Related Paper Summaries

Finn Schüle and Haoyu Sheng

May 12, 2023

1. Network Papers

1.1. Acemoglu, Daron, Vasco M. Carvalho, Asuman Ozdaglar, and Alireza Tahbaz-Salehi. 2012. "The Network Origins of Aggregate Fluctuations." Econometrica, Vol. 80. No. 5.

- Prior macro literature took for granted Lucas' (1977) claim that microeconomic shocks to firms or disaggregated sectors would only have a very small affect on aggregate output because the shocks would average out. This paper shows that this is no longer the case once we account for production linkages. In an economy featuring production linkages microeconomic shocks can have cascading effects that lead to aggregate fluctuations.

- How micro shocks propagate and whether they can cause aggregate fluctuations depends on the nature of the connections between firms/sectors. Authors show that the US economy in many ways resembles a star network, with a small number of sectors playing a disproportionate role as input suppliers of others.

- Everything is Cobb-Douglas.

- Derive the implied variance of output in a sequence of more and more disaggregate economies feature production linkages and disaggregated shocks. Show that in some cases the law of large numbers does not hold and micro shocks do cause aggregate fluctuations even as $n \to \infty$.

- Find that micro shocks to US network structure may be able to generate fluctuations in the ballpark of the approximately 2% standard deviation of US GDP.

1.2. Baqaee, David Rezza. 2018. "Cascading Failures in Production Networks." Econometrica, Vol. 86, No. 5.

- "Results like those of Hulten (1978) suggest that, as long as the economy is efficient, the systematic importance of firms and industries can be approximated by their sales, even in the presence of linkages and complementarities."

- Breaks equivalence between sales and systematic importance by introducing external economies of scale and imperfect competition.

- Features CES household preferences and production functions. Each industry is comprised of many monopolistically competitive firms who produce differentiated product varieties.

- Households maximize

$$U(c_1, \cdots, c_N) = \frac{C}{\overline{C}} = \left(\sum_{k=1}^{N} \beta_k^{\frac{1}{\sigma}} \left(\frac{c_k}{\overline{y}_k} \right)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

Subject to

$$\sum_{k=1}^{N} \int_0^{M_k} p(k, i) c(k, i) di = wl + \sum_{k=1}^{N} \int_0^{M_k} \pi(k, i) di$$

- Firms must hire a number of 'managers' f_k in order to operate. The number of managers needed is subject to productivity shocks. Firms' maximize profits given by

$$\pi(k, i) = p(k, i) y(k, i) - \sum_{l=1}^{N} \int_0^{M_l} p(l, j) x(k, i, h, j) dj - wl(k, i) - w \frac{f_k}{z_k^m}$$

And have production functions given by

$$\frac{y(k, i)}{\overline{y}} = \left(\alpha_k^{\frac{1}{\sigma}} \left(z_k^w \frac{l(k, i)}{\overline{l}} \right)^{\frac{\sigma-1}{\sigma}} + \sum_{h=1}^{N} \omega_{k,h}^{\frac{1}{\sigma}} \left(\frac{x(k, i, h)}{\overline{y}_k} \right)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

- Goal is to derive comparative statics of output with respect to productivity shocks, accounting for patterns of entry and exit generated by the network structure.

1.3. Rubbo, Elisa. 2020. "Networks, Phillips Curves, and Monetary Policy."

- Incorporates general network structure into a New Keynesian model. Derives novel inflation indicators that perform better than the consumer price index as targets for monetary policy. Demonstrates how the network structure can lead Phillips curve regressions to be misspecified, and how changes in the network structure can account for the flat and falling estimates of the slope of the Phillips curve over the last several decades.

- Main text considers a one period model: "before the world begins, firms set prices based on their expectations of productivity and money supply; then sectoral productivities are realized, and the central bank sets the money supply; some firms have the possibility to adjust their price after observing the realized productivity and money supply, while others do not; the world ends after production and consumption take place. Inflation is defined as the change in prices with respect to the preset ones."

- Model:

  - N sectors each comprised of a continuum of firms producing differentiated varieties.

  - Labor is freely mobile across sectors.

  - The CB sets monetary policy by picking the money supply. Nominal expenditures cannot exceed the money supply.

  - "For a given output gap, sectoral probabilities of price adjustment δ_i and sectoral productivity shifters, general equilibrium is given by a vector of firm-level markups, a vector of prices p_i, a nominal wage w, labor supply L, a vector of sectoral outputs y_i, a matrix of intermediate input quantities x_{ij}, and a vector of final demands c_i, such that: a fraction δ_i of firms in each sector i adjust their price; markups are optimally chosen by adjusting firms, while they are such that prices stay constant for the non-adjusting firms; consumers maximize utility subject to the budget and cash-in-advance constraint; producers in each sector i minimize costs and charge the relevant markup; and markets for all goods and labor clear."

- Doesn't feature wage rigidity, but says: "Wage rigidities can be easily incorporated into this setup, by adding a labor sector which collects labor services and sells them to all the other sectors. While there still is a flexible underlying wage (paid by the labor sector to workers), the market wage, defined as the price charged by the albor sector is sticky.

