarization and the vanishing middle class play no role whatsoever as drivers of slow potential growth. They simply drop out of the story." The problem with the neoclassical narrative that Storm rightly rejects is not, however, that it is "supply-side" but rather that it is burdened by the neoclassical nonsense known as "perfect competition" that the unproductive firm is the foundation of the most efficient economy. It is this supply-side absurdity, which "well-trained" PhD economists, be they liberal or conservative, teach millions of students around the world year after year, that has set the intellectual stage for agency theory with its destructive ideology that, for the sake of economic efficiency, companies should be run to "maximize shareholder value" (Lazonick 2016b, 2017a, 2017c). Rejection of the neoclassical supply-side explanation does not mean that in an economy dominated by large-scale business corporations the acceleration of income inequality and the disappearance of middle-class employment are not supply-side problems.

In my view, one cannot understand macroeconomic performance if one lacks a theory of the social conditions that enable what I call "the innovative enterprise" to create the foundations for stable and equitable economic growth. I contend that the primary explanation for employment instability, income inequity, and slowing productivity in the United States is that, in the name of maximizing shareholder value, predatory value extractors, including senior corporate executives, hedge-fund managers, and Wall Street bankers, have been permitted to enrich themselves through the supply-side implementation of a downsize-and-distribute corporate governance regime. To reverse the relation between a slowing productivity growth and the vanishing middle class that Storm so adroitly pinpoints, we need government policies that support a retain-and-reinvest corporate resource-allocation regime. As summed up in the headline of one of my newspaper op-eds: "Ban the Stock Buyback Binge, Bring Back the Middle Class" (Lazonick 2015a).

REFERENCES

Acemoglu, D. 2002. "Technical Change, Inequality, and the Labor Market." *Journal of Economic Literature* 40, no. 1: 7–72.

Autor, D. H., L. F. Katz, and M. S. Kearney. 2006. "The Polarization of the U.S. Labor Market." *American Economic Review* 96, no. 2: 189–94.

Board of Governors of the Federal Reserve System. 2017. "Federal Reserve Statistical Release Z.1, Financial Accounts of the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomic Accounts." September 21. https://www.federalreserve.gov/releases/z1/current/z1.pdf.

Brynjolfsson, E., and A. McAfee. 2014. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W. W. Norton.

Chandler, A. D., Jr. 1977. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, MA: Harvard University Press.

Ferguson, T., J. Chen, and P. Jorgenson. 2017, "Fifty Shades of Green: High Finance, Political Money, and the U.S. Congress." Roosevelt Institute Report. http://rooseveltinstitute.org/fifty-shades-green/.

Goldin, C., and L. Katz. 2010. *The Race between Education and Technology*. Cambridge, MA: Harvard University Press.

Hopkins, M., and W. Lazonick. 2016. "The Mismeasure of Mammon: The Uses and Abuses of Executive Pay Data." Institute for New Economic Thinking Working Paper No. 49. October 12. https://www.ineteconomics.org/research/research-papers/the-mismeasure-of-mammon-uses-and-abuses-of-executive-pay-data.

Lazonick, W. 1990. *Competitive Advantage on the Shop Floor*. Cambridge, MA: Harvard University Press.

———. 1998. "Organizational Learning and International Competition." In *Globalization, Growth, and Governance*, ed. J. Michie and J. G. Smith, 204–38. Oxford: Oxford University Press.

———, and M. O'Sullivan. 2000, "Maximizing Shareholder Value: A New Ideology for Corporate Governance." *Economy and Society* 29, no. 1: 13–35.

———. 2009. *Sustainable Prosperity in the New Economy? Business Organization and High-Tech Employment in the United States*. Kalamazoo, MI: Upjohn Institute for Employment Research.

———. 2010. "Innovative Business Models and Varieties of Capitalism: Financialization of the U.S. Corporation." *Business History Review* 84, no. 4: 675–702.

———. 2012. "Alfred Chandler's Managerial Revolution." In *Management Innovation: Essays in the Spirit of Alfred D. Chandler, Jr.*, ed. W. Lazonick and D. J. Teece, 3–29. Oxford: Oxford University Press.

———, P. Moss, H. Salzman, and Ö. Tulum. 2014. "Skill Development and Sustainable Prosperity: Collective and Cumulative Careers versus Skill-Biased Technical Change." Institute for New Economic Thinking Working Group on the Political Economy of Distribution Working Paper No. 7. https://ineteconomics.org/ideas-papers/research-papers/skill-development-and-sustainable-prosperity-cumulative-and-collective-careers-versus-skill-biased-technical-change.

