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Job market polarization and American poverty

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Abstract

The article posits that the puzzles of stagnating poverty rates amidst high growth and declining unemployment in the United States can be substantially explained by polarized job markets characterized by job quality and job distribution. In recent decades, there has been an increased number of poor-quality jobs and an unequal distribution of jobs in the developed world, particularly in the United States. I have calculated measures of uneven job distribution indices that account for the distribution of jobs across households. A higher value of the uneven job distribution indices implies that there are relatively large numbers of households with multiple employed people and households with no employed people. Similarly, poor-quality jobs are those jobs that do not offer full-time work. Two-way fixed-effect models estimate that higher uneven job distribution across households worsens aggregated poverty at the state level. Similarly, good-quality jobs help households escape poverty, whereas poor-quality jobs do not. This paper suggests that eradicating poverty requires the government to direct labor market policies to be tailored more toward distributing jobs from individuals to households and altering bad jobs into good jobs, rather than merely creating more jobs in the economy. This paper contributes by elaborating on relations of employment and poverty, addressing employment quality and distribution, and providing empirical evidence.

Keywords Job market polarization, Job quality, Job distribution, Poverty, Households

JEL Classification I30, E24, D19

1 Introduction

Poverty in the United States is measured by a threshold, and people fall into and escape poverty for many reasons. Many consider employment as the primary policy solution to all forms of poverty, accounting for both falling into and out of poverty (Middleton and Loumidis 2002; Saunders 2006; Krishna 2007).¹ In the recent pre-pandemic time, the United States reached its highest level of employment in 50 years, with low unemployment. By many metrics, the job market was doing well (Kelly 2019). However, poverty in America has remained stagnant for many decades (Desmond 2018). What kind of

jobs are available? Do they not pay enough to live on? Are these jobs not equally distributed?²

Although it may seem logical that higher employment rates would reduce poverty, as the income and consumption of poor people largely come from their work, the relationship between employment and poverty is not straightforward. While some scholars assume that increasing employment reduces poverty (Cantillon et al. 2003), others believe that creating more non-subsidized jobs may lead to a higher number of low-paid jobs, leaving more working people in poverty (Kalleberg

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¹ Standard literature on poverty identified a wide range of factors that are responsible for poverty such as lack of education (Hofmarcher 2021), industrialization (Kimura and Chang 2017), technology adoption (Comin et al. 2010), redistribution (Jouini et al. 2018), and others. Read Ravallion (2012), McMillan (2016), and Rosenzweig (2012) for a more standard explanation of poverty.

² In economics, this is called the productivity-pay gap when economic expansion does not broaden social uplift.

2009, 2011). In other words, when employment growth occurs at the cost of wage reduction it does not eradicate poverty (Sloane and Theodossiou 1996; Gardiner and Millar 2006). Moreover, poverty reduction may not be realized if employment growth occurs in sectors that do not accommodate many poor people (Ravallion and Datt 2002; Satchi and Temple 2009) or in industries that require higher levels of skills (Loayza and Raddatz 2010) and capital (Siddique 2016). Furthermore, poor people cannot always afford to be unemployed, and they are not necessarily unemployed people (Visaria 1981; Saunders 2002). Despite this complexity, there is little research exploring the relationship between employment and poverty, leading to a lack of evidence-based policy actions in this area. Specifically, there is a need for scientific empirical evidence on the relationship between job distribution, job quality, and poverty, and this paper makes an important contribution in these fields.

Despite strong economic performances, poverty rates in the United States have remained stubbornly high, and past attempts to explain this phenomenon have fallen short (Hoover et al. 2004; Hoynes et al. 2006; Edelman 2013; Meyers 2014; Pacas and Rothwell 2020). In this paper, I argue that job market polarization is a major factor that perpetuates poverty, even during periods of high employment and low unemployment. When jobs are distributed unequally across households and are of poor quality, with no full-time work available, the benefits of job growth fail to reach those who need them the most. This means that the “trickle-down” economy may not work for majority of poor Americans, who face both poor job quality and uneven job distribution. As a result, job growth in a polarized job market does not benefit jobless households, and poverty remains stagnant. Recent data shows that employment-rich households are experiencing faster employment growth than employment-poor households (England 2017), exacerbating the problem. In a more equitable, non-polarized job market, the unemployment rate would be the same for both individuals and households (Gregg et al. 2010).

The United States has not also succeeded in reducing poverty despite high employment rates due to the poor-quality of available jobs. The job market in the United States has become increasingly bifurcated, which has significant implications for poverty reduction strategies and outcomes. This trend started in the 1980s as the service sector began to replace the manufacturing sector and technology started playing major roles in the labor market (Autor and Dorn 2013; Goos et al. 2014; Salvatori 2018). Since then, Americans have faced an increase in low-paying jobs with few hours, little job security, and no entitled benefits. These poor-quality jobs are prevalent across multiple industries and have impacted the daily

lives of millions of Americans. Several studies have documented this trend, including Herzenberg et al. (2000), Desmond and Gershenson (2016), Kelly (2019), Newman (2009), and Kalleberg (2009, 2011). Contrastingly, while some industries like technological offer attractive salaries, promotions, benefits, and even equity in the company, they struggle to find a sufficient pool of skilled applicants to fill their job openings (Goos and Manning 2003; Salvatori 2018; Kelly 2019), contributing to job market polarization. Therefore, economic prosperity alone cannot effectively reduce poverty if it does not generate an adequate number of good-quality jobs (Odhiambo 2011; Page and Shimeles 2015). Unfortunately, the majority of recently available jobs are low-paying, part-time contract positions that does not provide healthcare or other benefits. The rise of these poor-quality jobs contributes to the growth of the working poor and inequality,³ which could be a potential explanation for the persistent high levels of poverty in the United States.

In this research paper, the impact of uneven job distribution and poor-quality jobs on poverty rates in the United States is examined. A longitudinal dataset was constructed by aggregating household-level data to the state-level to match with state-level variables, and a two-way fixed effect model was applied to estimate their effects. The results indicate that the eradication of poverty in the United States may depend on redistributing jobs from individuals to households and on improving quality of jobs. Rather than solely focusing on creating more jobs, policymakers should prioritize transforming existing poor-quality jobs into good-quality ones and ensuring their equitable distribution. It is important to note that creating more jobs is not discouraged, only the creation of poor-quality jobs. Moreover, the findings suggest that a high-growth economy and high employment rates are unlikely to alleviate poverty.

This paper makes a significant contribution by expanding our understanding about the intricate relationship between employment and poverty and presenting novel empirical evidence. Notably, this analysis introduces a fresh perspective by focusing on the United States context, which distinguishes it from previous research that primarily examined the United Kingdom and other European economies. In addition, it opens up avenues for further research into the potential implications of issues related to job distribution and job quality, not only on poverty but also on various aspects of socio-economic well-being.

³ According to the Bureau of Labor Statistics, in 2016, there were about 7.6 million “working poor” who spent at least half the year either working or looking for employment.

The following section will delve into the intricate relationships between family dynamics, employment, and poverty. [Data, measuring key variables, and empirical strategy](#) will provide detailed insights into data, the metrics used for key variables of interest, and chosen empirical methodologies. [Results: two-way fixed effect model](#) will unveil the findings, and, finally, in Sect. 5, I will wrap up this paper with a conclusion.

2 Job distribution, job quality, and poverty

2.1 Family is central to avoid poverty

In most societies, the risk of poverty is unevenly distributed, affecting specific groups such as ethnic minorities, single parents, and people with disabilities more significantly than others. Unexpected events, such as illness, can also lead to poverty (Flaherty et al. 2004; Gardiner and Millar 2006). Vulnerable individuals often employ strategies like living with family members or relying on state transfer benefits and tax credits to prevent falling into poverty. Gardiner and Millar (2006) conducted a study in British society and found that over 30% of low-paid workers can escape poverty by depending on the income of other family members. More than 60% rely on the income of their partners and other adults in the household. Approximately 8% of low-paid workers manage to avoid poverty by working long hours to compensate for their low earnings, while around 13% achieve this by combining incomes from state transfers. Living with other individuals plays a crucial role in helping many low-income individuals mitigate the impact of poverty. Pooling together all sources of income is effective, as even a family member with relatively low earnings can improve the overall financial well-being of the household. It's important to note that a single individual earning a decent income has the potential to lift the entire family out of poverty.

Over the past four to five decades, the family structure in the United States has undergone significant transformations, marked by a notable decrease in marriage rates, a decline in the proportion of children born within marriages, and a rise in the number of children born outside of wedlock (Cancian and Haskins 2014; Thiede et al. 2017). Simultaneously, there has been a substantial increase in women entering the labor market, while many men, particularly those with lower levels of education, have faced diminishing employment opportunities (Cancian and Haskins 2014; Binder and Bound 2019). These shifts in family structure have had a considerable impact on poverty through their influence on labor market opportunities. Increased participation of women in the workforce may have a poverty-reducing effect if they entered the labor market to compensate for limited family income. Data from the United States Census and the

American Community Survey show that families headed by single females with children have consistently experienced an average poverty rate of around 40% over the past four to five decades. In contrast, families headed by married couples with children have maintained a poverty rate of less than 8% during the same period. Moreover, the poverty rate for married couples without children has been even lower, averaging less than 4%. Conversely, families headed by single males and single females have experienced poverty rates higher than 15% on average (Cancian and Haskins 2014). Thus, families play a crucial role in shielding many individuals from falling into poverty.

When a single female gets married, the household's needs are likely to increase. However, this marriage also introduces a second earning adult to the household, potentially reducing the risk of poverty. Similarly, if she joins a joint family with another earner, similar benefits can arise. This phenomenon is known as economies of scale, where each additional person added to a household results in less than proportional increases in needs (Cancian and Haskins 2014; Reyes 2020). The current state of individual and household employment is influenced by various factors, including modernization, the prevalence of nuclear families, the feminization of labor markets, and an increasing number of individuals pursuing tertiary education (Corluy and Vandenbroucke 2017; Thiede et al. 2017). Considering these trends in family structure, I hypothesize that the unequal distribution of jobs among households may explain the persistent high levels of poverty in the United States. Surprisingly, there have been no studies to date that have specifically explored the distribution of employment across households and its associated consequences on poverty in the country.