-

1.4. Acemoglu, Daron and Pablo D. Azar. 2020. "Endogenous Production Networks." Econometrica.

- "We develop a tractable model of endogenous production networks. Each one of a number of products can be produced by combining labor and an endogenous subset of the other products as inputs. Different combinations of inputs generate (prespecified) levels of productivity and various distortions may affect costs and prices. We establish the existence and uniqueness of an equilibrium and provide comparative static results on how prices and endogenous technology/input choices (and thus the production network) respond to changes in parameters. These results show that improvements in technology (or reductions in distortions) spread throughout the economy via inputoutput linkages and reduce all prices, and under reasonable restrictions on the menu of production technologies, also lead to a denser production network. Using a dynamic version of the model, we establish that the endogenous evolution of the production network could be a powerful force towards sustained economic growth. At the root of this result is the fact that the arrival of a few new products expands the set of technological possibilities of all existing industries by a large amount—that is, if there are n products, the arrival of one more new product increases the combinations of inputs that each existing product can use from 2^{n-1} to 2^n, thus enabling significantly more pronounced cost reductions from choice of input combinations. These cost reductions then spread to other industries via lower input prices and incentivize them to also adopt additional inputs."

1.5. La'O, Jennifer and Alireza Tahbaz-Salehi. 2021. "Optimal Monetary Policy in Production Networks."

- "The ability of monetary policy to replicate flexible-price allocations in the textbook New Keynesian models, however, relies critically on the assumption that all firms are technologically identical [...]. But once there are technological differences across

firms—say, in a multi-sector economy with input-output linkages—monetary policy may lose its ability to replicate flexible-price allocations[...]."

- "We provide a necessary and sufficient condition for the monetary policy's ability to implement flexible-price equilibria in the presence of nominal rigidities and show that, generically, no monetary policy can implement the first-best allocation."

- "We develop these results in the context of a static multi-sector general equilibrium model á la Long and Plosser (1983) and Acemoglu et al. (2012) in which firms are linked to one another via input-output linkages and are subject to industry-level productivity shocks.[...] we assume that firms make their nominal pricing decisions under incomplete information about the productivity shocks. As a result, nominal prices respond to changes in productivities only to the extent that such changes are reflected in the firms' information sets."

- "In order to obtain closed-form expressions for the optimal policy, we impose a number of functional form assumptions by assuming that all firms employ Cobb-Douglas production technologies and that all signals are normally distributed."

- Jones (2013), Bigio and Lao (2020), and Baqaee and Farhi (2020) study misallocation in economies with production networks.

1.6. Jones, Charles I. 2011. "Misallocation, Economic Growth, and Input-Output Economic."

- "One of the most important developments in the growth literature of the last decade is the enhanced appreciation of the role that the misallocation of resources plays in helping us understand income differences across countries. Misallocation at the micro level typically reduces total factor productivity at the macro level. Quantifying these effects is leading growth researchers in new directions, two examples being the extensive use of firm-level data and the exploration of input-output tables, and promises to yield new insights on why some countries are so much richer than others."

- "When the capital share is 1/3, the intrinsic propogation mechanism of the neo-classical growth model is weak, convergence to the steady state is rapid, and the model generates a small multiplier on changes in productivity or the investment rate. In contrast, when the capital share is higher, like 2/3, these deficiencies are

largely remedied. [...] As documented carefully below, the intermediate goods share of gross output is about 1/2 across a large number of countries. The share of capital in value-added is about 1/3, so its share in gross output is 1/6. Combining these two kinds of capital, the share of capital-like goods in gross output is our magic number, 1/2 +1/6 = 2/3. Incorporating intermediate goods into macroeconomic models, then, has the potential to help us understand a range of economic phenomenon, including the propogation of business cycle shocks and the speed of transition dynamics."

1.7. Bigio, Saki and Jennifer La'O. 2020. "Distortions in production networks." QJE.

- "We study a relatively standard multisector, general equilibrium, static model of intermediate good trade. [...] Firms are subject to sectoral productivity shocks, and a representative household consumes and supplies labor inelastically. Within this framework, we allow sectoral production choices to be distorted. Distortions are captured by wedges between firms' prices and marginal costs. Although we remain agnostic regarding the microeconomic origin of these distortions, we show how they may be rationalized by tax rates, markups, working-capital constraints, and the like."

- "The aggregate production function admits an "efficiency wedge," or total factor productivity (TFP) component, while the intratemporal condition admits a wedge between the marginal rate of substitution between consumption and labor and their marginal rate of transformation. Fluctuations in the latter, known as the "labor wedge" or equivalently the aggregate markup, have been documented to account for a significant portion of macroeconomic variation at business cycle frequency (see Hall 1997;Rotemberg and Woodford 1999;Chari, Kehoe, and McGrattan 2007 ;Shimer 2009;Karabarbounis 2014)."