———. 2014a. "Innovative Enterprise and Shareholder Value." *Law and Financial Markets Review* 8, no. 1: 52–64.

———. 2014b. "Profits without Prosperity: Stock Buybacks Manipulate the Market and Leave Most Americans Worse Off." *Harvard Business Review* September: 46–55.

———. 2015a. "Ban the Stock Buyback Binge, Bring Back the Middle Class." *Boston Globe,* June 13. https://www.bostonglobe.com/opinion/2015/06/12/ban-buybacks-bring-back-middle-class/bP4vXM83IrzrnhBKvYgVlI/story.html.

———. 2015b. "Labor in the Twenty-First Century: The Top 0.1% and the Disappearing Middle Class." In *Inequality, Uncertainty, and Opportunity: The Varied and Growing Role of Finance in Labor Relations*, ed. C. E. Weller, 143–92. Ithaca, NY: Cornell University Press.

———. 2015c. "Stock Buybacks: From Retain-and-Reinvest to Downsize-and-Distribute." Center for Effective Public Management, Brookings Institution. http://www.brookings.edu/research/papers/2015/04/17-stock-buybacks-lazonick.

———. 2016a. "How Stock Buybacks Make Americans Vulnerable to Globalization." Paper presented at the Workshop on Mega-Regionalism: New Challenges for Trade and Innovation, East-West Center, University of Hawaii, Honolulu. January 20. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2745387.

———. 2016b. "Innovative Enterprise or Sweatshop Economics? In Search of Foundations of Economic Analysis." *Challenge* 59, no. 2: 65–114.

———. 2016c. "The Value-Extracting CEO: How Executive Stock-Based Pay Undermines Investment in Productive Capabilities." Institute for New Economic Thinking Working Paper No. 54. December 4. https://www.ineteconomics.org/research/research-papers/the-value-extracting-ceo-how-executive-stock-based-pay-undermines-investment-in-productive-capabilities.

———. 2017a. "Innovative Enterprise and Sustainable Prosperity." Paper presented at the conference of the Institute for New Economic Thinking, Edinburgh, October 23.

———. 2017b. “Innovative Enterprise Solves the Agency Problem: The Theory of the Firm, Financial Flows, and Economic Performance.” Institute for New Economic Thinking Working Paper No. 62. August 28. https://www.ineteconomics.org/research/research-papers/innovative-enterprise-solves-the-agency-problem.

———. 2017c. “The Functions of the Stock Market and the Fallacies of Shareholder Value.” Institute for New Economic Thinking Working Paper No. 58. July 20. https://www.ineteconomics.org/research/research-papers/the-functions-of-the-stock-market-and-the-fallacies-of-shareholder-value.

———, and M. Hopkins. 2016. “Corporate Executives Are Making Way More Money Than Anyone Reports.” *The Atlantic,* September 15. http://www.theatlantic.com/business/archive/2016/09/executives-making-way-more-than-reported/499850/.

———, M. Hopkins, and K. Jacobson. 2016a. “What We Learn about Inequality from Carl Icahn’s $2 Billion ‘No Brainer.’” Institute for New Economic Thinking Ideas & Papers. June 6. https://ineteconomics.org/ideas-papers/blog/what-we-learn-about-inequality-from-carl-icahns-2-billion-apple-no-brainer

———, P. Moss, and J. Weitz. 2016b. “The Equal Employment Opportunity Omission,” Institute for New Economic Thinking Working Paper No. 53. December 5. https://www.ineteconomics.org/research/research-papers/the-equal-employment-opportunity-omission.

———, and J.-S. Shin. 2017. Rebalancing Value Creation and Value Extraction: How to Deactivate Hedge Funds and Recreate Sustainable Prosperity.” Report to the Korea Economic Research Institute, May 31.

Storm, S., and C. W. M. Naastepad. 2012. *Macroeconomics beyond the NAIRU*. Cambridge, MA: Harvard University Press.

Storm, S. 2017. “The New Normal: Demand, Secular Stagnation and the Vanishing Middle-Class.” *International Journal of Political Economy* 46, no. 4 (Winter): 169–210.