2.2 Jobs quality, labor market policies, and poverty

The gap between good and bad jobs is widening in the United States, representing another dimension of job market polarization. The availability of good jobs that offer fringe benefits is declining, while the number of bad jobs without such benefits is increasing. In non-regulated and non-competitive labor markets, both good jobs and bad jobs can coexist. Acemoglu (2001) suggests that in a laissez-faire equilibrium, the labor market is biased towards poor-quality jobs due to a phenomenon known as "hold-up." According to his search model (Acemoglu 2001), the presence of diverse job creation costs results in differentiated compensation for similar workers. In this market, employers and employees share rents, thus breaking the relationship between wages and marginal productivity. Additionally, employers fail to internalize the externalities arising from rent-sharing, which

could otherwise be addressed through market allocation. Capital-intensive firms that have made substantial sunk investments are compelled to negotiate and create significant positive pecuniary externalities for workers. Consequently, these firms tend to create a scarcity of good jobs while simultaneously generating an excess number of bad jobs.

There are also several policy factors that play a crucial role in determining the quality of jobs in the market. These factors may include but not limited to inadequate social security programs, such as unemployment benefits, and the absence of minimum wage laws. Both policies can potentially incentivize workers to wait for better job opportunities, consequently reducing firms' profits from creating low-quality jobs and shifting overall job compositions (Carter 1995; Acemoglu 1996). In the United States, due to the limited prevalence of social security programs, most workers cannot afford to remain unemployed while waiting for better job offers. This results in an oversupply of labor in the market, prompting firms to shift towards a higher proportion of poor-quality jobs. On the contrary, if workers have the protection of unemployment insurance, the cost of waiting for a better job would be less burdensome. Therefore, social protection programs can potentially reduce the labor supply by increasing reservation wages (Marinescu and Skandalis 2021).

Similarly, the absence of a minimum wage requirement is also contributing to the growth of poor-quality jobs. Firms find it more profitable to offer poor-quality jobs when there are no higher minimum wage laws in place. Conversely, setting a higher minimum wage in the economy would have compelled firms to pay higher wages for poor-quality jobs, making them less economically profitable and encouraging firms to improve their job compositions (Bulow and Summers 1986; Carter 1998).

Poor-quality work may not alleviate poverty but rather perpetuate it. To comprehend the implications for poverty, in addition to the economic theories discussed above, it is necessary to examine the policy changes that have promoted a flexible labor market over the last five decades. The Regulatory Flexibility Act (RFA) of 1980 was adopted on a bipartisan basis, reflecting liberal economic principles aimed at deregulating laws and enhancing business power with an aim to improve innovation and production. These flexible labor policies have encouraged the creation of low-quality jobs while reducing the number of high-quality jobs. Sectors that offer low-quality jobs experience high employee turnover (Albrecht and Vroman 1992; Carter 1998). During economic downturns, these positions can easily be terminated without incurring costs, only to be rehired when production needs increase (Kalleberg 2000; Van Arsdale

2013), offer no job security to these workers. In other words, the underlying logic of creating low-quality jobs is to pay only for the units of work performed by these positions, and thus, this policy change has direct implications for poverty.

Within these flexible labor law regimes, new third-party staffing firms (e.g., Kelly Services Inc., Robert Half, Toptal, etc.) have emerged to manage this flexible workforce, creating a triangular relationship and operating their businesses at the expense of labor wages (Van Arsdale 2013). Major corporations like Amazon, Microsoft, and Sheraton often outsource numerous positions to independent staffing companies, predominantly offering jobs with unpredictable schedules. Surprisingly, approximately 40% of hourly employees receive their work schedules only a week or less in advance (Desmond 2018). It is common to see cleaners, reception assistants, and security officers working at prominent corporations, yet these workers are not directly employed by these companies. Instead, they are engaged through independent contractors who take a share of their wages. These intermediary companies not only deduct a portion of the employees' wages offered by the host companies but also deny workers any opportunity for career advancement within the host company, regardless of their hard work. Consequently, many workers under these contracts do not even receive their full wages. By outsourcing these positions to independent contracting agencies, large organizations evade their responsibilities to provide healthcare and other security benefits.

In this triangular relationship, staffing firms negotiate wage and work conditions between employing firms and employees, often leaving employees with little to no voice. Consequently, employees frequently reject job offers, resulting in an increased pool of unemployed individuals, further enhancing labor market flexibility, and boosting company profit margins. The consequence of a flexible labor market is increased poverty, as a large pool of flexible labor enables staffing companies to exploit employees, leading to more individuals earning poverty-level wages and a disproportionate transfer of resources to businesses. The decline in regular employment by host companies and the growth in employment through these staffing firms are strategic policies employed by businesses to avoid the costs associated with adding people to their payrolls, such as health insurance, bonuses, and other human resource expenses, particularly during economic recessions (Van Arsdale 2013). The poverty implications of this changing employment era have not been thoroughly studied yet.

The growth of poor-quality jobs is also linked to various recent developments, including technological advancements, changes in work arrangements, the expansion of

Table 1 Descriptive statistics

Variable	No. of obs.	Mean	Std. dev.	Min.	Max.
Poverty rate	561	0.14	0.03	0.07	0.24
Uneven job distribution index-1 (workless households)	561	0.12	0.03	0.05	0.22
Uneven job distribution index-2	561	0.06	0.02	0.02	0.14
Household with full-time workers (Good-Quality Job)	561	0.80	0.04	0.70	0.89
Household with only part-time workers (Poor-Quality Job)	561	0.08	0.01	0.05	0.11
Non-management/professional	561	0.62	0.04	0.41	0.70
State population (million)	561	6.20	6.98	0.55	39.56
GDP per capita (thousand)	561	53.18	20.10	33.15	183.97
Non-white population (%)	561	0.30	0.16	0.04	0.79
Theil inequality index (regional)	561	0.00	6.75	-27.04	9.08
Children aged 0 to 18	561	0.25	0.02	0.18	0.33
Elderly aged 65 +	561	0.14	0.02	0.07	0.21
Citizen (%)	561	0.95	0.03	0.85	0.99
Non-citizen (%)	561	0.05	0.03	0.01	0.15
Non-white children (%)	561	0.39	0.18	0.04	0.87
Less than 9th grade (%)	561	4.86	1.67	1.80	10.40
High school graduate (25 years & over)	561	29.24	4.18	17.60	41.40
Associate degree (%)	561	8.08	1.59	2.90	13.50
High school or higher (%)	561	87.55	3.35	78.90	93.00
Bachelor or higher (%)	561	28.77	5.96	17.10	56.60
Revenue / GDP	550	0.05	0.02	0.02	0.21
Public expenditure /GDP	550	0.12	0.04	0.06	0.32
Temp. assistance for needy families (\$100 per capita)	550	0.41	0.50	< 0.001	3.67
Per capita other cash assistance (\$100)	550	0.26	0.45	< 0.001	2.44

service sectors, and the decline of industrial employment. It is further associated with shifts in corporate governance and employer strategies (Kalleberg 2011). Moreover, it is intertwined with emerging trends such as privatization, marketization, and individualization (Keune 2013), along with the declining influence of trade unions (Farber and Levy 2000). Consequently, poverty reduction efforts have been stalled.

3 Data, measuring key variables, and empirical strategy

3.1 Data

I utilized publicly available data in this study, primarily drawing from the American Community Survey (ACS). The ACS provides individual-level data with household and geographic codes, enabling precise estimates at the local administrative unit level and tracking long-term trends. This dataset is collected by the Census Bureau and is representative of the entire USA population, based on a 1% sample. To align with state-level macro-variables, the data was initially aggregated to the household level and subsequently to the state level. The household-level employment status data is derived from the ACS, while individual unemployment data at the state level

is sourced from the Department of Labor and Training. Furthermore, the ACS data was instrumental in measuring households with good-quality jobs and poor-quality jobs. The ACS survey questionnaire includes multiple questions that inquire about the employment status of household members, facilitating the classification of households into full-time and part-time employment categories.

Other macroeconomic variables, such as GDP per capita and the estimated Theil inequality index, were acquired from the US Bureau of Economic Analysis (BEA). Data related to government expenditure and revenue were obtained from the National Association of State Budget Officers (NASBO) community. Human capital and educational attainment data were sourced from the US Census Bureau. Regarding poverty measures, I employed the official poverty measurement utilized by the Federal Government, which is based on the US Census Bureau's poverty threshold of \$20,212 for a family consisting of two adults and one child in 2018. This poverty threshold has been adjusted for the number of children, meaning that households with more than one child have a higher poverty threshold. Table 1 in the paper

presents the descriptive statistics of the data after aggregating it to the state level.

I aggregated individual and household-level data to the state level for several compelling reasons. Firstly, income is a flow variable that is commonly used to measure poverty, while employment / unemployment status represents the labor market conditions at a specific point in time, rendering it a stock variable. Consequently, if an individual is interviewed during a period of unemployment but remains employed for the rest of the year, their annual income may surpass the poverty line (Saunders 2002). Moreover, income is typically reported annually, whereas employment status is not regularly reported on an annual basis. Therefore, analyzing the impact of employment status on poverty without aggregation can lead to misleading results.

Secondly, employment status is usually analyzed at the individual level, whereas poverty measures consider the combined income of the entire family to determine the poverty level. As discussed earlier in this paper, an individual may have low or zero income but not meet the criteria for poverty according to Federal guidelines, as other family members may have higher earnings. Income within a household is shared, and it is the collective income that determines whether the individual or family qualifies for welfare benefits. Hence, measures of poverty and employment should ideally be aggregated at the family level over the entire year.

Thirdly, microdata sources like ACS exhibit variation over time but do not follow a panel format, which means they do not observe the same individual or household over an extended period. Without panel data, it is not possible to apply fixed-effect (FE) models, which allow for controlling observable and unobservable characteristics that remain constant over time (more details of empirical strategies are in Empirical strategies). The two-way FE model is more suitable for statistical inference than the pooled cross-section model (Lechner et al. 2016). Lastly, public welfare expenditure is a crucial determinant of poverty. However, individual or household-level records in the ACS do not provide information about the benefits received from public welfare programs, such as cash assistance. Aggregating the data at the state level is necessary because states are the primary authorities responsible for disbursing these types of payments. Additionally, states play a crucial role in decision-making regarding most poverty reduction programs.