- "In the class of Cobb-Douglas economies, we show that, near efficiency, the first-order effects of sectoral distortions on the labor wedge are succinctly characterized by a familiar vector of constants indicating each sectors' network "centrality." This vector, at times called the "influence vector," has been shown to determine the elasticity of TFP to sectoral productivities in Cobb-Douglas economies (Burress 1994;Acemoglu et al. 2012). The influence vector is a simple transformation of the Leontief inverse matrix. The Leontief inverse matrix captures the entire infinite sequence of all higher-order network effects; its mathematical structure is closely

related to the concept of Bonacich centrality, a measure of "importance" within a network."

- "Gabaix (2011) shows that in an efficient economy, idiosyncratic firm-level productivity shocks can become macroeconomic fluctuations when the firm size distribution is sufficiently fattailed. One implication of our work is that the Gabaix (2011) result can in theory be extended to the first-order labor wedge effects of "granular" distortions. That is, near efficiency, idiosyncratic shocks to firm-level distortions, for example, firm-level markups, can result in first-order labor wedge movement as long as the firm size distribution is fat-tailed."

- "The primary difference between our model and those of Jones (2013),Baqaee and Farhi (2020) ,andLiu (2019) is the treatment of primary factors. Although the supply of primary factors in those papers are exogenously fixed, we allow for the supply of labor—our primary factor of production—to be endogenously determined.3 This modeling choice has the following implication. With primary factors exogenously fixed, the distortions in Jones (2013),Baqaee and Farhi (2020),andLiu (2019) manifest solely in aggregate efficiency, or TFP."

1.8.   Ernest Liu. 2019. "Industrial Policies in Production Networks."

- Key ideas:

Focus on this thing called backward demand linkages, where some sectors become the sink for market imperfections

The market imperfections generate deadweight losses with input use, raising effective input prices and production costs, and misallocation of resources

Answers the question of which sector should be promoted first for subsidy:

  – policies can be guided by "distortion centrality": a nonparametric sufficient statistic for the marginal social value of policy subsidies in each sector
  – aggregate effects of policy can be captured by the covariance between each sector's distortion centrality and government spending on sectoral subsidies

- Key theoretical contribution:

"by modeling payments associated with imperfections as quasi-rents, the ratio between influence and Domar weights—what I call "distortion centrality"—is an ex ante,

nonparametric sufficient statistic that predicts the aggregate impact of introducing subsidies to the decentralized economy."

1.9. Minton, Robert and Brian Wheaton. 2022. "Hidden Inflation in Supply Chains: Theory and Evidence."

- "In a dynamic supply-side pricing model with Calvo pricing and a production network, we show that the extent and pace of pass-through is influenced by a number of factors. How much a price movement in sector j affects prices in sector i depends on the overall share of cost in sector i that ultimately lies in sector j, inclusive of supply chain connections. The speed of pass-through depends on sector i's "downstreamness" from sector j, a notion that captures how many links in the supply chain sector i is from sector j (on average, as many supply chain links between sectors may exist). Finally, forward-lookingness plays a key role in speeding up pass-through. With rational expectations (and full attention), downstream sectors adjust their prices to account for anticipated future price changes by their suppliers – that is, before the actual cost changes have worked their way down the supply chain to reach the downstream sectors. If firms are myopic – not forward-looking – they wait until the cost shocks have filtered down to them step-by-step before adjusting their prices, leading to a much higher degree of effective price rigidity."

- "[W]e contribute to the literature finding that sectoral shocks can generate meaningful aggregate fluctuations. We show this in the context of oil price movements, which generate indirect inflationary effects (through the supply chain) twice as large as their direct effect. Second, we add to the recent but growing literature performing empirical tests of production network models. We do so by studying the extent and pace of price pass-through along supply chains in a causal manner. Third, we provide direct evidence of nominal rigidity amplification in supply chains, a conjecture which dates back to Gordon (1981) and underlies a growing recent literature. Finally, we contribute to the literature on forward-looking expectations, as we develop a way to estimate firm forward-lookingness from observational macroeconomic data."

- "Horvath (1998) presents a model in which positive shocks to certain sectors are not equally offset by negative shocks in other sectors; interactions amongst producing sectors stymie the Law of Large Numbers from producing this result. Consequently, Horvath argued that sector-specific shocks can explain a substantial fraction of aggregate disturbances; as much as 80% of the volatility in GDP growth is due to

sector-specific shocks in Horvath's findings. Horvath (2000), Gabaix (2011), Acemoglu et al. (2012), and Baqaee and Farhi (2019) present additional modeling evidence of the importance of accounting explicitly for the network structure of the economy. Furthermore, in calibration exercises, Foerster, Sarte, and Watson (2011), Carvalho and Gabaix (2013), and Atalay (2017) attribute half or more of aggregate volatility to sector-specific shocks."

- "Boehm, Flaeen, and Pandalai-Nayar (2019) and Carvalho et al. (2021) focus on the 2011 Tohoku Earthquake, studying how its effects on output propagate upward and downward through supply chains, with the result being that a non-trivial part of the drag on Japanese real GDP growth from the disaster was due to network propagation effects. Acemoglu, Akcigit, and Kerr (2016) study the effects on industry-level output of a variety of supply and demand shocks (Chinese import shocks, government spending changes, TFP growth, and foreign-industry patenting) propagating through the production network. The authors find important network effects – dwarfing the own-sector effects – of all four types of shocks."

