Does Corporate Debt Perpetuate Labor Market Disparities? The Link Between Capital Structure, Unemployment, and Wages*

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Abstract

We study financial leverage as a transmission mechanism for unemployment risk in labor markets. While high firm-specific leverage increases workers' risk of unemployment, and compensation for it, high *aggregate* firm leverage affects the worker's outside option – other firms – putting downward pressure on wages. Because bargaining compensation for unemployment risk/outside option must increase during downturns/upturns, firms dampen fluctuations in wages using leverage, amplifying fluctuations in unemployment as a byproduct. This wage-unemployment risk trade-off has far-reaching consequences for redistribution which we test for using anti-discrimination reforms during the Civil Rights Movement.

Keywords: Capital Structure, Corporate Leverage, Labor Market Tightness, Unemployment Risk, Racial Disparities, Equitable Finance

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1 Introduction

In the past decade, a robust empirical literature in corporate finance has emerged that seeks to identify how labor market frictions affect capital structure (Matsa, 2018). Many papers in this literature analyze how a firm's workforce affects its optimal sources of finance, taking into account the needs of and risks posed by the labor force. This literature, however, largely fails to consider the transmission of risk to workers by increased leverage, and by extension the potential distributional consequences of firm capital structure. Firm leverage decisions are consequential to workers, since financially distressed firms resort to restructuring in order to avoid being forced into bankruptcy by creditors (Jensen 1989). Restructuring efforts often include worker layoffs (Ofek 1993; Kang & Shivdasani 1997). But in equilibrium how workers internalize corporate default risk is unclear. Layoff risk as a result of corporate default not only affects the value of employment to the worker, but also her valuation of unemployment – this is, her outside option or negotiation benchmark.

In this paper we propose a novel mechanism through which capital structure and firm-level financial decisions help regulate fluctuations in wages and aggregate unemployment volatility.[1] We also show that this mechanism (i) creates unequal exposure to unemployment fluctuations across workers (due to differences in leverage across industries and firms), and (ii) becomes quantitative salient when exogenous changes to labor market institutions take place, potentially diminishing the efficacy of such institutional changes.

While high firm-specific financial leverage increases a worker's risk of becoming unemployed (her unemployment risk), high *aggregate* firm financial leverage affects the value of outside jobs (her outside option). Thus, leverage puts upward pressure on wages by increasing unemployment risk and puts downward pressure on wages by reducing workers' outside options. Because workers

[1] The assessment of unemployment volatility extends at least as far back as Keynes' *General Theory*, although Shimer (2005) has sparked renewed interest on the topic. Researchers have long examined the role that labor market regulations (Blanchard & Wolfers 2000) and cultural norms (Bewley 1999) affect unemployment and wage dynamics. However, these studies largely overlook how a business enterprise's creditor obligations affect unemployment. The role of firm financial leverage remains unexplored.

experience higher unemployment risk during downturns and, conversely, workers have better outside options during upturns, firms have incentives to use debt pro-cyclically. Upturns make it cheaper for firms to exploit benefits of debt, leading to high financial leverage and bringing down high wages. Conversely, during downturns firms must compensate workers for their high leverage, bringing up low wages and reducing incentives for debt issuance. Furthermore, this implies firms can hire more workers during already good times and hire even fewer workers during tough times. We provide a formalization of these dynamics in Section (6). The dynamics in summary: leverage dampens fluctuations in wages and amplifies fluctuations in unemployment.

But this also means that exposure to unemployment fluctuations will not be borne by all workers equally, as more levered firms and industries will exhibit more unemployment fluctuations. Furthermore, any attempt to introduce labor market reforms that benefit a group of workers will be partially undone by increases in unemployment risk. As such, corporate debt serves a special role as a transmission mechanism for unemployment risk in labor markets. This suggests that some landmark labor reforms of the twentieth century – such as Equal Pay Act (equal pay for women), Norris-La Guardia (unions/anti-injunction), minimum wage... – may have seen their benefits eroded by changes in the capital structure of firms.

