Macroeconomic Sentiments and the Job Search Behavior of Labor Market Participants

Anushka Mitra*

September 14, 2022

Abstract

Macroeconomic expectations of individuals can play an important role in their labor market outcomes like job search effort. In this paper, using survey data from the Survey of Consumer Expectations for the period 2014-19, I provide evidence that workers' expectations towards the economy and specifically the labor market have a significant impact on their search effort. Optimistic workers with typically expansionary expectations for the economy, exert significantly lower search effort than their pessimistic counterparts. I then evaluate the effect of this observed dispersion in expectations by introducing workers with heterogeneous and biased beliefs in a Diamond-Mortensen-Pissarides search model with endogenous search effort. Quantitative analysis corroborate the empirical evidence, emphasizing the role of expectations and information frictions in labor market.

Expectations are central to decision making in most macroeconomic frameworks. Household decisions are often intra-temporal in nature and based on the outcomes that agents

*I am grateful to Ayşegül Şahin, Andreas Mueller, Saroj Bhattarai, Olivier Coibion and Christoph Boehm for their valuable advice on this project. I also thank Sadhika Bagga, Anjali Priya Verma, Niklas Kroner and Vasudha Jain for their insightful discussions. All mistakes remain mine. Mitra: Ph.D. Student, Department of Economics, The University of Texas at Austin, anushka@utexas.edu

expect in the future. This is true for not only consumption and savings, but also for other economic decisions that the households make, like investment, labor supply and educational choices; to name a few.[1] As expectations influence household behavior, they impact aggregate economic outcomes as well (D'Acunto, Hoang and Weber, 2015; Coibion et al., 2019; Coibion, Gorodnichenko and Ropele, 2020). Expectations, or rather shocks to consumer expectations, can also be a source of economic fluctuations.[2] Some recent papers find that expectations play a relevant role in explaining business cycle fluctuations (Beaudry and Portier, 2004; Lorenzoni, 2009; Eusepi and Preston, 2011; Barsky and Sims, 2012), which emphasizes the need to understand the impact that expectations have on household behavior. Business cycle fluctuations, driven by expectations and learning in labor market (Den Haan and Kaltenbrunner, 2009; Di Pace, Mitra and Zhang, 2016) further highlight the need to understand this relationship. Furthermore, most standard macroeconomic models assume full information and rational expectations on behalf of the households. However, increasing empirical evidence based on dispersion of macroeconomic expectations indicate a significant deviation from the standard assumptions (Woodford, 2001; Mankiw, Reis and Wolfers, 2003; Carroll, 2003). These deviations make it even more important to evaluate whether expectations inform actual choices of the households in the same way they determine choices in macroeconomic models.

Given the pervasive role of expectations, I ask in this paper, whether expectations have a significant impact on the labor market behavior of households. Models of labor market search and matching have expectations about the future outcomes embedded in them. In the workhorse models of search and unemployment (McCall, 1970; Pissarides, 1985;

[1] See Greenwood and Shleifer (2014), Armona, Fuster and Zafar (2018), Case, Quigley and Shiller (2003) and Zafar (2011) for discussions regarding role of expectations in investment decisions, housing markets and educational choices of households respectively.

[2] The idea goes back to Pigou et al. (1927), where he observes that optimism directs agents to build capital in anticipation of demand in future, and, when these expectations are not met, investments decline which may lead to recessions.

Mortensen and Pissarides, 1994; Burdett and Mortensen, 1998), when workers decide to accept a job or to even search for a job, their beliefs about future outcomes play a key role. Although there is growing evidence for the importance of workers' beliefs in shaping their decisions and affecting labor market outcomes (Carroll and Dunn, 1997; Hendren, 2017), not much has been explored regarding the impact on search behavior of workers.

The decision to search for a job is one of the most primary and crucial decisions that both the unemployed and the employed workers make. In labor markets with matching frictions, job search improves the efficiency and quality of matches, thus reducing unemployment. Furthermore, search effort is more often than not, costly, and workers face a choice of optimal effort. This trade-off calls for a rational decision from the workers and it is reasonable to assume that the beliefs and perceptions are taken into consideration for their choice of optimal search effort. Individual search effort can thus be important for evaluating the impact of various labor market policies. Overall, it is important to understand the search behavior along both extensive and intensive margins. In this paper, I evaluate the link between macroeconomic expectations and search behavior, by presenting some empirical evidence and then discussing them in a theoretical framework.

Using the Federal Reserve Bank of New York's Survey of Consumer Expectations (SCE), I empirically test the impact of expectations towards the economy on job search effort of workers. I consider both unemployed and employed workers who engage in job search for my empirical exercise. I estimate this relationship empirically by regressing the hourly search intensity of the workers on their expectations about the economy. The primary result of this exercise is that expectations matter significantly for the search intensity of workers. Expecting expansionary outcomes dampen current search effort for both unemployed and employed workers. This suggests that an inter-temporal substitution between searching in the present and searching in the future might be at play here. Search effort is costly

and workers for whom the marginal cost of searching in the present outweighs the benefit from search, choose to defer the full intensity of their effort to the future. Expansionary expectations decrease the cost of searching in the future which then decreases the current search hours. As Faberman et al. (2017) find, employed workers not only engage in on the job search, but they are also more efficient at it. However, the dynamics of the two groups can be very different from each other and hence I consider both these groups separately as well. As expected, unemployed workers exhibit higher search effort than their employed counterparts. They also respond less to changes in expectations. On an average, employed (unemployed) workers decrease their weekly search hours by 4% (1%) in response to a 10% increase in perceived probability of higher unemployment while in response to a 5% increase in expected inflation rate, employed (unemployed) workers decrease their weekly search hours by about 12.5% (6%).

Personal experiences or local conditions may shape expectations as well as search effort, thus biasing the estimates. I exploit an exogenous variation in expectations to identify the impact of expectations on search effort. This exogenous variation in macroeconomic expectations is driven by the 2016 Presidential elections. I report divergent sentiments post election for two demographic groups. First between Republican and Democratic states and secondly along race and party affiliation. Republicans grew more optimistic about the economy than the Democrats immediately after the election. Using state level data for the period 2015:12 to 2017:12, I use difference-in-difference mechanism to find that Republican sates where workers were more optimistic, searched for a job about 2 hours per week less than the Democratic states which were pessimistic in their outlook. I report similar results for Black voters in Democratic states and White voters in Republican states where White voters became more optimistic post elections and decreased their search hours by about 2.5 hours/week. This strengthens my findings that search effort is negatively related to

expansionary expectations about the economy.

I further find that household expectations reported in the survey are considerably dispersed. While some individuals have expectations that predict expansionary outcomes for the economy, at the same time, some individuals expect rather recessionary outcomes. This suggests that the households face imperfect information, and there is a deviation from the standard full information assumption. Heterogeneity in expectations and deviation from the standard assumptions is well documented in the literature. Coibion and Gorodnichenko (2012, 2015); Coibion, Gorodnichenko and Kamdar (2018), among many others, document deviations from the usual full information, rational expectations assumption. In the labor market, Conlon et al. (2018) find that workers' beliefs are biased and they respond to labor market shocks in a way that is consistent with presence of information frictions. Spinnewijn (2015) and Mueller, Spinnewijn and Topa (2018) also find evidences of bias in workers' beliefs. In my empirical exercise, I find that the workers who are optimistic and expect typically expansionary outcomes, tend to search lesser than their pessimistic counterparts, who expect recessionary outcomes.[3] This indicates the presence of heterogeneity in beliefs of workers about the economy.

I explain these empirical findings in context of a Diamond-Mortensen-Pissarides (DMP) model of frictional labor market with endogenous search effort, where the equilibrium search effort depends upon the expected labor market tightness.[4] In the baseline model, I consider a representative agent model with unbiased beliefs. However, taking into account all the evidence supporting imperfect information in household expectations, I introduce heterogeneity and bias in the workers' expectations towards labor market tightness, in an extension of the baseline model. Specifically, I introduce two types of workers: *optimists*

[3] I define this following Kamdar (2019). Using the SCE data, she suggests that the main driver of household beliefs is sentiment and households can range on a spectrum of being optimistic to being pessimistic.

[4] The theoretical framework does not consider on-the-job search at present.

and *pessimists*. They do not observe the true labor market tightness and their heterogeneity manifests in difference in their beliefs about it. The model further explains the differential search behavior of optimistic and pessimistic agents. Optimistic workers, overestimating the true conditions decrease their search efforts more in response to an improvement in expectations. Pessimistic workers, in contrast, underestimate the true conditions and do not decrease their search effort as much as the optimists. This dampening of response is caused by the presence of information frictions which may lead to a welfare loss as search is costly. I further use the model to conduct a sensitivity analysis with regards to the structural forces that may be a factor in determining search intensity. This exercise indicates that search intensity in both the models is sensitive to the bargaining power of the workers and it decreases as bargaining power improves. As bargaining power improves, workers are able to extract more surplus from a match, thus requiring them to search lesser for a job. Search effort, however, is also sensitive to unemployment benefits and decreases as the benefits increase. However, the presence of information frictions dampen the response of search effort to increase in benefits. Since the agents have biased beliefs, their response to increase in the unemployment benefits is also lower. Pessimists search more than optimists

This paper contributes to two strands of literature. Firstly, it contributes to the literature that studies the impact of household expectations on their behavior. By doing so, it also contributes to the literature documenting whether survey based expectations inform actual choices of the households in accordance with how expectations determine choices in a macroeconomic model. Several studies document the role of expectations in the labor market. Mueller, Spinnewijn and Topa (2018) and Conlon et al. (2018) have shown that worker beliefs are biased and they also affect worker decisions. Other studies that explore the role of beliefs in actual outcomes are Spinnewijn (2015); Hendren (2017) (unemployment benefits); Conlon et al. (2018)(wages) and Potter (2020) (offer arrival rates). My paper

complements the literature by developing evidence that expectations also play an important role in determining the search effort of workers. The aforementioned papers also contribute to a growing strand of literature that tries to understand the role of information frictions in labor market decisions. This paper complements these studies and extends the literature by documenting evidence about individual search behavior in presence of information frictions. Furthermore, I extend the DMP search model discussed by Mukoyama, Patterson and Şahin (2018), by introducing heterogeneous agents with biased beliefs about the labor market conditions.

Secondly, this paper contributes to the literature trying to understand the job search behavior of workers. Mukoyama, Patterson and Şahin (2018) find in their paper that individual search effort is countercyclical and my empirical exercise complements their result. However, they focus mainly on the relationship between search effort and current labor market tightness and do not explore the role of expectations or information frictions. Faberman, Kudlyak et al. (2016) focus on online job search and study the relationship between search intensity and search duration. One of their findings is that long-duration job seekers send more applications than short-duration job seekers. Using the American Time Use Survey (ATUS) survey, DeLoach and Kurt (2013) find that search intensity is acyclical overall. They find that workers decrease their search in response to deteriorating labor market conditions, but this is offset by positive effect on search due to declining household wealth. Krueger and Mueller (2010) use the ATUS to find some stylized facts on search intensity of unemployed workers, though they do not touch upon the role of beliefs or cyclical properties of search intensity.

