Labor Market Concentration and Wealth Inequality

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Abstract

In this paper, we develop a rich quantitative model to study the interaction between labor market concentration and wealth inequality. In our model, concentration affects wealth inequality through three channels. First, large firms pay lower wages while generating profits that go to wealthier shareholders. Second, borrowing-constrained workers cannot afford unemployment, which weakens their bargaining power and lowers their wages—an effect that is stronger in more concentrated markets where unemployment risk is higher. Third, there is lower job mobility in concentrated markets, leaving low-asset workers stuck in low-wage jobs. We utilize microdata and calibrate the model to match trends in U.S. labor markets to quantify the role of increasing concentration in rising wealth inequality over the last three decades. Finally, using our model as a laboratory, we study the optimal mix of minimum wage (a tax borne by employers) and social welfare (a tax on society as a whole). Our framework is well suited for this analysis, as it highlights how a worker's ability to insure against risk influences the impact of employer market power.

Keywords: *Market power, monopsony, wealth inequality, borrowing constraints*

JEL Codes: *E24, E21, C63*

1 Introduction

Recent studies indicate that the distribution of wealth has shifted significantly over time, with a notable increase in inequality (Piketty, 2014). The share of wealth held by the top 1% in the United States rose from approximately 25% in 1980 to over 40% in recent years (Saez and Zucman, 2016). This increase in wealth inequality has coincided with another long-term trend: rising concentration in the labor market. For instance, the share of employment held by the top-4 firms in the retail sector more than doubled, increasing from 12% in the 1980s to about 30% by 2010 (Autor et al., 2017). In concentrated markets, workers have limited outside options, giving employers greater market power to suppress wages. This effect can be especially pronounced for workers with constrained financial resources, as it limits their ability to wait for better job opportunities. As a result, labor market concentration can contribute to wealth inequality both by exacerbating wage suppression for workers lower on the wealth distribution and by redirecting the profits from reduced wages to wealthier shareholders.

In this paper, we first quantify the impact of rising employer concentration on wealth inequality. To do so, we develop a rich quantitative model that captures key channels through which these two interact. We calibrate the model to match trends in U.S. labor markets, defined by industry and location, from 1990 to 2022. Second, leveraging the strength of our framework, which is well-suited for analyzing labor market policies such as minimum wage and unemployment insurance, we conduct a series of counterfactual exercises to evaluate their impact.

For the modeling framework, we embed a job search model with large firms into a model of consumption and savings. In our model, workers are risk-averse and can borrow or save by holding two types of risk-free assets: capital, which is used as an input in production, and equity in firms' profits. Workers face a borrowing constraint, as in Aiyagari (1994), which implies that households cannot perfectly insure themselves against unemployment risk. Job search is random, with both unemployed and employed workers sampling job offers from firms with different productivity levels. On-the-job search creates a job ladder where workers gradually transition to more productive firms, deriving higher and higher value from successive employment matches.

Wages in our model are determined through strategic bargaining between firms and workers. Lower-asset unemployed workers, particularly those constrained by borrowing limits, have worse fallback options, which weakens their position during bargaining and leads to lower negotiated wages. Finally, because our model includes a finite number of firms rather than an infinite continuum of atomistic firms, these firms also exert market power in two additional ways. First, through a novel channel that we introduce—firms facing vacancy posting costs strategically post vacancies to control market tightness and strengthen their position in wage bargaining. Second, as in Jarosch et al. (2024), workers negotiating with a firm that dominates a significant share of the market have worse outside options, giving large firms greater ability to pay wages below the workers' marginal productivity.

In our model, market concentration impacts wealth inequality through multiple channels. First, large firms pay workers lower wages while generating profits, which are then distributed to shareholders—individuals who are already wealthier. Second, workers with limited assets, especially those unable to borrow freely, cannot afford to stay unemployed. This weakens their position in wage bargaining, resulting in lower negotiated wages for low-asset workers. The impact of the borrowing constraint is more severe when there are fewer firms in the market, as there is higher unemployment risk. Third, when markets are dominated by a few firms, workers have fewer opportunities to change jobs, leaving low-asset workers who start in low-wage roles stuck in those positions with limited upward mobility.

To calibrate the model, we represent the U.S. economy as a collection of labor markets, each represented by a combination of Metropolitan Statistical Areas (MSAs) and 2-digit NAICS sectors. We use data from the Survey of Income and Program Participation (SIPP) to estimate the joint empirical distribution of wages and assets within different firm-size bins. Additionally, we utilize the Business Dynamics Statistics (BDS) to calculate the share of firms within each firm-size bin across various markets for the years 1990–2022. These shares act as a measure of market concentration, reflecting how the presence of large firms varies across markets and evolves over time. We calibrate the model to match the 1990 economy and then examine how changes in firm size have influenced wealth inequality in the present day.

Related Literature. Our paper builds on multiple strands of the literature. It is the first to integrate a labor search model with large firms into a Bewley-Huggett-Aiyagari (BHA) economy (Bewley, 1980; Huggett, 1993; Aiyagari, 1994), enabling us to study the effects of market concentration in a setting with unemployment risk and limited insurance. While prior studies have incorporated random search (Krusell et al., 2010; Lise, 2012) and directed search (Chaumont and Shi, 2022) within a BHA framework, their models have atomistic, competitive firms with no market power.

Standard approaches to modeling market power in the labor market have traditionally followed the monopsony framework of Robinson (1934).[1] The core idea in these models is that large firms "underhire" and "underpay" relative to the perfectly competitive benchmark. The job search model here builds on Jarosch et al. (2024) (henceforth referred to as JNS), who depart from this standard approach and incorporate granular firms into a canonical random search and bargaining model, the Diamon-Mortensen-Pissaradis (DMP) model. In their model, firm size impacts the bargaining position of workers, affecting wages rather than employment quantities.

We extend the model in JNS by reintroducing elements of traditional monopsony, where firms act strategically. Specifically, firms in our model internalize congestion effects and strategically post vacancies to influence market tightness and strengthen their bargaining position in wage negotiations. This restores the connection between market concentration and employment quantities, as in classic monopsony models, while still allowing for unemployment risk. Additionally, we expand the JNS framework by incorporating on-the-job search, similar to Bagga (2023).

