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The Brookings Panel's Contributions to Research on Labor Markets

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The Brookings Panel on Economic Activity, and its journal, the *Brookings Papers*, has played a key role in the evolution of scientific understanding of the US labor market over the past 50 years. As in other branches of macroeconomics and related specialties, the Panel has developed a unique position in the research process and in the dissemination of research findings at the intersection of labor economics and macroeconomics. Major new ideas and theoretical constructs have informed the Panel's research and papers, always accompanied by careful use of the relevant data. Although the Panel has remained faithful to its founding goal of sponsoring research and publishing papers that informed current policy debates, the Panel has also established a leading position in basic research on labor-market issues. It has been my privilege to be involved in the Panel's activities as an occasional author, frequent discussant, and inveterate formulator of off-the-wall remarks from the floor, ever since the price of a room at the Dupont Plaza hotel was $14.

My remarks come in two parts. First, the labor-market topic that has

received the most attention from the Brookings Panel is unemployment. This preoccupation is not surprising. Unemployment is a key indicator of the state of the aggregate economy. Monetary policy and national fiscal policy aim to stabilize the unemployment rate at a low level, possibly as low as 3.5 percent, the rate prevailing before the roof fell in. Unemployment receives as much attention from macroeconomists as from labor economists. Modeling of unemployment advanced enormously over the past 50 years, and the advances were the subject of numerous well-known and heavily cited Brookings papers.

Second, Brookings papers on labor-market topics apart from unemployment has also had high impact. I will note the contributions of some specific papers in four areas:

- Labor dynamics across the states of the US
- Effects of rising immigration and international trade on wages
- The decline in labor's share of national income
- Rising volatility of individual earnings over time

1 Unemployment

Figure 1 shows the unemployment rate over the period that it has been measured scientifically and consistently in a survey of a large number of US households. Unemployment is the quintessential cyclical measure—there is no need for gray bars in the figure to identify recessions. Unemployment has no trend. It began around 3 percent and stood in Febrary 2020 near the same level. In the 1970s and the 1980s, unemployment was generally higher. In particular, unemployment declined to 5 or 6 percent at the peaks, compared to 3 or 4 percent in the earlier and later decades.

The traditional macroeconomic view of unemployment was simply the difference between labor supply and labor demand. At the personal level,

