Appendix for "Optimal Design and Quantitative Evaluation of the Minimum Wage"

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This Appendix contains the data construction for routine manual jobs used in the paper.

1 Productivity

The idea behind constructing an aggregate productivity process for routine manual jobs is to create a weighted sum of productivities by industry, where the weights reflect the distribution of routine manual jobs across sectors. Thus, for example, if the service sector is hit by a large shock and routine manual jobs are overrepresented in this sector, the resulting productivity measure will reflect this more strongly than an estimate of the economy wide productivity process. Specifically, we retrieve quarterly data on Real Value Added by Industry from the BEA for the years 2005-2016 (the longest series available). We denote this series VA_{it} where i is industry and t is quarter. We next use the CPS-MORG to group employed workers by the five job bins following table A.1 of Cortes et al. (2016). We then map the census industry classification codes to the BEA industries table and construct distribution weights of routine manual workers across the set of industries. Denote the weights $s^{rm}_{i\tilde{t}}$ where $\tilde{t}$ is the year (these are annual numbers). To convert these annual weights to quarterly, we linearly interpolate across quarters between each year and assume constant weights in the final year 2016, leaving us with s^{rm}_{it}. While imperfect, especially considering we will be estimating autocorrelations, these do not appear to effect estimates too much. In fact, in spite of the "artificial" autocorrelation we are inducing, we will find a lower autocorrelation than found at the aggregate level by HM and others.

We next construct a measure of aggregate employment in routine manual jobs. To do so, we retrieve quarterly measures of aggregate employment in the U.S., L_t, and multiply these by the fraction of all jobs in a given year that were routine manual, computed from the CPS-MORG data discussed above. Denote this share $\hat{s}_{\tilde{t}}^{rm}$.

Finally then, our quarterly measure of productivity for routine manual workers is denoted

$$p_t^{rm} = \frac{\sum_i VA_{it} s_{it}^{rm}}{L_t \hat{s}_{\tilde{t}}^{rm}}$$

In order to get the autocorrelation numbers, we simply take the logs of the series, HP-filter the series, and regress

$$\log(c_{p_{t+1}}) = \gamma \log(c_{p_t}) + \epsilon$$

where c_p stands for the cycle component of the productivity series. Then, we simply transform the value into weekly by $\rho = \gamma^{1/12} = 0.9715$, and $\sigma = \epsilon / \sqrt{\sum_{j=0}^{11} \rho^{2j}} = 0.0354$.

2 Wages

The construction of wages for routine manual jobs alters the approach in HM using the same weighting concept as above. We retrieve quarterly data on labor share from the BLS, denoted $ls_{i\tilde{t}}$. Aggregate labor share of routine manual jobs is computed

$$labor share_{it} = ls_{i\tilde{t}} s_{it}^{rm}$$

Wages are then computed as labor share times value added for routine manual jobs:

$$w_t^{rm} = \sum_i VA_{it} * labor share_{it}$$

Following Shimer (2005), we compute the elasticity of wages on productivity simply by HP filtering the series on log-wages, and regressing the cyclical component of the series on the cyclical component on the log-productivity. We obtain an elasticity

of 0.778.

3 Market Tightness

We construct a series for vacancies (job openings) in routine manual jobs using monthly industry-leval data from JOLTS.The data covers December 2000 to December 2012.

$$Vacancies_{RM} = \sum f_i^{RM} V_i$$

where f_i^{RM} is the fraction of all jobs in an industry that are identified as routine manual and V_i the total number of vacancies posted by industry i. Aggregating across all sectors yields a monthly estimate of routine manual vacancy postings. This approach effectively assumes that the fraction of routine manual vacancies posted reflects the overall proportion of routine manual jobs in each industry.

We use aggregate employment to unemployment transition flows to compute the implied routine manual unemployment stock for each month—employment values are from the BLS and rates are from Cortes et al. (2016). The vacancy rate is the ratio of vacancies to unemployed, which is computed at a monthly frequency. This yields an average market tightness of 0.276 over the sample.

References

Cortes, M., Jaimovich, N., Nekarda, C. J., and Siu, H. E. (2016). 'The Micro and Macro of Disappearing Routine Jobs: a Flows Approach'. Unpublished manuscript.