Rest of the paper is divided into the following sections. Section 1 presents new empirical evidence about the effect of macroeconomic expectations on search behavior of workers. Section **??** introduces the theoretical framework, within which, section **??** describes the

model with endogenous search effort and places the empirical evidence in its context. It also introduces heterogeneity in worker expectations and information friction to the model and quantifies the impact of expectations on search effort. Section 2 discusses the quantitative results from the two models and section 3 concludes.

1 Empirical Evidence: Expectations and Job Search Behavior

1.1 Data

To estimate the relationship between search effort and expected labor market tightness as dictated by equation (1), I use the data from the Survey of Consumer Expectations (henceforth SCE). It is fielded by the Federal Reserve Bank of New York and is a monthly survey of an annually rotating panel of approximately 1300 household heads from across the US. The survey also has a Labor Market module which is administered every 4 months.[5] The survey elicits household expectations on various economic variables and records demographic information of the participants. Although there are several surveys that elicit household expectations on various macroeconomic outcomes, SCE is unique in also administering a detailed survey about labor market outcomes and perceptions. The labor market module asks a variety of questions such as search hours, expected job offers, expected wage offers, reservation wages, probability of accepting offers to name a few.

Descriptive Statistics. Table 1 lists some descriptive statistics for the SCE. The monthly module of the SCE runs from 2013:06 to 2020:03. As the sample period for the SCE is short, I compare it to the corresponding statistics in the Current Population Survey (CPS) as CPS not only has a long time-line, it is a widely used survey for labor market outcomes. The sample period for this study is 2014:03 to 2018:03, as the labor market module was

[5]For further discussion about the survey, refer to Armantier et al. (2017).

administered only since 2014:03 and is publicly available till 2018:03. The SCE dataset consists of 11,537 unique individuals. Out of these individuals, about 7,094 (61%) have taken the labor market survey at least once. The sample is comparable to demographic characteristics of the Current Population Survey (CPS) as seen in table 1. Table 1 also reports some statistics on household expectations. Apart from those mentioned, on an average, 20% of the respondents were optimistic about better access to credit in future, while 33% were pessimistic about the same. 43% of the respondents expected their personal finances to be better while 13% of the respondents expected it to be worse than their current status. Coming to labor market variables, only about 25% of those who take the labor market survey report their search hours. Conditional on searching, 83% of the respondents reported engaging in multiple activities to look for a job. The most popular methods were browsing and applying to job postings online. Overall, this sample is nationally representative. [6]

I also report some descriptive statistics for the optimistic and pessimistic workers in Table 2. I label the workers who report their expected probability of higher unemployment in the top 20 percentile as optimistic. Analogously, I label the ones who report their expected probability of higher unemployment in the bottom 20 percentile as pessimistic. A higher percent of workers who were high school pass out or less were more optimistic. Also, a higher percent of the unemployed workers were pessimistic, which is not surprising.

[6] Although I do not report the descriptive statistics for the optimists and pessimists, the two groups are similar on most individual characteristics. Pessimists are more likely to be unemployed and the optimists are somewhat more likely to be male, older and have a lesser degree of education.

Table 1: Descriptive Statistics for Survey of Consumer Expectations

	SCE	**CPS**
Demographics		
Age	45.8	42.2
Female	48.3	51.0
High school or less	31.7	37.7
Some college	18.8	19.2
Bachelor's Degree or more	49.4	43.1
White	80.7	77.2
Black	11.6	13.2
Married	65.5	56.7
Labor Market Outcomes		
Employed (% of total)	73.6	72.3
Unemployed (% of total)	4.8	3.6
Search Hours: Employed	3.9 (5.1)	
Search Hours: Unemployed	11.8 (9.7)	
Average household expectations		
Percent chance of higher unemployment	37 (22.3)	
Expected inflation (%)	5.8 (7.7)	
Perceived Probability of Job Finding in the next 3 months		
Employed	0.56 (0.32)	
Unemployed	0.49 (0.30)	
Number of Labor Market Survey respondents	7094	
Number of Total Respondents	11537	

This table shows the descriptive statistics in the SCE and compares it to the CPS. Samples in both SCE and CPS are restricted to ages 20-65. Survey weights are taken into account while computing these statistics. Standard errors in parenthesis.

Table 2: Descriptive Statistics for Optimistic and Pessimistic Workers

	Optimistic	**Pessimistic**
Demographics		
Age	53.8	49.9
Female	47.7	51.1
High school or less	39.6	31.4
Some college	19.4	19.8
Bachelor's Degree or more	43.8	48.8
White	80.5	79.5
Black	12.0	11.8
Married	66.8	62.7
Labor Market Outcomes		
Employed (% of total)	74.4	72.2
Unemployed (% of total)	2.8	6.3
Search Hours: Employed	4.2	4.5
Search Hours: Unemployed	13.0	10.16

Note: This table presents descriptive statistics for optimistic and pessimistic workers. I define define optimistic workers as those who report the expected probability of higher unemployment in the top 20 percentile. Pessimistic is defined as those in the bottom 20 percentile. Samples restricted to ages 20-65. Survey weights are taken into account while computing these statistics. Standard errors in parenthesis

1.2 Estimation

I estimate the following relationship using the data described in the previous section,

$$\text{Search Intensity}_{it} = \alpha + \beta \mathbf{E}_i(\textit{State of Economy})_{t-1} + \Gamma X_{it} + \rho_t + \theta_s + \epsilon_{it} \quad (1)$$

Here, i denotes an individual while t stands for time. X_{it} is a set of individual demographic controls.[7] ρ_t and θ_s are time and state fixed effects respectively. The coefficient of interest is β which captures the responsiveness of search intensity of workers to their expectations about the economy. Search intensity is defined as the number of hours searched for a job in a week. I consider separate sub-samples of unemployed and, employed individuals who search for a job. There is ample evidence in the literature that employed individuals also engage in job search, and the behavior of the two groups can be very different from each other.[8]

I use multiple indicators to capture the expectations about the state of the economy. Primarily, I consider four indicators, the details of which are available in the Appendix section B. i) Expected probability of an increase in unemployment in future, ii) Expected rate of inflation iii) Expected ease of credit access and iv) Expected personal financial status. The expected probability of higher unemployment is the survey question that comes closest to measuring expected labor market tightness. The other three indicators reflect the general perception towards the economy. As, Andre et al. (2019) find, expectations about macroeconomic variables are formed jointly and there is some evidence of co-movement of expectations. Similarly, Kamdar (2019) finds that macroeconomic expectations display co-movement and the main driver behind these expectations are sentiments. When households are

[7] A standard set of demographic controls include age, age^2, household income, education, race, gender and marital status of the individual. I also include duration of search as an additional control.

[8] While considering the sub-sample of unemployed workers, I include unemployment duration as an additional control along with the standard set of controls.

optimistic, they expect typically expansionary outcomes (such as falling unemployment and improving business conditions) as well as improving personal financial conditions. Roth and Wohlfart (2019) find that a negative macroeconomic outlook has a negative effect on the financial prospects of households, and that a negative outlook increases the perceived chance of becoming personally unemployed. Thus, in absence of a direct question about the expected state of the economy in the survey, it seems reasonable to employ the expectations on inflation, ease of credit access and personal financial status.

1.3 Results

The primary result for the estimation in equation (1) is presented in Table 12. The panels of the table correspond to the sentiment indicators discussed above.[9]

Perceived probability of higher unemployment. These results are summarized in Panel A of Table 12. The estimation result shows that search effort is negatively and significantly related to expansionary or optimistic expectations about the economy. Workers who expect the economy to do worse, that is, expect a greater chance of higher unemployment rate, spend more time searching for a job than those who expect the economy to do better. To be more specific, a 10 percentage point increase in perceived probability of higher unemployment is related to an increase in an employed worker's search intensity by 0.15 hours per week. An employed worker searches for only about 4 hours per week, and an increase of 0.15 hours per week is about an increase of 4%. For the unemployed workers, the magnitude of response to a change in expectations is about the same as the employed. On an average the unemployed search about 14 hours per week, and thus the increase in search hours related to a 10 percentage point increase in expectations is much lower, at about 1% of the

[9]The results in this table are robust to inclusion of actual unemployment rate, the actual inflation and the actual federal funds rate.

total search effort per week.[10] Note that a 10% variation in perceived probability of higher unemployment is comparable to a drop in job finding rate during recessions.[11]

Expected Inflation Rate. These results are reported in Panel B of Table 12. Firstly, it is important to note that inflation expectations are associated with recessionary outcomes for individuals. Kamdar (2019) finds using the SCE that optimistic individuals indeed expect lower inflation which is generally observed in recessions, and attributes it to widespread contempt for inflation.[12] It is thus plausible that workers who expect the economy to do worse in future, expect inflation to increase. I interpret the results in Panel B in light of this finding. As expected rate of inflation increases, search hours increase for both the employed and the unemployed workers. A one percentage point increase in inflation expectation is related to an increase in search hour by about 0.1 hour per week. Inflation expectations are highly dispersed with a standard deviation of about 7.2 percentage points overall and individual specific inflations expectations show a dispersion of 5.5 percentage points on an average. Therefore, a jump of about 5 percentage point in expected rate of inflation translates to about 30 minutes of increase in search hours per week for the employed, while a 50 minute increase per week for the unemployed.

Expected Ease of Credit Access. The results are listed in Panel C of Table 12. Expected ease of credit access is a categorical variable that takes values 1-3 corresponding to harder, about

[10] This is likely because of the fact that the unemployed workers search much more on an average than the employed. Without a job, they also cannot dampen their search hours as much as the employed.

[11] In 2007, prior to the Great Recession, job finding probability, as calculated from CPS, was about 29% which then declined to about 17% in 2010. Similarly, it dropped from about 35% in 1999 to about 26% in 2002. Furthermore, in the SCE, households report a standard deviation in probability of higher unemployment of about 14 percentage point. Thus a 10% increase in probability of higher unemployment is not unusually large.

[12] Shiller (1997) also notes that consumers believe that inflation, by increase in costs and without appropriate increases in income, may lower their standards of living. Consumers thus appear to associate inflation with worsening economic conditions.

the same and easier access to loans respectively. The omitted category is those who expect the credit access to be the same as at the time of the survey. We see that, as optimism increases, search hours decreases. Employed workers who expect harder access to loans in future, thereby expecting worse economic conditions, search for jobs about 1.8 hours more per week than those who expect the economy to do better. Unemployed workers who are pessimistic search about 3.2 hours more per week than the optimistic workers. Although in the full sample, unemployed workers search more than employed workers on an average, an optimistic unemployed worker searches for lesser number of hours than a pessimistic unemployed worker.

Expected Personal Financial Status. The results are reported in Panel D of Table 12. Expected personal financial status is also a categorical variable that takes values 1-3 corresponding to worse, about the same and better personal financial status. It is thus, increasing in degree of optimism. The results reported in Panel D are very similar to the those in Panel C of Table 12. Workers who are more optimistic about their personal finances in the future, search for lesser number of hours than those who are pessimistic about their finances. This result is consistent for both employed and unemployed individuals.