  – Seems like it would be possible to do something similar with shock to energy sector from Russian invasion of Ukraine.

- "Our model most closely follows the supply-side setup of Rubbo (2020). We extend this model by allowing firms to be myopic about the pass-through of upstream shocks to suppliers' prices, following the setup of Gabaix (2020) and nesting the case of rational expectations."

- "use a simple, linear network to develop intuition about the role of myopia and compounding price rigidities in supply chain propagation of shocks. A linear network consists of a single supply chain in which each firm uses only labor and inputs from the previous link in the supply chain – with the final link in the supply chain ultimately selling to consumers. Our simple calibration of the linear network model allows for convenient graphical illustrations of propositions for the general network."

2. Labor mobility papers

2.1. Schubert, Gregor, Anna Stansbury and Bledi Taska. 2022. "Employer concentration and outside options."

- Construct a new data set of worker occupation to occupation transitions using 16 million workers' resumes from Burning Glass Technologies. They find that occupational mobility is high and highly heterogeneous across occupations.

- "develop a measure of the value of workers' outside job options in other occupations–an 'outside-occupation option index'–and estimate its effect on wages in our baseline regression alongside the effect of within-occupation employer concentration."

  – The outside-occupation option index is a weighted average of local wages in all occupations except the workers own, with each weight the product of (i) occupational mobility flows to each outside occupation and (ii) the local relative employment share in each outside occupation.

- "Find a large, positive, and significant effect of an increase in the value of outside-occupation options: an exogenous 1 percentage point increase in the wage in outside option occupations leads to a roughly 0.1 percent higher wage in workers' own occupation, and for the median occupation, moving from the 25th to the 75th percentile vale of our outside-occupation option index across metro areas is associated with 4.4 log points higher wages."

- "In using occupational transitions to identify outside options we build on papers which use worker flows to identify the scope of workers' labor markets (Manning and Petrongolo, 2017; Nimczik, 2018), and to study skill similarity across occupations and industries (Shaw, 1987; Neffke, Otto, and Weyh, 2017; Arnold, 2020)."

- Assume wages are a weighted average of labor productivity and workers' outside option.

- Find that

  – In the median occupation 24% of workers leave the occupation when they leave their job.

  – A quarter of occupations have a leave share below 19% while a quarter have a leave share above 28%.

– Moving up to a broader definition of an occupation does not remove the mobility patterns.

– The occupational transition matrix is sparse and highly asymmetric.

• They provide their data online.

Figure A6: 6-digit SOC occupational transition matrix
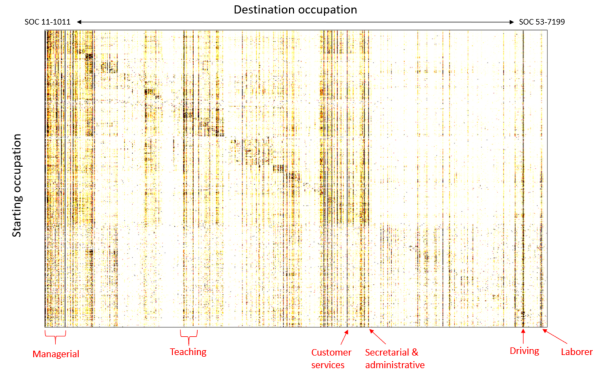
Note: Occupational transition matrix showing transition probability between 6-digit SOC occupations conditional on leaving the initial job. Occupations are sorted in SOC numerical order. Cells colored black have a transition probability of 1% or greater conditional on leaving the initial job. Transitions to own occupation are excluded. Data computed from BGT resume data set for 2002-2015. The annotation points out certain common destination occupations, which show up as darker vertical lines on the heatmap. The presence of a darker line along the diagonal suggests that workers commonly transition to occupations which are close to their own according to the numerical order of SOC codes. The resume data is discussed in detail in Appendix C.

Figure A7: 2-digit SOC occupational transition matrix
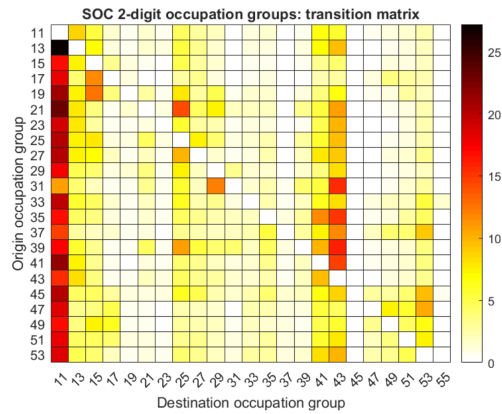
Note: Occupational transition matrix showing transition probability between 2-digit SOC occupation groups conditional on leaving the initial job. Cells colored black have a transition probability of 25% or greater conditional on leaving the initial job. Job transitions within an occupation group are excluded. Data computed from BGT resume data set for 2002-2015. The resume data is discussed in detail in Appendix C.