Finally, we revisit the question of the optimal minimum wage, which depends on the degree of employer market power. In our model, workers close to the borrowing constraint face greater market power from employers, suggesting that minimum wage policies could provide the greatest benefits to these workers. This highlights a previously overlooked aspect of minimum wage policy—its role in addressing incomplete insurance, a key channel in our framework. Recent studies on optimal minimum wages often abstract from unemployment

[1] See Card et al. (2018) and Berger et al. (2022a) for recent applications, and refer to Manning (2021) and Azar and Marinescu (2024) for a review of the literature.

risk (Berger et al., 2022b) and incomplete insurance (Hurst et al., 2022). By incorporating these factors, our work extends this literature by providing a more comprehensive framework to assess the impact of minimum wage policies in settings with borrowing constraints and labor market frictions.

2 Model

In this section, we build upon the random search model presented in JNS. As in JNS, workers in our model apply to jobs distributed across a finite number of firms, wages are Nash bargained, and granular employers exhibit market power by not competing with themselves. However, our framework differs in two key ways. First, workers are risk-averse and have the ability to borrow or save using a single risk-free asset. This addition enables us to study the interplay between wealth distribution and market structure. Second, we endogenize firms' vacancy decisions by replacing the "free-entry" condition in JNS with an optimization condition for granular firms operating strategically.

Ultimately, we will incorporate on-the-job search and allow individuals to save in both capital and firm equity. However, for now, we begin with a simplified model to ensure that the comparative statics, without these additional elements, align with the patterns observed in the data.

2.1 Setup

Time is continuous, and there is no aggregate uncertainty. Within a labor market, there is a unit measure of infinitely lived workers and a $M \in \mathbb{N}$ number of granular firms, each differing in productivity denoted by $z_i \in \{z_1, z_2, \ldots z_M\}$. Since firms are granular, each firm i controls a positive measure of vacancies v_i.

Workers can be either employed or unemployed. Employed workers exogenously separate from their employer at rate δ. Workers are homogeneous in terms of productivity, and when employed at firm i, a worker produces z_i units of the final good. Thus, workers are identical ex ante, but differ ex post due to different labor market histories.

2.1.1 Matching

The rate at which workers encounter job openings is described by a constant returns to scale matching function, $m(u, v)$, where u is the unemployment rate and $v = \sum_{i=1}^{M} v_i$. Job offers for unemployed workers arrive at the Poisson rate $\lambda \equiv m(u, v)/u$ and vacancies meet a worker at the rate $q \equiv m(u, v)/v$. Additionally, since each vacancy encounters workers at the same rate, by law of large numbers the rate at which an unemployed worker encounters firm i is given by $\lambda\pi_i$, where $\pi_i = v_i/v$.

When an unemployed worker encounters an open vacancy, wages are bargained as outlined below. The bargained wages never exceed the firm's marginal productivity, so a firm never rejects any matches. Unemployed workers, however, may decline offers if the value of rejecting the offer outweighs the value of working for the offered wage. If the worker rejects an offer from a firm, the firm bars the worker from it's future job opportunities for the duration of the worker's current unemployment spell. Like JNS, we do not allow a worker to be permanently barred from a firm they reject, to maintain tractability.

2.1.2 Workers

Workers maximize their lifetime utility given by

$$\mathbb{E}_0 \int e^{-\rho t} u(c_t) dt,$$

where ρ is the subjective rate of time preference and c_t is consumption at time t. In what follows, we omit the time subscripts when possible for brevity.

Unemployed workers receive a flow value of b, while employed workers receive their contracted wages. Workers make consumption decisions both when employed and unemployed. Assets are subject to a lower bound $\underline{a} \leq 0$ and evolve according to

$$\dot{a} = ra + \omega - c,$$

where a is the current asset level, r is the risk free interest rate, and ω is the household's labor income or unemployment income.

Let $W(a,w)$ denote the expected present value for an individual employed with assets a and a wage w, and let $U(a)$ represent the expected present value of being unemployed with asset level a. Given that the worker chooses consumption to maximize utility subject to the asset evolution equation and a borrowing constraint, we can express the flow value of employment as follows:

$$\rho W(a,w) = \max_{c} \; u(c) + \partial_a W(a,w)[ra + w - c] + \delta[U(a) - W(a,w)] \tag{1}$$

Throughout the paper, we use $\partial_x Y$ as a short-hand notation to denote $\partial Y / \partial x$.

Now consider the problem of a worker who is currently unemployed with assets a. The worker will accept a job offer from firm i if the value of accepting it exceeds the value of rejecting it. The value of accepting the offer is given by $W_i(a) = W(a, w_i(a))$, where $w_i(a)$ represents the bargained wage between firm i and an unemployed worker with assets a. Conversely, if the worker rejects the offer, they receive $\tilde{U}_i(a)$, which denotes the value of unemployment for a worker excluded from firm i. Hence, we can express the value of being unemployed as follows:

$$\rho U(a) = \max_{c} \; u(c) + \partial_a U(a)[ra + b - c] + \sum_{i=1}^{M} \lambda_i \left(\max\{W_i(a), \tilde{U}_i(a)\} - U(a) \right) \tag{2}$$

Finally, the value of unemployment for a worker excluded from firm j is given by

$$\rho \tilde{U}_j(a) = \max_{c} \; u(c) + \partial_a \tilde{U}_j(a)[ra + b - c] + \sum_{i \neq j} \lambda_i \left(\max\{W_i(a), \tilde{U}_i(a)\} - \tilde{U}_j(a) \right) \tag{3}$$

2.1.3 Wage Determination

Denote $J_i(w)$ as the value of a filled job to firm i at wage w and V_i as the value of an empty vacancy. Then the Nash-bargained wage for a worker with assets a at firm i is determined by:

$$w_i(a) \in \arg\max_{w} \; \left(W(a,w) - \tilde{U}_i(a) \right)^{\beta} \left(J_i(w) - V_i \right)^{1-\beta} \tag{4}$$

As is typical, the firm and the worker take each other's outside options, $\tilde{U}_i(a)$ and V_i, as given. Here, the firm also takes the worker's value of unemployment $U(a)$ as given. See Appendix A.3 for additional details on wage determination.

