Online Appendix for:
Employment Adjustment and Part-time Work: Lessons from the United States and the United Kingdom

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December 2017

OA.A U.S. ORG Data on Hours

Our analysis makes use of two time series of hours per worker: one at a yearly frequency and the other at a quarterly frequency. For the U.S., after 1979 our yearly series draws on data on usual hours from the ORG files of the CPS.[1] To our knowledge, we are the first to exploit this information in order to construct long series of hours worked within full-time and part-time employment. Here, we document some measurement issues with these data and raise a note of caution for researchers interested in using the same type of information from the CPS. Those measurement issues motivate the development of our alternative series of hours per worker labeled 'quarterly data' in the paper. We also show that our results concerning Fact 1 are robust to these issues.

As explained in Section 2, the collection of data on usual hours in the CPS has changed over time. Between January 1979 and December 1993, the information was collected only for respondents in the ORG samples. However, not all *eligible* respondents have information on their usual hours, meaning that the Bureau of Labor Statistics (BLS) replaces missing information by imputted values.[2] After January 1994, the question about usual hours is administered to the full CPS sample and respondents are allowed to answer "hours vary" instead of reporting an exact number of usual hours. The BLS does not impute values for workers choosing "hours vary", so we use the imputted values calculated by the Center for Economic and Policy Research (CEPR).[3] Figure OA.1 reports the fraction of employed individuals in our data with either BLS- or CEPR-imputted values on their usual hours.[4]

[1] The yearly data analyzed in the paper start in 1969: they are based on the May extracts of the CPS from 1969 to 1978. In this discussion, we focus on the data contained in the ORG files of the CPS.

[2] Details about edits and imputation methods are available in Chapter 9-1 of U.S. Bureau of the Census [2006].

[3] The CEPR procedure uses usual hours among respondents whose hours do not vary to run regressions of hours against a quartic polynomial of age, and race, marital status and education dummies. The regressions are fitted separately for full-time and part-time men and women in each calendar year. Then the predicted values are used to impute usual hours for respondents who report that their hours are variable. There is little evidence that these workers have employment patterns that differ from workers whose hours are not variable; see, e.g., Schmitt [2003].

[4] As can be seen in Figure OA.1, usual hours for roughly 5% of the ORG samples have imputted values prior to 1994. This number is consistent with the large share of respondents in the ORG files with imputted values on their weekly earnings, which averages at 14.6% between 1979 and 1993. In identifying respondents with imputted values, we paid close attention to the fact that some of the BLS-provided imputation flags are incorrect. We follow the approach laid out by Hirsch and Schumacher [2004] to identify respondents with imputted values, meaning we compare unedited and edited values available in the CPS files. We find no evidence of systematic discrepancies between the BLS imputation flags for usual hours and our own flag variable for imputted values.

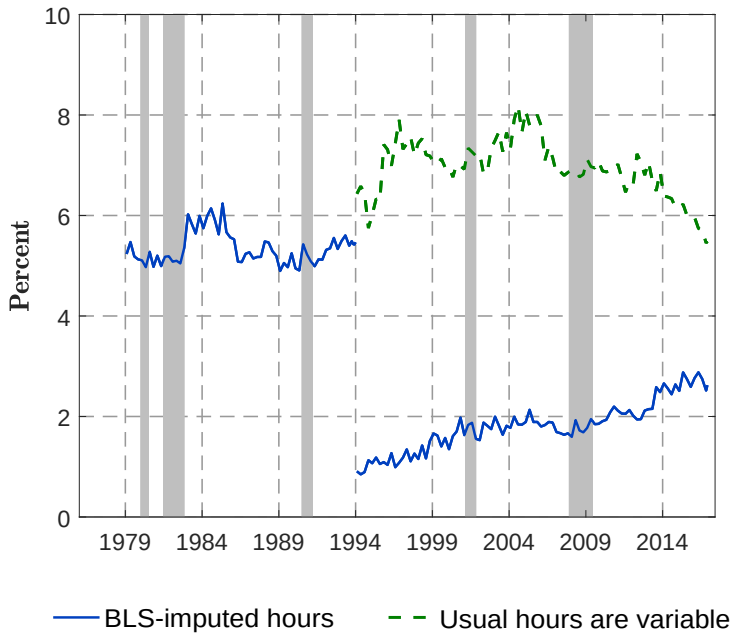

Figure OA.1: Imputed Values and Variable Usual Hours in the CPS, 1979–2017

Notes: Current Population Survey, quarterly average of monthly data, all working-age individuals in private-sector paid employment. Solid line: Share of eligible respondents with BLS-imputed values on usual hours (the discontinuity marks the 1994 redesign of the CPS). Dashed line: Share of CPS respondents who report that their usual hours are variable (data available after 1994). Gray-shaded areas indicate NBER recession periods.

Table OA.1: Variance Contribution of the U.S. Part-time Employment Share

A. All working-age individuals

	ORG CPS						Basic CPS
	Yearly frequency			Quarterly frequency			
	All. in	All. out	Diff.	All. in	All. out	Diff.	
All	40.5	41.2	**0.66**	32.7	25.4	**-7.31**	39.2
Before 1994	35.3	35.5	**0.24**	35.7	29.1	**-6.65**	44.0
After 1994	46.9	47.8	**0.97**	31.8	24.2	**-7.62**	35.4

B. Prime-age individuals

	ORG CPS						Basic CPS
	Yearly frequency			Quarterly frequency			
	All. in	All. out	Diff.	All. in	All. out	Diff.	
All	32.5	32.1	**-0.39**	23.1	30.1	**7.04**	37.4
Before 1994	26.9	24.6	**-2.34**	36.2	40.1	**3.88**	43.3
After 1994	38.7	40.5	**1.78**	16.3	26.6	**10.3**	32.3

Notes: Current Population Survey, 1979–2017 ORG series, 1976–2017 Basic CPS series, individuals in private-sector paid employment. The table reports the variance contribution β (in percent) of changes in the part-time employment share to changes in actual hours per worker. 'All in' ('All out') denotes the ORG series with (without) imputted values on usual hours. The numbers in boldface give the difference between the figures with and without imputted values.

Table OA.1 compares the beta coefficients (see equation (5)) calculated at difference time frequencies using the time series based on the ORG files. To facilitate comparisons, the last column of the table shows the beta coefficients based on the series labeled 'quarterly data' in the paper. The numbers in boldface report the differences between the coefficients computed with and without imputted values on usual hours. The first remark is that imputation seems to affect the short-run behavior of the series of hours per worker. In the ORG series at a quarterly frequency, there is a difference by at least 7 pp. between the variance contributions with and without imputted values. This effect is unstable across samples: imputted values increase the beta coefficients in the working-age sample (Panel A.), but reduce the coefficients in the sample of prime-age workers (Panel B.). Also, in this sample the magnitude of the impact of imputation appears to differ across the 1994 re-design of the CPS.[5] Second and importantly, Table OA.1 shows that aggregating the data to a yearly frequency drastically reduces the effects of imputation. Indeed, in the series labeled 'yearly data', there is a less than 1 pp. difference between the beta coefficients calculated with and without imputted values.

In Table OA.2, we compare the dynamics of U.S. hours per worker during recessions. The series labeled 'ORG CPS, Allocators in' are the quarterly series based on the ORG files that we use to construct our May-ORG 'yearly data'. 'ORG CPS, Allocators out' denotes the same time series without imputted values from any source on usual hours. Finally, the series in the last set of columns are the ones labeled 'quarterly data' in the paper.

