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Flow Origins of Labor Force Participation Fluctuations

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The onset and aftermath of the Great Recession have been accompanied by an historic cyclical decline in the labor force participation rate, which subsequently has remained persistently low. We provide a new perspective on these recent movements in labor force participation using a generalization of the flow-decompositions of labor market stocks in Elsby, Hobijn and Şahin (2013) and Elsby, Hobijn and Şahin (2015). The results paint a picture of contrasts between the proximate flow origins of cyclical and secular variation in the participation rate.

At cyclical frequencies, the results challenge a natural hypothesis that the procyclicality of the participation rate has its origins in discouraged workers leaving the labor force during recessions, and (re-)entering the labor force as labor market conditions improve. Labor force exits are in fact strongly *procyclical*, systematically working against declines in the participation rate in recessions, while labor force entry is comparatively *acyclical*. Our flow decomposition instead suggests that the majority of the procyclicality of the labor force participation rate is accounted for by *churn* within the labor force—that is, flows between unemployment and employment.

At secular frequencies, however, the processes of labor force entry and exit loom much larger. Among men, two-thirds of the substantial trend decline in male labor force participation can be traced to rising rates of labor force exit, with the remaining third accounted for by trend declines in labor force entry. Among women, while declines in rates of labor force exit dominate the trend rise in female participation during the 1990s, the trend decline since the Great Recession has instead been dominated by declines in female labor force entry.

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I. A new flow decomposition

Define the vector of labor force states,

$$\boldsymbol{s}_t = \begin{bmatrix} e_t & u_t \end{bmatrix}' \tag{1}$$

where e_t is the employment to population ratio (EPOP) and u_t is the unemployment to population ratio (UPOP). The remaining fraction of the population, $n_t = 1 - e_t - u_t$, is thus not in the labor force, and the labor force participation rate (LFPR) is given by $lfpr_t = e_t + u_t$.

Let $p_{i,j,t}$ denote the probability of transitioning from state i to state j. Then we can write $\Delta \boldsymbol{s}_t = \boldsymbol{d}_t + \boldsymbol{P}_t \boldsymbol{s}_{t-1}$, where $\boldsymbol{d}_t = \begin{bmatrix} p_{n,e,t} & p_{n,u,t} \end{bmatrix}'$ and the four elements of $\boldsymbol{P}_t$ are given by

$$\boldsymbol{P}[1,1]_t = -p_{e,n} - p_{e,u} - p_{n,e} \tag{2}$$

$$\boldsymbol{P}[1,2]_t = p_{u,e} - p_{n,e} \tag{3}$$

$$\boldsymbol{P}[2,1]_t = p_{e,u} - p_{n,u} \tag{4}$$

$$\boldsymbol{P}[2,2]_t = -p_{u,e} - p_{u,n} - p_{n,u} \tag{5}$$

For fixed transition probabilities, the state vector $\boldsymbol{s}_t$ converges to the flow-steady-state

$$\bar{\boldsymbol{s}}_t = -\boldsymbol{P}_t^{-1} \boldsymbol{d}_t \tag{6}$$

In the (online) appendix we show how these equations can be used to obtain an additive decomposition of changes in $\boldsymbol{s}_t$ into parts associated with transitional dynamics, and changes in transition probabilities,

$$\begin{aligned} \Delta \boldsymbol{s}_t &= \boldsymbol{P}_t \left(\boldsymbol{I} + \boldsymbol{P}_{t-1}\right) \boldsymbol{P}_{t-1}^{-1} \Delta \boldsymbol{s}_{t-1} \\ &+ \boldsymbol{P}_t \left(\boldsymbol{P}_t + \boldsymbol{P}_{t-1}\right)^{-1} \times \\ &\left[2\Delta \boldsymbol{d}_t + \Delta \boldsymbol{P}_t \left(\bar{\boldsymbol{s}}_t + \bar{\boldsymbol{s}}_{t-1}\right)\right] \end{aligned} \tag{7}$$

Because $lfpr_t = \boldsymbol{\iota}' \boldsymbol{s}_t$, where $\boldsymbol{\iota}$ is a column vector of ones, this in turn can be used to derive an additive decomposition of the labor force participation rate.