11

2.2. Neffke, Frank, Anne Otto, and Antje Weyh. 2017. "Inter-industry labor flows." Journal of Economic Behavior and Organization.

- Use German social security data from 1999 to 2008, which cover over 80% of the working population, to study inter-industry labor mobility.

- Find that workers do switch industries, even at a very high level of aggregation, but that these labor flows are highly structured.

- US studies find that workers change 1-digit industries at relatively high rates of 12% (Kambourov and Manovskii, 2008) to 20% (Parrado et al., 2007).

- "Of all workers who change jobs, 73.4% change industries at the 5-digit level, the most disaggregated level available. Most industry switching takes place across highly aggregated industries: 58.7% of 5-digit industry switchers switch industries at the section level, the most aggregate industry grouping in the NACE 1.1 classification."

- But: "Another way to evaluate the numbers in the table is to compare them to a random benchmark. To do so, we simulate switches in which all workers who leave a certain industry choose new industries with probabilities equal to the industries' employment share in the overall economy. This excersize shows that workers tend to remain in their 5-digit industry 39 times more often than random."

- "3.3% of all possible 5-digit industries account for 80% of all job switches and in 56% of pairs we do not observe any job switches whatsoever in the nine-year period we study."

Table 1
Cross-industry labor flows by labor-market segment.

LABOR-MARKET SEGMENT	WAGES			GERMANY		GEOGRAPHY		OCCUPATIONS							
	all	high	low	East	West	local	long-distance	managers	sales	accountants	office clerks	IT	cleaners	security
WORKERS (THOUSANDS)														
employment	19,897.1	9,947.6	9,914.8	3,890.2	15,958.8	n.a.	n.a.	435.9	1,440.2	293.1	2,600.8	390.5	220.2	254.2
job switchers	1,206.7	554.3	652.4	194.2	940.9	948.2	258.5	32.0	116.5	18.9	148.5	28.7	11.1	14.7
no industry switch	321.1	165.2	155.9	56.2	246.1	255.3	65.8	7.1	32.4	5.3	32.8	4.5	3.3	4.9
industry switch	885.7	389.1	496.5	138.0	694.8	692.9	192.8	24.9	84.1	13.7	115.7	24.2	7.8	9.8
different section	519.8	215.9	303.8	82.1	408.0	409.3	110.4	14.5	45.2	8.0	75.4	14.1	6.1	7.2
same section	365.9	173.2	192.7	56.0	286.8	283.6	82.3	10.3	38.9	5.7	40.3	10.0	1.7	2.6
same sub-section	301.6	145.4	156.2	50.1	231.1	229.8	71.7	8.6	36.2	5.2	34.5	9.4	1.6	2.5
same 2-digit industry	225.9	109.8	116.0	40.4	170.4	175.3	50.6	6.0	25.6	4.0	23.4	4.6	1.3	1.9
same 3-digit industry	117.3	58.8	58.5	20.5	88.6	90.4	26.9	2.8	11.4	3.0	10.8	2.1	0.3	0.6
same 4-digit industry	62.3	31.7	30.6	10.4	47.6	47.6	14.8	1.4	6.0	1.5	5.1	1.7	0.2	0.3
PERCENTAGES														
no industry switch	26.6%	29.8%	23.9%	28.9%	26.2%	26.9%	25.4%	22.2%	27.8%	27.9%	22.1%	15.7%	29.6%	33.3%
industry switch	73.4%	70.2%	76.1%	71.1%	73.8%	73.1%	74.6%	77.8%	72.2%	72.1%	77.9%	84.3%	70.4%	66.7%
different section	58.7%	55.5%	61.2%	59.5%	58.7%	59.1%	57.3%	58.4%	53.8%	58.4%	65.2%	58.5%	78.8%	73.9%
same section	41.3%	44.5%	38.8%	40.5%	41.3%	40.9%	42.7%	41.6%	46.2%	41.6%	34.8%	41.5%	21.2%	26.1%
same sub-section	34.1%	37.4%	31.4%	36.3%	33.3%	33.2%	37.2%	34.7%	43.1%	38.0%	29.8%	38.8%	20.2%	25.7%
same 2-digit industry	25.5%	28.2%	23.4%	29.3%	24.5%	25.3%	26.3%	23.9%	30.4%	29.3%	20.3%	19.0%	16.2%	19.1%
same 3-digit industry	13.2%	15.1%	11.8%	14.9%	12.7%	13.0%	14.0%	11.3%	13.5%	21.7%	9.3%	8.7%	4.4%	5.6%
same 4-digit industry	7.0%	8.1%	6.2%	7.5%	6.8%	6.9%	7.7%	5.7%	7.1%	10.9%	4.4%	6.8%	3.0%	3.3%

The table contains information about absolute and relative employment levels, jobs switching and cross-industry flows in each labor-market segment averaged over 1999–2007. In the section WAGES, column <all> refers to all workers, column <high> refers to workers with wages above their industry's median, column <low> to workers below this median. Long-distance flows are labor flows between establishments that are at least 100 km apart. The occupations are as defined in Table C1.