The main message conveyed by the gamma coefficients in Table OA.2 is that the results are qualitatively and quantitatively similar across the different sets of series. During the Twin Recessions of the 1980s and the 2001 recession, the ORG-based coefficients are very close to those computed using the other series. The results are somewhat different for the Great Recession: the ORG data suggest a less pronounced (but still large) role for the part-time employment share during the downturn. These data also indicate fewer differences across the working-age and prime-age samples relative to the baseline results. We note, however, that the 1990-1991 recession seems somewhat different in the ORG-based time series. The peak-to-trough coefficient is significantly off in the working-age sample (29.1% with allocated values, 42.7% without allocated values), whereas in the baseline results these coefficients are at similar values across all recessions except the 2001 recession (more than 70% in the sample of working-age individuals and almost 50% in the other sample). One reason to question the reliability of the ORG-based coefficients is that the 1990-1991 recession appears spuriously 'mild' in these data. As the table shows, compared to the baseline series, the corresponding delta coefficients computed using the 'ORG CPS, Allocators in' indicate a peak-to-trough reduction in hours per worker which is 39.5% lower for working-age individuals and 69.6% lower among prime-age workers. Last, Table OA.2 shows that, during downturns, the alternative time series give a similar picture of the role of part-time employment. This leads us to conclude that the discrepancies in beta coefficients shown in Table OA.1 reflect mostly a differential behavior of the time series in tranquil times.

OA.B Other Robustness Checks

OA.B.1 Defining Part-time Employment using Actual Hours

The quarterly data of U.S. hours per worker conditional on employment status relies on a definition of part-time employment based on actual hours (see Appendix A of the paper). We check the robustness

[5] The discrepancy might also reflect a shift in the seasonal component of our CPS series of hours worked in part-time employment. This shift is illustrated in Figure OA.6 in Subsection OA.D.1.

Table OA.2: Change in U.S. Hours per Worker during Recessions

A. All working-age individuals

		ORG CPS						Basic CPS		
		Allocators in			Allocators out					
		$\Delta h_{s,t}$	$\frac{\Delta h_{s,t}}{h_s}$ (%)	$\gamma_{s,t}$ (%)	$\Delta h_{s,t}$	$\frac{\Delta h_{s,t}}{h_s}$ (%)	$\gamma_{s,t}$ (%)	$\Delta h_{s,t}$	$\frac{\Delta h_{s,t}}{h_s}$ (%)	$\gamma_{s,t}$ (%)
$s = 1980Q1$	$t = 1982Q4$	-0.92	-2.40	63.6	-0.93	-2.41	62.3	-0.92	-2.45	75.7
	$t = 1983Q4$	-0.45	-1.18	109.4	-0.45	-1.18	102.1	-0.39	-1.03	90.1
$s = 1990Q3$	$t = 1991Q1$	-0.26	-0.66	29.1	-0.27	-0.69	42.7	-0.43	-1.06	67.2
	$t = 1992Q1$	-0.05	-0.13	171.7	-0.09	-0.22	198.9	-0.08	-0.20	180.6
$s = 2001Q1$	$t = 2001Q4$	-0.43	-1.08	13.1	-0.40	-1.01	3.42	-0.49	-1.28	11.6
	$t = 2002Q4$	-0.41	-1.04	42.6	-0.40	-1.02	36.9	-0.56	-1.45	44.0
$s = 2007Q4$	$t = 2009Q2$	-1.15	-2.90	46.4	-1.09	-2.73	47.3	-1.16	-3.01	71.7
	$t = 2010Q2$	-0.86	-2.17	57.8	-0.80	-2.02	61.1	-0.64	-1.65	84.3

B. Prime-age individuals

		ORG CPS						Basic CPS		
		Allocators in			Allocators out					
		$\Delta h_{s,t}$	$\frac{\Delta h_{s,t}}{h_s}$ (%)	$\gamma_{s,t}$ (%)	$\Delta h_{s,t}$	$\frac{\Delta h_{s,t}}{h_s}$ (%)	$\gamma_{s,t}$ (%)	$\Delta h_{s,t}$	$\frac{\Delta h_{s,t}}{h_s}$ (%)	$\gamma_{s,t}$ (%)
$s = 1980Q1$	$t = 1982Q4$	-0.87	-2.17	50.8	-0.85	-2.12	51.0	-1.02	-2.59	47.1
	$t = 1983Q4$	-0.40	-0.99	96.0	-0.39	-0.98	96.9	-0.32	-0.82	73.5
$s = 1990Q3$	$t = 1991Q1$	-0.14	-0.33	46.0	-0.12	-0.29	58.1	-0.45	-1.12	46.1
	$t = 1992Q1$	-0.02	-0.05	303.8	-0.02	-0.04	147.6	-0.14	-0.34	103.1
$s = 2001Q1$	$t = 2001Q4$	-0.62	-1.51	19.2	-0.57	-1.39	21.7	-0.50	-1.23	9.89
	$t = 2002Q4$	-0.74	-1.80	51.7	-0.50	-1.20	39.1	-0.58	-1.43	10.0
$s = 2007Q4$	$t = 2009Q2$	-1.07	-2.59	37.2	-1.16	-2.83	41.1	-1.27	-3.17	47.9
	$t = 2010Q2$	-0.81	-1.95	47.5	-0.89	-2.17	47.2	-0.76	-1.89	43.7

Notes: Current Population Survey, individuals in private-sector paid employment. 'ORG CPS' denotes quarterly time series computed from the ORG files of the CPS. 'Allocators in' ('Allocators out') indicates that the series includes (excludes) imputted values on usual hours. 'Basic CPS' denotes the 'quarterly data' series presented in the text. $\Delta h_{s,t}$ reports the change in the levels of hours per worker between quarter s and quarter t. $\frac{\Delta h_{s,t}}{h_s}$ reports the corresponding change relative to the peak of each recession. $\gamma_{s,t}$ reports the contribution of the part-time employment share to the change $\Delta h_{s,t}$ (see text for details).

of our definition in various ways in Table OA.3. We do so using data from the CPS after January 1994, when the survey started collecting information on usual hours for all rotation groups.

Table OA.3: Defining Part-time Employment using Actual Hours in the CPS

A. Fraction (in %) classified differently in part-time employment

	(1a)		(1b)		(2a)		(2b)		(3a)		(3b)	
	$\not{P_a}, P_b$	$P_a, \not{P_b}$	$\not{P_a}, P_b$	$P_a, \not{P_b}$	$\not{P_a}, P_b$	$P_a, \not{P_b}$	$\not{P_a}, P_b$	$P_a, \not{P_b}$	$\not{P_a}, P_b$	$P_a, \not{P_b}$	$\not{P_a}, P_b$	$P_a, \not{P_b}$
All workers	1.98	5.22	1.90	4.21	2.01	4.14	1.93	3.30	1.61	4.40	1.54	3.17
Hourly workers	2.08	7.06	2.02	5.74	2.14	5.71	2.08	4.60	1.65	6.14	1.58	4.36

B. Comparison: Usual hours worked

		(1a)		(1b)		(2a)		(2b)		(3a)		(3b)	
		P	F	P	F	P	F	P	F	P	F	P	F
Mean of h_t^i	base	21.7	44.1	23.3	44.2	21.4	43.3	23.0	43.5	18.3	43.2	19.2	43.6
(in hours)	alt.	23.0	44.3	24.6	44.6	21.7	43.7	23.1	43.8	19.2	43.6	20.4	44.1