A caveat is that the expectations regarding ease of credit access and personal finances are also related to the income effect on labor supply.[13] If a worker expects easier access to loans in the future or better financial conditions, she expects an increase in her non-labor earnings. As a result she may expect to demand more leisure in future and therefore search less today for a job. To account for this, I estimate equation (1) including expected

[13] An income effect on the labor supply increases demand for leisure if leisure is a normal good and not an inferior one. For all practical purposes, leisure is indeed a normal good and hence, an increase in non-labor income decreases labor supply and increases demand for leisure.

Table 3: Sentiment towards the Economy and Job Search Hours

Search Hours/Week	(1)	(2)	(3)	(4)	(5)
Expected Probability of Higher Unemployment	0.0212***				0.0122*
	(0.007)				(0.007)
Expected Inflation Rate		0.0660***			0.0527***
		(0.018)			(0.019)
Exp(Credit Access): Harder			0.741**		0.512
			(0.356)		(0.373)
Exp(Credit Access): Easier			-0.724**		-0.744**
			(0.335)		(0.345)
Exp(Personal Finances): Worse				1.379***	1.115**
				(0.469)	(0.479)
Exp(Personal Finances): Better				0.886	0.227
				(0.604)	(0.315)
N	3475	3468	3480	3480	3463
R^2	0.307	0.312	0.310	0.309	0.319
Controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes	Yes	Yes

This table presents estimates of how search intensity of workers is related to their expectations towards the economy. It is summarized by the coefficient *beta* in equation 1. Columns (1)-(4) have a different sentiment indicator and Column (5) has all the sentiment variables together. The dependent variable for all the panels is search hours of the workers in a week. Set of controls include economy wide unemployment rate and inflation rate; individual's employment status, age, age^2, household income, education, race, gender, and marital status for all columns. Fixed effects include time (monthly); and state fixed effects. The Sample period is from 2014:03 to 2020:03. Survey weights used. Clustered standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.

Table 4: Sentiment towards the Economy and Job Search Hours: Employed Workers

Search Hours/Week	(1)	(2)	(3)	(4)	(5)
Expected Probability of Higher Unemployment	0.0573***				0.0304***
	(0.006)				(0.006)
Expected Inflation Rate		0.0508***			0.0390**
		(0.016)			(0.016)
Exp(Credit Access): Harder			0.692**		0.611**
			(0.281)		(0.282)
Exp(Credit Access): Easier			-0.338		-0.267
			(0.176)		(0.177)
Exp(Personal Finances): Worse				1.945***	0.713**
				(0.361)	(0.355)
Exp(Personal Finances): Better				-0.254sym*	0.161
				(0.154)	(0.152)
N	2889	2883	2894	2894	2878
R^2	0.115	0.114	0.115	0.113	0.124
Controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes	Yes	Yes

This table presents estimates of how search intensity of employed workers is related to their expectations towards the economy. It is summarized by the coefficient β in equation 1. Columns (1)-(4) have a different sentiment indicator and Column (5) has all the sentiment variables together. The dependent variable for all the panels is search hours of the workers in a week. Set of controls include economy wide unemployment rate and inflation rate; , age, age^2, household income, education, race, gender, marital status and current wage for all columns. Fixed effects include time (monthly); and state fixed effects. The Sample period is from 2014:03 to 2020:03. Survey weights used. Clustered standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.

Table 5: Sentiment towards the Economy and Job Search Hours: Unemployed Workers

Search Hours/Week	(1)	(2)	(3)	(4)	(5)
Expected Probability of Higher Unemployment	0.0212***				0.0122*
	(0.007)				(0.007)
Expected Inflation Rate		0.0660***			0.0527***
		(0.018)			(0.019)
Exp(Credit Access): Harder			0.741**		0.512
			(0.356)		(0.373)
Exp(Credit Access): Easier			-0.724**		-0.744**
			(0.335)		(0.345)
Exp(Personal Finances): Worse				1.379***	1.115**
				(0.469)	(0.479)
Exp(Personal Finances): Better				0.886	0.227
				(0.604)	(0.315)
N	3475	3468	3480	3480	3463
R^2	0.307	0.312	0.310	0.309	0.319
Controls	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes	Yes	Yes

This table presents estimates of how search intensity of unemployed workers is related to their expectations towards the economy. It is summarized by the coefficient β in equation 1. Columns (1)-(4) have a different sentiment indicator and Column (5) has all the sentiment variables together. The dependent variable for all the panels is search hours of the workers in a week. Set of controls include economy wide unemployment rate and inflation rate; , age, age^2, household income, education, race, gender, marital status and unemployment duration for all columns. Fixed effects include time (monthly); and state fixed effects. The Sample period is from 2014:03 to 2020:03. Survey weights used. Clustered standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.

total earnings [14] in the next 4 months, in the set of controls. The results remain robust to inclusion of expected total earning.[15] The results in Table 12 are robust to further inclusion of current labor market tightness, suggesting that even when labor markets are tight or the economy is currently doing well, a pessimistic worker searches more than her optimistic counterpart. This indicates that expectations about the economy indeed matter for the current search behavior of workers as the model suggests.

The results in Table 12 suggest that an inter-temporal substitution takes place between searching in the current period and searching in future. This can arise from the fact that optimistic workers expect tighter markets in future, thereby increasing their surplus and decreasing their marginal cost of searching in the future. When a worker expects bad times ahead, she may also expect the matching efficiency or the vacancy posting to decline further in future and hence searches harder in the current period. This inter-temporal choice can impact how policies in the labor market are framed. Guiding expectations of households may have impact on their search behavior as well. This remains outside the premise of this paper and I leave it for a future project. These results also indicate a role for information frictions as highlighted by the key role played by sentiments in these results. Given that we observe individuals who are either pessimistic or optimistic in the sample, it points towards lack of full information for workers. It is likely that there are information frictions which lead individuals to have different sentiments towards the economy.

[14] I also consider expected labor earnings, and the results remain the same. However, there are fewer responses for expected labor earnings and hence I do not include this in my estimation.

[15] These results are conditional on searching which indicate that this is not a pure income effect. Furthermore, from a broader perspective, even if these expectations encompass the income effect, they remain relevant for the job search behavior of the workers.

1.4 Identification

Expectations about the economy and choice of search hours maybe informed by local conditions or personal experiences that we do not observe. In that case, the impact on search hours that we observe from expectations about the economy could be biased. To address this issue, I exploit a unique difference-in-difference environment, which would purge out any other factor that may confound the estimates. To do so, I use an exogenous shock that shifts household expectations differentially for two demographic groups. This shift in expectations comes from the US Presidential election in 2016.

1.4.1 2016 Presidential Election and Household Expectations

Presidential elections are known to cause partisan polarization of household expectations. Coibion, Gorodnichenko and Weber (2020) find that households predict better economic condition if their preferred candidate wins but a dire one if the other candidate wins. The 2016 Presidential election caused an unprecedented increase in relative economic optimism for Republican voters as reported by Mian, Sufi and Khoshkhou (2018). Using the SCE Armantier et al. (2019) also find that after the 2016 election, depending on partisan affiliation, political and economic outlook of the American electorate shifted. Republican voters became substantially more optimistic than their Democratic counterparts. I therefore, plan to exploit this exogenous shift in expectations caused by the tightly contested Presidential election in 2016 to estimate the impact of household expectations on their search behavior. I primarily conduct this exercise by party affiliation as the relevant demographic group, but I also perform this exercise for race and party affiliation in Section 1.1.

In Table 14, I present the statistics for Expected probability of higher unemployment and search hours for the demographic groups in question.[16] The average expected probability

[16]The sample is restricted to individuals in the age group 20-65 and with responses to both the questions

		Democrats	Republicans
Expected Probability of Higher Unemployment	Mean	0.385	0.388
	SE	0.006	0.004
	N	1,229	2,184
Weekly Search Hours	Mean	5.28	5.86
	SE	0.200	0.158
	N	1,229	2,184

This table shows the descriptive statistics in the SCE for party affiliation. Samples are restricted to individuals with ages 20-65, and those with responses to both search hours and expected probability of higher unemployment. Swing states are omitted. Survey weights are taken into account while computing these statistics. Standard errors in parenthesis.

Table 6: Descriptive Statistics by Party: 2013:06 to 2019:12

of higher unemployment is similar across Democrats and Republicans. It is also similar for Black Democrats and White Republicans. Although Republicans seem to be slightly more pessimistic in general. For search hours, Democrats and Republicans seem to be putting in similar number of hours weekly, however, Black Democrats (7.78 hours) search much higher than White Republicans (4.91 hours). This difference is likely driven by race as Black individuals search more than their White counterparts in general.[17] I show below in Section 1.1 that although the levels are different for the search hours, the elections change the slope of the difference between the two groups by race and party affiliation. I present evidence at the state level[18] in Figure 1, which is in agreement with the findings by Armantier et al. (2019) at the county level.[19] Republican states were more pessimistic than Democratic

about expectations and search effort.

[17]The Appendix Table 11 presents the relevant statistics by race as well.

[18]SCE does not report county identifiers for its respondents in the publicly available data, but only the state of the respondent.

[19]The article and the county level trends can be found here. This study compares expectations between the two electoral groups for personal finances, chance of increase in stock prices and unemployment, government debt and taxes. They find evidences of partisan polarization in household expectations. However, both Mian,

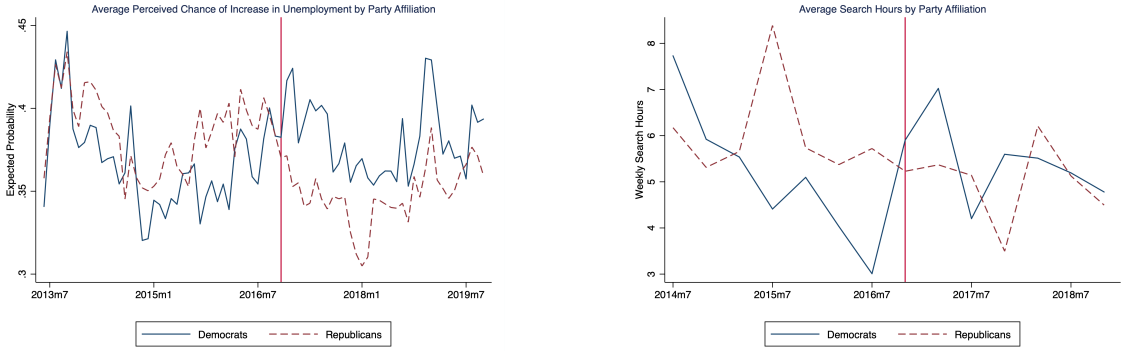


Figure 1: 2016 Presidential Election and Shift in Sentiments

Note: The left panel plots the monthly average of expected probability of higher unemployment while the right panel plots the 4-month average of search hours for the two electoral groups in the 2016 election.

states prior to the election and grew relatively much more optimistic immediately after the election. As seen in Figure 1, prior to the 2016 elections, Democratic states were reporting a lower probability of a higher year-ahead unemployment rate than Republican states, but this pattern reversed immediately after the election. I perform similar checks for the other measure of sentiments towards the economy and those variables also see an analogous shift in expectations of the two electoral groups differentially, post elections. Average search hours also had declined pre election for the Democrats, but it sharply increases post elections while it declines for the Republicans.[20]

The outcome of an event study for perceived probability of higher unemployment and search hours is reported in Figure **??**. This figure plots the expectations regarding higher chance of unemployment and search hours of individuals in Republican states relative to those in Democratic states. For the perceived probability of higher unemployment, the difference between the two electoral groups post election is large and significant, even after

Sufi and Khoshkhou (2018), and Conlon et al. (2018) find that polarized economic expectations did not translate into polarized consumer spending.