International Journal of Political Economy, 46: 227–232, 2017

ISSN: 0891-1916 print/1558-0970 online
DOI: 10.1080/08911916.2017.1411425

Routledge
Taylor & Francis Group

The New Normal: Demand, Secular Stagnation, and the Vanishing Middle Class: A Reply to James K. Galbraith and William Lazonick

Servaas Storm

Department of Economics, Delft University of Technology, Delft, The Netherlands

Abstract: This is a rejoinder to the challenging comments by Professors James K. Galbraith and William Lazonick on my article "The New Normal: Demand, Secular Stagnation, and the Vanishing Middle Class." Professor Galbraith favors an evolutionary approach to the issue instead of my approach but admittedly not on very convincing grounds. His characterization of actual conditions in the U.S. economy (including his view of what drove voters to Trump) appears to focus more on the current state than on underlying structural trends (which are all more negative than he seems to think). Professor Lazonick usefully extends my macroeconomic analysis by his microeconomic emphasis on the impacts of the change to predatory value extraction under a "downsize-and-distribute" corporate governance regime, legitimated in the name of shareholder-value maximization. However, even when we extend the analysis to include micro-level financialization, it is still insufficient aggregate demand that is underlying the twin diseases—secular stagnation and a growing dualization—afflicting the U.S. economy at the macro level.

Keywords Baumol model; demand; dual economy; secular stagnation; vanishing middle class

> I would rather be attacked than unnoticed. For the worst thing you can do to an author is to be silent as to his works. (Samuel Johnson)

The hope of writing an article like "The New Normal: Demand, Secular Stagnation, and the Vanishing Middle Class" is to provoke debate on what I believe are economically and politically important issues. I am therefore delighted to have been offered this opportunity for debate, and I wish to thank Professors James Galbraith and William Lazonick for taking the time to critically reflect and comment on the article. It is true that, as Professor Galbraith writes, "in the greater scheme of political struggle" we are all on the same side—favoring stable and equitable prosperity based on a more open and effective democratic process (one that is not dominated by money as ours now is). However, as is clear from the comments, we are not in agreement when it comes to the "details" of approach, analysis, diagnosis, or remedial action. The comments are wide ranging and, in responding, I have to be selective, as it is impossible to do full justice to the assortment of issues raised in a short rejoinder.

Servaas Storm is a senior lecturer at the Delft University of Technology, Delft, The Netherlands. He is a macroeconomist who works on growth, distribution, crisis, technological change, economic development, and climate change. He is one of the editors of the journal *Development and Change*.

The disagreement is strongest with Professor Galbraith who, while expressing agreement with parts of my empirical analysis, dismisses the larger narrative in no unclear prose. In Galbraith's view, the Cobb-Douglas math—already demonstrated to be pointless long ago—only detracts the attention of the reader and hence should have been neglected; my emphasis on demand shortage as the cause of secular stagnation is, in his opinion, based on 20th-century equilibrium thinking that should give way to an evolutionary approach, in which the "conceptual distinction between demand-side and supply-side effects fades away." In his view, no, the American middle class has not vanished; it is also hard to see how globalization is hurting the U.S. middle class; the newly created jobs in Professional and Business Services (PBS) are by no means "mediocre" or "bullshit" jobs—consider the many baristas serving exotic, high-end coffee; and finally, voters in the U.S. Midwest did not turn to Trump because of economic distress originating from low wages or unemployment. Professor Galbraith concludes that the article is bogged down in "the stale mathematics of a century past" applied to "slippery" concepts including the median wage and the disappearing middle—and argues that such an approach is a hindrance to the kind of communitarian (democratic?) imagination we (in his opinion) need to construct a "good society." Somewhat surprisingly, Galbraith and I appear to be in agreement about what should be done to improve the performance of the U.S. economy for ordinary citizens—even if it is not so clear what Professor Galbraith sees as the main disease(s) if it is not the kind of unbalanced growth I am writing about. What to make of this long list of disagreements? Let me structure my reply in three steps.