C. Comparison: Actual hours worked

		(1a)		(1b)		(2a)		(2b)		(3a)		(3b)	
		P	F	P	F	P	F	P	F	P	F	P	F
Mean of h_t^i	base	23.1	41.7	24.3	42.3	22.5	41.0	23.5	41.6	20.53	41.20	21.9	41.7
(in hours)	alt.	22.5	42.9	24.2	43.2	21.5	42.4	22.9	42.7	19.61	42.35	20.6	42.7
Variance of	base	0.332	0.136	0.482	0.135	0.401	0.138	0.485	0.135	0.449	0.147	0.612	0.147
$\Delta h_{t-1,t}^i$	alt.	0.315	0.141	0.458	0.138	0.417	0.132	0.408	0.136	0.421	0.141	0.537	0.142

Notes: Current Population Survey, 1994-2017. Sample: All working-age individuals in (1a), (2a), (3a), prime-age workers in (1b), (2b), (3b). Columns (1a) and (1b): baseline definition of part-time work, baseline sample. Columns (2a) and (2b): baseline definition of part-time work, the sample excludes multiple jobholders. Columns (3a) and (3b): part-time work defined as less than 30 weekly hours, baseline sample. 'base' refers to our baseline definition of full-time/part-time employment based on actual hours; 'alt.' refers to the alternative definition of full-time/part-time employment based on usual hours.

Analysis. To begin our investigation, we define for each individual a part-time employment status based on our definition (P_b), and an alternative part-time employment status using information on usual hours worked (P_a). In Panel A. of Table OA.3, we report the share of employed individuals who are classified as part-time workers under only one definition. For instance, 1.98% of working-age individuals fall into the part-time employment category under our definition but not under the definition based on usual hours (column 1a). This number remains roughly unchanged if we restrict the sample to prime-age individuals (column 1b), remove multiple jobholders from the sample (columns 2a and 2b), or use a threshold of 30 hours to distinguish full-time from part-time work (columns 3a and 3b). A larger but still modest fraction of individuals (5.22% in column 1a) are classified as part-time workers under the alternative definition as opposed to our definition. Overall, these numbers indicate a fair amount of consistency between the two definitions. The assessment is very similar if we focus on hourly workers, for whom we expect hours worked to be reported more accurately.[6]

Next, we analyze how the definitions underlying P_a and P_b affect the measurement of hours worked in part-time and full-time employment. We clearly do not expect misclassification in part-time employment to occur in a random way. The key question is whether the impact on the time series is sizable and sufficient to change the results based on our 'quarterly data'.

The figures reported in Panel B. of Table OA.3 indicate that *usual* hours per worker in part-time and full-time employment are very similar under the definitions considered. In fact, the main

[6]Hourly workers, or workers who are paid by the hour, can be identified using the Earner Study questions administered to the ORG samples of the CPS. Since the usual earnings of hourly workers are determined by the pay rate and usual hours worked, the latter notion is likely more meaningful than for other categories, such as salary employees.

appreciable difference is that hours per worker tend to be higher in both employment categories under the alternative definition. This suggests that our definition implies a slightly lower cutoff between part-time and full-time employment, thereby classifying part-timers with the greatest number of hours worked as full-timers. We continue our comparison by looking at *actual* hours in Panel C. of Table OA.3. We find, again, very small differences between the definitions considered in terms of hours per worker.[7] This conclusion holds true when we change our sample (columns 2a and 2b) or use a different threshold of hours to define part-time work (columns 3a and 3b). We find small differences as well for *short-run fluctuations* in actual hours worked, which is measured here by the variance of the first-difference in hours $\Delta h^i_{t-1,t}$.[8] The short-run fluctuations of hours also exhibit the same patterns under both definitions, namely more volatility in hours per worker in part-time employment.

OA.B.2 Comparison with other Data Series

As an external validity check, we compare the time series of hours per worker constructed from our data (which aggregate hours worked in full-time and part-time employment) with several other data series that have been documented in the literature.

U.S. Hours per Worker. In Figure OA.2, the solid line is our series of U.S. hours per worker shown in Figure 1 in the main text. The dashed line is the time series 'LNS12033251' provided by the Bureau of Labor Statistics (BLS). That series is also based on data from the CPS. Not surprisingly the two lines track each other closely – the difference in levels being caused by differences in sample selection. The other line shows the series of hours per worker from the study by Ohanian and Raffo [2012] (hereafter OR12). OR12 use estimates from the Current Establishment Survey (CES) on paid hours of nonsupervisory workers in the business sector. It is well known and well documented that the CES yields very different hours series compared to the CPS; see, among others, Frazis and Stewart [2010].[9] The large discrepancy between the levels of hours per worker measured by the OR12 series (which is plotted against the right axis) vs. our own series and that of the BLS is therefore in line with previous literature. Despite the difference in levels, the three time series paint a fairly similar picture of the dynamics of hours per worker (the series behave somewhat differently between the mid 1970s and the mid 1990s).

U.K. Hours per Worker. Figure OA.3 compares our series of U.K. hours per worker to a series calculated by Blundell et al. [2013] (hereafter BBL13) and to the U.K. series taken from OR12. We think this validation exercise is especially important for the U.K. because the Office of National Statistics (ONS) deems the LFS data fully reliable only from 1992 onwards.[10] The ONS advises users to carefully consider using the two datasets prior to 1979, and although the variable definitions, sample weighting, etc. became much more consistent in the annual survey available from 1984 onwards, there remain some discrepancies across periods.

[7] Notice that actual hours in full-time employment are on average lower than usual hours. A likely explanation for this is that differences between usual hours and actual hours are mainly caused by events that tend to pull individuals away from work, such as sick leaves, holidays, etc.

[8] Our conclusions are unchanged if we use the deviations of the time series from a filtered trend.

[9] Frazis and Stewart [2010] provide a careful analysis of the different factors that could drive these differences. These include: differences in coverage between the CPS and the CES, multiple jobholding, differences between hours paid and hours worked, overreporting of hours in the CPS, and differences in the reference period of the two surveys.

[10] The ONS official series based of hours per worker from the LFS start in 1992. See e.g. the series of seasonally-adjusted average actual weekly hours of work, denoted YBUV, and available at: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/labourmarketstatistics.