Note that the firm's value from a filled job does not depend on the worker's assets. However, the firm's flow profit from hiring a worker with lower assets will be higher due to the lower bargained wages for such a worker.

2.1.4 Firm Optimization

The value of a filled job to firm i at wage w is given by

$$rJ_i(w) = z_i - w + \delta[-J_i(w)] \tag{5}$$

We will focus on the stationary equilibrium. For the characterization of steady-state distributions over assets and employment states, see Appendix A.4. In which case, firm's value from an empty vacancy is given by:

$$rV_i = -c(v_i) + q(u, v)\left(\int_{\underline{a}}^{\infty} J_i(w_i(a))g_i^u(a)\, \mathrm{d}a - V_i\right) \tag{6}$$

where $c(v_i)$ is flow cost of posting a vacancy that depends on total number of vacancies posted by firm i and $g_i^u(a)$ is the steady-state density of workers who are unemployed but not excluded from firm i and have assets a.

From the firm's perspective, the bargained wage $w_i(a)$ is a function of the worker's outside options, summarized by $U(a)$ and $\tilde{U}_i(a)$, as well as the firm's outside option, V_i. Firms choose vacancies to maximize their steady-state profits, given by $\Pi_i = V_i v_i$. We assume that while making this choice, firms recognize that their vacancy decision affects the rate at which empty vacancies meet workers, $q(u, v)$, and also influences the contracted wages, $w_i(a)$, through changes in their outside option, V_i. However, the firm takes the unemployment rate u, the vacancies of other firms $\boldsymbol{v}_{-i}$, the workers' value of unemployment $U(a)$, their outside option in bargaining $\tilde{U}_i(a)$, and the steady-state distribution of workers $g(.)$ as given.

In an abuse of notation, let $V_i(v_i|u, \boldsymbol{v}_{-i}, \tilde{U}_i, U, g)$ denote the solution to the nonlinear equation in terms of V_i given by substituting $w_i(a, V_i)$ in eq. (6). Then firm i's vacancy-choice problem can be written as:

$$\max_{v_i} \; V_i(v_i|u, \boldsymbol{v}_{-i}, \tilde{U}_i, U, g)v_i$$

Thus, equilibrium vacancies are determined by the following first-order condition:

$$V_i(v_i|u, \boldsymbol{v}_{-i}, \tilde{U}_i, U, g) + \frac{\partial}{\partial v_i} V_i(v_i|u, \boldsymbol{v}_{-i}, \tilde{U}_i, U, g) \cdot v_i = 0 \tag{7}$$

where,

$$\frac{\partial}{\partial v_i} V_i(v_i|u, \boldsymbol{v}_{-i}, \tilde{U}_i, U, g) = \frac{-c'(v_i) + \partial_v q(u,v)\left(\int_{\underline{a}}^{\infty} J_i(w_i(a)) g_i^u(a)\, \mathrm{d}a - V_i\right)}{r + q(u,v) + [q(u,v)/(r+\delta)] \int_{\underline{a}}^{\infty} \partial_{V_i} w_i(a) g_i^u(a)\, \mathrm{d}a}$$

JNS assume that firms do not act strategically and do not internalize the impact of their vacancy choice on V_i. Thus, the first-order condition analogous to JNS in this setting would be $V_i = 0$, similar to the free-entry condition in the DMP model.

2.2 Computation

To compute the stationary equilibrium, we define an equilibrium residual function and use a nonlinear equation solver to find the equilibrium aggregates. The input to this function is the number of vacancies per firm type $\{v_i\}_{i=1}^M$, the value of a vacancy per firm type $\{V_i\}_{i=1}^M$, the unemployment rate u, and the number of unemployed people who are excluded from firm i, $\{\tilde{u}_i\}_{i=1}^M$. Applying the number of vacancies and unemployment rates in the matching function, we get the job match rates.

In this model, the wages bargained between the firm and the household are a function of the firm's productivity, the value of a vacancy, and household assets. We need to solve this simultaneously with the household value functions. With an initial guess of the value functions, we solve for the wage function. Then, we update the value functions and continue this loop until both the value and wage functions have converged.

Once convergence is achieved, we compute the distribution of households and household aggregates. Using the household aggregates, we compute the residual values for the equilibrium conditions. The roots of this nonlinear function are then solved using a standard nonlinear solver.

3 Numerical Examples

In this section, we illustrate comparative statics from our model by utilizing several numerical illustrations. For these illustrations, we use the following functional forms. The utility function is given by $u(c) = (c^{1-\gamma} - 1)/(1-\gamma)$. The matching technology follows $m(u, v) = Au^{\alpha}v^{1-\alpha}$. The vacancy posting cost is specified as $c(v_i) = v_i^{1+\sigma}/(1+\sigma)$. The parameter values used are displayed in Table 1.

Table 1: Parameters for Numerical Examples

Parameter	Value	Parameter	Value
A	0.5	γ	1.1
$\underline{a}$	0.0	κ	10.0
α	0.5	ρ	0.004
b	0.1	r	0.002
β	0.5	σ	1.3
δ	0.125	z	0.5