A key implication of this decomposition is that movements in the LFPR are determined both by the flow transition probabilities in $\boldsymbol{P}_t$, and the distribution of workers in $\boldsymbol{s}_t$, across *all three* labor force states, not just those between in and out of the labor force. Thus, for example, past and current flows between u_t and e_t play a role in shaping labor force participation dynamics. Our decomposition provides a separate additive measure of each of these forces.

II. Data

Figure 1a plots the recent evolution of the LFPR and its subcomponents, the EPOP e_t and UPOP u_t ratios. These monthly time series are the elements of the state vector $\boldsymbol{s}_t$. To measure the monthly flow transition probabilities in $\boldsymbol{P}_t$, we use the *gross flows* data from the Current Population Survey (CPS), which provide measures of worker flows obtained by exploiting a rotating-panel element in the CPS sample design. We use the data provided by the Bureau of Labor Statistics Bureau of

Labor Statistics (BLS) from January 1990 onwards. Table 1 reports the sample averages of worker flow rates between the three labor force states. In what follows, we use these data to implement our decomposition of the LFPR, both for the overall economy, as well as by gender.[1]

III. Flow origins of labor force participation: Cycle and trend

We implement the decomposition in (7) for the period from January 1990 to November 2018. To illustrate our results clearly, we distil gross worker flows into three categories: those capturing labor force exit ($p_{e,n}$ and $p_{u,n}$), labor force entry ($p_{n,e}$ and $p_{n,u}$) and within-labor-force churn ($p_{u,e}$ and $p_{e,u}$). We calculate the contribution of each of these three groups of flows to the percentage point difference between the labor force participation rate in each month and that at its peak before the Great Recession in January 2007. Figure 1b plots the resulting time series from this decomposition for the total labor force. Figures 1c and 1d provide analogous results for men and women.

A. *Cyclical forces: The importance of churn*

We begin by focusing on cyclical patterns. As we have noted, a natural hypothesis for the recessionary declines in participation in Figure 1b is that they are associated with discouraged workers leaving the labor force. This account receives little empirical support. Under this hypothesis, changes in labor force exit rates push down the participation rate during recessions, and prop it up during expansions—the contribution of exits to changes in $lfpr$ would thus be *procyclical*. In stark contrast, Figure 1b reveals that the contribution of labor force exit rates to $lfpr$ is strongly *countercylical*.

The reason for this that labor force exit rates—from both unemployment and employment—in fact fall notably during recessions. Prior work has suggested this pattern can be traced in part to cyclical shifts in labor force attachment. For example, Elsby, Hobijn and Şahin (2015) find that the majority of recessionary declines in labor force exit rates from unemployment can be explained by compositional shifts in the pool of unemployed workers toward individuals who are relatively more attached to the labor force.

Turning now to the role of labor force entry, it is again natural to hypothesize that rises in labor force participation during recoveries are associated with sidelined workers (re-)entering the labor force. This account also receives little empirical support. Under this hypothesis, changes in labor force entry rates would act as a drag on the $lfpr$ during recessions, but would shore it up during expansions. By contrast, the results in Figure 1b reveal that the contribution of labor force entry is comparatively

[1] To ensure the transition probabilities are consistent with the evolution of labor force stocks, we apply a "margin error" adjustment using the method described in Elsby, Hobijn and Şahin (2015).

acyclical.

A consequence of the preceding results is that the final group of flows—namely those associated with within-labor-force churn between unemployment and employment—accounts for the majority of the mild procyclicality of $lfpr$ movements. Figure 1b confirms this expectation. The intuition for this is subtle: Churn does not affect the $lfpr$ contemporaneously; rather, it changes the degree of attachment to the labor force in subsequent periods. A well-known feature of within-labor-force flows is that they contribute to increased unemployment during recessions. Since the unemployed are much more likely to exit the labor force—see Table 1—such rises in the unemployment rate during recessions place downward pressure on labor force participation. Symmetrically, within-labor-force flows contribute to declines in the unemployment rate during expansions, thereby raising labor force participation.

A central theme in the cyclical behavior of labor force flows, then, is the crucial role played by shifts in labor force attachment.