[20] Although it is true that Republican states can be systematically different from Democratic states, these differences are not enough to explain these trends since even after controlling for demographic differences I observe similar trends.

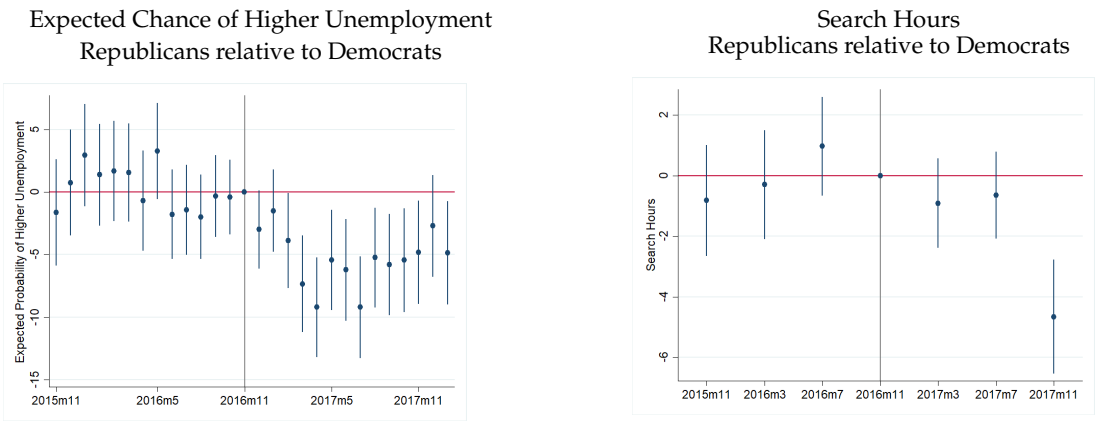


Figure 2: Event Study: 2016 Presidential Election and Shift in Expectations

Note: The left panel plots the difference (and confidence interval) in expected probability of higher unemployment between Republican and Democrats, after controlling for demographic differences. The right panel plots the difference (and confidence interval) in search hours between Republicans and Democrats pre and post the 2016 elections. Demographic controls used are age, age^2, household income, education, gender and race.

controlling for demographics. For search hours the trend is not as stark, but it appears that Republicans who were searching about the same or even somewhat more than Democrats, started searching lesser post election. Since Presidential elections have been known to polarize economic expectations, the shift in expectations post election is not surprising. The shift in search hours immediately after the elections is thus, likely to be coming from this exogenous shift in expectations about the economy.

Keeping these evidences in mind, I perform a difference-in-difference analysis, by dividing the sample into two groups: Republicans and Democrats and the time period into pre and post November 2016 when the result for the Presidential election was announced. I estimate the following equation

$$s_{it} = \alpha + \beta_1 Party_i \times Post_t + Party_i + Post_t + \Gamma X_{it} + \epsilon_{it} \tag{2}$$

where, s_{it} is the search hour, Post is the post election time dummy and Party is the party

for which the respondent voted.[21] The coefficient of interest here is β_1. It captures the effect of being a Republican voter post the election in 2016. *Party* and *Post* capture all other events that were common to the electoral groups and the time period. I also include a set of demographic controls in column (2) of Table 7, to purge away all other influences coming from demographic differences in the two groups. The result of this analysis is reported in Table 7. Republicans who were optimistic post election about the economy; searched about 2 hour per week less than the Democrats who were pessimistic after the election. Column (2) shows similar result with inclusion of demographic controls. These results augment the findings in Table 12 that search effort decreases with increase in optimism towards the economy.

Table 7: Difference-in-Differences

Sample Period: 2015:11 to 2017:12		
Dep Var: Search Hours	(1)	(2)
Republican × Post Election	-4.046**	-3.749**
	(1.909)	(1.752)
Post Election	2.428	1.892
	(1.609)	(2.139)
Republican	1.895	1.951**
	(1.188)	(0.958)
Demographic Controls	No	Yes
N	1146	1146
R^2	0.117	0.116

Note: This table presents estimates of changes in search hours for individuals in Republican states after the 2016 Presidential Elections. These estimates correspond to the coefficient β_1 from equation 2. Post Election period is from 2016:12 to 2017:12. Set of controls include age, age^2, household income, education, race, gender and marital status. Clustered standard errors in parentheses. Survey weights used. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

[21] Post Election is a dummy that takes value 1 if $time > 2016:11$. Party is either Republican or Democratic depending upon the state of the respondent. I drop swing states in this analysis. Swing states are defined as the states with a less than 5% difference in vote share.

This section discusses a theoretical framework for contextualizing the relationship between macroeconomic expectations and job search effort of workers that we saw in Section 1. While most conventional macroeconomic models assume that households form full-information rational expectations, existing work using survey data on expectations provides evidence in support of existence of information frictions arising due to lack of complete information (Carroll, 2003; Coibion and Gorodnichenko, 2012, 2015; Coibion, Gorodnichenko and Kamdar, 2018). If individuals do not have complete information about the state of the economy, most of their economic decisions will be directly affected. The full information model, in this case, biases the estimates. This is true for the labor market as well. Although, we have relatively fewer studies focusing on information frictions in the labor market; this literature is growing. Several papers have found evidences of bias in workers' beliefs (Spinnewijn, 2015; Mueller, Spinnewijn and Topa, 2018; Conlon et al., 2018). Mueller, Spinnewijn and Topa (2018) find that the workers, particularly the long term unemployed tend to be over optimistic in their beliefs and this accounts for about 10% of the incidence of long term unemployment. Thus, these biases in beliefs translate into actual outcomes for the labor market participants.

The empirical findings in the previous section establish that expectations are heterogeneous across individuals. Some workers expect expansionary outcomes for the economy while some do not. This indicates two thing: first that the workers are heterogeneous in their beliefs, and second, that these beliefs are biased and do not let the workers to perceive the true state of the economy. Search and matching in labor market is already frictional. We do not see perfect matches between jobs and vacancies and as a result, there are vacancies that remain unfulfilled and workers who remain unemployed. If workers had less than full information about the economy, it will lead to further loss in efficiency of the matches. It is therefore important to incorporate information friction in models of search and matching to

capture the true search effort of workers and hence the aggregate as well. I introduce these elements in a Diamond-Mortensen-Pissarides (DMP) model of job search in a frictional labor market with endogenous search effort.[22]

Setup. Consider an economy comprised of workers and firms with discrete time t over an infinite horizon. Workers can be either employed or unemployed and they discount future at the rate $\beta \in (0,1)$. Firms post vacancies and workers must be matched with it for them to be employed. Firms and workers are matched following a matching function

$$m(u,v) = \chi U^{1-\alpha} V^{\alpha}$$

Only the unemployed workers search for a job with individual search effort s_{it} for a worker i at time t. Searching is costly and the cost function is increasing and convex. It takes the form $c(s_{it}) = \phi s^{\omega}/\omega$, where $\omega > 1$. The probability of finding a job for an unemployed worker is given by the function $f(s_{it}, \theta_t) = \chi(s_{it})^{\psi}()\theta_t)^{\alpha}$, where $\bar{s_t}$ is the aggregate search effort (of all unemployed workers) and θ_t is the labor market tightness.[23] $\theta = \frac{v}{\bar{s}u}$, which is the vacancy ($v_t$) to unemployment ($u_t$) ratio. An employed worker can be separated from his job with an exogenous probability given by σ. The probability of a firm finding a worker for its vacancy is given by $q(\bar{s_t}, \theta_t)$. At the aggregate level, total number of matches are governed by a matching function $\mathcal{M}(\bar{s}, \theta)$. A job-worker match produces z_t units of output each period which is stochastic. $X_t \equiv \{z_t, u_t\}$ is the state space.

[22] I have referred, among many others to Pries (2008) and Bils, Chang and Kim (2011), for worker heterogeneity in a standard DMP model. I refer to Stupnytska and Zaharieva (2015) for worker heterogeneity in DMP model with endogenous search effort. All of these studies however, introduce heterogeneity in worker productivity or surplus from being employed.

[23] Here, $\chi \geq 0$ and $\alpha \in [0,1]$. This is a departure from the standard assumption in Pissarides (2000), of the job finding probability being proportional to s, in a model with endogenous search intensity.

Introducing heterogeneous agents. Now consider two types of workers in the economy: Pessimists and Optimists, denoted by $i = \{p, o\}$. Pessimistic workers have a mass of $p \in [0, 1]$ while the optimistic workers have a mass of $1 - p$. Thus, the total mass of workers remains 1. Optimistic workers expect expansionary outcomes for the economy while the pessimistic workers expect recessionary outcomes. This difference manifests in the belief that they form about the labor market tightness and their separation rate. The workers do not observe the true value of θ_t and their separation risk, σ . Rather, they only observe a signal $\tilde{\theta_{it}}$ about the actual labor market tightness and a signal $\tilde{\sigma_{it}}$ about their separation risk. I assume that the signals for worker i take the following form

$$\tilde{\theta}_{it} = q\delta_i + (1 - q)\theta_t \tag{3}$$

$$\tilde{\sigma}_i = \delta_{\sigma i}\sigma_{ss} \tag{4}$$

where, θ_t is the actual labor market tightness and σ_{ss} is the steady state exogenous separation risk. The worker does not know what δ_i is and only observes $\tilde{\theta_{it}}$ and $\tilde{\sigma_{it}}$. q is the weight put on the intrinsic bias or perception factor. Thus, when $q = 0$, the agent has perfect information and zero bias. On the other hand, when $q = 1$, the agent has completely biased perceptions and she does not take into account the current state of the economy to form her expectations. δ_i can take positive values and $\delta_i > 1$ implies that the worker observes the labor market to be tighter than the actual, while $\delta_i < 1$ implies that the worker observes a slacker labor market than the actual. Similarly, $delta_{\sigma i} > 1$ implies that agents perceive a greater separation risk than actual. To maintain consistency with the empirical findings, I define workers with $\delta_i > 1$ and $delta_{\sigma i} < 1$ as optimistic and the workers with $\delta_i < 1$ and $delta_{\sigma i} > 1$ as pessimistic. δ_i and σi thus indicates the position of the worker on sentiment spectrum, that is, the degree of optimism (or pessimism) towards the economy. I also assume that a worker does not change her beliefs over her lifetime.