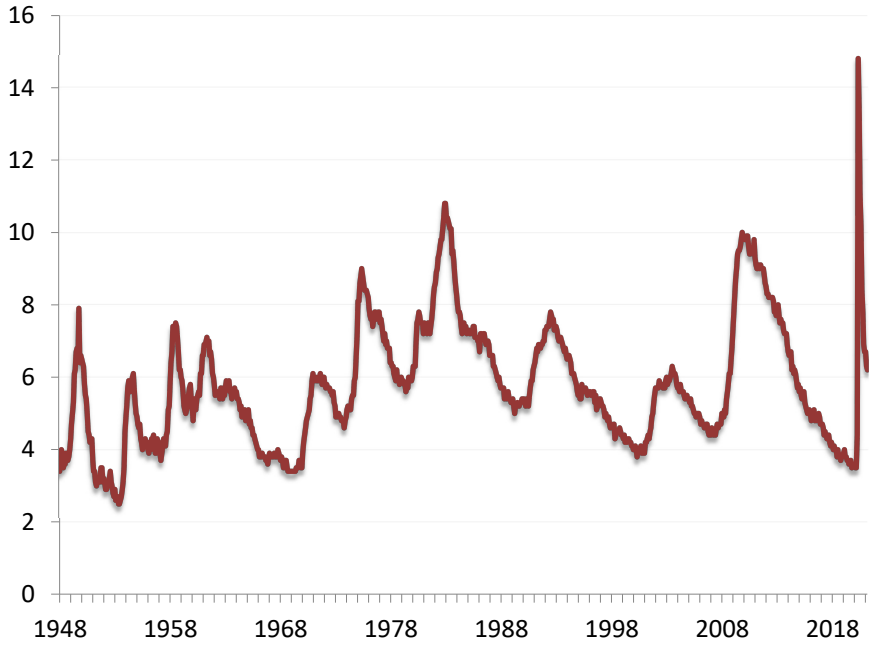

Figure 1: US Unemployment Rate Starting in 1948

being unemployed was a state that a few percent of workers occupied in normal times but double as many in recession and way more in the pandemic. In 1970, coincidentally the year of the BPEA's founding, a book appeared that came to be known as the "Phelps volume" (Phelps, ed (1970)). Its editor had spotted a new development in economic theory promising an alternative to Walrasian competitive equilibrium and to the idea that disequilibrium could be modeled as the difference between Walrasian supply and demand. In the concluding chapter in the volume, Phelps, along with Sidney Winter, wrote:

> A landing on the non-Walrasian continent has been made. Whatever further exploration may reveal, it has been a mind-expanding trip. We need never go back to $\dot{p} = \alpha(D - S)$ and $q = \min(D - S)$ (page 337).

I was a fellow traveler of the authors of the volume but not an author myself, and I was the (highly sympathetic) reviewer of the volume for the *Journal of Economic Literature*, Hall (1972).

Phelps and Winter proved right on the first point—the landing on that continent has been as successful as the British settlement of North America. However, they were wrong on the second. The branch of macro that deals with the output gap and the Phillips curve—Europe, to continue the continental analogy—remains equally successful, though outside the scope of my remarks.

The Third Way that germinated in the Phelps volume started from the proposition that unemployment was a purposeful activity of people who desired to work and were in the process of searching for work. To explain the continuing presence of unemployment, the new model invoked a steady flow of job-losers and job-leavers. Unemployment represented the stochastic equilibrium of inflows of workers to the pool of job-seekers and outflows from the pool.

The Third Way grew in influence to the point of a Nobel prize in 2010, awarded to Peter Diamond, Dale Mortensen (author of a chapter in the Phelps volume), and Christopher Pissarides. Many established macroeconomists in 1970 gave it a chilly reception, arguing that search theory was blaming the victim by making job search somehow voluntary. That condemnation has gradually declined. Most macroeconomists today view unemployment as the result of rational conduct of job-seekers in the face of labor-market frictions that impede the job-finding process.

We now call the Third Way the DMP model. Perhaps the single most important contribution of the DMP model to economic theory is to make rigorous theoretical sense out of the concept of labor-market tightness. The concept was obviously important in practice but it had no previous counterpart in theory. Sometimes, notably in recent years, the market is tight. Job-seekers find jobs quickly and employers have to wait to find qualified applicants for jobs. In other times, such as 2010, the reverse holds—jobs are hard to find and vacancies are easy to fill. The DMP model defines tightness as the ratio of vacancies to unemployment.

The DMP model has two components. The first, search and matching, describes the frictional job-finding process. Its centerpiece is the matching function. In a given labor market, the volume of job-seekers and the volume of job-openings are factors of production that combine, as in a production function, to generate a flow of newly filled jobs. The matching function determines two key flow rates as functions of tightness, the job-finding rate for job-seekers (the ratio of jobs filled to the number of job-seekers) and the job-filling rate for employers (the ratio of jobs filled to the number of vacancies). The matching function also lies behind the Beveridge curve, which traces out the variations in tightness in the unemployment-vacancy space—vacancies are high when unemployment is low in a tight market and unemployment is high and vacancies low in a slack market.

The second component of the DMP model involves wage determination.

The incentive to create a job is provided by the *job value*, which is the present value of the difference between a worker's contribution to revenue and the worker's wage over the duration of the new job. In a frictional labor market, where employers exert effort to get in touch with prospective workers, the incentive will be present in equilibrium—wages will be below productivity. A key assumption of the DMP model is that employers maintain vacancies at the level where the incremental vacancy has zero net contribution to profit.

The two components of the DMP model connect because the zero-profit condition determines tightness, tightness determines the job-finding rate, and the job-finding rate determines the path of unemployment. From an initial point after an adverse shock that has caused a jump in unemployment, but with normal conditions gradually raising tightness and thus the job-finding rate during the recovery, applying that rate to higher unemployment causes the excess unemployment to disappear over time, thanks to the rising flow of workers into jobs.