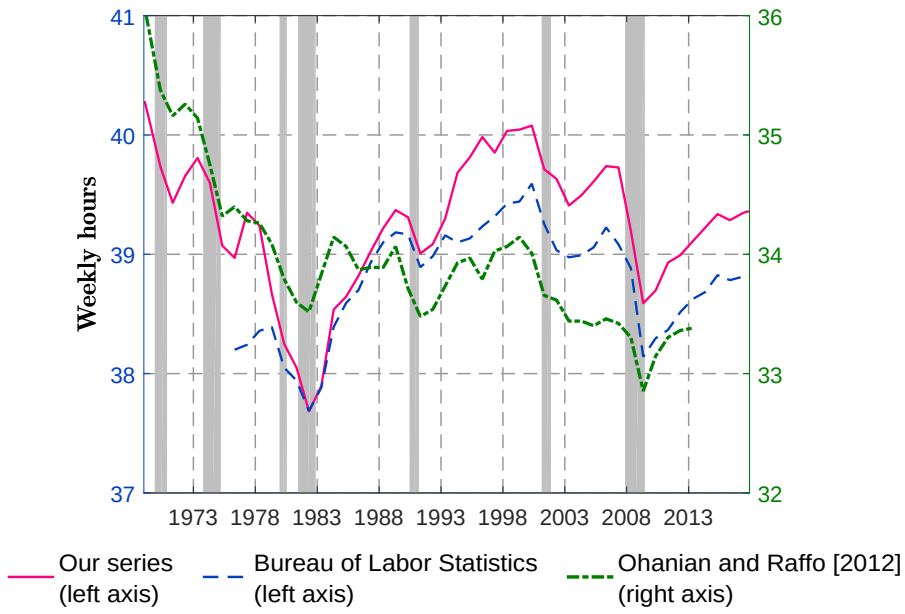

Figure OA.2: U.S. Hours per Worker, 1976–2017: Comparison with other Data Series

Notes: Solid line: Current Population Survey, yearly data, all working-age individuals in private-sector paid employment. Dashed line: LNS12033251 from the Bureau of Labor Statistics, yearly average of monthly data, individuals aged 16 and over at work in nonagricultural industries. Dashed-dotted line: yearly average of the quarterly data from Ohanian and Raffo [2012] (the series is plotted against the right axis), based on estimates from the Current Establishment Survey, paid hours of nonsupervisory workers in the business sector. Gray-shaded areas indicate NBER recession periods.

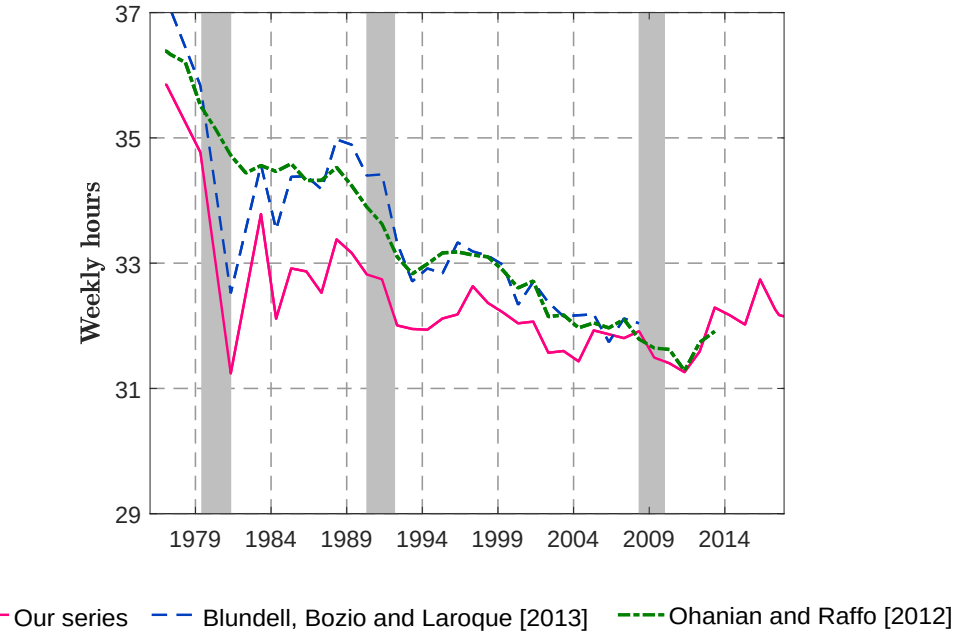

Figure OA.3: U.K. Hours per Worker, 1977–2017: Comparison with other Data Series

Notes: Solid line: Labor Force Survey, yearly data (annual data are obtained by interpolating on the biennial series from 1977 to 1983), working-age individuals in paid employment. Dashed line: data from Blundell et al. [2013] based on the Labor Force Survey, yearly data, all employed individuals aged 16 to 74. Dashed-dotted line: based on spring quarters of quarterly data from Ohanian and Raffo [2012], based on data from the data provided by the Office for National Statistics, all working-age individuals. Gray-shaded areas indicate ECRI recession periods.

Figure OA.3 shows that our time series provides an almost exact same picture of the recession of the early 1980s as the BBL13 series. The very large swing in actual hours per worker from 1977 to 1983 contrasts with the much smoother variation depicted by the OR12 series. The reason for this difference is easy to detect. Unlike BBL13, OR12 is based on two ONS data series that use establishment-level data for this earlier period, namely MGRZ (Employment, 16 and over, seasonally adjusted) and YBUS (Total Hours Actually Worked, 16 and over, seasonally adjusted). While OR12 for this period appears more credible, only the LFS data allows one to relate fluctuations in part-time employment and hours per worker. The similarity across the three time series is much greater during the 1990s recession. Finally, during the Great Recession our time series and OR12 behave very similarly. Thus, at least for the past three decades which include two large recessions, the time series that we construct lines up well with those used in OR12 and BBL13.

OA.B.3 Reasons for Involuntary Part-time Work

We investigate whether the stated reasons for involuntary part-time work provide robust information about the labor market trajectory of workers. To do so, we use the longitudinal structure of the CPS to match respondents across 4 consecutive months. We consider two types of trajectories: (i) 2 months in full-time employment (F) followed by 2 months of involuntary part-time work, and (ii) 2 months in unemployment (U) followed by 2 months of involuntary part-time work.[11] We denote by SW involuntary part-time work due to slack work conditions and by CF involuntary part-time work because the worker cannot find a full-time job. Trajectories (i) and (ii) are depicted respectively in the left part and the right part of Figure OA.4.

For spells of involuntary part-time work preceded by full-time employment, the stated reason initially in month 3 is "slack work conditions" in 73.7% of all cases. Out of this very large fraction, 87.3% keep reporting "slack work conditions" as the main stated reason in month 4. These findings dovetail well with Facts 3 and 5 documented in the paper. Conversely, spells that are preceded by unemployment often involve "cannot find a full-time job" as the main stated reason in month 3 (63.0%), which persists in month 4 in 76.8% of cases. The non-negligible share of SW that we observe among previously unemployed workers is perhaps explained by the fact that "slack work conditions" is a broader phenomenon.[12] All in all, the stated reasons "slack work conditions" and "cannot find a full-time job" appear reasonably linked to the previous status of individuals to convey robust information about their labor market trajectories.[13]

OA.C More on the Evolution of Part-time Employment in the U.K.

In Section 4 of the paper, we briefly commented on the long-run trend in the U.K. part-time employment share. We provide a longer discussion of those findings in this section. In our view, there are three potential explanations for the increase in the use of part-time employment during the Great Recession. All explanations can be understood as different causes for the increased flexibility in labor adjustments in the U.K.

[11] We look at spells in which the labor market status of the individual is the same across 2 consecutive months in order to minimize measurement error.

[12] Consider for instance a worker who is hired part time with the 'understanding' that she will be promoted to full time once demand picks up. It is conceivable that she reports "slack work" instead of "cannot find a full-time job" as her main reason for working part-time involuntarily.

[13] In addition, out of all the newly involuntary part-time workers facing "slack work conditions" in a given month, 47.6% were in full-time employment while only 10.6% were unemployed in the previous month.