It is important to note that the form of bias introduced here does not account for learning or updating of beliefs, unlike other forms of signals, where agents incorporate learning in their estimates, as in Conlon et al. (2018).[24] Though the signal in 3 does not consider prior beliefs of agents, it still captures their current perception or, an immediate albeit biased, update to the latest θ_t. Firms, on the other hand, have full information about the macroeconomic variables and can observe the true values. A key assumption that I make here to solve this model is summarized in Assumption 1.

Assumption 1. *The firms are aware of existence of two types of workers. However, they cannot differentiate between the types of workers.*

The workers have no other differences in terms of productivity or bargaining power apart from this single difference in their beliefs about the state of the economy. Moreover, the firms do not have any other mechanism to reveal the type when a match occurs. It is therefore safe to assume that the firms cannot identify the type of worker.

Value Functions. First, consider the problem of the workers. The employed worker with type $i = \{o, p\}$ has the following value function $W_i(X_t)$ while the value of being unemployed is given by $U_i(X_t)$. An employed worker earns a wage $w({}_iX_t)$ while employed. She can be separated from her job in the next period with probability σ, becomes unemployed and gets value $U_i(X_{t+1})$. With $(1-\sigma)$ she continues to remain employed and gets $W_i(X_{t+1})$ in the next period. There are no job-to-job transitions in this framework at the moment.

$$\tilde{W}_i\left(X_t\right) = w_i\left(X_t\right) + \beta \mathbf{E}\left[(1-\tilde{\sigma}_i)\tilde{W}_i\left(X_{t+1}\right) + \tilde{\sigma}_i\tilde{U}_i\left(X_{t+1}\right)\right] \tag{5}$$

An unemployed worker with type i gets b from being unemployed in terms of unemploy-

[24]The signal following Conlon et al. (2018) would be of the form $\tilde{\theta}_{it} = \zeta\tilde{\theta}_{it-1} + (1-\zeta)\theta_t$, where ζ is the learning parameter. Here, I have zero weight on the prior and hence there is no learning. However, this simplistic signal manages to capture the essence of information frictions

ment benefit and searches for a job. She exerts optimum search effort that maximizes her value from search. Since job search is costly, she incurs a cost $c(s_{it})$. In the next period, the unemployed worker can be matched with a job and become employed with the probability $f(s_{it}, \theta_t)$ and get value $W_i(X_{t+1})$ from employment. With remaining probability, she continues to be unemployed and gets value $U_i(X_{t+1})$.

$$\begin{aligned}\tilde{U}_i\left(X_t\right) = \max_{s_{it}} \Big\{ b - c\left(s_{it}\right) + \beta \mathbf{E}\big[\tilde{f}(s_{it}, \tilde{\theta_{it}}) \tilde{W}_i\left(X_{t+1}\right) \\ + \left(1 - \tilde{f}\left(s_{it}, \tilde{\theta_{it}}\right)\right) \tilde{U}_i\left(X_{t+1}\right) \big] \Big\}\end{aligned} \tag{6}$$

The first order conditions for each type i are now given by

$$c'\left(s_{it}\right) = \beta \tilde{f}_1(s_{it}, \tilde{\theta_{it}}) \mathbf{E}\left[\tilde{W}_i\left(X_{t+1}\right) - \tilde{U}_i\left(X_{t+1}\right)\right] \tag{7}$$

The optimal search effort that satisfies (**??**) equates the marginal cost of searching to the expected benefit from an additional unit of search.

Now, from Assumption 1, though firms know about the existence of heterogeneous workers and associates different wages to each type of worker, they cannot differentiate between the type of worker upon matching and can not predict the type they will be matched with. Note that, even ex-post, the firms do not have a mechanism to identify the type of the worker they match with. Thus, due to Assumption 1, firms have an expected value from being matched.

The value that the firm gets from a match is given by $J(X_t)$. A firm earns z_t from a match while incurs the worker's wage as a cost in the current period. In the next period, the firm is separated from the worker with probability σ and gets value from the vacancy $V(X_{t+1})$.

With remaining probability the worker continues to work at the firm and the firm gets the value $J(X_{t+1})$.

$$J_i(X_t) = z_t - w_i(X_t) + \beta \mathbf{E}\Big[(1-\sigma)J_i(X_{t+1}) + \sigma V\left(X_{t+1}\right)\Big] \tag{8}$$

The value of a vacancy is the same for each job and since in the future the firm can be matched with either type of worker, we have the following value function,

$$\begin{aligned} V(X_t) = -\kappa + \beta \mathbf{E}\Big\{ & q(\bar{s_t}, \theta_t)(m_t^i J_i(X_{t+1}) + m_t^{-i} J_{-i}(X_{t+1})) \\ & + (1 - q(\bar{s_t}, \theta_t))V(X_{t+1})\Big\} \end{aligned} \tag{9}$$

Here, the future expected match is weighted by the true job finding probability for each type of worker. [25]

Equilibrium and Wage Setting. Here, I assume the existence of a worker union which bargains with firms on behalf of all workers. The union is assumed to be aware of the true surpluses of the workers had they observed the true state of the world. The union thus sets the wage by Nash Bargaining using the true surplus $S(X_t) = S_i(X_t) = W_i(w, X_t) - U_i(X_t)$ of the workers. Therefore, there is no wage dispersion in the economy and each type of worker earns a wage $w_i = w$, which solves the bargaining problem

$$(1-\gamma)\left[W_i(w, X_t) - U_i(X_t)\right] = \left[J_i(w, X_t) - V_i(X_t)\right] \tag{10}$$

where γ is the worker's bargaining power.

In equilibrium, the free entry condition, $\tilde{V} = 0$, is imposed to get $(\tilde{W}_i(X_t) - \tilde{U}_i(X_t)) = \tilde{J}(X_t)$. Further details for solution of the model can be found in section **??**. We now have

[25] For $i = \{p, o\}$, the associated weight is $m_t^i = \frac{p_i f(s_t^i, \theta_t)}{p_i * f(s_t^i, \theta_t) + p_{-i} f(s_t^{-i}, \theta_t)}$

the following equation,

$$\frac{\gamma}{(1-\gamma)}\frac{\kappa}{(1-\sigma)q\left(\bar{s}_t,\theta_t\right)} = S(X_t) - z_t + w_t \tag{11}$$

where, $S(X_t)$ is the surplus had the workers observed the true value of the state. From the first order conditions in equation 7, we have for each type,

$$\phi(s_{it})^{\omega-1} = \beta f_1\left(s_{it},\delta_i\theta_t\right)\mathbf{E}(\tilde{S}_i(X_{t+1})) \tag{12}$$

We now have three equations that govern the dynamics of the three variables, s_{ot}, s_{pt} and, θ_t. [26]

2 Solution and Quantitative Results

2.1 Model Solution

To quantify the responsiveness of search effort to expected labor market tightness, I set the value of the parameters in the baseline model without information friction from section **??** and the one presented above with information frictions to some commonly used values in the literature. I assume that a period in the model corresponds to a month. I mostly use standard parametrization in the literature; either from Shimer (2005) or Hagedorn and Manovskii (2008). For the parameters unique to the generalized job finding rate, I follow Mukoyama, Patterson and Şahin (2018). Following Shimer (2005), I set the discount rate $\beta = 0.988^{\frac{1}{3}}$ and the exogenous separation rate $\sigma = 0.034$. The steady state 1 month job finding rate is taken to be 0.28, to match the data from the SCE. As in the model, the steady

[26] Here, the state variable u_t, does not appear in either **??** or **??**. The dynamics of s_t and θ_t is therefore determined by the state variable z_t. Once the dynamics of s_t and θ_t is determined, one can solve for the path of unemployment.

state values are assumed to be $\bar{\theta} = \bar{s_i} = 1$, $\chi = 0.28$. Following Mukoyama, Patterson and Şahin (2018), I set $\psi = 0.15$ and $\alpha = 0.5$. [27] Now, assuming that z_t is given by the AR(1) process

$$log(z_{t+1}) = \rho log(z_t) + \epsilon_{t+1}$$

Here $\epsilon \sim N(0, \sigma_\epsilon^2)$. Following Hagedorn and Manovskii (2008), I set the monthly auto-correlation of log of labor productivity to be $\rho = 0.0065$ and $\sigma_\epsilon^2 = 0.949$. I also follow Shimer (2005) to set the worker's bargaining power, $\gamma = 0.5$. Following Yashiv (2000), I set the convexity of the search cost function $\omega = 2$. κ and ϕ are determined from the steady state values of equations 11 and 12. Given other parameters, these are found to be $\kappa = 4.72$ and $\phi = 0.0389$. To set the value of unemployment, I consider Shimer (2005) and set $b - \frac{\phi}{\omega} = 0.4$. The proportion of pessimists and optimists is constant and I take it as $p = 0.6$, as I find in the SCE data. Setting $p = 0.5$ does not make much of a difference either. All these values are reported in Table 8.

The model is solved primarily using value function iteration using the algorithm sketched in Section C. In the following sub-section, I discuss some of the quantitative results.

2.2 Quantitative Results

In this section I report the results of some quntitative exercises. I compare the heterogenous agent model with information frictions to a baseline with representative agents and full information. Here, the model does not capture the counter-cyclicality of search effort due to the structure imposed by the standard Cobb-Douglas matching function in the literature. However, due to the form of the information signal that the agents recieve, I can capture acyclicality of search effort. As q goes to 1, search effort becomes more and more acyclical in nature. The aim of this model is so study the role of information frictions

[27] ψ and α are set to match the elasticity of search effort to labor market tightness.

Calibrated Parameters		Value	Source
β	Discount Rate	0.996	Shimer (2005)
ρ	Correlation of Labor Productivity	0.949	Hagedorn and Manovskii (2008)
σ_ϵ	Std Dev of Labor Productivity	0.0065	Hagedorn and Manovskii (2008)
σ	Separation Rate	0.034	Shimer (2005)
ω	Convexity of Search Cost	2	Yashiv (2000)
χ	Job-finding rate	0.49	Mukoyama et al.(2018)
α		0.5	
ψ		0.15	
$b - \phi/\omega$	Value of Unemployment	0.4	Shimer (2005)
γ	Worker's Bargaining Power	0.5	Shimer (2005) (2005)
κ	Cost of Vacancy	0.33	Solved from model
ϕ	Search Cost Parameter	0.082	Solved from model
$\tilde{s}$	Steady state value	1	Mukoyama et al.(2018)
$\tilde{\theta}$	Steady state value	1	Mukoyama et al.(2018)
p	Proportion of Pessimist workers	0.5	
δ	Information Parameter	0.5, 1.5	
q	Weight on θ in the signal	0.5	

Table 8: Parameter Choices

This table presents the choice of the parameters used to solve the models. These values of parameters are commonly used in the literature.

in the standard search and matching model. First of all, I present the impulse response functions of unemployment, labor market tightness and search hours for a productivity shock. I calculate the responses to a one-standard-deviation shock to the log productivity, both positive and negative, starting from a given initial point. I consider three different initial points, bad, median, and good economies. The impulse responses are averaged across 5,000 simulations, each with 120 months. These results are reported in Figure 3.