3.2 Measuring the index of uneven job distribution

The index of uneven job distribution indicates an increasing concentration of jobs at the individual level and a decreasing concentration of jobs at the household level. This index essentially reflects unequal job distribution

between individuals and households, as opposed to the usual measures of job polarization in occupation, pay, and sector, as explained elsewhere (Goos and Manning 2003; Salvatori 2018; Jaimovich and Siu 2020).⁴ In this paper, the index of uneven job distribution is measured using the method of Gregg & Wadsworth (2008), which discerns the discrepancy between individual-level joblessness and household-level joblessness. When a state's population consists of individuals 'i', the total number of households 'H' consists of individual household 'h', and person 'k' resides within household 'h', the total population 'P' can be expressed as:

$$P = \sum_{h=1}^H k_h$$

When an individual person living in a household has no job, a binary outcome value of 1 ($n_{ih} = 1$) is assigned, and when an individual person living in a household has a job, a binary outcome value of 0 ($n_{ih} = 0$) is set. Therefore, the individual-level joblessness rate in the population will be:

$$n = \frac{\sum_{h=1}^H \sum_{i=1}^{k_h} n_{ih}}{P}$$

Let's now consider household-level joblessness, where households can host both jobless individuals and individuals with a job. Such joblessness can now be grouped by households. When a household does not have any people with a job, a binary outcome value of 1 ($m_h = 1$) is assigned, and when a household has at least one person with a job, a binary value of 0 ($m_h = 0$) is set. Therefore, the household-level joblessness will be:

$$m = \frac{\sum_{h=1}^H m_h}{H}$$

Here, 'm' essentially reflects the number of households with a value of 1 for m_h weighted by the total number of households 'H'. A simple example will be highly useful here to understand the distinction between joblessness at the individual level and at the household level, and why this distinction should matter for poverty prevalence. Consider a small economy with only two households, each consisting of two people, for a total of four people. The economy offers only two jobs, leaving only two possible scenarios. In the first scenario, one person from each household is unemployed, denoted by $N = [\{1, 0\}, \{1, 0\}]$, with an associated joblessness rate of 50%. In the

⁴ For example, job polarization in occupation means higher growth of job in the highest-wage and lowest-wage occupations while wiping out the mid-waged occupational jobs (Goos and Manning 2003).

second scenario, both working individuals belong to the same household, leaving the other household with no employed individuals, denoted by $N = [\{1, 1\}, \{0, 0\}]$, with an associated joblessness rate of 50%. Despite both scenarios having the same unemployment rate, they have different rates of joblessness at the household level. In the first scenario, no households are jobless, whereas in the second scenario, 50% of households are jobless.

This illustrates how aggregated individual-level job statistics fail to reflect the actual distribution of jobs across households, much like how typical income distribution measures fail to capture the necessary details of income distribution. To address this, we can measure the degree of uneven job distribution across households by calculating the difference between the actual rate of jobless households and the rate predicted under a counterfactual scenario in which jobs are randomly distributed among the working-age population. This difference can offer insight into the extent to which households experience joblessness beyond what would be expected under random job distribution.

Assuming that all other factors remain constant, it is more likely for fewer individuals to be present in a household where all occupants are employed if the family structure is nuclear, as opposed to extended. This is because households are categorized based solely on their size, and as family sizes decrease, the number of households without any employed individuals is expected to increase. Consequently, the size of workless households can be attributed to a combination of the individual-level unemployment rate and the number of individuals in the household.

$$Uneven\ job\ distribution_{it} = J_{it} - J_{it}^e \quad (1)$$

where $unevenjobdistribution_{it}$ represents the extent of uneven job distribution in state i for year t . Meanwhile, J_{it} denotes the fraction of households that do not have any employed individuals in state i for year t , regardless their size of households. J_{it}^e represents the expected rate of jobless households in state i for year t if jobs were randomly distributed. We can present a counterfactual rate of households without any employed individuals, denoted as \hat{J}_k for households with k as follows:

$$\hat{J}_k = E[U_k | k, n] = n^k$$

Assuming that joblessness is randomly distributed, every individual adult in a household k has an equal chance of being unemployed. Consequently, the probability of observing an adult in a jobless household (counterfactual rate) should be the same as the observed unemployment rate at the individual level. Similarly, the likelihood of a household with two adults being jobless

would be twice the individual unemployment rate (Gregg and Wadsworth 2008). To benchmark the probabilities of equal job distribution, we can consider it as having an intuitive appeal similar to the criterion of income equality used in the Lorenz curve. Finally, we can aggregate the counterfactual households with no employed individuals and weigh them by the population, (s_k) , of households of size k :

$$\hat{J} = \sum_{k=1}^K s_k \hat{J}_k = \sum_{k=1}^K s_k n^k \quad (2)$$

So, the uneven job distribution is the distinction between observed and counterfactual jobless households.

$$\begin{aligned} Uneven\ job\ distribution(n, s_k, j_k) &= J - \hat{J} \\ &= \sum_{k=1}^K s_k j_k - \sum_{k=1}^K s_k n^k - \sum_{k=1}^K s_k (j_k - n^k) \end{aligned} \quad (3)$$

The measure of uneven job distribution discussed here does not have any normative implications. A higher index of uneven job distribution indicates a larger proportion of households are jobless and greater job distribution inequality. Since job numbers are generally limited, positive values in the index can be considered as reflecting ‘Matthew effects,’ wherein additional jobs are concentrated among households who already have employment, rather than being spread out more evenly across population, particularly households with all members are jobless.⁵ Conversely, negative value of uneven job distribution index suggests that there are fewer jobless households than would be expected if jobs were randomly distributed, which can be seen as a form of solidarity. If the expected and observed rates of jobless households are identical, the index of uneven job distribution should have a value of zero.

We never know the counterfactual jobless household rate. While the individual unemployment rate can be a reasonable proxy for the counterfactual jobless households, this will still be an extremely conservative measure of uneven job distribution. This is because there are more jobs available than the number of households in the country. Consider a state with a population of 1 million; there will be a million households if each household only has one person. If the state’s unemployment rate is 5%, then both the individual unemployment rate and household joblessness rate will also be 5%. Since job numbers

⁵ The Matthew effect is related to a statement from the Gospel of St Matthew—“For to all those who have, more will be given.” In recent times, this concept is used to present form of self-reinforcing inequality in income, wealth, political power, prestige, and others (Rigney 2010).

Table 2 Population, households, and jobs in the United States

Year	Total population (million)	Working-age population	Working-age population (million)	Average family size	Number of households (million)	Number of people employed (million)	Expected workless households
2008	304.09	61%	185.50	2.56	118.79	189.14	None but negative
2018	326.68	60%	196.01	2.53	129.13	197.31	None but negative

are generally fixed at a point in time, a negative or positive uneven job distribution index will only emerge when two or more individuals form a family, and some of them are employed while others are not. If one household has multiple jobholders, it comes at the expense of another family that has no employed individuals. The value of the index of uneven job distribution increases as more households have no employed individuals while others have multiple jobholders.

3.3 Description of uneven job distribution measures and poverty with data from United States

Let's consider the data provided by the United States Census Bureau for 2018. According to their report, the United States had a population of 326.68 million people, with 60% of them falling within the working-age bracket, totaling approximately 196.01 million individuals. With an average family size of 2.53, we can estimate that there were around 129.13 million households in the country. In comparison to the number of households, there were approximately 197.31 million available jobs in the country for the year 2018. If these jobs were randomly distributed, every household should ideally have at least one employed member (as shown in Table 2). Therefore, the percentage of workless households can serve as a measure of uneven job distribution, which, while still conservative, is less so than the measure expressed in Eq. (3). In this paper, I will examine the association between both uneven job distribution measures and the poverty rate. The less conservative uneven job distribution measure will be referred to as Uneven Job Distribution Index 1 (UJD-1), while the more conservative measure mentioned in Eq. (3) will be known as Uneven Job Distribution Index 2 (UJD-2).

With an average family size of 2.53, we can estimate that there were around 129.13 million households in the country. In comparison to the number of households, there were approximately 197.31 million available jobs in the country for the year 2018. If these jobs were randomly distributed, every household should ideally have at least one employed member (as shown in Table 2). Therefore, the percentage of workless households can serve as a measure of uneven job distribution, which, while still

conservative, is less so than the measure expressed in Eq. (3).

In this paper, I will examine the association between both measures of uneven job distribution and the poverty rate. The less conservative measure of uneven job distribution will be referred to as Uneven Job Distribution Index 1 (UJD-1), while the more conservative measure mentioned in Eq. (3) will be known as Uneven Job Distribution Index 2 (UJD-2). Figures 1 and 2 provide valuable insights into job distribution measures at the national level as well as within and across states. Figure 1 demonstrates a noticeable divergence between the unemployment rate at the individual level and the prevalence of jobless households from 2008 to 2018. The state level heterogeneities in the same divergence trend are presented in the Appendix A.

The main concern highlighted by these illustrations is the increasing rate of workless households (UJD-2) in the United States despite a stable decrease in the individual-level unemployment rate. Consequently, there has been a growing disparity between the rates of unemployment for individuals and jobless households (UJD-2) in the country. This divergence indicates that job growth in the United States over the past few decades has not benefited workless households. States with higher employment growth have primarily witnessed benefits for individuals or households with already employed members, resulting in a lack of improvement in job distributions at the household level and, in fact, worsening the situation. Similar trends of employment growth predominantly benefiting households with employed individuals have been observed not only in the United States but also in the UK, Netherlands, and other developed economies (Gregg and Wadsworth 1994, 2003; Beer 2001; Cantillon et al. 2003; Corluy and Vandenbroucke 2017).