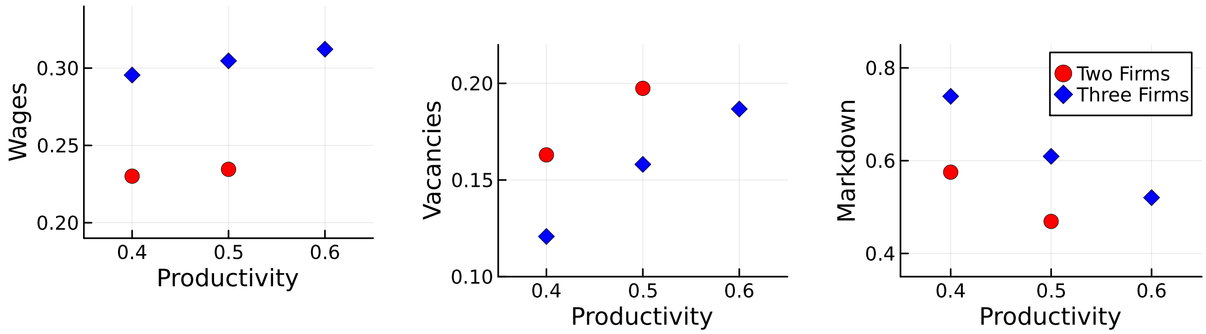
3.1 Size-based market power

To begin, we examine the effect of firm size on its market power. Figure 1 illustrates the outcomes of firms in two different markets. The first market consists of two firms with productivity levels $z_1 = 0.4$ and $z_2 = 0.5$, while the second market includes an additional, higher-productivity firm with $z_3 = 0.6$. In both markets, wages and vacancy shares increase with productivity, aligning with the positive size-wage gradient documented in the literature.

Although the highest-productivity firm offers the highest wage, it also has the smallest average markdown, which is defined as the ratio of wages to productivity. This occurs because the most productive firm holds the largest share of posted vacancies, making the cost of rejecting an offer from this firm substantially higher compared to rejecting a smaller firm's offer. As a result, larger firms have greater bargaining power during wage negotiations.

When the third higher-productivity firm enters the market, it becomes the largest firm in the market. However, its market share is smaller than that of the previous market leader. In this case, the reduction in market power due to the presence of an additional firm outweighs the

FIGURE 1: EFFECTS OF A HIGH-PRODUCTIVITY NEW ENTRANT



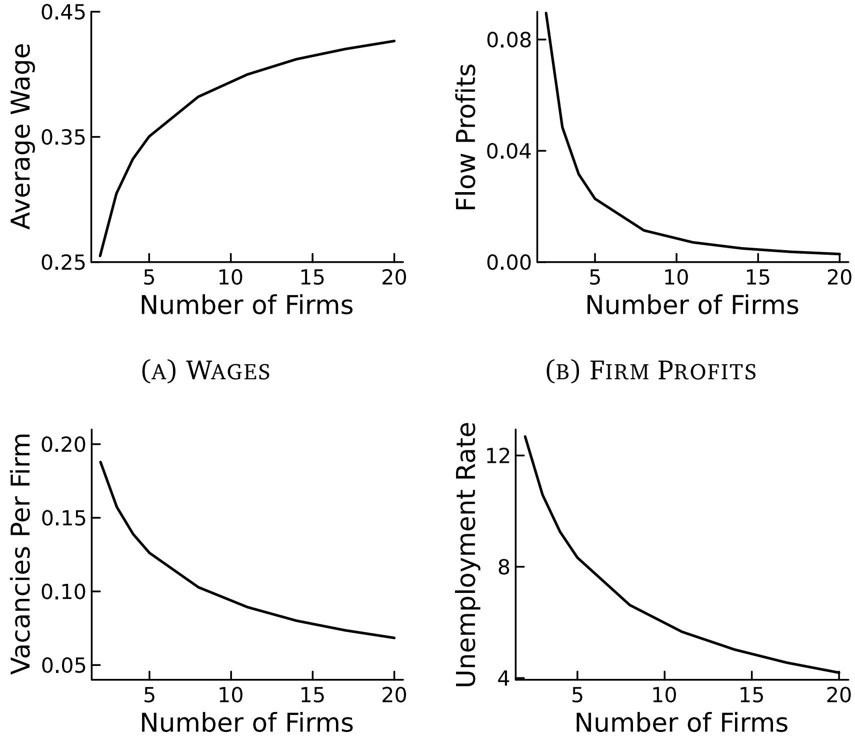
potential market power gains from having a higher-productivity firm. This decline in market power is not confined to the new entrant; every firm in the market now offers substantially higher wages. Importantly, this wage increase does not come at the expense of higher unemployment. Instead, total vacancies in the market rise, leading to a lower unemployment rate compared to the two-firm market.

3.2 *Increasing the number of homogeneous firms*

To examine the effect of labor market concentration, we vary the number of equally productive firms in a market. Figure 2 shows how market outcomes change as the number of firms in the market increases. First, as the number of firms increases, the average wage in the market increases. This is because, with more firms in the market, the penalty faced by a worker for rejecting a job offer is lower than in more concentrated markets. Under our baseline parameterization, the wage gain is substantial: going from a market with two firms to a market with five firms results in a twenty percent increase in the average wage in a labor market. This substantial gain in wages is paired with a drop in each firm's profit. This is because each individual firm's labor market power decreases as the number of firms increases. The decrease in profits leads to firms cutting back on the number of vacancies they post. However, the decrease in an individual firm's vacancies is made up for by the growth in the number of firms. So, total vacancies increase as the number of firms increases. This leads to a reduction in the unemployment rate as the number of firms increases.

There is heterogeneity in the impact of labor-market concentration. Figure 3 examines out-