Focusing on the median initial economy, information frictions lead to a heightened response to productivity shock and a longer recovery as compared to the baseline model. However, as we look at the good and the bad economies, non-linear patterns can be seen. For a bad intial economy, response of unemployment is dampened by information frictions but is opposite in case of a good initial economy. In good and bad economies, the response to positive and negative shock is also asymmetric. In a good economy, a positive shock leads

to a much more fall in unemployment than an increase due to negative shock. Similarly, in a bad economy, a negative shock leads to a much higher increase in unemployment than fall due to a positive shock. These results are tied with not only the intial conditions of the economy, but the information frictions themselves play a role in exaggerating the asymmetry. Here, in a bad economy, pessimists perceive even worse state of the economy than actual and hence when a negative shock hits, they decrease their search hours by a lot which drives the higher unemployment in this situation. Similar arguments can be made for optimists and good economies.

Overall, information frictions seem to capture not only an asymmetry of responses tied with the intial conditions, they also capture longer recoveries and heightened response to productivity shocks.

I also present some estimated model moments in Table 9. Since I use Shimer (2005) to calibrate they key parameteres, the volatility for unemployment and vacancies does not match the data well. However, as compared to the representative agent model, the heterogeneous agent model with information frictions is better at generating volatility. In Table 10, I present some moments from the data (SCE) and the models. The model with information frictions seems to match the data somewhat better. Expected 3-month job finding probabilities seem to match closely, however average search hours are higher in both the baseline and the information frictions model. Search hours are more volatile in the data with a standard deviation of 7 hours. The baseline model predicts much lower volatility, but the model with information friction yields somewhat higher volatility in search effort. Overall, the fit is better with biased beliefs.

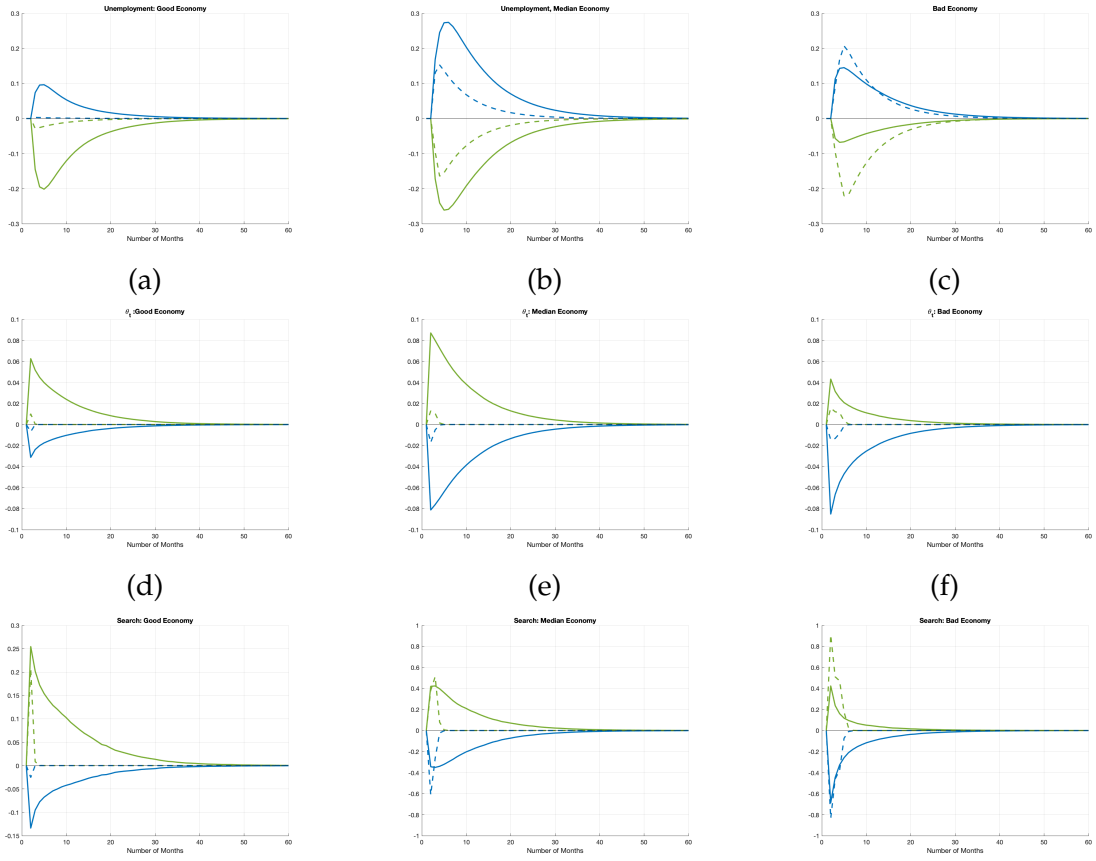


Figure 3: Impulse Response Functions to Productivity Shock

Note: The solid lines are from the Heterogeneous agent,information friction model while the dashed lines are from the baseline. Green lines represent positive shock while the blue lines represent negative shocks in all panels.

Estimated model moments: Representative Agent					Estimated model moments: Heterogenous Agent				
	U	V	θ	z		U	V	θ	z
Standard deviation	0.022	0.032	0.041	0.013	Standard deviation	0.084	0.095	0.167	0.013
Autocorrelation	0.730	0.450	0.659	0.765	Autocorrelation	0.608	0.322	0.560	0.766
Correlation matrix					Correlation matrix				
U		-0.802	-0.976	-0.959	U		-0.901	-0.964	-0.723
V			0.899	0.625	V			0.938	0.454
θ				0.670	θ				0.502
Hagedorn Manovskii (2008, Data Table 3)									
	U	V	θ	z					
Standard deviation	0.125	0.139	0.259	0.013					
Autocorrelation	0.870	0.904	0.896	0.765					
Correlation matrix									
U		-0.919	-0.977	-0.302					
V			0.982	0.460					
θ				0.393					

Table 9: Estimated Model Moments

Reported are the quarterly cross-simulation average across 5000 simulations, of weekly variables.All the variables are HP filtered deviations from the mean with a smoothing parameter of 1600.

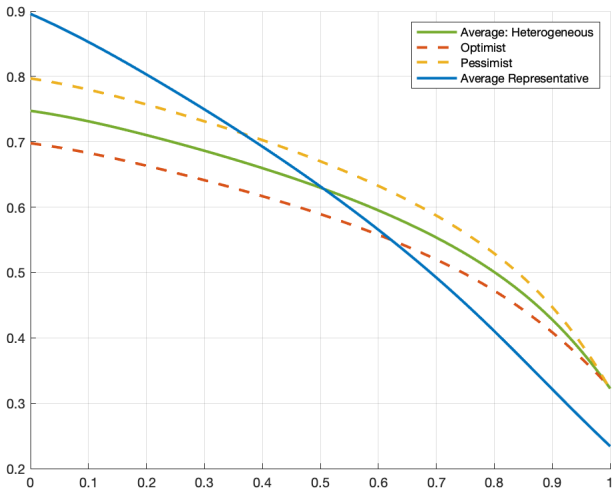
	Baseline	With Information Frictions	Data
Expected 3-Month Job Finding Probability Pessimists		0.38	0.40
Expected 3-Month Job Finding Probability Optimists		0.54	0.53
Expected 3-Month Job Finding Probability Average	0.33	0.46	0.48
Average Search Hours	9.2	7.6	6.0
Volatility of search intensity (hrs/month)	4.2	5.5	7.1
Unemployment Volatility $\times$ 100	3.2	8.4	12.5

Table 10: Some more Moments from Data and Model

The data for expected 3 month job finding rate is from SCE (2013-2019), ages 20-65. Baseline model refers to the model with represntative agents and full information. The model with information frictions is the one with heterogenous agents and biased beliefs.

2.3 Comparative Statitsics

In this section I conuct some counterfactual analysis with unemployment benefits. Unemployment benefits play an important role in search effort for the unemployed. Here, as unemployment benefits increase, search hours decrease for both the baseline and in presence of information frictions. However, the presence of information frictions dampen the response of search effort. This is because search is modeled to be acyclical in presence of information frictions. Thus, the agents do not completely take into account the improvement in economy due to an increase of the benefits. In the baseline model, search effort declines rapidly as the benefits increase. However, biased beliefs lead to a flatter decline in search effort. Pessimists in the model perceive the economy as worse than actual and hence decrease their search effort slowly as compared to their optimist counterparts for higher levels of unemployment benefits.



3 Conclusion

This paper documents the role of macroeconomic expectations in job search behavior of workers using both empirical and quantitative analysis. Using survey data, I find that not only do expectations about the economy play an important role in affecting job search effort of workers, it also emphasizes the role of information frictions in determining these outcomes. Specifically, I find that workers who expect expansionary outcomes for the economy tend to spend less time searching for a job than their pessimistic counterparts. This result is robust to various specifications and across both employed and unemployed workers. Placing this empirical finding in context of a DMP model with endogenous search efforts, this paper introduces heterogeneous expectations and information frictions. Quantitative analysis supports the empirical findings that search effort decreases in presence of expansionary expectations and points out that the responsiveness of aggregate search effort to expected labor market tightness is dampened in presence of information frictions.

Overall this paper highlights the importance of household expectations in labor market. Furthermore, it documents the lack of complete information on part of workers, thus highlighting the need for information frictions in models of labor market search. In this paper I find that the employed people also engage in on-the-job search and react to their sentiments in a manner that is in agreement with the results from the quantitative model which does not consider on the job search. Therefore, another important addition would be to incorporate on-the-job search in the DMP model with endogenous search effort. In terms of the empirical framework, the SCE also has a panel dimension to it, which could allow one to potentially study the role of learning in presence of the documented information frictions. At present, I leave these questions to future research on this project.

References

Andre, Peter, Carlo Pizzinelli, Christopher Roth, and Johannes Wohlfart. 2019. "Subjective Models of the Macroeconomy: Evidence from Experts and a Representative Sample." *Available at SSRN 3355356*.

Armantier, Olivier, Giorgio Topa, Wilbert Van der Klaauw, and Basit Zafar. 2017. "An overview of the Survey of Consumer Expectations." *Economic Policy Review*, , (23-2): 51–72.

Armantier, Olivier, Michael Neubauer, Daphne Skandalis, and Wilbert Klaauw. 2019. "Economic Expectations Grow Less Polarized since the 2016 Election."

Armona, Luis, Andreas Fuster, and Basit Zafar. 2018. "Home price expectations and behaviour: Evidence from a randomized information experiment." *The Review of Economic Studies*, 86(4): 1371–1410.

Barsky, Robert B, and Eric R Sims. 2012. "Information, animal spirits, and the meaning of innovations in consumer confidence." *American Economic Review*, 102(4): 1343–77.

Beaudry, Paul, and Franck Portier. 2004. "An exploration into Pigou's theory of cycles." *Journal of monetary Economics*, 51(6): 1183–1216.