2.3. Manning, Alan and Barbara Petrongolo. 2017. "How local are labor markets? Evidence from a spatial job search model." AER.

- "We estimate that labor markets are quite local, as the attractiveness of jobs to applicants sharply decays with distance. Also, workers are discouraged from searching in areas with strong competition from other job-seekers."

- "In our empirical analysis we use unemployment and vacancy data on 8,850 Census wards in England and Wales, and combine these with microdata on wages and the use of transport modes, which allow us to model commuting costs between any two wards in the economy. Our estimates show evidence of high costs of distance. For example, the probability of a random job 5 kilometers distant being preferred to random local job is only 19 percent. We find that workers are discouraged from applying to jobs in areas where they expect relatively strong competition from other job-seekers."

- "The hypothesis of constant returns in search markets is not rejected, implying that larger scale markets do not systematically offer more efficient matching of workers to jobs."

- "Despite the fact that workers in any of 8,850 wards may apply to jobs in any of 8,850 locations—with over 78 million combinations of origin and destination wards—and the decision of each worker is influenced by the search strategies of other workers, we show that the equilibrium allocation of applications can be solved for using an efficient contraction mapping."

- "The observation that commutes are generally short or, equivalently, that our estimated cost of distance is relatively high, may suggest that local intervention would have heavily concentrated effects on target areas. We show that this argument is deceptive if labor markets are overlapping, an insight for which structural modeling is critical. Even though the labor market for an individual worker may be quite local, a local shock sends a ripple effect through surrounding areas, diffusing its impact over a much wider area than the typical commute."

- Endogenous wages by assuming they are set (presumably by firms) to maximize surplus per vacancy.

2.4. Nimczik, Jan Sebastian. 2018. "Job mobility networks and endogenous labor markets."

- "In this paper, I introduce a novel method to identify endogenous labor markets which are revealed by job mobility flows rather than pre-defined administrative boundaries. In particular, I decompose a large job mobility network that is generated by the universe of job-to-job transitions in the economy into separate markets. The estimation is based on the stochastic block model (SBM) from the literature on network analysis and micro-founded by a simple firm choice model. Firms are in the same labor market if they have similar links to other firms and not because they are located in the same region. In an extensive descriptive analysis, I compare endogenous markets to geographically separated markets. Based on the novel concept, I analyze employment spillovers following a large local labor demand shock as well as mobility responses to import competition from China and Eastern Europe."

- "My empirical analysis is based on administrative records from the Austrian Social Security Database (ASSD) which provides detailed matched employer-employee data for all private sector employees in Austria. Building on the universe of job-to-job transitions from 1975 to 2005, I compute a large and detailed job mobility network and analyze the resulting network structure. The job mobility network consists of about 930,000 job-to-job transitions and more than 95,000 firms. Given this observed job mobility network, I estimate the SBM by maximum likelihood via Markov Chain Monte Carlo methods in order to assign firms to endogenous labor markets conditional on their individual propensity to attract workers."

- "Compared to local labor markets, endogenous labor markets are more self-contained. I find higher shares of job transitions within endogenous labor markets than within geographical entities of the same size."

- "The separation of these markets can be partly rationalized by differences in the industry composition and wage distribution. Second, some endogenous labor markets are scattered across several regions and contain very distant firms. Geographically dispersed endogenous markets tend to be relatively more specialized in particular industries than geographically concentrated markets. In general, however, endogenous labor markets are not particularly concentrated within specific industries. Workers regularly switch industries and firms hire from a variety of different occupations."

- "In the present paper, I utilize the model to analyze the impact of local labor demand shocks and global trade shocks on employment and worker mobility. In particular, I demonstrate that endogenous labor markets estimated in the period prior to the shock can explain and predict worker flows in response to the break-down of the Austrian steel industry at the end of the 1980s and to the increasing exposure of manufacturing industries to trade with China and Eastern Europe."

2.5.   Parrado, Eric, Asena Caner, and Edward N. Wolff. 2007. "Occupational and industrial mobility in the United States." Labour Economics.

- "Using the Panel Study of Income Dynamics [...] we investigate occupational and industrial mobility of individuals over the 1969–1980 and 1981–1993 periods in the U.S. We find that workers changed both occupations and industries more frequently in the later period."

- "Based on these criteria the original sample was reduced to 11,135 men and 6937 women for the 1969–80 sample using the original files; 14,295 men and 8429 women for the same period using the new retrospective occupation and industry files; and 24,121 men and 16,649 women for the 1981–1993 sample."