For a start, Professor Galbraith expresses impatience with my insistence that the secular stagnation of U.S. growth is mostly caused by a structural *demand* shortage—rather than by a supply-side crisis manifesting itself in a slowdown in innovation, stalling technical progress and entrepreneurial torpor. He seems to agree that depressed demand has not just lowered *actual* growth but the rate of *potential* growth as well—although he rejects the latter notion. Where we then disagree is on the following three points. First, Galbraith seems to think that the economics establishment accepts this demand-determined nature of the secular stagnation of (potential) growth. I could only wish this were the case: The establishment view is the exact opposite—namely, that the stagnation is due to supply-side rigidities, which stifle competition in labor and capital markets while reducing the incentives to innovate. The policy (reform) agenda for the U.S. economy, and its workers, derived from this supply-side diagnosis is the opposite of the policy implications I proposed based my demand-side diagnosis of long-run decline. Second, in just one single sentence, Galbraith reduces the rich set of policy lessons coming out of my demand-side interpretation of the secular stagnation of U.S. growth to a narrow "pump-priming" Keynesianism in the shape of sufficient (fiscal) stimulus in bad times or of a rather unimaginative strategy of reindustrialization (not of a "green" variety) as a longer-term strategy. The precise point made in the article, however, is that this would be all too easy—what is needed instead is much more complex and encompassing: a Kaldor-type incomes policy (in many ways similar to the Meidner/Rehn model); structural fiscal-cum-industrial policy (not just stimulus of aggregate demand); supportive monetary policy; a strengthening of job and income security; and a socialization of investment (by an "entrepreneurial state") in areas of education, health, transportation, and energy—to get away from the current "private affluence and public squalor."

Third, in a rather astonishing twist, Professor Galbraith denounces my approach as old-fashioned "equilibrium economics," centered on the pointless notion of *potential* growth, and outlines his favored alternative: Veblenian evolutionary thinking. I am enough of a realist and a pluralist to accept the usefulness of evolutionary thinking, but I have difficulty accepting Galbraith's claim that "the conceptual distinction between demand-side and supply-side effects fades away" once one adopts his preferred evolutionary approach. The point is not merely that my model ("bogged down in the stale mathematics") has no built-in tendency toward equilibrium (or balanced growth) but in contrast is generating—as the new normal—patterns of unbalanced growth, which drive the long-run growth of the economy (both actual and potential) down to zero. The point is not even that blurring the conceptual distinction between demand- and supply-side causes of long-run decline is simply unhelpful, as Professor Galbraith, in an earlier incarnation, would have agreed when he insisted (in his textbook coauthored with William Darity) that longstanding disputes in macroeconomics are deeply rooted in unresolvable disputes over points of theory—to which I add that the most fundamental one of which surely concerns the role of demand in growth. "In our view macroeconomics contains no […] single coherent doctrine," write Galbraith and Darity (1994: xiv). "Indeed, we believe that the attempt to patch together such a single view […] leads to more confusion than it resolves."

However, my real disagreement is that it is due to insufficient aggregate demand that the U.S. economy is on a path of unbalanced growth, which is economically and politically unsustainable. This would be clear from any sensible evolutionary analysis as well because, similarly, the evolutionary analyst cannot avoid the issue of choosing between what Lance Taylor (2004) has called "macro closures." This is illustrated by important recent work on economic growth in the "Keynes-meets-Schumpeter" literature by Dosi, Sodini, and Virgillito (2015) and Lorentz et al. (2016), both published in the *Journal of Evolutionary Economics,* which conceptualizes growth as an evolving demand-driven dynamical system—and demonstrates that the conceptual distinction between demand- and supply-driven growth does not fade away in evolutionary thinking. What is more, it is the exact argument of my article that *potential* growth is a meaningless concept (indeed, with no "independent existence") because it is determined by demand (shortage)—which in establishment economics is ruled out by assumption.

The second (big) issue is Professor Galbraith's rejection of the "nonsense" narrative on the vanishing American middle class on the grounds that the pillars of middle-class America—Social Security, Medicare, Medicaid etc.—although under stress, still exist. Galbraith sums up factors that in his opinion have strengthened, rather than weakened, the middle classes, and his list makes for rather depressing reading: Middle America benefited from cheap energy and underpriced gasoline, underpaid immigrant workers, and cheap goods imported from Asian sweatshops. This charge is rather rhetorical, however, if only because no one is claiming that middle-class America has already vanished. The point is, and this is backed up by studies by Autor and Dorn (2013), Weil (2014), Lazonick (2015), Alichi, Kantenga, and Solé (2016), Temin (2017) and many others, that the U.S. middle class is under severe stress and shrinking under the combined pressures of steady technological advance, globalization, greater inequality, and a "predator state" (Galbraith 2008). Professor Lazonick explains these pressures very well in his comment on my article. Professor Galbraith is right, of course, when he argues that the New Deal institutions have, so far, come to the rescue of misguided conservative policies and kept the U.S. economy going, notwithstanding all the deregulatory action and rhetoric, but he is wrong when he holds up Rose (2016) as proof that the U.S. middle class is doing rather OK. It is also difficult to see why he thinks the median wage and the disappearing middle class are "slippery" concepts. But a more important and rather more intriguing point is that Galbraith finds it hard to see how stagnant-sector workers would be hurt by the arrival of cheap imported consumption goods. Well, two mechanisms (both are present in my model) through which this is happening are: deindustrialization (which pushes "dynamic-sector" workers into lower-paying jobs in stagnant activities) and the loss of countervailing power of workers, due to the threat of offshoring, which turns them into workers "traumatized" by job and income insecurity and unable to claim part of the benefits from productivity growth. This is a point made by Professor Lazonick as well.