Bils, Mark, Yongsung Chang, and Sun-Bin Kim. 2011. "Worker Heterogeneity and Endogenous Separations in a Matching Model of Unemployment Fluctuations." *American Economic Journal: Macroeconomics*, 3(1): 128–54.

Burdett, Kenneth, and Dale T Mortensen. 1998. "Wage differentials, employer size, and unemployment." *International Economic Review*, 257–273.

Carroll, Christopher D. 2003. "Macroeconomic expectations of households and professional forecasters." *the Quarterly Journal of economics*, 118(1): 269–298.

Carroll, Christopher D, and Wendy E Dunn. 1997. "Unemployment expectations, jumping (S, s) triggers, and household balance sheets." *NBER macroeconomics annual*, 12: 165–217.

Case, Karl E, John M Quigley, and Robert J Shiller. 2003. "Home-buyers, Housing and the Macroeconomy."

Coibion, Olivier, and Yuriy Gorodnichenko. 2012. "What can survey forecasts tell us about information rigidities?" *Journal of Political Economy*, 120(1): 116–159.

Coibion, Olivier, and Yuriy Gorodnichenko. 2015. "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts." *American Economic Review*, 105(8): 2644–78.

Coibion, Olivier, Dimitris Georgarakos, Yuriy Gorodnichenko, and Maarten van Rooij. 2019. "How does consumption respond to news about inflation? Field evidence from a randomized control trial." National Bureau of Economic Research.

Coibion, Olivier, Yuriy Gorodnichenko, and Michael Weber. 2020. "Political Polarization and Expected Economic Outcomes." National Bureau of Economic Research.

Coibion, Olivier, Yuriy Gorodnichenko, and Rupal Kamdar. 2018. "The formation of expectations, inflation, and the phillips curve." *Journal of Economic Literature*, 56(4): 1447–91.

Coibion, Olivier, Yuriy Gorodnichenko, and Tiziano Ropele. 2020. "Inflation expectations and firm decisions: New causal evidence." *The Quarterly Journal of Economics*, 135(1): 165–219.

Conlon, John J, Laura Pilossoph, Matthew Wiswall, and Basit Zafar. 2018. "Labor market search with imperfect information and learning." National Bureau of Economic Research.

D'Acunto, Francesco, Daniel Hoang, and Michael Weber. 2015. "Inflation expectations and consumption expenditure." *Chicago Booth Global Market Working Paper Series*.

DeLoach, Stephen B, and Mark Kurt. 2013. "Discouraging workers: Estimating the impacts of macroeconomic shocks on the search intensity of the unemployed." *Journal of Labor Research*, 34(4): 433–454.

Den Haan, Wouter J, and Georg Kaltenbrunner. 2009. "Anticipated growth and business cycles in matching models." *Journal of Monetary Economics*, 56(3): 309–327.

Di Pace, Federico, Kaushik Mitra, and Shoujian Zhang. 2016. "Adaptive learning and labour market dynamics."

Eusepi, Stefano, and Bruce Preston. 2011. "Expectations, learning, and business cycle fluctuations." *American Economic Review*, 101(6): 2844–72.

Faberman, Jason, Marianna Kudlyak, et al. 2016. "What does online job search tell us about the labor market?" *FRB Chicago Economic Perspectives*, 40(1).

Faberman, R Jason, Andreas I Mueller, Ayşegül Şahin, and Giorgio Topa. 2017. "Job search behavior among the employed and non-employed." National Bureau of Economic Research.

Greenwood, Robin, and Andrei Shleifer. 2014. "Expectations of returns and expected returns." *The Review of Financial Studies*, 27(3): 714–746.

Hagedorn, Marcus, and Iourii Manovskii. 2008. "The cyclical behavior of equilibrium unemployment and vacancies revisited." *American Economic Review*, 98(4): 1692–1706.

Hendren, Nathaniel. 2017. "Knowledge of future job loss and implications for unemployment insurance." *American Economic Review*, 107(7): 1778–1823.

Kamdar, Rupal. 2019. "The Inattentive Consumer: Sentiment and Expectations." Society for Economic Dynamics.

Krueger, Alan B, and Andreas Mueller. 2010. "Job search and unemployment insurance: New evidence from time use data." *Journal of Public Economics*, 94(3-4): 298–307.

Lorenzoni, Guido. 2009. "A theory of demand shocks." *American Economic Review*, 99(5): 2050–84.

Mankiw, N Gregory, Ricardo Reis, and Justin Wolfers. 2003. "Disagreement about inflation expectations." *NBER macroeconomics annual*, 18: 209–248.

McCall, John Joseph. 1970. "Economics of information and job search." *The Quarterly Journal of Economics*, 113–126.

Mian, Atif R, Amir Sufi, and Nasim Khoshkhou. 2018. "Partisan bias, economic expectations, and household spending." *Fama-Miller Working Paper*.

Mortensen, Dale T, and Christopher A Pissarides. 1994. "Job creation and job destruction in the theory of unemployment." *The review of economic studies*, 61(3): 397–415.

Mueller, Andreas I, Johannes Spinnewijn, and Giorgio Topa. 2018. "Job Seekers' Perceptions and Employment Prospects: Heterogeneity, Duration Dependence and Bias." National Bureau of Economic Research.

Mukoyama, Toshihiko, Christina Patterson, and Ayşegül Şahin. 2018. "Job search behavior over the business cycle." *American Economic Journal: Macroeconomics*, 10(1): 190–215.

Pigou, Arthur Cecil, et al. 1927. "Industrial fluctuations."

Pissarides, Christopher A. 1985. "Short-run equilibrium dynamics of unemployment, vacancies, and real wages." *The American Economic Review*, 75(4): 676–690.

Pissarides, Christopher A. 2000. *Equilibrium unemployment theory*. MIT press.

Potter, Tristan. 2020. "Learning and job search dynamics during the great recession." *Journal of Monetary Economics*.

PRC. 2018. "Wide Gender Gap, Growing Educational Divide in Voters' Party Identification."

Pries, Michael J. 2008. "Worker heterogeneity and labor market volatility in matching models." *Review of Economic Dynamics*, 11(3): 664–678.

Roth, Christopher, and Johannes Wohlfart. 2019. "How do expectations about the macroeconomy affect personal expectations and behavior?" *Review of Economics and Statistics*, 1–45.

Shiller, Robert J. 1997. "Why do people dislike inflation?" In *Reducing inflation: Motivation and strategy*. 13–70. University of Chicago Press.

Shimer, Robert. 2005. "The cyclical behavior of equilibrium unemployment and vacancies." *American economic review*, 95(1): 25–49.

		Black	White
Expected Probability of Higher Unemployment	Mean	0.38	0.39
	SE	0.008	0.004
	N	825	2,654
Weekly Search Hours	Mean	9.01	5.07
	SE	1.12	0.131
	N	825	2,654

Table 11: Descriptive Statistics by Race

Spinnewijn, Johannes. 2015. "Unemployed but optimistic: Optimal insurance design with biased beliefs." *Journal of the European Economic Association*, 13(1): 130–167.

Stupnytska, Yuliia, and Anna Zaharieva. 2015. "Explaining U-shape of the referral hiring pattern in a search model with heterogeneous workers." *Journal of Economic Behavior & Organization*, 119: 211–233.

Woodford, Michael. 2001. "Imperfect common knowledge and the effects of monetary policy." National Bureau of Economic Research.

Yashiv, Eran. 2000. "The determinants of equilibrium unemployment." *American Economic Review*, 90(5): 1297–1322.

Zafar, Basit. 2011. "How do college students form expectations?" *Journal of Labor Economics*, 29(2): 301–348.

A Empirical Appendix

1 Sentiments towards the Economy and Perceived Probability of Job Finding

In this section, I present some additional evidence on the role of sentiments in guiding the labor market behavior of workers. In light of the evidences presented in the main text, it is only natural to test whether sentiments about the economy also influence other labor market outcomes. In particular, expectations about the economy are likely to influence

Table 12: Impact of Sentiment towards the Economy on Search Hours

Panel A. Sentiment Indicator: Exp(Prob(ΔUnemp) >0)			
Dep Var: **Search Hours**	(1)	(2)	(3)
	Employed	**Unemployed**	**Full Sample**
Expected Probability of	1.414***	0.0141*	1.507**
Higher Unemployment	(0.499)	(0.008)	(0.689)
Labor Force Status:			7.880***
Unemployed			(0.655)
N	2389	451	2840
R^2	0.306	0.360	0.309
Expected Probability of higher unemployment is in percents			
Panel B. Sentiment Indicator: Expected Inflation			
Expected Inflation Rate	4.855**	5.592	6.364***
	(2.059)	(5.065)	(2.149)
Labor Force Status:			7.794***
Unemployed			(0.632)
N	2386	450	2836
R^2	0.150	0.355	0.319
Expected inflation is in percents			
Panel C. Sentiment Indicator: Expected Ease of Credit Access			
Exp(Credit Access): Harder	1.168***	2.156**	2.633***
	(0.329)	(1.078)	(0.894)
Exp(Credit Access): Easier	-0.672***	-1.047*	-0.912***
	(0.268)	(0.624)	(0.216)
Labor Force Status:			7.851***
Unemployed			(0.641)
N	2394	451	2845
R^2	0.153	0.362	0.314
Omitted category Exp(Credit Access):About the Same			
Panel D. Sentiment Indicator: Expected Personal Finance Status			
Exp(Personal Finances): Worse	1.184***	2.387**	1.388***
	(0.453)	(1.169)	(0.498)
Exp(Personal Finances): Better	-1.031***	-1.966**	-1.034***
	(0.286)	(1.034)	(0.349)
Labor Force Status:			7.851***
Unemployed			(0.641)
N	2394	451	2845
R^2	0.142	0.370	0.312
Omitted category Exp(Personal Finances):About the Same			
Controls	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes

This table presents estimates of how search intensity of workers is impacted by their expectations towards the economy. It is summarized by the coefficient *beta* in equation 1. Each panel has a different sentiment indicator while the dependent variable for all the panels is search hours of the workers. Set of controls include age, age^2, household income, education, race, gender, marital status, unemployment duration for the unemployed sample and search duration for all samples. For Panel C and D expected total earnings in 4 months is also used as an additional control. Fixed effects include time (monthly); and state fixed effects. The Sample period is from 2014:03 to 2020:03. Survey weights used. Clustered standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.

one's perception about the probability of finding a job. It is plausible that an optimistic worker perceives her probability of job finding to be higher in future that a pessimistic worker. This hypothesis can be tested by using the SCE data and a variation of equation 1.

$$Y_{it} = \alpha + \beta_2 \mathbf{E}_i(State\ of\ Economy)_t + \Gamma X_{it} + \rho_t + \theta_s + \epsilon_{it} \tag{13}$$

Here, as before, i denotes an individual while t stands for time. Y_{it} is the perceived probability of job finding. X_{it} is a set of individual demographic controls. ρ_t and θ_s are time and state fixed effects respectively. I consider the employed and the unemployed separately. The results are presented in the Table 13 below.