B. Secular forces: Gender, exit and entry

An important message of Figure 1a is that the LFPR also displays considerable secular variation. Viewed from an aggregate perspective, such variation appears to have become prominent in the wake of the Great Recession.

This aggregate picture veils more nuanced trends by gender, however. Among men, Figure 1c underscores the considerable trend decline in the male labor force participation rate of approximately 7 percentage points over the last three decades. By contrast, participation rates among women in Figure 1d have exhibited a hump-shaped path, rising by around 2.5 percentage points in the 1990s, stabilizing in the early 2000s, and then falling by around 2.5 percentage points since the Great Recession. Thus, offsetting trends by gender underlie the seeming trend stability of the aggregate LFPR prior to the Great Recession. And mutually reinforcing downward trends by gender underlie the decline of the aggregate LFPR since the Great Recession.

It therefore makes sense to study secular trends in participation separately by gender. Interestingly, and in contrast to the preceding picture for cyclical variation, a common theme for both men and women is that the roles of labor force exit and entry loom much larger for secular variation.

For males, Figure 1c reveals that the majority of the decline in male participation rates can be traced to the exit margin. Rises in rates of labor force exit among men can account for around 4 percentage points of the 7-percentage-point decline since 1990. Strikingly, most of the residual decline in male participation rates can in turn be accounted for by declines in labor force entry that have emerged over a relatively short period since 2007.

For females, Figure 1d reveals that almost all of the rise in female participation rates in the 1990s can be accounted for by falling rates of labor force exit. But, the narrative for the recent decline in female participation bears a striking resemblance to that for the recent behavior of men, both in terms of its origin—declines in labor force entry—and in terms of its severity—accumulating relatively sharply over the last decade.

IV. Outlook for labor force participation

Taken together, our decomposition shows that business cycle fluctuations mostly affect the participation rate through the exit and churn components while labor force entry is driving the longer-run trend in participation. Thus, our decomposition provides a natural connection between unemployment and labor force participation rate fluctuations and is helpful in assessing the outlook for the labor force participation rate.

In particular, our decomposition shows that the within-labor market churn that captures the effect of improvements in labor market conditions is very close to zero both for men and women. Given that the unemployment rate is at 3.7% in November 2018, when we write this paper, there is little room for improvement in the churn component. Similarly the cyclical adjustment in the exit component—which proxies for labor force attachment—has been mostly completed with this component being flat recently. As a result we expect future movements in the labor force participation rate to be mostly shaped by by the slow-moving downward trend in the contribution of labor force entry.

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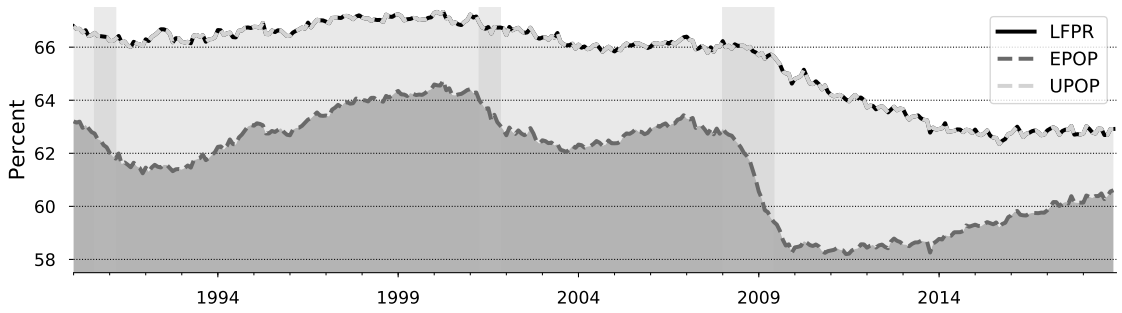
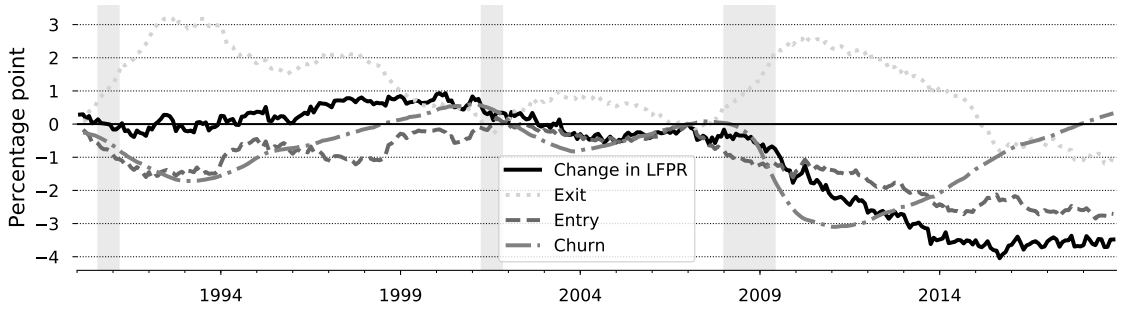
	from E	from U	from N	stock
		Total		
E	95.85	25.08	4.68	61.61
U	1.39	52.76	2.68	3.87
N	2.76	22.16	92.64	34.51
		Men		
E	96.23	26.34	5.35	68.52
U	1.54	54.76	3.26	4.43
N	2.23	18.91	91.38	27.05
		Women		
E	95.42	23.54	4.28	55.21
U	1.21	50.33	2.32	3.35
N	3.37	26.13	93.41	41.44