FIGURE 2: IMPACT OF CONCENTRATION ON AGGREGATE OUTCOMES



(A) WAGES

(B) FIRM PROFITS

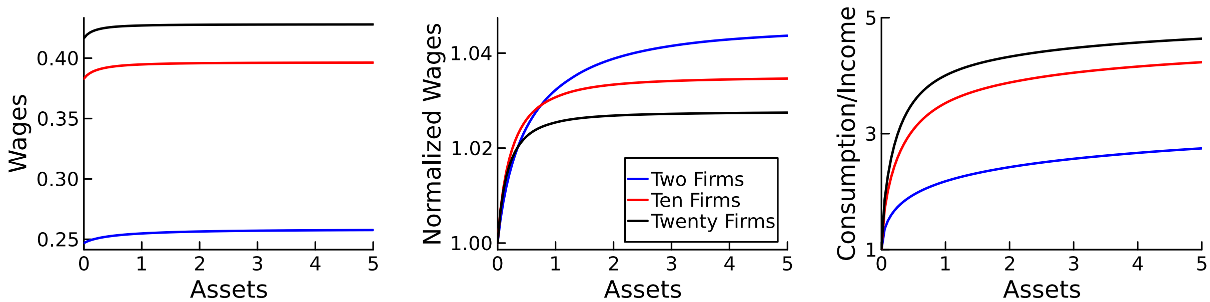
(C) VACANCIES

(D) UNEMPLOYMENT

comes for households with different asset levels with two, ten, and twenty firms in the market. Panel 3a shows the wage offer an unemployed household with assets a receives after a match. As concentration decreases, the wage offer function shifts upwards. To closely examine how this effect varies by asset levels, we plot wages as a fraction of the wage at the lowest asset level for each case in Panel 3b. First, note that in all three cases, the wage function is increasing in assets, meaning households at the borrowing constraint are receiving lower offers than households with more assets. This is because households with more assets can more readily afford to reject low-wage offers and wait for another job offer.

Secondly, the extent to which wages are reduced for low-asset workers relative to equally productive high-asset workers depends on the number of firms in the market. In particular, the wage haircut faced by borrowing-constrained households in a market with two firms is more than twice as large as that of a household in a market with twenty firms. The reason for this is that rejecting a job offer in a two-firm market leads to a significantly longer unemployment

FIGURE 3: HETEROGENEOUS IMPACT OF CONCENTRATION ON UNEMPLOYED HOUSEHOLDS



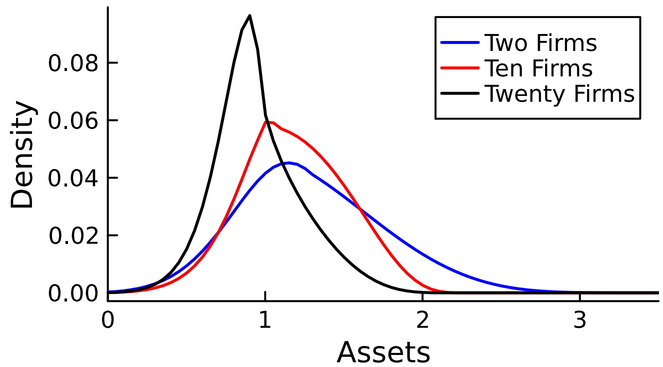
(A) WAGES (B) WAGE COMPRESSION (C) CONSUMPTION

spell.[2] Since workers draw down their assets while unemployed, prolonged spells increase the likelihood of approaching the asset lower bound, which they seek to avoid. As a result, workers who anticipate longer unemployment spells are more willing to accept lower wages to avoid ending up at the asset lower bound.

Figure 4 presents the steady-state asset density function for markets with two, ten, and twenty equally productive firms. The first key observation is that households, on average, save more in highly concentrated markets. This is because unemployment risk is higher in concentrated markets, as firms post fewer vacancies. As a result, an unemployed worker is less certain of finding a job in the next period, and an employed worker who may lose their job faces a longer expected unemployment spell. This increased uncertainty leads to higher precautionary savings. At the same time, the spread of the asset distribution is wider in more concentrated markets. This is because higher market concentration increases both the savings intensity of employed workers—pushing the distribution further to the right—and the duration of unemployment spells, which leads to greater asset depletion for some households—extending the distribution to the left. As a result, the overall dispersion of assets grows as market concentration rises.

[2] Recall that when a household rejects a job offer from a firm, they are excluded from other jobs at the same firm for rest of the unemployment spell.

FIGURE 4: DISTRIBUTION OF ASSETS



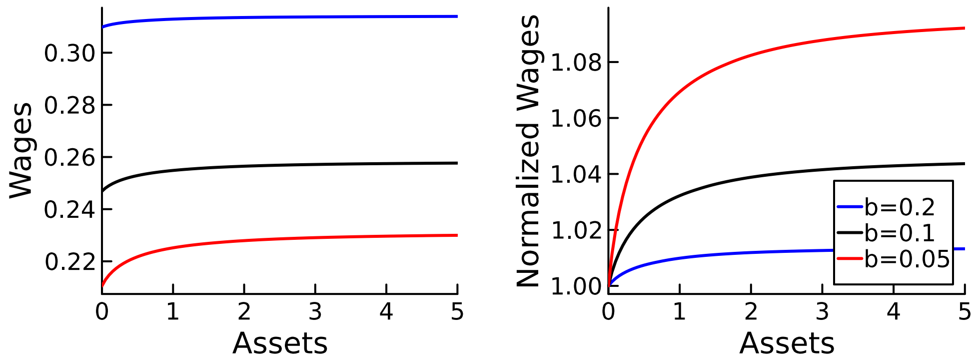
3.3 The Role of Social Insurance

In the model, an unemployed household receives a guaranteed payment b for the entirety of their unemployment spell. Figure 5 examines how wages would change under different levels of this benefit. As the unemployment benefit increases, the wage offer curve shifts up. The increased benefit increases the value of being unemployed, which puts workers in better bargaining positions with potential employers.[3] Additionally, low-asset workers are taking a smaller wage cut as the unemployment benefit increases. This is because the benefit serves as a substitute for the household's savings as a source of insurance. This is especially important for asset-poor households who have limited insurance ability. Thus, social insurance can mitigate both the average impact of monopsony power and its heterogeneous effects across workers with different asset levels.

Figure 6 examines how the impact of unemployment insurance changes with market concentration. We recompute the stationary distribution while varying the number of equally productive firms under both the baseline unemployment benefit and a scenario where the benefit is doubled. Panel 6a shows that across all market concentrations, average wages increase as the unemployment benefit rises. Moreover, the more concentrated the market, the larger the impact of increasing the benefit on wages. Specifically, in a labor market with only two firms, doubling the benefit leads to an approximately 22% increase in average wages, whereas in a

[3]The worker's marginal product of labor is constant across all three cases. So, an increase in wages solely comes from a decrease in the firm's monopsony power.