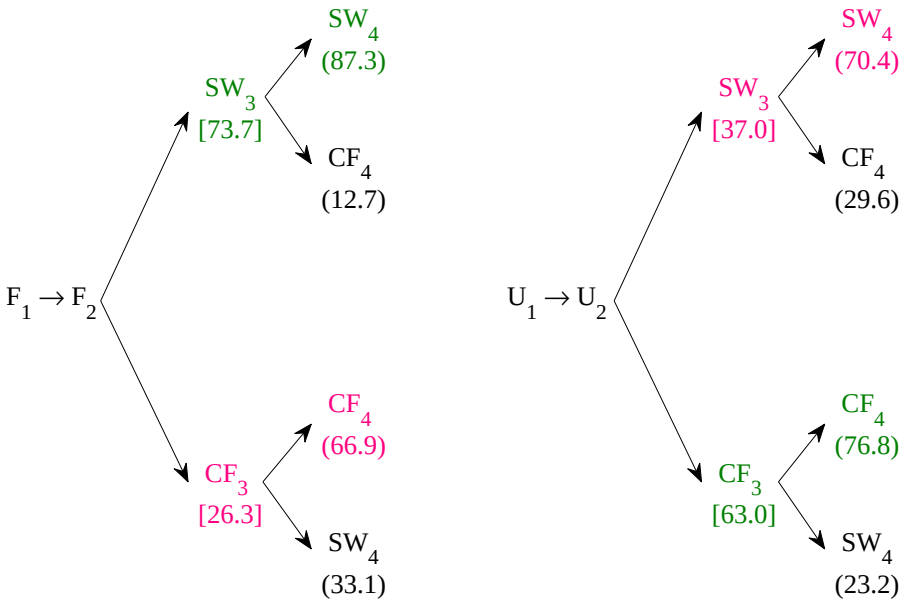

Figure OA.4: U.S. Reasons for Involuntary Part-time Work

Notes: Current Population Survey, pooled data from 1994 to 2017, all working-age individuals in private-sector paid employment. CF_t: employed part-time involuntarily because the worker cannot find a full-time job; F_t: employed full-time; SW_t: employed part-time involuntarily due to slack work conditions; U_t: unemployed. The time t subscript on these four labor market states indicates the month of interview of the respondent. The numbers in brackets are in percentage points; see the text for details.

A first hypothesis for the increased flexibility of the U.K. labor market during the Great Recession concerns reduced unionization rates. Blundell et al. [2014] document that trade-union membership among working-age individuals in the U.K. declined from 37% in the early 1980s to about 19% in 2008. If trade unions introduce constraints in changes in working hours (e.g. promote a more even distribution of adjustment on the intensive margin across its members), their decreasing presence in the U.K. labor market may be behind those changes. A perfunctory inspection of our data (not reported here) suggests that there may be some truth in this, insofar as the probability to move from full-time to part-time work among job stayers in private-sector paid employment is lower for unionized employees (both among working-age and prime-age individuals). However, unionization rates have been declining since the 1970s and are unlikely to be the only explanation for the increased response of part-time employment during the Great Recession.

A second hypothesis attributes the increased flexibility to an expansion in the labor supply of low-skilled workers due to reforms of the welfare system (namely of in-work tax credits and unemployment insurance) undertaken mainly since the late 1990s. The voluminous literature on the impact of changes to U.K. in-work benefits (see e.g. Blundell et al. [2000] and Brewer et al. [2006]) suggests a clear positive impact on labor-market participation, but finds no, or ambiguous, effects on the share of part-time employment among targeted workers. Irrespective of the effect on part-time work, this expansion in labor supply may have allowed firms greater flexibility in adjusting earnings downwards (either through reductions in hourly wages, working hours, or both) during the downturn. The greater attachment to work induced by these reforms is likely to promote workers' acceptance of a reduction in

pay due to lower working hours when the alternative is a lower income in full-time unemployment and facing lower job prospects due to the recession. However, the part-time employment share increased substantially during the Great Recession also among highly-educated, prime-age workers (both males and females). Therefore, while this hypothesis may tell part of the story, it is unlikely to be the sole driver of the increased response of part-time employment during the Great Recession in the U.K.

A final hypothesis concerns changes in the legislation that may have increased the availability of part-time work arrangements in the U.K. labor market.[14] Apart from the changes to the welfare system mentioned above, two pieces of legislation in the U.K. may have had that effect. The first concerns the introduction of equal-treatment provisions for part-time compared to full-time work (namely, working conditions and pay on a pro-rata basis), which occurred in 2000. The second change took place in 2003 (and later in 2009) and introduced a statutory right for some workers to request flexible working arrangements (including part-time) to take care of children and adult family members (see OECD [2010] for further details). We are not aware of any evaluation of the effects of these policy reforms on the availability of part-time employment. As we point out above, the evolution of part-time employment among prime-age workers does not seem consistent with a large increase in its availability/use before the Great Recession.

In sum, since the late 1990s the U.K. introduced several changes to its labor market institutions and those are likely to have increased the degree of flexibility in labor adjustment. Several papers find evidence of much greater flexibility in downward adjustment of real wages (see Blundell et al. [2014], Gregg et al. [2014] and Elsby et al. [2016]). The increased importance of part-time employment in the reduction in hours per worker during the Great Recession may be another instance of greater labor-market flexibility, but further research is needed to establish the exact sources of these changes.

OA.D Additional Facts

OA.D.1 Hours Worked in Full-time and Part-time Employment

In this subsection, we provide additional information about hours worked in full-time and part-time employment.

Time Series. We begin with the 'dynamic' information provided by the time series of hours worked conditional on employment status. Figure OA.5 shows time series of hours per worker in full-time and part-time work for the U.S. (the so-called 'quarterly data') and the U.K. In each plot the solid lines denote the series calculated for all working-age individuals and the dashed lines the series for prime-age individuals.

The plots in Figure OA.5 complement the results presented in Section 3 of the paper ("Hours per Worker and Part-time Employment"). Specifically, the time series highlight the procyclicality in hours per worker in full-time employment and the lack thereof in part-time employment. There is also substantial short-run variation in the U.S. series of hours per worker in part-time employment. By comparison with the U.S., the U.K. patterns are unstable across recessions. In the 1980s recession hours per worker dropped for both employment categories, whereas they fell by much less in the Great Recession. Despite the presence of trends in some of the time series, the differences in average hours worked across the two employment categories are sizable over the whole sample period. On

[14] We thank an anonymous referee for suggesting this hypothesis.