While the growing gap in employment distribution between households and individuals may pose various issues concerning labor market performance in the country, the rising rate of workless households (even if it is a stagnant one) carries significant implications for poverty reduction strategies. As mentioned earlier, in an ideal scenario with a normative world of random employment distribution, the unemployment rate at the individual level and the rate of joblessness in households should be

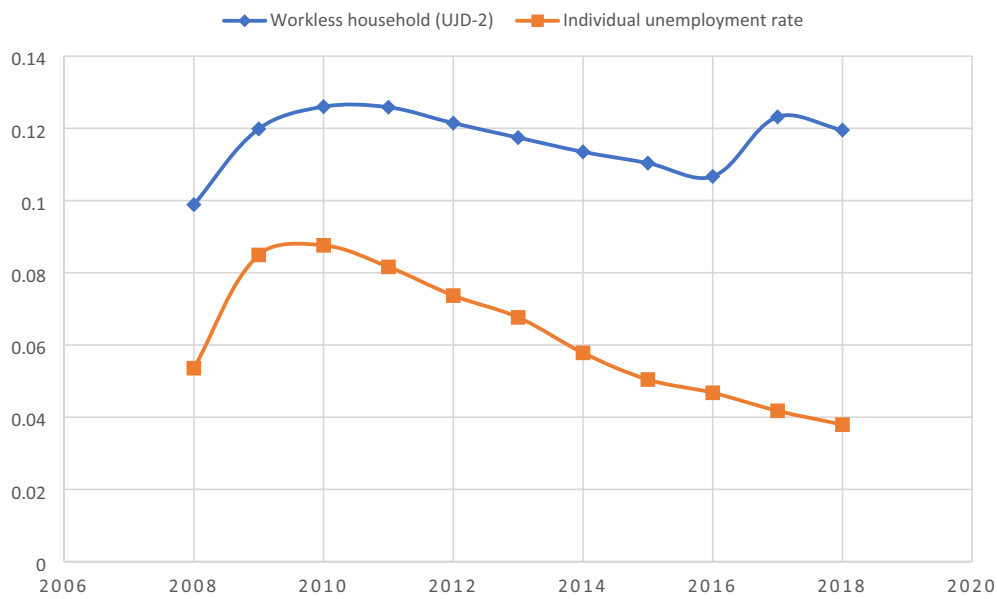


Fig. 1 Workless households and individual unemployment rate in the United States. This was calculated using American Community Survey (ACS) and Bureau of Labor Statistics (BLS) data

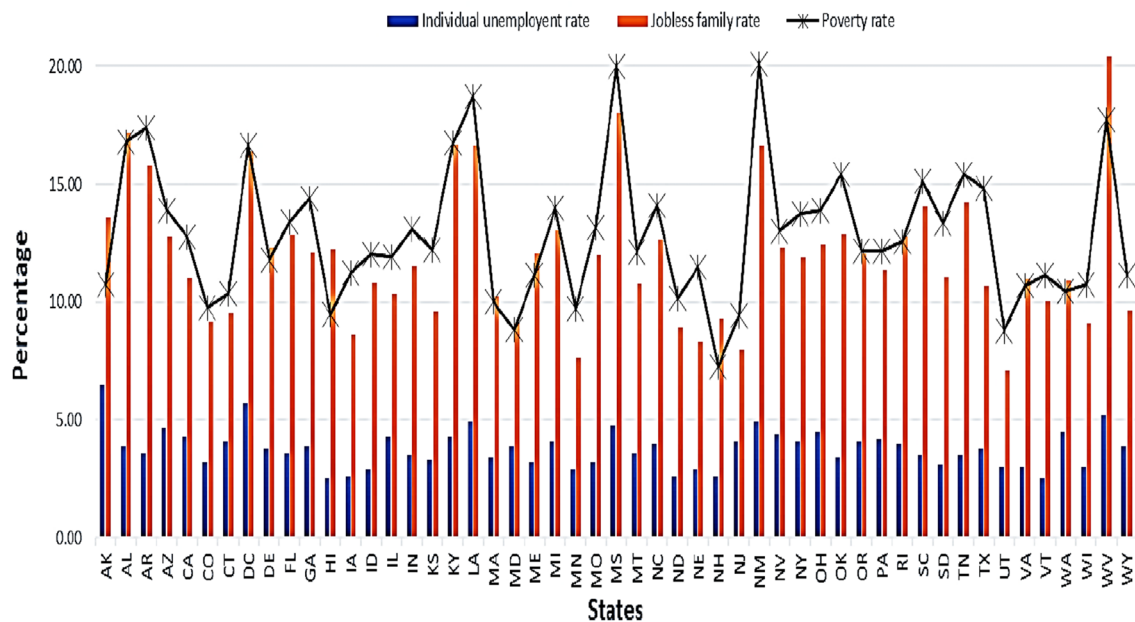


Fig. 2 Employment and poverty across states for the year 2018. The data sources are ACS and BLS

identical, and more importantly, with zero joblessness at the household level in the United States. Therefore, the values presented in Fig. 1 represent the extent of uneven job distribution in the United States. Despite positive job market outcomes at the individual level, the situation at the household level has been deteriorating. In this paper, I propose the hypothesis that this higher index of uneven

job distribution may be responsible for the increased poverty levels in the country.

Figure 2 showcases the percentage of workless families and individual unemployment rates in relation to the poverty rate across states for the year of 2018. It also highlights the disparity between individual-level unemployment and workless households across different

states. Notably, the individual-level unemployment rate is significantly lower than the rate of workless households. Several states, including West Virginia, Mississippi, Alabama, Kentucky, New Mexico, Louisiana, and others, exhibit considerably higher index of uneven job distribution, indicating a pronounced discrepancy between individual-level unemployment and workless households. Intriguingly, these states with higher rates of jobless families are also characterized by higher poverty rates, as depicted in Fig. 2. In contrast, the states of Utah, Minnesota, New Jersey, Nebraska, Iowa, North Dakota, Wisconsin, Maryland, Colorado, New Hampshire, Connecticut, and others show the lowest index of uneven job distribution. These states demonstrate a more balanced distribution of job opportunities, with a smaller gap between individual-level unemployment and workless households, and lower poverty rate.

3.4 Measure of job quality

Measuring job quality, particularly when identifying households with poor-quality jobs, presents complex challenges. While it's true that low-paying jobs are often categorized as poor-quality jobs, as conventionally defined in economics (Acemoglu 2001), this criterion alone doesn't provide the most comprehensive measure of job quality. Job quality is multifaceted (Findlay et al. 2013), and the International Labor Organization (2019) offers a more comprehensive definition of a high-quality job, encompassing factors such as higher pay, job security, safety, work-life balance, fairness in employment, social protections, and various other socio-economic considerations. Additionally, scholars like Stecy-Hildebrandt et al. (2019) and Adamson and Roper (2019) emphasize additional indicators, including fringe benefits, job security, and favorable income trajectories as characteristics of high-quality jobs. It's important to recognize that job quality is also subjective and influenced by individual perceptions (Clarke 2015). In some cases, even a low-paying job can be viewed as a high-quality job if it includes in-work benefits, job security, full-time employment, and other favorable aspects, particularly if it is perceived as such. Many employees prioritize factors like job security, as it can have a more substantial positive impact on their overall well-being than wages alone.

This paper defines a 'good job' as one held by a household with at least one full-time worker who commits to 35 h or more of work per week, and I refer to such households as having 'good jobs.' Conversely, it defines a 'bad job' when a household has only part-time worker(s) putting in less than 35 h of work per week and has no full-time worker, and I refer to such households as having 'bad jobs.' This classification of full-time and part-time employment status at the household level can serve as

proxies for assessing job quality at the household level. Moreover, it is expected that part-time and full-time work status is associated with other indicators of job quality such as wages, and it provides suitable quantitative measurement for regression analysis in this paper. While it can be argued that some women and students voluntarily choose part-time positions to allocate more time to family responsibilities (Walsh 1999; Hill et al. 2004; Pech et al. 2021) and education, it's crucial to recognize here that the measurement used in this paper operates at the household level, where it is reasonable to expect that at least one member of the household should be willing to take on a full-time role, unless the household is a single-parent household or its member(s) require special care (e.g., disability).

Furthermore, there is strong evidence to suggest that a significant proportion of part-time jobs are involuntary, with individuals preferring full-time contracts if they were given the opportunity (Tilly 1991, 2010; Kalleberg 2009; Kauhanen and Nätti 2015). Involuntary part-time jobs represent a form of underemployment, as these part-time workers are actively seeking full-time positions but have not been able to secure them. Notably, part-time workers constitute more than one-fifth of the total workforce in the United States, and their presence in the labor market has been steadily increasing since 1970 (Tilly 1991; Fullerton et al. 2020). This growth in involuntary part-time employment is primarily driven by employer demands for flexible scheduling, cost minimization, and their predictability of available labor forces, rather than worker's preferences (Tilly 1991, 2010; Kalleberg 2009).

Two significant theories, neoclassical and institutionalist, can potentially elucidate the issue of job composition in terms of part-time and full-time employment, particularly regarding involuntary part-time positions. The neoclassical approach can be extended in two ways—building a microeconomic foundation to analyze market constraints and addressing the lack of aggregate demand in the macroeconomic environment. Bulow and Summers (1986), who developed the "efficiency wage" model based on a microeconomic foundation, suggest that firms pay full-time workers higher wages than their marginal product, while part-time workers receive lower wages at the market rate. The higher pay for full-time workers is efficient because it disincentivizes them from shirking, leading to lower employee turnover and increased productivity. In contrast, part-time employees, who face low wages and high turnover, become less productive even though they may be identical to full-time employees in all other aspects. In such situations, involuntary part-timers may consider the loss of their job and associated income to be significantly more detrimental than accepting lower wages. Full-timers are also treated as insiders, while

part-timers are seen as outsiders (Lindbeck and Snower 1986). Insiders have the power to threaten to leave, leading to higher costs for firms related to hiring and training new employees, but part-timers lack such bargaining power.

In macroeconomic contexts, involuntary part-time employment or underemployment emerges as a natural consequence. During economic downturns, part-time employment may be the preferred choice for employers, enabling them to retain skilled employees at reduced wages while reducing the workforce. For instance, the recent COVID-19 pandemic vividly exemplified that, as part-time workers were more susceptible to job loss, full-time workers were better equipped to retain their employment. In such economic downturns, workers often find that accepting lower wages is a more viable option than losing their jobs, particularly in the absence of unemployment insurance.

The institutionalist approach, while acknowledging the logic of neoclassical perspectives, underscores that part-time employment is distinguished not only by hours worked but also by various other attributes. Institutional theories contend that a fundamental shift in the organizational environment, including elements such as labor unions and policies, is necessary to transition between different job compositions rather than merely adjusting to economic variables within the same framework (Woodbury 1987; Tilly 2010). In contrast to the neoclassical approach, which assumes that market actors act rationally and that labor market outcomes are determined by the standard demand–supply model, the institutional approach recognizes that a range of labor market outcomes is possible and that these outcomes are shaped by socially imposed norms and traditions. Given the tradition of strong capitalism and a history of limited policy regulations in place in the United States, employers enjoy greater flexibility in crafting job configurations that maximize their profit margins compared to other welfare-oriented nations.