- "Occupational mobility is defined in this paper as the percentage of currently employed individuals who report a current occupation different from their most recent previous report of an occupation."
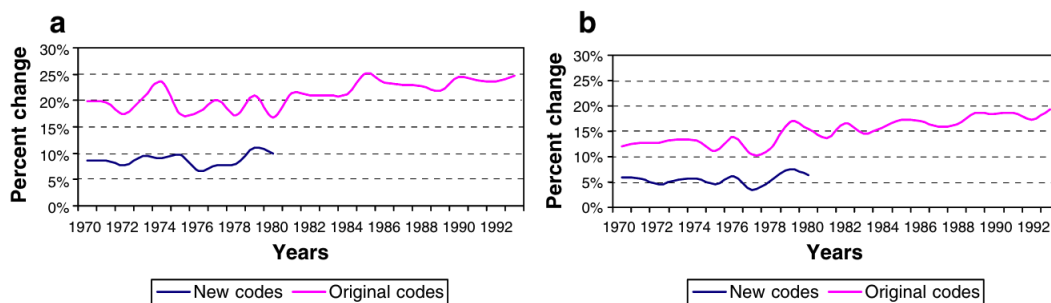

Fig. 1. a. Occupational mobility, men, 1969–1993. b. Occupational mobility, women, 1969–1993. Source: PSID and authors' calculations.
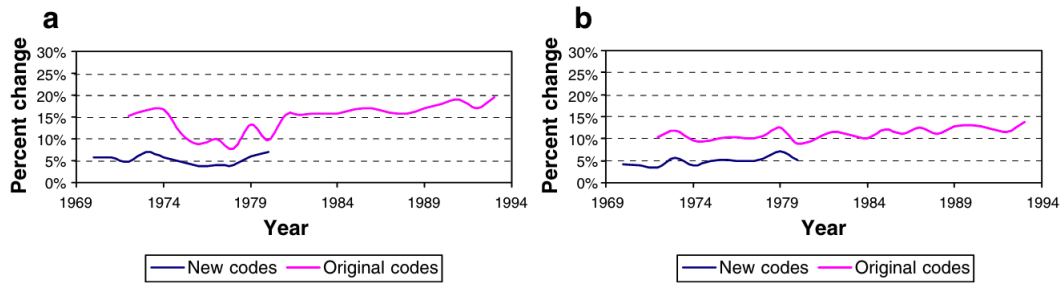
Fig. 2. a. Industrial Mobility, men, 1969–1993. b. Industrial mobility, women, 1969–1993. Source: PSID and authors' calculations.

2.6. Kambourov, Gueorgui and Iourii Manovskii. 2004. "Rising Occupational and Industry Mobility in the United States: 1968-1993."

- "The main message of the paper is that occupational and industry mobility in the United States is high and has increased sharply since the late 1960s."

- Also use PSID.

- "We define occupational mobility as the fraction of currently employed individuals who report a current occupation different from their most recent previous report of an occupation. Industry mobility is defined similarly."

- "Occupational mobility has increased from 10% to 15% at the one-digit level, from 12% to 17% at the two-digit level, and from 16% to 19% at the three-digit level. The corresponding increases in industry mobility are 7% to 11%, 8% to 12%, and 10% to 12%, respectively."

2.7. Schmutte, Ian M. 2014. "Free to move? A network analytic approach for learning the limits of job mobility." Labour Economics.

-

2.8. Humlum

3. Factor Reallocation Literature

3.1. Chodorow-Reich, Gabriel and Johannes Wieland. 2020. "Secular Labor Reallocation and Business Cycles." JPE.

- "We revisit an old question: does industry labor reallocation affect the business cycle? Our empirical methodology exploits variation in a local labor market's exposure to industry reallocation on the basis of the area's initial industry composition and national industry employment trends for identification. Applied to confidential employment data over 1980–2014, we find sharp evidence of reallocation contributing to higher local area unemployment if it occurs during a national recession but little difference in outcomes during an expansion. A multiarea, multisector search-and-matching model with imperfect mobility across industries and downward nominal wage rigidity can reproduce these cross-sectional patterns."

- "We study the consequences of secular labor reallocation, defined as the change in an economy's allocation of labor in response to mean-preserving, long-lasting idiosyncratic industry shocks." (Why do they want the shocks to be mean preserving?)

- "To circumvent the small number of national business cycles, we use variation in reallocation and business cycle outcomes across broadly defined local labor markets in the United States. To isolate long-lasting shocks, our metric of reallocation sums the absolute value of industry employment share changes between the start and the end of a recession-to-recovery or expansion cycle, thereby filtering out cyclical changes that occur during a recession but reverse during a recovery. We address the endogeneity of reallocation to local conditions by developing a Bartik-style measure of predicted reallocation on the basis of a local area's initial industry composition and industry employment changes in the rest of the country and use this measure as an instrument for actual reallocation. Finally, we account for non-mean-preserving industry shifts by directly controlling for the Bartik predicted employment growth rate given an area's industry composition. Thus, our empirical specification regresses local area unemployment on local area reallocation, controlling for predicted growth and with reallocation instrumented using predicted reallocation. Intuitively, the research design compares outcomes in areas with the same predicted employment growth but different predicted reallocation."

- "In an early and influential contribution, Lilien (1982) argued that sectoral shifts were responsible for much of the fluctuation in unemployment in the 1970s, a point subsequently disputed by Abraham and Katz (1986) and Murphy and Topel (1987)."