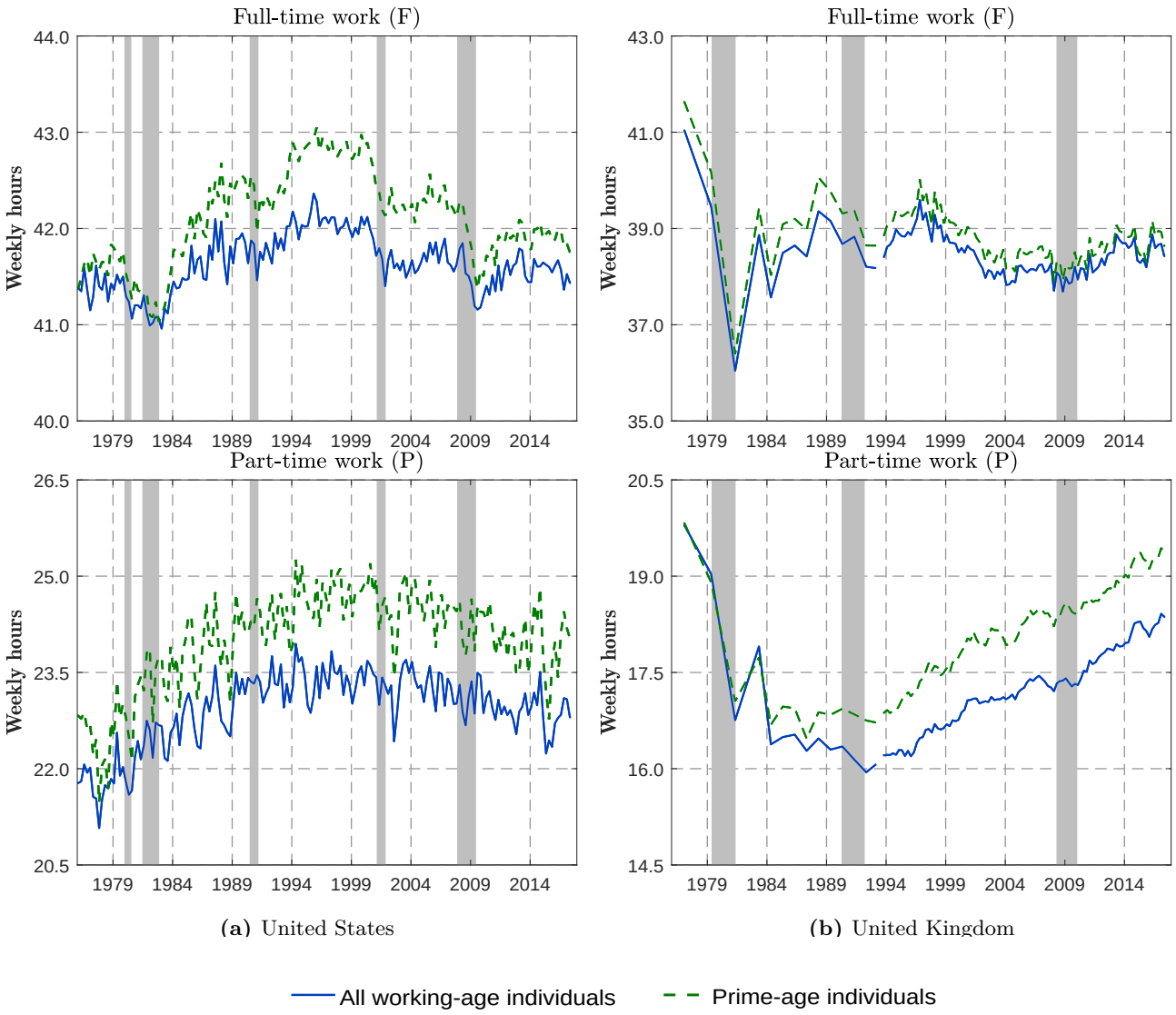

Figure OA.5: Time Series of Hours Worked in Full-time and Part-time Employment

Notes: Fig. OA.5a: Current Population Survey, quarterly data, 1976–2017. Sample: individuals in private-sector paid employment . Fig. OA.5b: Labor Force Survey, yearly data from 1977 to 1993, quarterly data from 1994 to 2017. Sample: individuals in paid employment (1977-1993) and in private-sector paid employment (1994-2017), with the yearly series adjusted to match the average of the quarterly series. The line show actual hours per worker in full-time and part-time employment. Gray-shaded areas indicate NBER and ECRI recession periods.

average, full-time employment entails a schedule of working hours that is about twice that of part-time employment.

Let us comment briefly on an alternative quarterly series of hours worked conditional on employment status for the U.S., namely that based on the ORG files. In Subsection OA.A, we noted a discrepancy around the 1994 break of the CPS in the behavior of the time series based on the ORG data. We also indicated that, in our view, hours imputations are only partially responsible for this. Another factor that seems relevant is the change in the seasonal component of the ORG-based series of hours worked in part-time employment, which is visible in Figure OA.6. In this figure, we use respondents from the ORG samples both before and after the 1994 break, so that the shift is not driven by changes in the sample size. We also find that this pattern is robust to removing allocated values from any source (BLS or CEPR). The sources of this evolution are not clear to us, but we think they caution against using the ORG-based series of hours at a high frequency (e.g. monthly or quarterly).

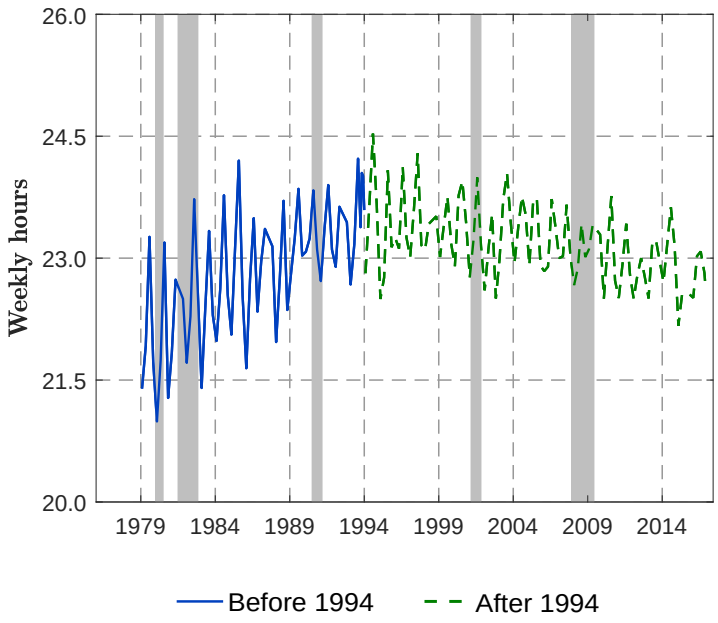

Figure OA.6: ORG Series of Hours Worked in Part-time Employment, 1979–2017

Notes: Current Population Survey, quarterly data from the ORG files, not seasonally adjusted, all working-age individuals in private-sector paid employment. Solid line: pre-1994 data. Dashed line: post-1994 data. Gray-shaded areas indicate NBER recession periods.

Histograms. In order to offer more detail on hours worked, we report 'static' information provided by the distribution of hours worked in the two employment categories. In Figure OA.7, the graphs display the distribution of both actual (solid bars) and usual hours (dashed bars) among working-age individuals.

The distributions of (actual and usual) hours worked exhibit a number of remarkable features. First, there are clear mass points in the interval between 20 and 50 hours, which is where most of the probability mass is concentrated. In full-time employment, the most common schedule seems to be 5 days of 8 hours reflected by the mass point at 40 weekly hours. In part-time employment, the mass points are observed at intervals divisible by 5, and also at 24 and 32 hours, both of which are divisible by 8. A workweek of 20 hours, for instance, could reflect 4 half working days (of 5 hours each) while a workweek of 32 hours could indicate 4 full working days (of 8 hours each). Second, as shown by the difference in scale of the vertical axis, the mass points in the U.K. data are overall lower, and hours are more evenly distributed within the 20-50 hours interval. Clearly, the main difference with the U.S. comes from the mass point at 40 weekly hours. This is consistent with the greater prevalence of the "Monday-Friday 9am–5pm" schedule in this country.