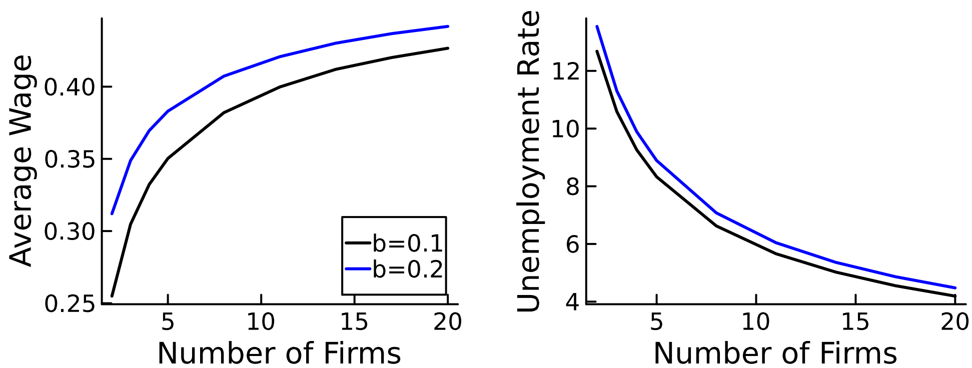
FIGURE 5: CHANGING THE LEVEL OF UNEMPLOYMENT BENEFITS



(A) WAGES

(B) WAGE COMPRESSION

FIGURE 6: ROLE OF UI IN CONCENTRATED MARKETS



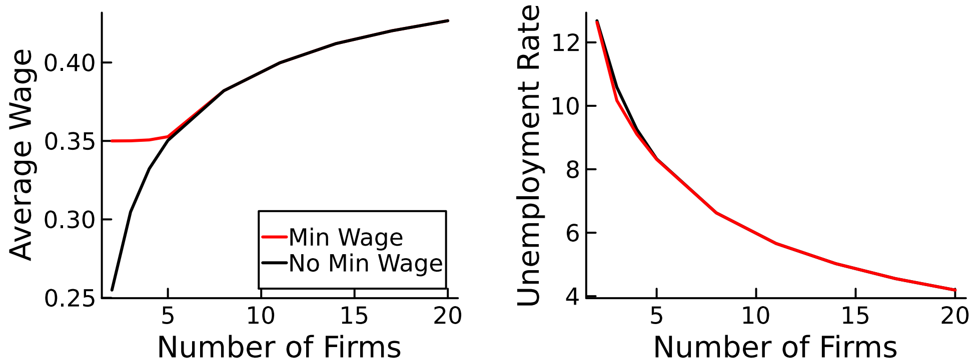
(A) WAGES

(B) UNEMPLOYMENT

market with twenty firms, the increase is closer to 4%. As previously discussed, a higher unemployment benefit strengthens workers' wage bargaining positions, resulting in higher wages. However, this effect diminishes in less concentrated markets, where workers already have significantly stronger bargaining positions compared to those in more concentrated markets.

However, the improvement in workers' bargaining power and the corresponding reduction in monopsony power comes at a cost. Since higher wages reduce the return on posting vacancies, firms respond by posting fewer vacancies, leading to an increase in the unemployment rate. Panel 6b shows that as the unemployment benefit doubles, the unemployment rate rises by

FIGURE 7: IMPACT OF MINIMUM WAGE IN CONCENTRATED MARKETTS



(A) WAGES

(B) UNEMPLOYMENT

approximately 7%.[4] Notably, the percentage increase in the unemployment rate is roughly the same across different levels of market concentration.

3.4 *The Minimum Wage*

Finally, we examine the impact of the minimum wage and its interaction with market concentration. Figure 7 shows average wages and the unemployment rate across markets with different numbers of homogeneous firms, comparing cases with a minimum wage of 0.35 and no minimum wage. The wage improvement from the minimum wage is larger in more concentrated markets, as it binds for more workers. For instance, when there are only two firms, the wage floor binds for every household. Moreover, the employment effect of the minimum wage is nearly zero. Hence, our model reflects a key insight from empirical evidence and academic discourse on the minimum wage: in highly concentrated markets, minimum wage can increase wages without causing negative employment effects.

[4]When there are two firms in a market, the unemployment rate increases by 0.86 percentage points. When there are twenty firms, it increases by 0.29 percentage points.

TABLE 2: CALIBRATION PARAMETERS

Parameter	Description	Value	Target/Source
		Externally Calibrated	
γ	Coefficient of relative risk aversion	2	
ρ	Discount rate	0.05	
r	Interest rate	0.03	
α	Elasticity of the matching function	0.5	
		Internally Calibrated	
A	Efficiency of the matching function		UE rate
δ	Job destruction rate		Unemployment rate
b	Unemployment flow value		$0.45 \times$ wages
$\{z_j\}_{j=1}^{J}$	Levels of the productivity distribution		Wage distribution
$f_m(z)$	Mass of the productivity distribution	–	BDS
β	Worker's bargaining power		$Corr(w, a) \mid$ firm size
σ	Vacancy posting cost parameter		HHI

4 QUANTIFYING THE THEORY

We calibrate the model to quantitatively study the impact of concentration on inequality and conduct policy counterfactuals. In Section 4.1, we outline our calibration strategy for determining the parameters. In Section 4.2, we validate the model by comparing model-generated moments at chosen parameters to their empirical counterparts.

4.1 Calibration

We match long-run averages of empirical moments for the US economy over the period 1990–2022 to the moments implied by the stationary equilibrium of our model. We assume the economy consists of a set of labor markets, each defined as a combination of Metropolitan Statistical Areas (MSAs) and 2-digit NAICS sectors.[5] The model is solved and simulated separately for each labor market. Whenever the corresponding empirical moment can be measured at the market level, we select market-specific parameters and index markets by m. A unit of time is defined as one month.

[5] This choice is driven by data availability.

Preferences. The preferences over consumption are represented by the Constant Relative Risk Aversion (CRRA) utility function,

$$u(c) = \begin{cases} \dfrac{c^{1-\gamma}-1}{1-\gamma}, & \gamma > 0 \\ \log(c), & \gamma = 1, \end{cases}$$

where γ is the coefficient of relative risk aversion. In the baseline calibration, we set $\gamma = 2$. The workers' discount rate is set to 5 percent, and the risk-free interest rate is set to 3 percent.