These part-time positions consistently come with a wage penalty (Hirsch 2005; Baffoe-Bonnie and Gyapong 2018; Gallego-Granados 2019) and provide limited opportunities for career advancement, resulting in high turnover rates (Tilly 1991; Sloane and Theodossiou 1996). Part-time work status also implies limited access to social protections due to shorter lengths of service (Stecy-Hildebrandt et al. 2019) and is generally associated with lower rates of unionization (Anderson et al. 2006). Research has also demonstrated that the prevalence of part-time jobs, primarily driven by neoliberal market restructuring, contributes to wage disparities across race (Wilson and Roscigno 2016) and gender (Fuller 2005). In addition to the reduced income potential associated with

part-time positions, studies by McDonald et al. (2009) have raised several other concerns, including limitations on career progression, restricted access to high-status roles, increased workloads, challenging work environments, and related issues. For these various reasons, part-time positions are a fair representation of poor-quality jobs, while full-time positions signify good-quality jobs.

Hence, it is reasserted here that economic prosperity alone may not effectively alleviate poverty unless it results in a sufficient number of good-quality jobs with full-time contracts for households. An increase in the number of families with good-quality jobs is expected to play a pivotal role in poverty eradication in the United States. The combined remuneration package associated with full-time employment has the potential to lift a household above the poverty threshold. Conversely, households relying solely on part-time jobs are likely to contribute to an increase in poverty rates across the states. These household-level indicators of job quality are anticipated to have a direct and significant impact on the economic status of people living in poverty, surpassing the influence of broader macro-level determinants, such as overall economic growth and employment levels.

3.5 Empirical strategies

The identification strategy of this paper is to estimate Eqs. 4 and 5 using the two-way fixed effect (TWFE) method for a strong balanced panel data that spans from 2008 to 2018. With a large number of independent clusters of observations (i.e. states), the coefficient of our variable of interests can be consistently estimated using a TWFE regression specification, and by clustering standard errors the conclusion will be an asymptotically valid inference (Roth et al. 2023).

$$Y_{it} = \alpha_0 + \beta UJD_{it} + \gamma X_{it} + \delta_i + \mu_t + \varepsilon_{it} \quad (4)$$

$$Y_{it} = \alpha_0 + \beta JQ_{it} + \gamma X_{it} + \delta_i + \mu_t + \varepsilon_{it} \quad (5)$$

Where Y_{it} represents the poverty rate, UJD_{it} represents either the uneven job distribution index-1 or index-2, and JQ_{it} represents either the measure of good-quality jobs or poor-quality jobs in state i for year t . X_{it} is a vector of characteristics that vary over time at the state level, including GDP per capita, GDP growth rate, state population size, regional inequality, per capita tax revenue, intergovernmental transfers, population demographics (such as age groups, immigration/citizenship status, and human capital), and others. ε_{it} is the random error term. By applying the two-way fixed effect method, I examine the within-state variation to estimate the impact of polarized job distribution and job quality on the poverty rate.

However, it is important to note that, given our observational data, this analysis does not intend to interpret the β coefficient as a strictly causal relationship between employment variables and the poverty rate outcome. The state fixed effect, δ_i , estimate accounts for both observable and unobservable time-invariant factors that may impact poverty rates, such as colonial history and geographic locations. The year fixed effect, μ_t , captures any unusual time trends, such as financial crises, that may also influence the poverty rate. However, the two-way fixed-effect model cannot address problems that may arise if employment distribution and quality and poverty are simultaneously related. For instance, it may not account for scenarios where higher poverty leads to either higher or lower uneven job distribution or job quality, thus failing to discern any such reverse effect. To tackle this issue, we would require an instrument that is strongly correlated with poverty but has no association with our employment variables, and then apply an instrumental variables regression approach. Unfortunately, our data lacks such an instrumental variable that fulfills both of these conditions for a good instrument. This concern regarding internal validity remains unaddressed in this paper.

Furthermore, while the two-way fixed-effect model accounts for observed and unobserved time-invariant factors, it does not consider omitted time-varying factors, such as union and firm density in the local area. These factors could not be controlled for due to the absence of long-panel data used in this paper. Similarly, measurement errors pose potential threats to estimating unbiased coefficients. For instance, using part-time and full-time working status at the household level as proxies for job quality may not accurately capture the true measures of job quality and may introduce bias into the estimates. If alternative measures of job quality in terms of pay and benefits were available, the results might differ from those presented in this paper, thus posing a threat to the external validity of these results in this paper.

4 Results: two-way fixed effect model

Figure 3 presents the scatterplot matrix depicting the relationships among the key variables of interest. Both the less conservative and more conservative measures of uneven job distribution are positively associated with the poverty rate. Conversely, there exists a strong negative relationship between poverty and good-quality jobs (households with full-time workers), while the relationship between poverty and poor-quality jobs (families with only part-time workers) is positive. All of these relationships confirm our earlier predictions in this paper that an unequal job distribution across households is a significant predictor of persistent poverty in the United States.

Similarly, bad jobs also serve as a predictor of higher poverty, whereas good jobs act as a predictor of lower poverty in the country. While these scatterplots provide a visual representation of the basic strength, direction, and nature of the relationship between poverty and variables related to job distribution and quality, the following sections delve into the empirical findings obtained through the application of two-way fixed effect methods.

4.1 Uneven job distributions and poverty

Table 3 presents the two-way fixed effect estimates of the effect of uneven job distribution on the poverty rate. The poverty rate is measured as the average poverty across all races, based on the Federal poverty guideline at 100%. Uneven job distribution consists of two measures: the more conservative index-2 from Eq. (3) and the less conservative index-1, which represents the share of jobless households as discussed in section III. The estimates in Table 3 are presented as percentage point estimates for both job distribution indices. The results strongly support the prediction made earlier in this paper that higher job market polarization in the form of job distribution leads to a higher poverty.

Notably, the uneven job distribution index-1 has a significantly larger impact on the poverty rate compared to uneven job distribution index-2. The interpretation of these coefficients is straightforward. A one percentage point increase in uneven job distribution index-1 will result in approximately a 0.50 percentage point increase in the poverty rate. On the other hand, a one percentage point increase in uneven job distribution index-2 will lead to an approximately 0.25 percentage point increase in the poverty rate. This disparity in magnitudes between index-1 and index-2 can be attributed to the subtraction of unequal job distribution from index-1 to obtain index-2. This difference reinforces the hypothesis that as the level of uneven job distribution increases, the poverty rate also increases. In other words, this provides strong evidence that equal distribution of jobs is a necessary condition to reduce poverty in the United States. Furthermore, these results indicate that the higher employment levels in the United States did not benefit all families, especially low-income families. The findings persist in terms of both effect size and significance level across all model specifications.

The most vulnerable group of people in every society comprises those living in families where no one is employed (Gallie et al. 2000; Cantillon et al. 2003). Our results in this paper align with the findings from earlier literature. Even after controlling for a comprehensive set of variables as presented in Table 3, the effect size remains large and statistically significant which is an alarming issue for the country. Förster (2000) reported raw figures

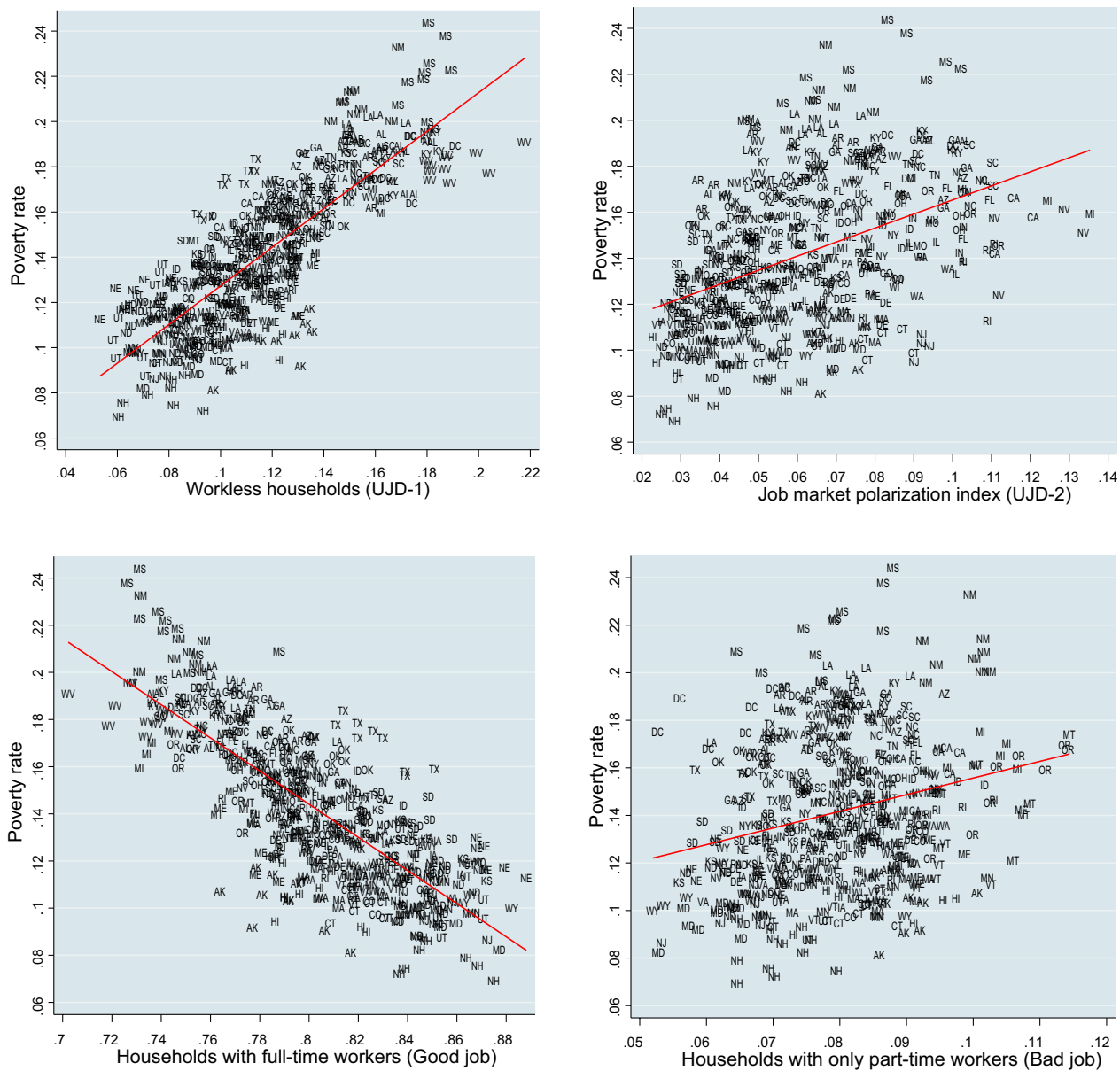


Fig. 3 Scatterplot of uneven job distribution, job quality, and poverty

indicating that the average poverty rate among households with a working-age head but only one employed member is approximately 36% across 16 OECD countries. In contrast, the corresponding figures are only about 13% for families with one employed household member and merely 3% for households with two employed members. It is important to note that the coefficient presented in this paper cannot be directly compared to the raw numbers reported in Förster's (2000) work. Nonetheless, our coefficients suggest that a ten-percentage point increase

in jobless families (uneven job distribution index-1) leads to a substantial five-percentage point increase in poverty.