To better understand the differences between the solid and dashed bars in Figure OA.7, we study the distribution of the differences between usual and actual hours at the individual level (see the earlier version of the paper available as IZA working paper #9847, 2016). We find that between a quarter (U.S.) and a third (U.K.) of individuals report different usual and actual hours. Conditional on reporting different usual and actual hours, the resulting difference can be large: in the U.S., the difference among individuals whose usual hours are higher than their actual hours is 10.5 hours on average. Therefore, a likely scenario is that some workers who usually work 40 weekly hours report actual hours below the 35 hours threshold, but remain in the upper part of the distribution of hours worked among part-time workers. This would shift part of the probability mass at 40 weekly hours

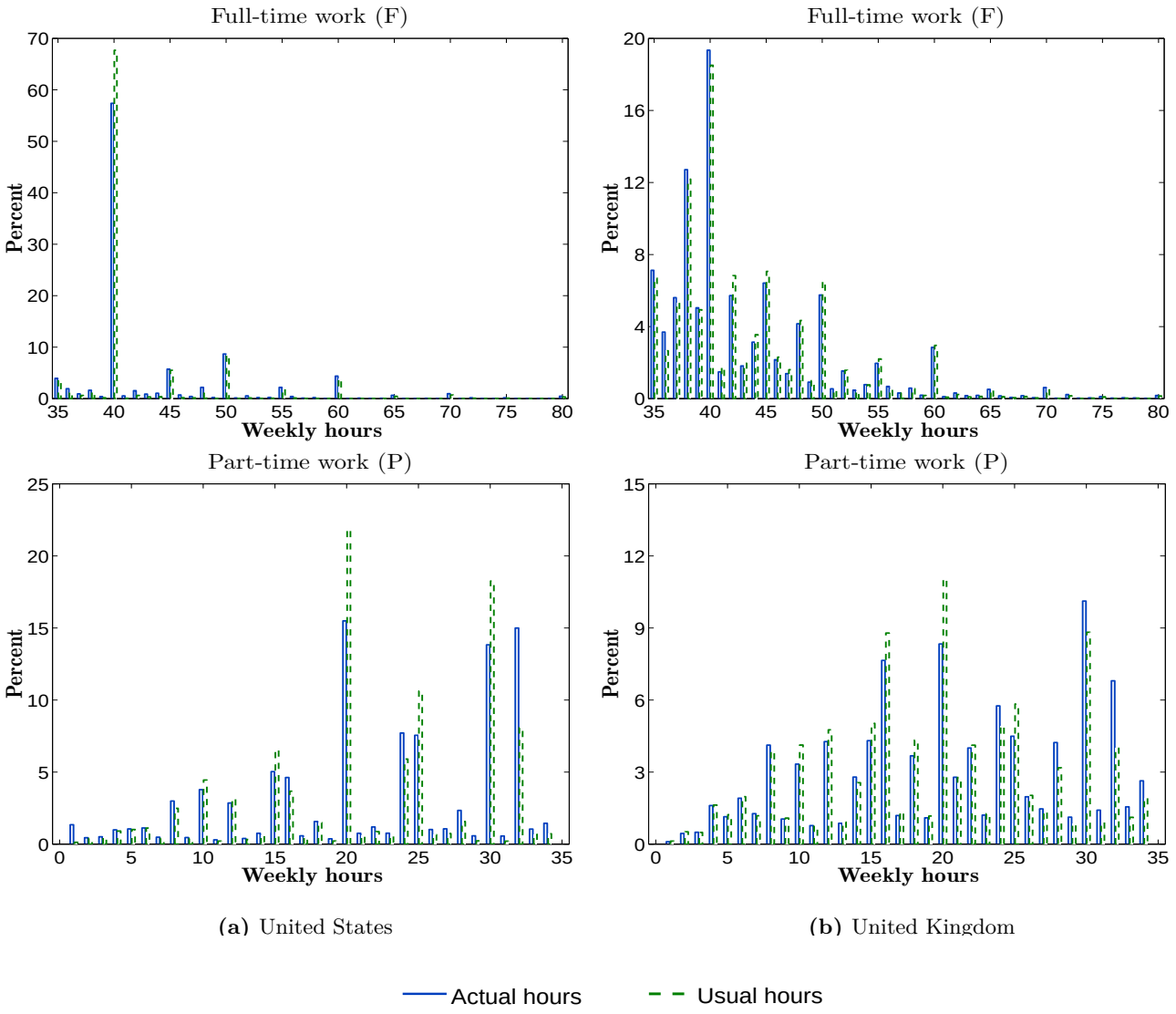

Figure OA.7: Distribution of Hours Worked in Full-time and Part-time Employment

Notes: Current Population Survey (Fig. OA.7a) and Labor Force Survey (Fig. OA.7b), pooled data from 2003 to 2006, all working-age individuals in private-sector paid employment. The histograms show the distribution of hours worked conditional on full-time and part-time employment. The solid (dashed) bars denote the distribution of actual (resp. usual) hours. The figures on the vertical axis are reported in percent.

towards the interval between 20 and 34 hours. The differences between the solid and dashed bars are more difficult to fathom for the U.K.

OA.D.2 Descriptive Statistics on Part-time Work

In Tables OA.4 and OA.5, we characterize part-time work with respect to the demographic characteristics of workers and their industries and occupations of employment. The statistics shown in the tables substantiate Subsection 3.3 of the paper ("Taking Stock"), namely when we point out the differences between the two labor market states (full-time and part-time employment). They also give some background for the discussion of composition effects in Subsection 5.3 of the paper ("An Examination of Alternative Hypotheses").

As one would expect, the composition of employment in terms of gender and age is very similar across the U.S. and U.K. labor markets (columns 1 of Panels A. to B.). That similarity extends to the

Table OA.4: Part-time Employment, Descriptive Statistics for the United States

	% of population		Part-time
	employed	part-time	share (ω^P)
	(1)	(2)	(3)
All	–	–	17.3
A. Gender			
Men	54.6	31.9	10.1
Women	45.4	68.1	25.9
B. Age (in years)			
16 to 24	16.9	41.4	42.4
25 to 34	23.7	16.6	12.1
35 to 44	25.3	16.7	11.4
45 to 54	22.5	14.3	11.0
55 to 64	11.7	11.0	16.3
C. Education			
Low	13.1	21.8	28.7
Middle	31.2	26.2	14.5
High	24.2	30.3	21.7
Very high	31.5	21.7	11.9
D. Industry (top 5 by employment)			
Retail Trade	22.1	42.5	32.3
Professional and Related Services	21.6	26.8	20.8
Manufacturing, Nondurable Goods	10.2	1.77	2.93
Construction	8.87	3.22	6.09
Business and Repair Services	7.34	5.51	12.6
E. Occupation (top 5 by employment)			
Office and Administrative Support	15.5	22.2	24.2
Production	14.5	4.77	5.53
Management in Business, Sciences and Arts	11.9	3.71	5.24
Transportation and Material Moving	8.09	6.89	14.3
Food Preparation and Serving	7.53	20.1	44.9

Notes: Current Population Survey, pooled data from 2003 to 2006, all working-age individuals in private-sector paid employment. In Panel C., Low is "Less than high-school", Middle is "High-school graduates", High is "Some college", Very high is "College or higher education". In Panels D. and E., industries and occupations are the two-digit categories of the 2000 Census classification schemes. In Panels D. and E., the statistics are for the five industries/occupations with the highest share of private-sector paid employment. All entries are reported in percent.