My final disagreement with Professor Galbraith concerns his claim that Trump voters are worried more about the decline of community life and the decaying public infrastructures of deindustrializing cities and areas rather than by low wages and unemployment. The difficulty of course is that the two sets of factors are closely related—that is, community life will decay once unemployment rises and wage growth stalls. Monnat and Brown (2017), for instance, find that Trump performed well in what they call (rural) "areas of despair" in which economic distress has been building for decades and in which far fewer manufacturing and natural resource industry jobs (providing reliable, livable wages and benefits) exist now than before. In this sense, Professor Galbraith is setting up a dichotomy that does not exist. Galbraith also does not mention that even when people were able to find new employment, they have experienced a sharp rise in job insecurity and economic anxiety that came along with the growth of "alternative work arrangements" and the "fissuring of the workplace" (Weil 2014). What is more, the political science evidence is speaking against his claim: Preliminary findings by Ferguson and Page (2017) indicate that in the general election, Trump voters were attracted by his economic agenda, while the Democrats lost their traditional advantage on social welfare and New Deal issues.

Let me now turn to Professor Lazonick's comment that squarely locates the source of the secular stagnation, unstable employment, growing dualism, and rising inequalities in the predatory value extraction under a "downsize-and-distribute" corporate governance regime, legitimated in the name of shareholder-value maximization. Unlike Galbraith, Lazonick does observe a shrinking U.S. middle class, as typical middle-class employment vanished (Lazonick 2015). Specifically, "careers-with-one-company" disappeared as a result of a process of corporate financialization, which prioritizes the unproductive disgorging of corporate cash profits—through massive dividend payouts and unprecedented spending on stock repurchases—over productive investment in innovation. Lazonick's argument is persuasive, both empirically and in terms of his critique of (nonsensical) neoclassical agency theory, with which I agree. However, rather than counterposing his approach to mine, I read Professor Lazonick's detailed and empirically grounded microeconomic exposition of the changing corporate governance regime as largely complementary to and consistent with my own macroeconomic analysis. It is true that finance and the financialization of the business corporation are absent from my—already lengthy—analysis, as Lazonick observes, but these dimensions can be quite straightforwardly integrated into my narrative. More specifically, in my model, the financialization of corporations would manifest itself in (a) a structural decline in autonomous investment demand growth (which is also declining because of the rise in—extreme—inequality), and (b) depressed real wage growth. Both factors lower output, productivity, and employment growth in the dynamic sector, and former core-sector workers will be pushed into stagnant-sector employment. Operationalized this way, financialization at the micro level reinforces the tendencies toward aggregate stagnation, which are already working at a macroeconomic level—and to a very significant degree. However, while for me the principal driver of the new normal of "unbalanced growth" is the deliberate creation of structurally low-wage-growth economy that also slowed productivity growth by means of macroeconomic NAIRU policies (see Storm and Naastepad 2012), Professor Lazonick centers his analysis on the microeconomic financialization of the business corporation. I interpret this more as reflecting a difference in perspective than as of real disagreement.

That does not mean that there is no difference of views, however. For Lazonick, the causes of the secular stagnation of the U.S. economy lie firmly on the supply side, *viz,* in the change toward predatory value extraction in corporate governance and in the decline of industrial unionism. He does not see a demand-deficiency problem and calls the argument "curious." What I perhaps did not make clear enough, however, is that it has been supply-side reforms, often operating at the microeconomic level, which have led to a shortage of demand at the macro level. NAIRU economics legitimized not just fiscal austerity but, more importantly, the deregulation of labor markets, the fissuring of the workplace, and the lowering of wage growth (Storm and Naastepad 2012). All this depressed aggregate demand, which in turn reduced profit rates, slowed down capital deepening, limited the division of labor, and slackened labor-saving technical progress (as my article explains). The "downsize-and-distribute" shift in corporate governance strengthened, and was itself reinforced by, these tendencies. It could well be argued that the financialization of the firm has itself been a direct consequence of the aggregate demand shortfall caused by the decline in real wage growth and the crumbling of the middle class (see Storm 2018). That is, as NAIRU policies from the early 1980s onward put the real economy on a slow-moving turtle, activist shareholders began to press for new ways to churn out the corporate cash—insisting on higher dividend payouts and a stock buyback binge. The "rational" response by each corporation was to rationalize, marketize, and globalize, as Professor Lazonick well explains, but such microeconomic "rationality" just fortified and amplified the aggregate demand shortage—further slowing down the turtle and prompting additional shareholders' pressure. This negative feedback loop cannot be broken at the micro level (of the business corporation) but needs macro-level reforms along the lines outlined in the concluding part of my article.