What kind of a shock would cause an increase in unemployment in a recession? Only a decline in the job value. In the original developments of the DMP model, that decline took the form of a drop in productivity. Whereas traditional thinking involved a drop in *aggregate demand*, in the DMP model, the source had to be something more specific. Though productivity is an obvious source as a matter of theory, measured productivity fluctuations do not constitute a plausible candidate in data for the past 50 years, especially recently. Recent work has turned to rises in the discount rate as a source of sharp declines in the job value.

Many Brookings papers dealt with the issues of unemployment and the DMP model. The first issue was the new view of unemployment as a frictional process that involved more than a simple gap. My paper, Hall (1970), appeared in the first year of the panel's existence and the year of the publication of the Phelps volume. My Brookings paper was the first of quite a few in the BPEA to study flows into and out of unemployment for various

demographic groups. It concluded,

> Unemployment is high at full employment both because (1) normal unemployment remains high—the natural flow of workers through the labor market is high; and (2) there is an additional component of abnormal unemployment—members of some groups in the labor force do not follow definite careers but change frequently and erratically from one job to another, experiencing unemployment with most changes.

Perry (1972) was the next in the line of Brookings papers that studied labor-market flows in the Current Population Survey. Perry extended the investigation into what the literature now calls the "three-state" model, adding consideration of time spent out of the labor force to the story. Charles Holt's discussion nicely summarized its conclusion, "...he shows clearly and dramatically the dynamic character of most unemployment. For most workers, unemployment is a state through which many pass, rather than...a condition that constitutes a chronic problem for a fixed group of workers" (page 282). Holt's commentary also included a Cobb-Douglas matching function in exactly the same functional form and notation that has been used in hundreds of search-and-matching papers in subsequent decades (page 286).

Next in order in this line of Brookings papers is Marston (1976). This paper continued the development of the three-state dynamic model. It introduced the study of what has come to be called the "ins and outs" of unemployment—rates of inflow to unemployment from job loss and rates of outflow from job-finding. It also documented that the inflow also included entry to unemployment of people previously out of the labor force and exits from unemployment to out of the labor force.

Clark and Summers (1979) detected a conclusion that economists were drawing from the findings of the studies of flows into and out of unemployment. The conclusion was that unemployment arose from short spells of

job-seeking among a broad swath of the labor force, rather than a concentration of extensive unemployment among a small fraction of the population with extensive unemployment. Clark and Summers showed that this conclusion was incorrect, even though most spells of unemployment are short, most unemployment occurs among people suffering repeated long spells of unemployment.

Summers (1986) tackled the explanation of the bulge of unemployment that is so apparent in Figure 1 after 1970. The expansion of the 1960s drove the rate down to 3.4 percent. The first expansion of the 1970s got to 4.6 percent and the second expansion to only 5.6 percent. Summers was writing partway through the expansion following the deep recession of the early 1980s, which had propelled the rate to its all-time high of 10.8 percent. He recognized that part of the rise occurred because of demographic shifts toward groups with higher normal unemployment, but he concluded that there was more to the story: "...increases in unemployment are a serious problem because they are concentrated among mature men, job losers, and the long-term unemployed" (page 340). The expansion underway when Summers was writing got unemployment down to 5.2 percent, the strong expansion of the 1990s achieved 3.8 percent, the weaker expansion of the 2000s reached 4.4 percent, and the vigorous expansion of the 2010s got back to 3.5 percent, or, who knows, to an even lower figure. So the changes that Summers noted were generally reversed. At least some of his observations—such as the importance of job losers and the elevation of long-term unemployment—were the lingering result of the bad recession 4 years earlier. Similar issues came up during the earlier years of the current expansion.

Abraham (1987) followed Summers's paper by a year and considers the same apparent systematic rise in unemployment from 1970 to the mid-1980s. She studied the issue from the perspective of the Beveridge curve, which required her to deal with the absence of direct measures of vacancies in the US. In 1987, this meant validating a measure based on the volume of help-wanted

advertising. She diagnosed an outward shift of the Beveridge curve, which accounts for higher average unemployment. Later research has confirmed the continuation of that shift, but also found it to be offset by a downward trend in the flow into unemployment, which is consistent with the restoration of earlier average levels of unemployment in the 1990s through the present. During her long term as Commissioner of the Bureau of Labor Statistics, starting in 1993, she launched the Job Openings and Labor Turnover Survey (JOLTS) which has provided reliable, economy-wide data on vacancies since late 2000.