Averages in percent from Jan 1990-Nov 2018.

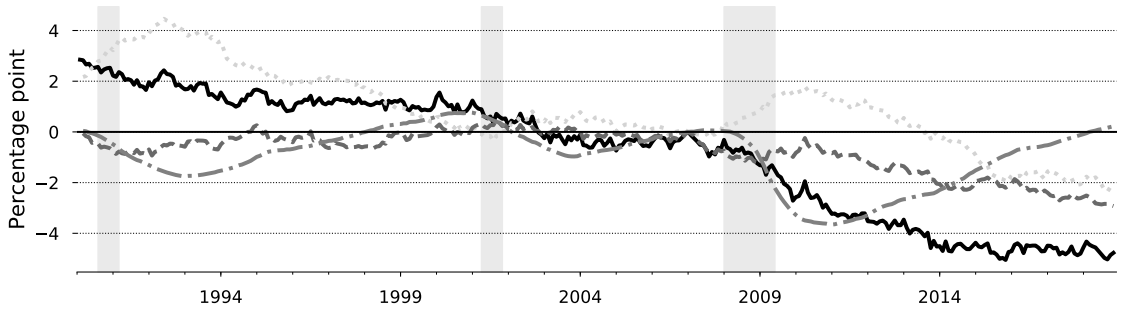
Table 1—: Average transition probabilities and stocks



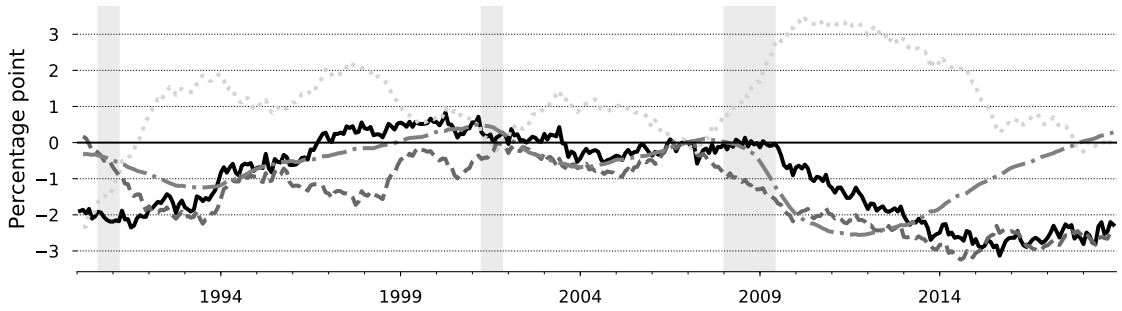
(a) LFPR and its components



(b) Flow decomposition of change in LFPR: Total



(c) Flow decomposition of change in LFPR: Men



(d) Flow decomposition of change in LFPR: Women

Figure 1. : Change in LFPR decomposed, total and by gender.

Source: BLS and author's calculations
Note: Decomposition splits up percentage point difference between LFPR in respective month and January 2007.