Matching technology. The matching function takes the Cobb-Douglas form and is given by $m(u_m, v_m) = Au_m^{\alpha} v_m^{1-\alpha}$, where A represents the matching efficiency, and α denotes the elasticity of matches with respect to the stock of unemployed workers. The match elasticity is set to the standard value of 0.5. The matching efficiency parameter, A, is pinned down by the aggregate monthly UE rate of 0.45 (Shimer, 2005).

Separation rate (δ). We utilize the aggregate UE rate of 0.45 with the steady-state unemployment rate of 5.7 percent from Shimer (2005) to pindown δ, which is assumed to be the same across all markets.

Flow value of unemployment (b). We calibrate b to equal 0.45 replacement rate of wages for individual workers. (Replacement rates available here.)

Firm productivity distribution. In our model, a firm's productivity is closely tied to its size. Since productivity is unobservable, we utilize data available by firm size to proxy for the firm-productivity distribution. Due to the lack of detailed measures of firm size in publically available data, we assume firm productivity takes five values corresponding to the five firm size bins consistently observable in the SIPP and BDS. This allows us to quantify the relationship between wages and assets within each firm bin using SIPP data and get the share of firms in each bin from the BDS. [6] While the shares for five productivity types are directly observable from the BDS, the five productivity values are pinned down by the distribution of wages, conditional on assets within each bin.

[6] Note that technically, the smallest firm size bin in SIPP is "less than 20", but it is "less than 26" in the BDS data. Alternatively, we can do 4 bins instead of 5.

Worker's bargaining power (β). A worker's wages in the model depend on their outside option, which depends on their assets. Conditional on firm type, a higher β would lead to a lower correlation between assets and wages for identical workers. Essentially, if workers have higher bargaining power, they are able to get a higher share of the firm surplus and the relationship between their outside option and wages is weakened. We target the correlation between assets and wages to pin down β.

Vacancy posting cost. Flow cost of posting a vacancy is given by the iso-elastic function $c(v_i) = v_i^{1+\sigma}/(1+\sigma)$. The cost parameter σ determines the distribution of vacancies across firms. In particular, keeping else constant, a higher σ means vacancies are more concentrated at high-productivity firms. We will target the aggregate HHI index to pin this. Once we add capital to the model, we will also target the labor share of income.

4.2 Validation

5 Results and Policy Counterfactuals

6 Conclusion

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A Model Appendix

A.1 Reservation wage/productivity

Reservation wage for firm i for asset a worker $w_i^r(a)$ is characterized by:

$$W(a, w_i^r(a)) = \tilde{U}_i(a)$$

If in equilibrium, $z_i > z_j$ implies $v_i > v_j$ and $w_i(a) > w_j(a)$ for all a, then $\tilde{U}_i(a) < \tilde{U}_j(a)$. Hence, we would have that $w_i^r(a) < w_j^r(a)$, such that higher productivity firms are more sought after. This implies that there is a threshold $z_r(a)$, such that the worker accepts all offers from firms with $z > z_r(a)$ in the equilibrium. If firms ordered by productivity $z_1 < z_2 < \ldots < z_M$ then denote $i_r(a) = \arg\min_i \{z_i | z_i > z_r(a)\}$. In this case we can write the value functions as:

$$\rho U(a) = \max_{c \geq 0} \; u(c) + \sum_{i=i_r(a)}^{M} \lambda_i \left[W_i(a) - U(a) \right]$$

$$\text{s.t.} \quad \dot{a} = ra + b - c$$

A.2 Optimal policy functions

A worker with asset level a and flow income ω can be in one of the following $2M + 1$ states,

$$\chi \in \{u_0, \tilde{u}_1, \tilde{u}_2, \ldots, \tilde{u}_M, e_1, e_2, \ldots, e_M\}.$$

Here, u_0 represents the state of being unemployed and not excluded from any firm, $\tilde{u}_i$ represents the state of being unemployed and excluded from firm i, and e_i represents the state of being employed at firm i.

Denote the optimal consumption and saving policy functions by $c(a, \omega, \chi)$ and $s(a, \omega, \chi)$, which are characterized by the following equations:

$$u'(c(a, b, u_0)) = \partial_a U(a)$$

$$u'(c(a, b, \tilde{u}_i)) = \partial_a \tilde{U}_i(a) \quad \text{for } i = 1, 2, \ldots, M$$

$$u'(c(a, w, e_i)) = \partial_a W(a, w) \quad \text{for } i = 1, 2, \ldots, M$$

Note that $\omega = b$ in all of the unemployed states. Also, the consumption policy function in all employed states is identical so we can denote $c_e(a,w) \equiv c(a,w,e_i)$. Finally, the optimal job-offer acceptance function, $I_i(a)$, is defined as follows:

$$I_i(a) = \begin{cases} 1, & W_i(a) \geq \tilde{U}_i(a) \\ 0, & \text{otherwise} \end{cases}$$

A.3 Wage Determination

The bargained wage is characterized by eq. (4), with the corresponding first-order condition (FOC) given by:

$$\beta[J_i(w) - V_i]\partial_w W(a,w) + (1-\beta)[W(a,w) - \tilde{U}_i(a)]\partial_w J_i(w) = 0$$

Note that from eq. (1), we can write:

$$W(a,w) = \frac{u(c_e(a,w)) + u'(c_e(a,w))[ra + w - c_e(a,w)] + \delta U(a)}{\rho + \delta}$$

Then by envelope theorem,

$$\partial_w W(a,w) = \frac{u'(c_e(a,w))}{\rho + \delta}$$

Also note from eq. (5),

$$J_i(w) = \frac{z_i - w}{\rho + \delta}, \qquad \partial_w J_i(w) = \frac{-1}{\rho + \delta}$$

Plugging the above expressions in the FOC:

$$\beta[z_i - w - (\rho + \delta)V_i]u'(c_e(a,w)) = (1-\beta)[H(a,w) + \delta U(a) - (\rho + \delta)\tilde{U}_i(a)]$$

where $H(a,w) \equiv u(c_e(a,w)) + u'(c_e(a,w))[ra + w - c_e(a,w)]$.