Blanchard and Diamond (1989) investigated the labor-market turnover process in the framework of the Beveridge curve. A year earlier, Chris Pissarides had published a related paper that laid out what became the theory of labor-market tightness that became the search-and-matching component of the DMP model, in Mortensen and Pissarides (1994). Blanchard and Diamond were mainly concerned with separating the effects of shocks that moved the market along its Beveridge curve and shocks that moved the Beveridge curve. They observe, "Aggregate activity shocks drive unemployment and vacancies in opposite directions, causing counterclockwise movements around a downward-sloping locus in the Beveridge space. Reallocation shocks lead instead to movements along an upward-sloping locus, to parallel movements in unemployment and vacancies." Their aggregate-activity shocks operate through changes in market tightness in the subsequent literature, though they do not invoke that concept. They found, in concert with a voluminous later literature, that the disproportional source of the volatility of unemployment and vacancies was the aggregate-activity shock.

Blanchard and Diamond (1990) followed up the authors' year-earlier paper by studying two bodies of data in parallel, firm-level employment changes and household-level flows among employment, unemployment, and non-market pursuits. They showed that recessions, which involve contractions in total employment, achieve most of the decline from major cuts in some firms,

rather than from diminished flows of hires. In most theoretical treatments of hiring and firing decisions, the tendency for new hires to have lower surpluses than incumbents should make the hiring rate more sensitive to adverse events than the firing rate. With respect to the cyclical flows at the household level, they find important changes over the cycle in flows into and out of the labor market.

Krueger, Cramer and Cho (2014) made a key contribution to research in labor-market dynamics by their critique of the prevailing practice of studying monthly transition rates as descriptions of behavior. They found that the probability that a job-seeker finds a job in the coming month is not really indicative of job-finding success—job-finding rates seriously overstate the probability of finding a stable job. In data from the Current Population Survey, it is a good idea to look at what happens over the entire 16-month span that the survey covers for each respondent. The paper applies this insight to develop a picture of the experiences of job-seekers who have been looking for many months. In the aftermath of serious recessions, notably the one that started in late 2007, substantial populations of these long-term unemployed accumulate.

Davis and von Wachter (2011) studied administrative data on workers who lost jobs where they had substantial tenure. They followed job-losers for many years as they recovered from the adverse effects of job loss. This line of research is the ultimate application of the idea of tracking individuals in panel data rather than trying to infer experiences by estimating a model based on one or a few transitions. Earlier research of this type used panel surveys, but administrative data are more plentiful and accurate. The results show that displacement from a job that has proven durable results, typically, in a year or two of depressed employment—presumably a number of spells of unemployment or time out of the labor force—followed by lower wage rates for many years, often until retirement. Models in the DMP framework are only beginning to absorb the teachings of this literature, where the paper by

Davis and von Wachter is prominent.

Gordon (1973) quantified the gains and losses from reductions in unemployment. He provided a comprehensive analysis of the differences in the economy between 4 and 5 percent unemployment. From the starting point that a small perturbation from an optimum in a friction-free economy has no effect on welfare, Gordon studied, in incredible detail, what we would now call wedges. The obvious wedge is the income tax, but the paper considers many others. His conclusion was that wedges are sufficiently big that the naive analysis based on Okun's Law—real GDP would rise by 2.7 percent of real GDP for each decline in unemployment of one percentage point—is only exaggerated by 0.4 percentage points. If this number is correct, analyses in the more recent literature on the burden of wedges have seriously underestimated that burden.

Okun (1973) on the benefits of a low-unemployment economy appeared in the same issue of the *Brookings Papers* as Gordon's paper quantifying those benefits. He noted that "... unemployment [is] merely the tip of the iceberg that forms in a cold economy" (page 208). In addition to adjustments that are also present in Gordon's paper, Okun focused on employee upgrading.