While factors such as the share of children, elderly individuals, non-white population, and non-professional occupations also contribute to a higher overall poverty rate in the USA, their magnitudes are considerably smaller compared to the job distribution measures. Moreover, variables negatively associated with poverty rates, such as GDP per capita, human capital, and public expenditures, also exhibit relatively small effects. Previous studies that excluded these job distribution measures

Table 3 Impact of uneven job distribution on poverty

	Model 3.1 Poverty	Model 3.2 Poverty	Model 3.3 Poverty	Model 3.4 Poverty	Model 3.5 Poverty	Model 3.6 Poverty
Employment polarization						
Uneven job distribution index-1 (workless households)	0.478*** (0.043)		0.497*** (0.045)		0.478*** (0.045)	
Uneven job distribution index-2		0.245*** (0.042)		0.283*** (0.045)		0.264*** (0.045)
Non-management/professional	0.104*** (0.036)	0.093** (0.039)	0.115*** (0.037)	0.077* (0.040)	0.100*** (0.037)	0.063 (0.040)
Demographic characters						
State population (million)	−0.003*** (0.001)	−0.004*** (0.001)	−0.003*** (0.001)	−0.004*** (0.001)	−0.003*** (0.001)	−0.004*** (0.001)
GDP per capita (thousand)	−0.001*** (< 0.0001)	−0.001*** (< 0.0001)	−0.001*** (< 0.0001)	−0.001*** (< 0.0001)	−0.001*** (< 0.0001)	−0.001*** (< 0.0001)
Non-white population (%)	0.102* (0.061)	0.182*** (0.065)	0.106 (0.070)	0.151** (0.075)	0.155** (0.076)	0.202** (0.081)
Theil inequality index (regional)	< 0.001 (< 0.001)	< 0.001 (< 0.001)	< 0.001 (< 0.001)	< 0.001 (< 0.001)	< 0.001 (< 0.001)	< 0.001 (< 0.001)
Children aged 0 to 18	0.042 (0.094)	0.176* (0.101)	0.136 (0.100)	0.253** (0.107)	0.103 (0.113)	0.209* (0.120)
Elderly aged 65 +	0.011 (0.085)	0.214** (0.092)	0.007 (0.094)	0.172* (0.101)	0.016 (0.106)	0.201* (0.114)
Citizen (%)	0.057 (0.082)	0.167* (0.090)	0.044 (0.084)	0.145 (0.092)	0.026 (0.092)	0.104 (0.100)
Non-white children (%)	0.043 (0.042)	0.019 (0.046)	0.033 (0.043)	0.026 (0.046)	−0.002 (0.045)	0.001 (0.049)
Educational attainment						
Less than 9th grade (%)			0.002 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.003)
High school graduate (25 years & over)			−0.003* (0.001)	−0.003* (0.002)	−0.003** (0.002)	−0.003* (0.002)
Associate degree (%)			−0.006*** (0.002)	−0.006*** (0.002)	−0.005** (0.002)	−0.006** (0.002)
High school or higher (%)			0.003** (0.001)	0.005*** (0.002)	0.004** (0.002)	0.005*** (0.002)
Bachelor or higher (%)			−0.002 (0.001)	−0.004*** (0.001)	−0.003* (0.002)	−0.006*** (0.002)
Government expenditure						
Revenue/GDP					−0.043 (0.032)	−0.032 (0.034)
Public expenditure/GDP						
					−0.038* (0.022)	−0.042* (0.024)
Per capita temp. assistance for needy families (\$100)					−0.002 (0.001)	−0.001 (0.001)
Per capita other cash assistance (\$100)					−0.003** (0.001)	−0.003* (0.001)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.038 (0.092)	−0.171* (0.100)	−0.160 (0.166)	−0.323* (0.190)	−0.127 (0.182)	−0.225 (0.203)
Within group R^2	0.77	0.73	0.77	0.73	0.79	0.75
Number of observations	561	561	561	561	550	550

Clustered standard errors at the state level are in parenthesis. $p < 0.01$. The mean of the outcome variable is 0.14, * $p < 0.1$; ** $p < 0.05$; ***

in their analyses of poverty had less predictive power as a result. Appendix B presents a comparison of aggregated household-level employment (such as job distribution index) versus aggregated individual-level unemployment rate. The uneven job distribution index at the household level exhibits more than three times the predictive power to explain poverty compared to the individual unemployment rate.

A higher percentage of the non-white population and individuals outside the working age (such as children and older people) is positively associated with the poverty rate, which aligns with earlier literature (Bradbury et al. 2001; Hoover et al. 2004). This result suggests that a portion of children and individuals outside the working age lack the support of working-age individuals within their families. It is worth noting that the fraction of immigrants and non-white individuals has been increasing over the past few decades. Data indicates that recent immigrants, on average, have lower levels of education and fewer skillsets compared to native individuals, resulting in a higher proportion of immigrants earning lower incomes and living in poverty (Hoynes et al. 2006; Siddique et al. 2022). Alternatively, the influx of immigrants may reduce job market opportunities for native individuals. Consequently, if this argument holds, the overall association between the share of immigrants and the poverty rate will be positive, although the evidence in the literature is mixed (Llull 2017). Moreover, the increasing share of non-white and immigrant populations leads to greater ethnic diversity within states, which in turn contributes less to public income and resources (Siddique 2021, 2022). This indirect effect may further hinder poverty reduction efforts.

On average, historically non-white populations face relative disadvantages in this country. Therefore, an increasing fraction of the non-white population can be seen as a predictor of higher poverty, indicating the ongoing disadvantages faced by non-white individuals in society (Siddique 2022). However, the statistical association between immigration status (citizenship) and poverty is not significant, except in model 3.2. This is because although recent immigrants experience higher poverty rates compared to earlier immigrant cohorts, their share in the overall population of the United States is relatively small (the non-citizen population is 4.91% as shown in Table 1) to significantly impact the state-level poverty rate. The growth rate among non-white children surpasses that of white children, and non-white children are more likely to experience poverty due to their parents' lower economic resources (Mordechay and Orfield 2017; Siddique 2022). Therefore, a higher share of non-white children may

contribute to an overall increase in poverty. However, the share of non-white children is not statistically significant, suggesting that the effects may have been absorbed by the share of the non-white population as a whole.

Spatial variations and economic development can potentially play a role in determining poverty and inequality (Glasmeier 2002; Khan and Siddique 2021). As the spatial differences between states are likely to be fixed during our study period and are accounted for by fixed effects estimates, I also control for within-state spatial economic inequality, measured by Theil regional inequality, along with GDP per capita. The results show that higher GDP per capita is negatively associated with poverty and is statistically significant, while the Theil local inequality index is not statistically significant. The insignificant coefficient for regional inequality is small because regional inequality within states has remained relatively stable throughout the study period (Khan and Siddique 2021). Although a higher GDP per capita is negatively associated with the poverty rate, the relationship between the two variables is weak in terms of effect size. This finding is consistent with earlier literature in the United States and across countries (Adams 2004; Hoynes et al. 2006).

The proportion of non-management/professional jobs also serves as a predictor of higher poverty, although its impact is less consistent. On average, 62% of employment falls within this occupational category. In addition, I have included controls for various measures of human capital or educational attainment and government expenditure. Human capital has always played a crucial role in explaining economic growth and poverty. It directly influences employment and growth patterns by providing the skills necessary for the growth process, thereby impacting poverty (Gutierrez 2007). Controlling for human capital takes into account the reverse impact of poverty on employment. Limited human capital may prevent many low-income families from accessing good job opportunities. By including measures of human capital or educational attainment, we can capture the impact of poverty on employment, if any. Most educational achievements are negatively associated with the poverty rate, with the exception of those who have completed less than the 9th grade and the share of high school graduates or higher. Education below the 9th grade is likely insufficient in terms of human capital to prevent poverty. Increasing the percentage of high school graduates among individuals aged 25 years and above (who are likely to be part of the workforce) helps in poverty prevention, whereas the share of high school graduates among the overall

population does not have the same effect, as many individuals in this group are not part of the labor force. Those who are not in the labor force do not utilize their human capital to earn income. Overall, the relationship between educational attainment and poverty aligns with the existing literature, which suggests that higher levels of education, such as a bachelor's degree or associate degree, help people escape poverty (Assari 2018).

Government taxes and transfers play a vital role as income sources for the poor. While a higher share of public expenditure is negatively associated with the poverty rate, a higher percentage of public revenues does not show the same relationship (models 3.5–6). The link between public spending and poverty is well-established in the literature (Hidalgo-Hidalgo and Iturbe-Ormaetxe 2018); however, there are debates regarding which types of public expenditures effectively help the poor escape poverty (Fan et al. 2000; Jung et al. 2009). Furthermore, I have included controls for two different measures related to welfare expenditures: the Temporary Assistance to Needy Families (TANF) program and other cash assistance. The TANF program does not have a significant impact on poverty reduction, whereas the other cash assistance program shows a significant negative effect on the poverty rate. Government transfers can have both direct and indirect consequences on family earnings. The immediate impact is that government transfers provide households with cash and other benefits, which directly affect income and poverty. However, there is an indirect effect as well, where households may adjust their behavior due to the availability of government transfers, potentially reducing their incentive to work and resulting in lower incomes (Schoeni and Blank 2000). Thus, the indirect impact may offset the direct effect. Moreover, estimating the immediate impact of government benefits on poverty can be challenging due to the various types of benefits and the definition of the poverty level used in this study. The TANF program, for example, provides cash benefits to low-income households with children. Assuming no behavioral changes due to TANF, it should directly increase the incomes of poor families. However, its impact on poverty reduction may be limited since TANF transfers phase out at income levels around the poverty line (Hoynes et al. 2006). Therefore, these estimates do not show any effects of TANF on the poverty rate.