Wrapping up, let me state that what motivated me to write the article was an attempt to understand the structural economic origins of the "groundswell of popular discontent" that propelled Donald Trump into the White House. These structural causes, I believe, must lie in the secular stagnation of U.S. growth and the fact that the United States is becoming a dual economy. My analysis is an attempt to unify these different aspects into one consistent whole. However, far more important than any of my answers is the recognition that we have a huge problem. "Ill fares the land, to hastening ill a prey, where wealth accumulates and men decay," wrote Oliver Goldsmith in 1770—in a truly uncanny parallel with the contemporary political-economic situation. I am very grateful to both commentators for not being silent on the biggest of political-economy challenges of our time.

REFERENCES

Alichi, A., K. Kantenga, and J. Solé. 2016. "Income Polarization in the United States." IMF Working Paper WP/16/121. Washington, DC: IMF.

Autor, D. H., and D. Dorn. 2013. "The Growth of Low-Skill Service Jobs and the Polarization of the U.S. Labor Market." *American Economic Review* 103 (5):1553–1597. doi:10.1257/aer.103.5.1553.

Dosi, G., M. Sodini, and M. Virgillito. 2015. "Profit-Driven and Demand-Driven Investment Growth and Fluctuations in Different Accumulation Regimes." *Journal of Evolutionary Economics* 25 (4):707–728. doi:10.1007/s00191-015-0406-8.

Ferguson, T., and B. Page. 2017. "The hinge of fate? Economic and social populism in the 2016 Presidential elections. A preliminary analysis." Paper Presented at the Institute for New Economic Thinking Conference, Edinburgh, October 2017. Available at: https://www.ineteconomics.org/research/research-papers/the-hinge-of-fate-economic-and-social-populism-in-the-2016-presidential-election-a-preliminary-exploration

Galbraith, J. K. 2008. *The Predator State. How Conservatives Abandoned the Free Market and Why Liberals Should Too*. New York: The Free Press.

Galbraith, J. K., and W. Darity Jr. 1994. *Macroeconomics*. Boston: Houghton Mifflin.

Lazonick, W. 2015. "Labor in the Twenty-First Century: The Top 0.1% and the Disappearing Middle Class." In *Inequality, Uncertainty, and Opportunity: The Varied and Growing Role of Finance in Labor Relations,* edited by C. E. Weller, 143–192. Ithaca, NY: Cornell University Press.

Lorentz, A., T. Ciarli, M. Savano, and M. Valente. 2016. "The Effect of Demand-Driven Structural Transformations on Growth and Technological Change." *Journal of Evolutionary Economics* 26 (1):219–246. doi:10.1007/s00191-015-0409-5.

Monnat, S. M., and D. L. Brown. 2017. "More than a Revolt: Landscapes of Despair and the 2016 Presidential Election." *Journal of Rural Studies* 55 (October):227–236.

Rose, S. A. 2016. *The Growing Size and Incomes of the Upper Middle Class*. Washington: Urban Institute, Income and Benefits Policy Center (June).

Storm, S. 2018. "Financialisation and Economic Development: A Debate on the Social Efficiency of Finance." *Development and Change* 49 (2), forthcoming.

Storm, S., and C. W. M. Naastepad. 2012. *Macroeconomics beyond the NAIRU*. Cambridge, Mass: Harvard University Press.

Taylor, L. 2004. *Reconstructing Macroeconomics. Structuralist Proposals and Critiques of the Mainstream*. Cambridge, Mass: Harvard University Press.

Temin, P. 2017. *The Vanishing Middle Class. Prejudice and Power in a Dual Economy*. Cambridge, Mass: The MIT Press.

Weil, D. 2014. *The Fissured Workplace: Why Work Became So Bad for So Many and What Can Be Done to Improve It*. Cambridge, Mass.: Harvard University Press.