Katz and Krueger (1999) is a retrospective discussion of the tight labor market of the 1990s, written at a time when labor-market conditions were similar to those of 2019. The paper's main contact with the ideas considered here is its documentation of an inward shift of the Beveridge curve, just before the onset of reliable data on vacancies from JOLTS. The authors were too cautious to quantify the shift in terms of the shift in unemployment conditional on the vacancy rate, but their Figure 5 easily supports a 2 percentage point drop in tightness-adjusted unemployment. They reported a 0.4 percentage-point decline attributable to the aging of the labor force and a 0.2 decline from rising incarceration.

Aaronson, Fallick, Figura, Pingle and Wascher (2006) is a comprehensive review of data on labor-force participation. The participation rate is

only barely cyclical—when employment plunges in a recession, unemployment rises by close to the same amount. The DMP canon, Mortensen and Pissarides (1994), studied a population who all participated. The transition to the 3-activity DMP-style model in recent years has made the labor-force participation rate an important topic in that body of thought. This paper did not enter the territory of modeling labor supply, but it provided an informative account of the participation rate over time, broken down into detailed demographic groups. Prior to 2000, overall participation rose because rising rates among women offset gently declining rates among men. But the rise among women ended in that year, and overall participation has been declining, with only a small reversal recently. The equations fitted by Aaronson and co-authors permitted calculations of the likely path of participation in future years. The paper forecasted a decline of 3.6 percentage points from 2005 to 2015. The forecasts of the Congressional Budget Office, the Bureau of Labor Statistics, and the Social Security Administration were for declines of 1.5 percentage points or less (Table 6).

Shortly after the financial crisis in 2008, an unusual decline in participation occurred. Many observers thought that the extremely slack labor market in 2009 and 2010 had changed the earlier rule that the increase in unemployment roughly equaled the decline in employment. There was concern that the rise in unemployment therefore understated the effect of the recession in the labor market. Aaronson, Cajner, Fallick, Galbis-Reig, Smith and Wascher (2014) tackled this issue. Its conclusion was that the decline in participation was not only foreseeable, but had been foreseen in Aaronson et al. (2006). Figure 1 of the paper shows that the actual participation rate through 2014 tracked the forecast from the 2006 paper remarkably well. Because the 2006 paper made no adjustment for the unforeseeable tragedy of the financial crisis, the conclusion appears to be that even a large and persistent increase in unemployment has little effect on participation.

Abraham, Haltiwanger and Rendell (2020) studied the seemingly super-

tight labor market of 2019 in a framework that recognized heterogeneity among the unemployed and other job-seekers. After adjustment for differences in base-year job-finding rates, the paper shows that some anomalies that appeared in the data, notably in a large favorable shift of the Beveridge curve, were artifacts that disappeared in the adjusted data. The paper concludes that the apparatus underlying the DMP model performs reliably even at unemployment rates under 4 percent once composition effects are taken into account.

Last but conspicuously not least was the explosion of unemployment in April 2020, from the pandemic. As the figure shows, unemployment reached much higher levels than in any other time in the figure. The Brookings Panel swung into immediate action, scheduling a special meeting on the macroeconomics of the pandemic in June 2020. Two papers focused on the labor market. Cajner, Crane, Decker, Grigsby, Hamins-Puertolas, Hurst, Kurz and Yildirmaz (2020) documented the huge 21 percent decline in employment that occurred in late March and April, as the economy shut down. It also showed that recalls of workers on temporary layoff occurred in May, anticipating the sudden importance of the layoff-recall process that dominated labor-market dynamics in later months of the pandemic. Bartik, Bertrand, Ling, Rothstein and Unrath (2020) studied a variety of high-frequency data sources to demonstrate the concentration of reduced hours of work in the retail and hospitality sectors. The authors found that the vast majority of laid-off workers expected to be recalled, and some had already been recalled by June.