4.2 Job quality and poverty

Table 4 presents the impact of job quality measures on the overall poverty rate at the state level. Good-quality jobs have a significant effect on poverty reduction, while

poor-quality jobs have a significant opposite effect on poverty (increasing effect) across all model specifications in Table 4. As previously defined, "good-quality jobs" refer to households with at least one full-time employee, while "poor-quality jobs" encompass households with only part-time employment. The model specifications in Table 4 are identical to those in Table 3, except that here, I replaced the uneven job distribution index-1 and index-2 with measures of good-quality jobs and poor-quality jobs.

The interpretation of this result is simple: a one percentage point increase in the share of households with good-quality jobs reduces the poverty rate by 0.42 to 0.44 percentage points. On the other hand, a one percentage point increase in the share of households with poor-quality jobs increases the poverty rate by 0.35 to 0.38 percentage points. This evidence demonstrates that job quality matters for poverty reduction. The existence of a substantial share of poor-quality jobs in the economy, concentrated in households that have no other good jobs, is responsible for the higher persistent poverty rate in the country. In addition to uneven job distribution, as we have seen in the earlier section, job quality is another factor that can explain the persistent level of poverty in the United States. The significance level and size of coefficients are consistent, and the estimated model has high goodness of fit measures (R -square = 0.81 and 0.76 in models 4.5–6). After controlling for both state and year fixed effects and gradually including control variables, no inconsistencies in terms of the size of the coefficients and their significance levels have been noticed. These findings provide robust support for partial causal evidence that job quality plays a critical role in determining the poverty rate in the country: bad jobs increase poverty, and good jobs reduce poverty.

When people are working but still living below the poverty line, it is referred to as "poverty in work," as we have observed in the case of households with poor-quality jobs, which aligns with earlier evidence (Burkhauser and Finegan 1989). Due to the lack of extensive unemployment insurance, minimum wage protections, and the diminishing presence of trade unions in the USA, most poor individuals cannot afford to remain unemployed and wait for offers of good jobs. Consequently, they are compelled to accept these bad jobs regardless of their quality and level of compensation (Berry and Sabot 1978; Visaria 1981; Acemoglu 2001; Saunders 2002). The existence of bad jobs stems from employers being able to find an adequate labor supply to fill these positions. Therefore, the presence of bad jobs and higher poverty rates are closely intertwined. If these bad jobs persist in the

Table 4 Impact of job quality on poverty

	Model 4.1 Poverty	Model 4.2 Poverty	Model 4.3 Poverty	Model 4.4 Poverty	Model 4.5 Poverty	Model 4.6 Poverty
Job Quality						
Households with full-time worker (good-quality job)	−0.442*** (0.031)		−0.444*** (0.031)		−0.422*** (0.032)	
Households with only part-time worker (poor-quality job)		0.387*** (0.053)		0.388*** (0.054)		0.353*** (0.054)
Non-management/professional	0.087*** (0.034)	0.093** (0.038)	0.085** (0.035)	0.071* (0.039)	0.069* (0.035)	0.054 (0.040)
Demographic characters						
State population (million)	−0.003*** (0.001)	−0.004*** (0.001)	−0.003*** (0.001)	−0.004*** (0.001)	−0.003*** (0.001)	−0.004*** (0.001)
GDP per capita (thousand)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)
Non-white population (%)	0.065 (0.057)	0.181*** (0.064)	0.051 (0.066)	0.114 (0.074)	0.087 (0.073)	0.171** (0.081)
Theil inequality index (regional)	< −0.001 (< 0.001)	0.001 (< 0.001)	< −0.001 (< 0.001)	< 0.001 (< 0.001)	< −0.001 (< 0.001)	0.001 (< 0.001)
Children aged 0 to 18	0.100 (0.087)	0.299*** (0.098)	0.155* (0.093)	0.315*** (0.105)	0.133 (0.107)	0.288** (0.119)
Elderly aged 65 +	0.073 (0.079)	0.201** (0.090)	0.043 (0.088)	0.118 (0.099)	0.033 (0.101)	0.146 (0.112)
Citizen (%)	−0.007 (0.078)	0.034 (0.088)	−0.021 (0.079)	−0.018 (0.090)	−0.036 (0.088)	−0.046 (0.098)
Non-white children (%)	0.075* (0.040)	0.017 (0.045)	0.074* (0.040)	0.037 (0.045)	0.043 (0.043)	0.008 (0.048)
Human capital/education						
Less than 9th grade (%)			0.002 (0.002)	−0.002 (0.002)	0.002 (0.002)	−0.001 (0.002)
High school graduate (25 years & over)			−0.002 (0.001)	−0.001 (0.002)	−0.002 (0.002)	−0.001 (0.002)
Associate degree (%)			−0.004* (0.002)	−0.005** (0.002)	−0.004* (0.002)	−0.004* (0.002)
High school or higher (%)			0.003* (0.001)	< 0.001 (0.002)	0.003** (0.001)	0.001 (0.002)
Bachelor or higher (%)			−0.002* (0.001)	−0.003** (0.001)	−0.003* (0.002)	−0.004** (0.002)
Government expenditures						
Revenue/GDP					−0.033 (0.030)	−0.024 (0.034)
Public expenditure/GDP					−0.026 (0.021)	−0.043* (0.024)
Per capita temp. assistance for needy families (\$100)					−0.002 (0.001)	< −0.001 (0.001)
Per capita other cash assistance (\$100)					−0.002* (0.001)	−0.003* (0.001)
State FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4 (continued)

	Model 4.1 Poverty	Model 4.2 Poverty	Model 4.3 Poverty	Model 4.4 Poverty	Model 4.5 Poverty	Model 4.6 Poverty
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.416*** (0.093)	-0.088 (0.097)	0.354** (0.156)	0.138 (0.175)	0.365** (0.171)	0.190 (0.191)
<i>Within group R²</i>	0.79	0.74	0.80	0.74	0.81	0.76
<i>Number of observations</i>	561	561	561	561	550	550

Clustered standard errors at the state level are in parenthesis.

The mean of the outcome variable is 0.14.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

labor market, it is unlikely that poverty will disappear from the economy.

Previous literature attempted to explain why the poverty rate remained persistent in the United States despite positive economic indicators (Hoover et al. 2004; Hoxnes et al. 2006). However, they failed to adequately consider the role of employment quality and employment distribution, which are the primary sources of income for the poor. If jobs are not evenly distributed and predominantly consist of poor-quality positions, a rapidly growing economy is unlikely to help poor individuals escape poverty. A \$1,000 increase in GDP per capita only reduces the poverty rate by 0.001 percentage points, which is minimal compared to the impact of uneven job distributions and job quality on poverty, as demonstrated in Tables 3 and 4. These results suggest that the "trickle-down" economy does not effectively benefit the poor if employment, their main source of earnings, does not prioritize their well-being. In the United States, the role of uneven job distributions and job quality in determining poverty is more significant compared to other developed economies, as alternative means of support for the poor, such as transfers and redistribution, are relatively limited in this country (Gilens 2009; Garfinkel et al. 2010). Therefore, without sufficient redistribution programs, higher levels of uneven job distributions and the prevalence of low-quality jobs may explain why the income poverty rate remains high and persistent in the country, even during periods of robust economic growth and low unemployment.

5 Conclusions

The poverty rate in the United States has persistently remained high, posing a challenge to understand the underlying reasons. This paper aims to explore whether higher levels of uneven job distribution and the prevalence of poor-quality jobs contribute significantly to poverty in the country. The findings reveal that both uneven

job distribution and poor-quality jobs play an important role in explaining poverty in the United States.

An increase of one percentage point in the uneven job distribution index—1, which represents workless households, leads to an almost 0.48 percentage point increase in the poverty rate. This suggests that for a state with an average poverty rate of 14 percent, a 1 percent increase in workless households will result in a corresponding rise of approximately 3.43 percent in the poverty rate. Similarly, a one percentage point increase in the share of households with poor-quality jobs results in a 0.35 percentage point increase in the poverty rate. This implies that in a state where the average poverty rate stands at 14 percent, a mere one percentage point rise in households with only part-time workers can potentially contribute to an increase in poverty by approximately 2.5 percent. In contrast, a mere one percentage point increment in the proportion of households with good-quality jobs results in a poverty reduction of 0.42 percentage points. Consequently, in a state with an average poverty rate of 14 percent, this translates to a significant decline in poverty by approximately 3 percent.

In comparison to other commonly studied variables in the literature, such as individual unemployment rate, GDP per capita, public expenditure, and human capital, which are expected to impact the poverty rate, the role of job distribution and job quality is significantly prominent and noteworthy. The evidence presented in this paper can serve as a valuable resource for public policy debates aimed at reducing poverty in developed economies. It sheds light on the reasons behind the stagnation in poverty reduction efforts in the United States. Both uneven job distribution and poor-quality jobs are structural problems that hinder progress in achieving poverty reduction targets. This is not to say that safety-net programs and other measures do not alleviate poverty—they likely lift millions of households above the poverty line each year. However, I find that the most

effective anti-poverty solutions lie in the availability of good-quality jobs and their equitable distribution among households.

In the absence of policy guidance, the issue of uneven job distribution is likely to worsen in the future, potentially hindering the achievement of poverty reduction goals. Traditionally, when the first person from a family enters the labor market, it is more likely to be a male, unless the family is headed by a single mother. Subsequently, the second person from a family to enter the labor market is more likely to be a woman. When a woman becomes the second earner due to financial hardship, the family's economic situation improves, increasing their chances of surpassing the poverty threshold (Blackburn and Bloom 1994). However, in recent decades, a significant portion of the female labor force, particularly those married to well-paid men, has joined the workforce (Stier and Lewin 2002; Averett et al. 2021). There is a positive correlation between husbands' and wives' incomes (Averett et al. 2021). As female labor market opportunities expand, high-earning women tend to marry high-earning men, resulting in a rise in households with two high-earning individuals. Such structural forces play a role in determining employment opportunities, and as a result, the likelihood of both spouses in some families being unemployed may increase (De Graaf and Ultee 2000; Stier and Lewin 2002).