Expecting the economy to do better in future is positively correlated with higher perceived probability of finding a job. Optimistic workers appear have higher perceived probability of job finding compared to the pessimistic workers. This result is consistent for both the employed and the unemployed workers. This result is in support of the findings discussed in the main text and highlights the role of sentiments in shaping worker beliefs about their own labor market outcomes.

1.1 Robustness

The left panel plots the monthly average of expected probability of higher unemployment while the right panel plots the 4-month average of search hours for the Black Democratic Voters and White Republican Voters in the 2016 election. Survey weights are used and the sample is restricted to individuals in the working age-group 20-64.

To test if the identification in Section 1.4.1 is robust to other demographic groups whose expectations about the economy can be influenced by the election, I interact race with party affiliation. According to a report by the Pew Research Center (PRC, 2018), Black voters

Table 13: Impact of Sentiment towards the Economy on Perceived Probability of Job Finding

	(1)	(2)
Panel A. Sentiment Indicator: Exp(Prob(ΔUnemp) >0)		
	Employed	**Unemployed**
Expected Probability of	-0.373***	-0.203
Higher Unemployment	(0.015)	(0.412)
N	52938	2575
R^2	0.089	0.296
Expected Probability of higher unemployment is in percents		
Panel B. Sentiment Indicator: Expected Inflation		
Expected Inflation Rate	-1.164***	0.937*
	(0.039)	(0.55)
N	52795	2568
R^2	0.090	0.297
Expected inflation is in percents		
Panel C. Sentiment Indicator: Expected Ease of Credit Access		
Exp(Credit Access): Harder	-2.241***	-5.413***
	(0.751)	(1.856)
Exp(Credit Access): Easier	4.303***	1.902*
	(0.747)	(1.238)
N	52971	2579
R^2	0.093	0.304
Omitted category Exp(Credit Access):About the Same		
Panel D. Sentiment Indicator: Expected Personal Finance Status		
Exp(Personal Finances): Worse	-5.865***	-2.583**
	(1.100)	(1.251)
Exp(Personal Fiances): Better	7.607***	6.671***
	(0.657)	(1.928)
N	44597	1737
R^2	0.114	0.384
Omitted category Exp(Personal Finances):About the Same		
Controls	Yes	Yes
Fixed Effects	Yes	Yes

This table presents estimates of how perceived job finding probability of workers is impacted by their expectations towards the economy. It is summarized by the coefficient β_2 in equation 13. Each panel has a different sentiment indicator. Actual rate of unemployment is included for all specifications.For the unemployed sample, Unemployment duration is included as a control. For Panel C and D, Expected earnings are also included. Set of demographic controls include age, age^2, household income, education, race, gender, marital status and expected earnings in 4 months. Fixed effects include time (monthly); and state fixed effects. The Sample period is from 2014:03 to 2018:03. Survey weights used. Clustered standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.

remain overwhelmingly Democratic, while White voters continued to be somewhat more likely to lean toward the Republican Party. I now consider Black voters in Democratic states and White voters in Republican states, which provides a starker partisanship. While this diminishes the sample, it provides a sharper identification as the SCE provides race identifiers for all respondents. As seen in Figure **??** the sentiments of the Black voters in Democratic states flipped post elections and they became more pessimistic about the unemployment in future. Similarly the White Republican voters became more optimistic post elections. In general, Black voters consistently search for jobs more that their White counterparts, but the relative difference increased sharply post the 2016 elections. Black Democrats increased their search hours while White Republicans decreased it even further.

		Democrats	**Republicans**	**Black Democrats**	**White Republicans**
Expected Probability of 3*Higher Unemployment	Mean	0.385	0.388	0.378	0.388
	SE	0.006	0.004	0.009	0.006
	N	1,229	2,184	569	1,114
3*Weekly Search Hours	Mean	5.28	5.86	7.78	4.91
	SE	0.200	0.158	0.362	0.199
	N	1,229	2,184	569	1,114

This table shows the descriptive statistics in the SCE for the relevant demographic groups. Samples are restricted to individuals with ages 20-65, and those with responses to both search hours and expected probability of higher unemployment. Survey weights are taken into account while computing these statistics. Standard errors in parenthesis.

Table 14: Descriptive Statistics by Demography: 2013:06 to 2019:12

This fact is better demonstrated by the event-study plots in Figure 5. Here, I report the perceived probability of higher expectations and search hours for White Republicans relative to Black Democrats. As the left panel demonstrates, optimism increased amongst White Republicans post elections, relative to the Black Democrats (lower perceived probability of higher unemployment). In the right panel, relative search hours for White Republicans

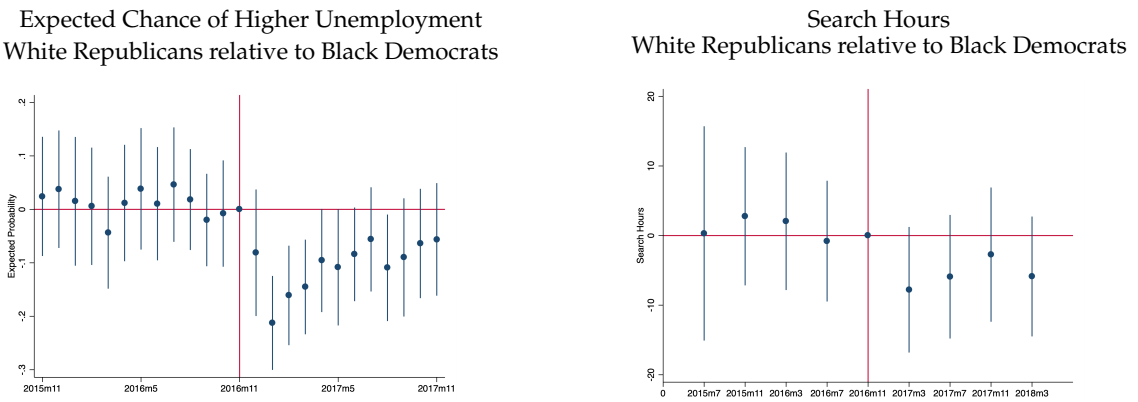


Figure 5: Event Study: 2016 Presidential Election and Shift in Expectations

The left panel plots the monthly average of expected probability of higher unemployment while the right panel plots the 4-month average of search hours for the White Republican Voters relative to Black Democratic Voters in the 2016 election. The event study controls for the following demographics : age, education, income, job status, gender and marital status. Survey weights are used and standard errors are clustered. The sample is restricted to individuals in the working age-group 20-64.

decreased after the elections. Also to be noted is the fact that pre-elections, the difference in sentiments between the two groups was substantially lower. I report the results of a difference-in-differences exercise for White Republicans and Black Democrats in Table 15. I estimate a version of equation 2,

$$s_{it} = \alpha + \beta_2 Race_i \times Post_t + Race_i + Post_t + \Gamma X_{it} + \epsilon_{it} \tag{14}$$

where, $Race_i$ is a dummy variable that takes value 1 if the respondent is White and lives in a Republican state. It takes 0 if the respondent is Black and lives in a Democratic State. The coefficient β_2 estimates the weekly search hours for White Republicans as compared to the Black Democrats. The results are presented in Table 15. As can be noted, White Republicans, who had lower expected probability of higher unemployment (that is, more optimistic sentiments) post election, searched about 2.5 hours per week *less* than Black voters in Democratic states. Thus, the results are consistent with what I report in Section

1.4.1. Optimistic sentiments about the future lead to lower current search effort.

Table 15: Difference-in-Differences along Race and Party Affiliation

Sample Period: 2015:11 to 2017:12		
Dep Var: Search Hours	(1)	(2)
White Republicans × Post Election	-0.565*	-2.468***
	(0.349)	(0.810)
White Republicans	-1.936*	0.217
	(1.155)	(1.417)
Post Election	-0.078	1.041
	(1.343)	(1.170)
Demographic Controls	No	Yes
Observations	692	692
R^2	0.021	0.253

Note: This table presents estimates of changes in search hours for White voters in Republican states after the 2016 Presidential Elections. Post Election period is from 2016:12 to 2017:12. Observations for the election month (2016:11) have been dropped as timing of the survey for the labor market module is unclear within the month. Set of controls include age, age^2, household income, education, gender and marital status. Clustered standard errors in parentheses. Survey weights used. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Survey Questionnaire

The survey questions about individual expectations from the SCE are listed in this section. Questions on demographic details in the survey are standard and not reported here.

- Monthly SCE Survey

  1. Expected probability of higher unemployment rate.

     Q4new. *"What do you think is the percent chance that 12 months from now the unemployment rate in the U.S. will be higher than it is now?"*

2. Expected rate of inflation.

   Q8v2part2. *"What do you expect the rate of inflation (or deflation) to be over the next 12 months?"*

3. Expected financial status. The survey asks the following question

   Q2. *"...looking ahead, do you think you (and any family living with you) will be financially better or worse off 12 months from now than you are these days"*. The respondents can respond on a scale of 1-5 (much worse off, somewhat worse off, about the same, somewhat better off, much better off)

4. Expected credit constraint. The survey asks the following question to elicit expectations about future credit constraints.

   Q29 *"And looking ahead, do you think that 12 months from now it will generally be harder or easier for people to obtain credit or loans (including credit and retail cards, auto loans, student loans, and mortgages) than it is these days?"* The respondents can respond on a scale of 1-5 (much worse off, somewhat worse off, about the same, somewhat better off, much better off)

- SCE Labor Market Module (Every 4 month)

1. Search Intensity.

   Q js9. *"number of hours you searched for a job in the last 7 days?"*

2. Probability of job finding. The following question is asked separately to the employed and the unemployed individuals

   Q oo2u and oo2e. *"What do you think is the percent chance that within the coming four months, you will receive at least one job offer from another employer? Remember that a job offer is not necessarily a job you will accept"*

3. Reservation Wage.

   Q RW2 *Suppose someone offered you a job today in a line of work that you would consider. What is the lowest wage or salary you would accept (BEFORE taxes and other deductions) for this job?*

C Algorithm for model solution

1. Discretize the state space X.The stochastic process for the idiosyncratic productivity is approximated by the First-order Markov process of which transition probability matrix is computed using Tauchen's (1986) algorithm.

2. Assume an initial θ^0

3. Given θ^0, we solve the Nash bargaining and individual optimization problems to approximate wages and value functions

   (a) Assume initial $w^0(X, \theta^0)$.

   (b) Given this, compute the worker's value functions using the iterative method.

   (c) Use the first order condition for Nash bargaining to arrive at a wage $w^1(X, \theta^0)$. If $w^1(X, \theta^0)$ and $w^0(X, \theta^0)$ are close enough then move to the next step, otherwise go to 3.1 and update the guess for wage as:

$$w^0(X, \theta^0) = \zeta_w w^1(X, \theta^0) + (1 - \zeta_w) w^0(X, \theta^0)$$

4. Compute the labor market tightness and search intensities using (2) and (5). If θ^1 and θ^0 are close enough, then we found the steady state. Otherwise, go back to the step 2

with updated θ^0.

$$\theta^0 = \zeta_\theta \theta^1 + (1 - \zeta_\theta)\theta^0$$