At the regular September 2020 meeting of the panel, Gallant, Kroft, Lange and Notowidigdo (2020) presented a detailed structural model of the pandemic labor market. The paper emphasizes the importance of treating unemployed workers who expect to be recalled differently from those who have definitively lost jobs. For the first time, people holding jobs but not working or being paid by their employers were an important fraction of the

unemployed. The monthly probability of recall and resumption of work is much higher for those on layoff than for those suffering job loss. The figure shows that unemployment fell much faster from its peak in April 2020 than it ever had in the aftermath of earlier spikes in unemployment, a strong confirmation of the altered structure of the labor market diagnosed in the paper.

2 Other Labor Topics

The *Brookings Papers* have published dozens of papers in the macro-labor subject area that are not focused specifically on unemployment. I will mention five that stand out in my memory.

Blanchard and Katz (1992) studied the state-level dynamics of employment and unemployment, reaching two famous conclusions: (1) "...a state typically returns to normal after an adverse shock not because employment picks up, but because workers leave the state" and (2) "...in response to an adverse shock in employment, nominal wages decline strongly before returning to normal after approximately 10 years. This decline triggers some recovery in employment, but the response of job creation to wage declines is not sufficient to fully offset the initial shock" (page 3).

Borjas, Freeman and Katz (1997) asked the perennial questions: Are low-skill domestic workers harmed by immigration? And, are workers harmed by international trade? The answers were yes and no. The effects of immigration operate across all sectors; many low-skill immigrants work in construction and services. The effects are large and geographically concentrated. Immigration is concentrated in high-skill individuals and in those lacking even high-school level education. The effects of trade operate only through tradable goods and are small.

Two important papers have tackled the issue of the decline of labor's share of national income in recent decades. First was Elsby, Hobijn and

Sahin (2013). Their paper disposed of two explanations, finding little role for capital-labor substitution and for the decline of unionization. It pointed out that the treatment of the self-employed overstates the decline and finds that the decline is mostly confined to manufacturing. In that connection, it pointed out that the off-shoring of the labor-intensive components of supply chains is a growing source of decline in the measured labor share.

Rognlie (2015) built on the earlier work of Elsby and co-authors, taking particular aim at the suggestion of Piketty and others that capital accumulation was the driver of the decline in the labor share. He observed that the comprehensive measure of the share used in that literature includes housing, which accounts for a large part of the measured decline. He favored studying the corporate sector, in part to avoid the problem of measuring the share for the self-employed. He argues for using capital income net of depreciation in calculating the labor share

Gottschalk and Moffitt (1994) considered the body of research as of the mid-1990s that demonstrated high and risking dispersion of labor earnings across individual workers. That research had interpreted the dispersion as reflecting inequality. This paper made the key point that measured cross-sectional dispersion combined inequality in the permanent component of wages with the variability of earnings over time at the individual level. In the subsequent 25 years, the availability of large panels of administrative data on earnings, and the computing power to study that data, has allowed researchers to follow up the authors' insight and made big advances in our understanding of individual earnings dispersion. For example, Fatih Guvenen has access to every single W-2 form filed with the IRS from 1948 to the present.

3 Concluding Remarks

The story of the founding of the Brookings Panel is almost lost in the mists of time. Prior to the Panel's founding in 1970, the Brookings Institution's main involvement in macroeconomics was the sponsorship and funding of the Brookings Model of the US Economy. Though that model captured the attention of macroeconomists in its time, the late 1960s, today it is forgotten and its vestiges remain only in the form of models used in central banks. A joke circulated in those days that the main purpose of big models was to see that all accounting identities were satisfied in the model's output.

The Panel's founders, Art Okun and George Perry, believed that macro would advance as a science if we attacked the subject in chunks, issue by issue and event by event. The founding motto was "NO big models" and none ever appeared in the pages of the *Papers*. I hardly need to say how much I agreed with the motto, then and now.

The Brookings Panel was a complete innovation. Nothing like it existed, in macro or in any other branch of economics. I congratulate the designers for a remarkable and durable achievement.

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Disclosure: Among the papers cited here, I served as a discussant for Perry (1972), Clark and Summers (1979), Blanchard and Diamond (1989), Blanchard and Diamond (1990), Blanchard and Katz (1992), Davis and von Wachter (2011), and Aaronson et al. (2014).