Therefore, it is crucial to establish public policy guidelines for the recruitment process that prioritize the common benefits over private benefits in order to reduce poverty in our society. One effective policy approach could be implementing a preference system similar to the veteran preference policy, where job applicants from workless families are entitled to preferences over applicants from households with already employed individuals in recruitment from competitive lists. Similar strategies should also be followed during firm's downsizing times where employee retention offer should prioritize individual whose household does not have a second earning individual. This preference system can be implemented in the job market without sacrificing efficiency since candidates must still meet the minimum qualifications. It can be further strengthened by restricting job offers to employees' spouses, a practice that some institutions such as universities have recently adopted, although it overlooks the overall societal benefits. While achieving comprehensive job distribution efforts may pose challenges in the short term, even limited success would yield significant societal equity gains in the long-term.

Similarly, in the absence of a minimum wage, unemployment insurance, and trade unions, the proportion of poor-quality jobs will continue to rise and coexist with good-quality jobs. As a result, a high poverty rate will

also persist. There is a significant disconnect between the booming labor market and the well-being of the people, particularly those at the bottom. The labor market is trapped in a cycle of bad jobs. The continuous rise of employment in gig economies may make the employment rate appear impressive, but without proper regulation and policies, the economy will keep producing more poor-quality jobs. This growth in poor-quality jobs is a byproduct of the massive scale development of the service sector, such as healthcare, leisure, hospitality, and restaurants, which predominantly hire people on a part-time basis and pay low wages. This trend also coincides with the declining manufacturing sector.

To reduce poverty, it is not only important to stop creating new poor-quality jobs, but also to replace the current poor-quality jobs with good-quality ones. Both direct and indirect policy guidance is necessary. The direct approach may include policy guidance by setting minimum work conditions and wages for all jobs in the market. Setting higher standards and a higher minimum wage would not only directly regulate job quality but also reduce incentives for firms to create more poor-quality jobs. Poor-quality jobs would be less beneficial for them compared to creating more good-quality jobs.

The indirect method should consist of increasing the coverage of unemployment insurance, investing in education to ensure equitable access to higher education for all, and allowing trade unions to function within each institution. Unemployment insurance should enable people to wait for better job offers instead of immediately accepting poor-quality jobs. It would also reduce the labor supply in the market, which would further push firms to raise pay and improve job quality. Similarly, increasing access to higher education is another way to create demand for good-quality jobs and reduce the supply of recipients of poor-quality jobs. This would leave firms with no choice but to produce more good-quality jobs. Highly skilled workers typically demand higher job quality than low-skilled workers (Cortés and Tessada 2011). Historically, unions have played a significant role in protecting workers' interests, and strengthening workers' unions can extend institutional regulations to represent worker interests and generate collective pressure to improve job quality (Simms 2017).

There are more full-time, good-quality jobs in the United States than the total number of households, as demonstrated in this paper. Therefore, their equitable distribution among families can play a significant role in eradicating poverty. While achieving a completely even distribution of jobs across households may not be immediately feasible due to structural constraints, combined and simultaneous efforts to allocate jobs from individuals to households and implement policies to enhance job quality would help alleviate poverty.

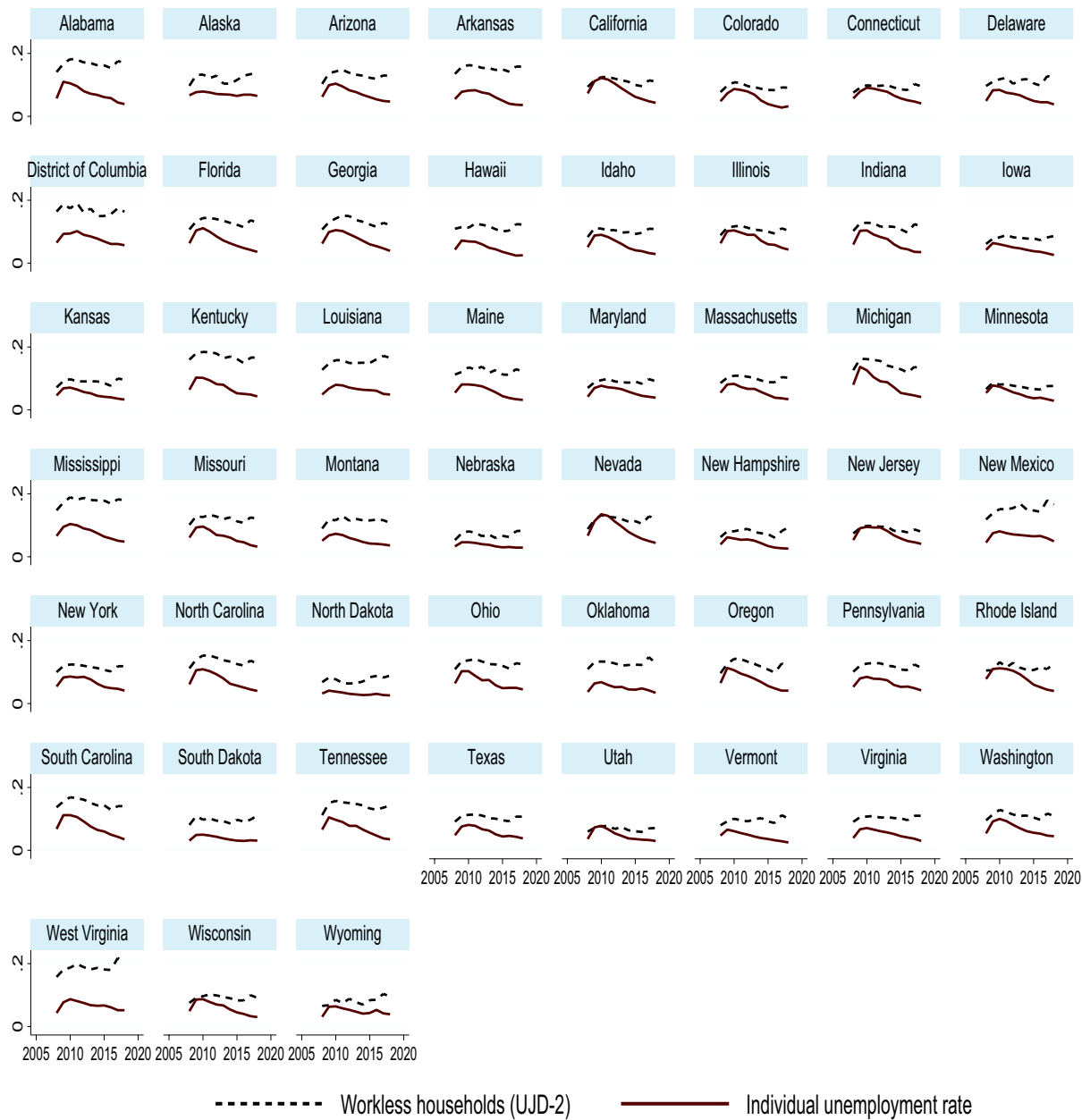
Future research should explore methods to improve the distribution of jobs among households and transition from low-quality to high-quality jobs without sacrificing efficiency, as this paper did not adequately address these aspects, which fall beyond its scope.

Data are from the US Census Bureau, American Community Survey (ACS), World Development Indicators, and the Department of Labor.

Appendix

Appendix A

See Fig. 4.



Note: This was calculated using ACS and BLS data.

Fig. 4 Workless households and individual unemployment rate by states. This was calculated using ACS and BLS data

Table 5 Checking predictive power across employment variables

	Model 5.1 Poverty	Model 5.2 Poverty	Model 5.3 Poverty	Model 5.4 Poverty	Model 5.5 Poverty	Model 5.6 Poverty	Model 5.7 Poverty	Model 5.8 Poverty	Model 5.9 Poverty
Uneven job distribution index-1 (workless households)	0.855*** (0.026)		0.819*** (0.029)					0.821*** (0.029)	0.862*** (0.087)
Individual unemployment rate		0.006*** (0.001)	0.001*** (< 0.001)		0.006*** (0.001)		< 0.001 (< 0.001)	0.001*** (< 0.001)	0.001*** (< 0.001)
Households with only part-time worker (poor-quality job)				0.701*** (0.117)	0.219* (0.120)			-0.042 (0.078)	
Households with full-time worker (good-quality job)						-0.703*** (0.024)	-0.690*** (0.029)		0.041 (0.078)
Constant	0.042*** (0.003)	0.103*** (0.004)	0.039*** (0.003)	0.086*** (0.009)	0.088*** (0.009)	0.707*** (0.019)	0.693*** (0.025)	0.042*** (0.006)	0.001 (0.073)
R ²	0.66	0.19	0.66	0.06	0.19	0.60	0.60	0.66	0.66
N	561	561	561	561	561	561	561	561	561

Ordinary least square estimates.

Standard errors are in parenthesis.

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Appendix B

Household-level versus aggregate-level measures.

This paper highlights an important issue regarding the significance of household-level employment measures compared to aggregate-level employment measures. To support this argument, a comparison is made between the predictive abilities of the job distribution index, job quality measure, and individual-level unemployment rate. Since the predictive power of two-way fixed effect estimates is largely driven by state and year fixed effects, I employ an ordinary least square model and compare their predictive power to offer suggestive evidence. In determining the statistical model's explanatory power, R-square is widely used and has been employed here (Hagerty and Srinivasan 1991; Foster et al. 1997; Choodari-Oskooei et al. 2012). Table 5 presents various estimates using the uneven job distribution index, job quality measures, and individual unemployment rate separately, as well as their estimates jointly. Remarkably, the uneven job distribution index, measured at the household level, exhibits more than three times the predictive power for poverty compared to the individual unemployment rate (R-square of 0.66 versus 0.19 in columns 5.1 to 5.2). Interestingly, including the individual unemployment rate alongside the uneven job distribution does not improve the R-square value. Additionally, it is important to note that good-quality jobs demonstrate higher explanatory power (R-square 0.60) as well, while poor-quality jobs have limited explanatory power. Therefore, the key takeaway from this analysis is that

household-level employment distribution holds significantly greater explanatory power in understanding poverty than the commonly used economic indicator of the unemployment rate.

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Author contributions

All analysis and manuscript writing were done by ABS.

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Availability of data and materials

The associated data are publicly available, and the Stata code can be requested at asiddique@fau.edu for reproducing and replicating the results.

Declarations

Conflict of Interests

There are no conflicts of interest.

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