Table OA.5: Part-time Employment, Descriptive Statistics for the United Kingdom

	% of population		Part-time
	employed	part-time	share (ω^p)
	(1)	(2)	(3)
All	–	–	25.3
A. Gender			
Men	57.1	22.8	10.1
Women	42.9	77.2	45.5
B. Age (in years)			
16 to 24	19.3	28.9	37.9
25 to 34	24.1	17.2	18.1
35 to 44	25.1	22.7	22.9
45 to 54	19.3	16.4	21.6
55 to 64	12.2	14.8	30.8
C. Education			
Low	23.7	27.8	29.8
Middle	51.5	57.1	28.1
High	24.8	15.1	15.4
D. Industry (top 5 by employment)			
Wholesale, Retail and Motor Trade	21.4	35.1	41.6
Manufacturing	19.6	6.8	8.7
Real Estate, Renting and Business Activities	13.6	10.1	18.8
Transport, Storage and Communication	8.4	4.3	12.9
Construction	7.4	2.5	8.6
E. Occupation (top 5 by employment)			
Sales Assistants and Retail Cashiers	8.9	24.1	68.4
Functional Managers	6.0	1.4	5.9
Elementary Personal Service Occupations	3.9	10.1	70.3
Administrative Occupations in Finance	3.8	5.1	34.5
Transport Drivers and Operatives	3.5	1.4	9.7

Notes: Labor Force Survey, pooled data from 2003 to 2006, all working-age individuals in private-sector paid employment. In Panel C., Low is "Primary education (below GCSE)", Middle is "Secondary Education (A-level, GCSE or equivalent)", High is "Higher Education or more". In Panel D., industries are the 17 sections of the Standard Industry Classification of 1992. In Panel E., occupations are the two-digit occupation groups of the Standard Occupational Classification of 2000. In Panels D. and E., the statistics are for the five industries/occupations with the highest share of private-sector paid employment. All entries are reported in percent.

composition of part-time employment, which is concentrated on women and younger individuals (aged 16 to 24) (columns 2 of Panels A. to B.). The younger take a large share of part-time employment in the U.S., whereas women account for a greater share of part-time work in the U.K. The flip side of these patterns are sharp differences in the extent of part-time work across different groups of workers (columns 3 of Panels A. to B.). Although part-time work is a pervasive form of employment (affecting all workers), women and the younger are disproportionately affected. Consistent with the differences cited above, there is greater heterogeneity in part-time employment shares by gender in the U.K. and by age in the U.S. For sake of space, we do not report time series by gender. We observe that the cyclical behavior of part-time employment is similar among men and women in the U.S., whereas in the U.K. part-time employment is more cyclical among women. For men in the U.K., part-time employment exhibits an upward trend over the whole sample period.

Although the CPS and the LFS use different categories for educational attainment, industries and occupations, a number of common features for the U.S. and the U.K. emerge from Tables OA.4 and OA.5. First, it seems worth pointing out the lower intensity of part-time employment among the more highly educated. A closer look at the time series by education also shows that part-time employment is more cyclically sensitive among less educated workers. Second, the U.S. and the U.K. are also similar in terms of the segments of the labor market that are more intensive in part-time work. In both countries, part-time employment is concentrated (mainly) in retail trade and in sales and services occupations. Third, the part-time employment share displays considerable variation among the main industry and occupation categories of employment. This is especially striking for occupations: part-time employment shares in the main occupations go from 4.4 to 43.9% in the U.S., and from 5.9 to 70.3% in the U.K. The figures in those columns also highlight that part-time work is widespread, covering a nonnegligible share of employment in very distinct industries and occupations in both countries.

OA.D.3 Dynamics of Part-time Work in U.S. Recessions

Table OA.6 complements the results discussed in Subsection 4.3 of the paper ("Decomposing the Variation in Part-time Employment"). The table reports the set of γ^{ij} coefficients quantifying the contribution of different transition hazards to changes in the part-time employment share during the four U.S. recessions covered by our data. In the main text, only the coefficients for the peak to through of the Great Recession are shown.

The table confirms a number of findings presented in the paper. First, and foremost, it reiterates Fact 2: that the cyclical behavior of transitions between full-time and part-time work is the main driver of fluctuations in part-time employment. Moreover, for the Twin Recessions of the 1980s and the Great Recession, we see that the sum $\gamma^{FP}+\gamma^{PF}$ comes close to the sum of the variance contribution coefficients $\beta^{FP}+\beta^{PF}$ analyzed in Subsection 4.3. In this respect, the dynamic variance decomposition does seem to capture well the sources of variation operating during cyclical swings in the labor market. Second, the coefficient γ^{FP} confirms that the U.S part-time employment share during recessions is predominantly driven by the inflows from full-time employment (i.e. p^{FP}). It also shows that these patterns were never as pronounced as during the Great Recession and its aftermath. Third, the table shows, once again, that the 2001 recession differs from the standard U.S. recession: during that episode, the transition probability from part-time to full-time employment, p^{PF}, contributed *negatively* to the dynamics of the part-time employment share. This outcome is also visible in the behavior of the time series reported in Figure 6 of the paper.

Table OA.6: Dynamics of the U.S. Part-time Employment Share during Recessions

	1980Q1 to:		1990Q3 to:		2001Q1 to:		2007Q4 to:	
	1982Q4	1983Q4	1991Q1	1992Q1	2001Q4	2002Q4	2009Q2	2010Q2
A. All working-age individuals								
(i) Full- and part-time employment								
γ^{FP}	45.1	35.0	74.2	71.8	164.0	124.4	59.3	67.1
γ^{PF}	24.5	32.3	58.5	65.9	48.3	43.8	25.5	5.66
$\gamma^{FP}+\gamma^{PF}$	69.6	67.2	132.7	137.6	212.3	168.2	84.8	72.7
(ii) Other and non-employment								
γ^{X}	2.97	-1.29	-14.8	-14.7	-3.07	9.69	-3.91	6.41
γ^{U}	23.7	31.8	0.77	21.1	-28.7	12.5	23.2	24.7
γ^{N}	3.77	2.20	-18.7	-44.0	-80.6	-90.4	-4.03	-3.83
B. Prime-age individuals								
	1980Q1 to:		1990Q3 to:		2001Q1 to:		2007Q4 to:	
	1982Q4	1983Q4	1991Q1	1992Q1	2001Q4	2002Q4	2009Q2	2010Q2
(i) Full- and part-time employment								
γ^{FP}	62.4	53.0	90.3	84.8	61.8	74.7	67.4	75.8
γ^{PF}	13.6	19.4	42.0	47.8	-7.65	-23.7	14.3	2.56
$\gamma^{FP}+\gamma^{PF}$	75.9	72.4	132.3	132.6	54.2	51.0	81.7	78.4
(ii) Other and non-employment								
γ^{X}	1.13	-1.68	-7.92	-1.99	-6.30	-11.3	-4.56	0.96
γ^{U}	21.7	21.8	-15.3	-4.15	72.2	47.0	25.2	20.7
γ^{N}	1.22	7.54	-9.13	-26.4	-20.1	13.2	-2.41	-0.01

Notes: Current Population Survey, 1976-2017. The table reports the contribution of transitions between employment states (FP, PF), their sum, and the contribution of other states (X, U, N) to the predicted changes in the part-time employment share during U.S. recessions. Panels A. (Panel. B) displays the results for working-age (prime-age) individuals. All entries are reported in percent. The sum $\gamma^{FP}+\gamma^{PF}+\gamma^{X}+\gamma^{U}+\gamma^{N}$ in each column of each panel may not add up to 100 due to rounding.

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