A.4 Steady-state distribution

Let $g(a,\omega,\chi)$ denote the steady-state joint distribution over assets, flow income, and labor market states. Let $g_j^u(a)$ represent the proportion of unemployed workers available to firm j (i.e., not in firm j's excluded set), defined as $g_j^u(a) = g(a,b,u_0) + \sum_{i \neq j} g(a,b,u_i)$. Also, note that the steady-state unemployment rate can be written as:

$$u = \sum_{i=0}^{M} \int g(a, b, u_i)\ \mathrm{d}a$$

The following Kolmogorov Forward (or Fokker-Planck) equations characterize the steady-state distribution.

Unemployment without exclusion:

$$-\frac{d}{da}\left[s(a, b, u_0) g(a, b, u_0)\right] - g(a, b, u_0) \sum_{i=1}^{M} \lambda_i + \delta \sum_{i=1}^{M} \int g(a, w, e_i)\ \mathrm{d}w = 0$$

For $\omega \neq b$, $g(a, \omega, u_0) = 0$.

Unemployment with exclusion, for $j = 1, 2, \ldots, M$,

$$-\frac{d}{da}\left[s(a, b, \tilde{u}_j) g(a, b, \tilde{u}_j)\right] - g(a, b, \tilde{u}_j) \sum_{i \neq j} \lambda_i + \lambda_j [1 - I_j(a, b)] \left(g(a, b, u_0) + \sum_{i \neq j} g(a, b, \tilde{u}_i) \right) = 0$$

For $\omega \neq b$, $g(a, \omega, u_j) = 0$ for $j = 1, 2, \ldots, M$.

Employment, for $j = 1, 2, \ldots, M$,

$$-\frac{d}{da}\left[s(a, \omega, e_j) g(a, \omega, e_j)\right] - \delta g(a, \omega, e_j) + \lambda_j I_j(a, b) \left(g(a, b, u_0) + \sum_{i \neq j} g(a, b, u_i) \right) = 0$$

A.5 Aggregation

Note that the assumed matching technology implies that the contact rate $\lambda_m = A(v_m / u_m)^{1-\alpha}$. According to the model, the UE transition rate is given by $\lambda_m \times P_m$, where P_m is the probability that a match is formed conditional on meeting. The aggregate UE rate then would be:

$$A \cdot \frac{\sum_m (v_m / u_m)^{1-\alpha} \times P_m \times u_m}{u}$$

So, matching efficiency A would be pinned by the aggregate UE rate. To help pin δ, target the aggregate steady-state unemployment rate:

$$u = \sum_m \frac{\lambda_m P_m}{\lambda_m P_m + \delta} \pi_m^L$$

B Extensions

B.1 Unemployment flow depends on past wages

Value of being employed with assets a and wages w:

$$\begin{aligned}\rho W(a,w) = \max_c \; & u(c) + \partial_a W(a,w)[ra + w - c] \\ & + \delta[U(a,b(w)) - W(a,w)]\end{aligned} \tag{8}$$

Value of being unemployed with assets a and flow income b:

$$\begin{aligned}\rho U(a,b) = \max_c \; & u(c) + \partial_a U(a,b)[ra + b - c] \\ & + \sum_{i=1}^{M} \lambda_i \left(\max\{W(a,w_i(a,b)), \tilde{U}_i(a,b)\} - U(a,b)\right)\end{aligned} \tag{9}$$

Here, $w_i(a,b)$ denotes bargained wage at firm i for an unemployed worker with assets a and flow income b.

Value of being unemployed and excluded from firm j with assets a and flow income b:

$$\begin{aligned}\rho \tilde{U}_j(a,b) = \max_c \; & u(c) + \partial_a \tilde{U}_j(a,b)[ra + b - c] \\ & + \sum_{i \neq j} \lambda_i \left(\max\{W(a,w_i(a,b)), \tilde{U}_i(a,b)\} - \tilde{U}_j(a,b)\right)\end{aligned} \tag{10}$$

Let $g(a,\omega,\chi)$ denote the steady-state distribution over assets, flow income ω and labor market state χ which can take one of the following $2M+1$ values:

$$\chi \in \{u_0, \tilde{u}_1, \ldots, \tilde{u}_M, e_1, \ldots, e_M\}$$

$s(a,\omega,\chi)$ the denotes the optimal saving policy function. Let $I_i(a,b)$ denote the offer acceptance policy function.

Kolmogorov Forward equations:

Unemployment without exclusion:

$$-\frac{d}{da}[s(a,\omega,u_0)g(a,\omega,u_0)] - g(a,\omega,u_0)\sum_{i=1}^{M}\lambda_i + \delta \sum_{i=1}^{M} \int_{w:\omega=b(w)} g(a,w,e_i)\, \mathrm{d}w = 0$$

Unemployment with exclusion, for $j = 1, 2, \ldots, M$,

$$-\frac{d}{da}\left[s(a,\omega,\tilde{u}_j)g(a,\omega,\tilde{u}_j)\right] - g(a,\omega,\tilde{u}_j)\sum_{i\neq j}\lambda_i + \lambda_j[1-I_j(a,b)]\left(g(a,\omega,u_0) + \sum_{i\neq j} g(a,\omega,\tilde{u}_i)\right) = 0$$

Employment, for $j = 1, 2, \ldots, M$,

$$-\frac{d}{da}\left[s(a,\omega,e_j)g(a,\omega,e_j)\right] - \delta g(a,\omega,e_j) + \lambda_j \int_{b:w_j(a,b)=\omega} I_j(a,b)\left(g(a,b,u_0) + \sum_{i\neq j} g(a,b,u_i)\right) \mathrm{d}b = 0$$

B.2 Worker heterogeneity

B.3 On-the-job search

B.4 Capital and equity