- "Our general equilibrium search-and-matching model with nominal frictions builds on Christiano, Eichenbaum, and Trabandt (2016) and earlier work by Walsh (2005). We incorporate an industry structure and labor reallocation frictions following Kline (2008), Dvorkin (2014), and Pilossoph (2014). Downward nominal wage rigidity has recently been emphasized by Daly and Hobijn (2014) and Schmitt-Grohé and Uribe (2016), and following Hall (2005) our implementation does not violate bilateral efficiency conditions."

- "Unemployed workers search in one industry and one area at a time. Their choice of where to search plays an important role. In line with recent literature, we assume semidirected search (Kline 2008; Artuç,Chaudhuri, and McLaren 2010; Kennan and Walker 2011; Dvorkin 2014; Pilossoph 2014)." $\rightarrow$ Workers receive a taste shock with arrival rate λ_t that affects which industry they choose to search in. If they don't receive a taste shock they continue to search in their current industry. If they do receive a taste shock, they reoptimize where to search over industries, but not over areas.

- Model features downward nominal wage rigidity: "A large literature reports evidence of downward nominal wage rigidity in the data (Card and Hyslop 1997; Kahn 1997; Dickens et al. 2007; Goette, Sunde, and Bauer 2007; Daly and Hobijn 2014)."

3.2. Lilien, David M. "Sectoral Shifts and Cyclical Unemployment." Journal of Political Economy 90, no. 4 (1982): 777–93.

Key idea:

- "most of the unemployment fluctuations of the seventies (unlike those in the sixties) were induced by unusual structural shifts within the U.S. economy."

- Reallocation mechanism: random fluctuations of product demand $\rightarrow$ change in wages $\rightarrow$ shifts in sectoral labor supply

The Model:

- The key idea is that hiring rate depends on a random disturbance with changing variance. This variance is a measure of dispersion of employment demand conditions across sectors.

- Then write layoffs as functions of hires, and regress aggregate layoffs on some labor market variables and employment dispersion - mainly making a point that it is not enough to look at aggregate mean

- Then goes into unemployment, rewriting unemployment in terms of layoffs and quits etc, as well as random shocks (MP shocks for example) to the economy.

- Then estimated several versions of the above reduced-form, getting high R^2 for unemployment. Showed that dispersion and MP shocks are essentially orthogonal, and dispersion not very explained by other variables in the economy.

- Constructed natural rate of unemployment by shutting off shocks. Thus showing that we are really observing a large fluctuation of natural rate of unemployment which can be attributed to structural sectoral shifts.

3.3. Murphy, Kevin M., and Robert H. Topel. "The Evolution of Unemployment in the United States: 1968–1985." In NBER Macroeconomics Annual 1987, Volume 2, 11–68. The MIT Press, 1987.

3.4. Abraham, Katharine G., and Lawrence F. Katz. "Cyclical Unemployment: Sectoral Shifts or Aggregate Disturbances?" Journal of Political Economy 94, no. 3 (1986): 507–22.

Key idea:

- This paper is a response to Lilien (1982) and shows that either pure sectoral shift explanation and a pure AD explanation can gender "the strong positive relationship between the cross-industry dispersion of employment growth rates and the unemployment rate that Lilien (1982b) appeals to as evidence for the sectoral shift hypothesis"

- Then use information on job vacancies to support the aggregate demand claim

  The two views:

- The sectoral shift hypothesis has to satisfy two assumptions:

(i) all sectors have the same trend rate of growth

(ii) sectors do not differ in their sensitivity to AD fluctuations

- AD disturbances can generate correlation between dispersion of employment growth and change in unemployment

  – "This will happen under either of the following scenarios: (1) industries' trend growth rates and cyclical sensitivities are negatively correlated or (2) industries differ in their cyclical sensitivities and labor force adjustment costs are asymmetric such that an increase in employment costs more than a decline of equal magnitude"

Distinguishing the two (The key is in the job vacancy rate):

- The sectoral shift hypothesis: predicts a positive correlation between dispersion and vacancy rate

- The AD scenario: predicts a negative correlation (but this is a now standard labor market fact). positive AD → lowers u and increases v

Tested with help wanted index (the OG job postings data)

4. Optimal Unemployment, benefits, etc

4.1. Michaillat, Pascal and Emmanuel Saez. 2021. "Beveridgean Unemployment Gap." JPEplus.

- Would need to derive a Beveridge curve $v(u)$ at the occupation level. In our case, the total number of vacancies posted would probably depend on unemployment, as well as firms productivity's and interactions through the production network. Would need to work out the elasticity of the vacancy rate with respect to unemployment along the Beveridge curve

$$\epsilon = -\frac{u}{v}v'(u)$$

- Would need to introduce home production, unemployment benefits, or some concept of welfare when unemployed. The key tradeoff is between unemployment and cost of vacancy postings. Without a clear idea of the the cost of unemployment relative to employment this is not possible.

- Would need a concept of social welfare that incorporates home production. Could we use total final output produced as a proxy? Within this framework how should we think about home production?

-