We concentrate our empirical analysis in one such set of reforms: the Civil Rights Movement. The impact of the labor market reforms enacted during this era is well-documented (Donohue & Heckman 1991; Chay 1998; Aneja & Avenancio-León 2018) and the period is considered one of the most important economic periods of the 20th century. But that time period also saw firms becoming significantly more reliant on debt, reliance that to this date is cannot be fully explained (Graham et al. 2015). Some sociologists have even speculated that the Great Recession might have roots on the "financialization" of the 60's and 70's (Arrighi 1994; Bellamy-Foster & Magdoff 2009; Krippner 2011).

Using this setting provides is useful for both methodological and conceptual reasons. The institutions changes that we exploit provide exogenous shifters in the cost of of labor. In general,

because changes increasing the cost of labor have negative effects on employment, it is difficult to obtain variation in the total wage bill. However, using anti-discrimination regulations, as we do, allows us to circumvent this issue by focusing on the relative wage bill change across two groups of workers – in this setting, black and white workers. In addition, this setting allows us to study the distributional effects of financial leverage decisions. Thus, Civil Rights Era reforms allow us to assess both the effects of labor reforms on capital structure and also trace its redistribution effects through unemployment risk.[2]

To draw a picture of the relationship between leverage, wages, and unemployment risk, we perform three types of tests. First and foremost, we causally test that the central variable of interest, corporate debt, reacts to changes in a major labor market institution – showing that the transmission mechanism is indeed *responsive* to distortions. We estimate that the passing of anti-discrimination regulation leads to an increase in leverage of about 29 basis points per each percentage of minority workers. Since minority workers' wages increased by about 13% and employment by about 12%, a back of the envelop calculation shows that wage increases between the 1950's and 1970's accounted for between 35 and 60% of the increase in debt issuance during that same period. Crucially, we show that the responsiveness of leverage varies under different labor market conditions and different financial needs of the firm. The increase in leverage resulted in an increase in the unemployment risk of workers – employment growth is substantially lower in highly leveraged firms during periods of high unemployment.

Second, we show that the burden of unemployment risk in highly-leveraged firms is not shared equally across worker groups. Our results highlight that during periods of high unemployment for whites, leveraged firms are more likely recover in terms of their employment levels. The same is

[2] Another advantage of studying this period is that it exhibited uncharacteristically high job finding probabilities. The value of unemployment to a worker is tightly-connected to the probability of obtaining employment in another firm – again, her outside option. It is well documented that the job-finding probability fluctuates with the business cycle (Shimer 2011). This presents a difficulty if the relationship we are trying to test is tied to business cycle fluctuations, and, hence, non-linear in nature. Business cycle fluctuations might lead to under-rejection of the null of no change in financial leverage by: (i) averaging out business cycle non-linearities in the response to a policy change, and (ii) by letting those non-linearities inflate the standard errors. Civil Rights Era reforms occurred during a period with historically high job finding probability, allowing us to circumvent excessive noise in our estimation.

not true when black unemployment rates are high (employment growth remains negative overall), implying that the risk burden of leverage is not shared equally by different groups of workers.

Third, after exploring the influence of financial leverage on unemployment volatility and unemployment risk, we turn to assess the role of labor market conditions on explaining the variation in capital structure across firms. To do so, we proxy for labor market conditions using job finding probability measures (Shimer 2011). There is still significant unexplained empirical variation in capital structure both cross-industry (Lemmon, Roberts & Zedner, 2008) and in the time-series (DeAngelo and Roll, 2015). Adding job finding probability measures to Lemmon, Roberts & Zedner (2008) analysis we show, that variations in labor market conditions have additional explanatory power over variation in capital structure. Labor market conditions measures can expand to our current set of variables that help to conditionally explain the choice of capital structure.

Our work is motivated by several recently-established key facts about the relationship between the worker and the firm. First, Giroud & Mueller (2016) show that counties with more highly levered firms experience more layoffs in response to consumer demand shocks. This finding is robust to productivity differences across firms. Second, economic conditions at the firm level play a significant component for layoff decisions relative to worker-specific or macro-driven risk. Davis et al (2006) document that two thirds of layoffs are concentrated in firms shrinking by more than 10% within a quarter, with more than a fifth coming from firms that shut down. In addition, Schmieder & von Wachter (2010) find that workers hired at higher wages due to tighter labor market conditions experience higher risk of layoff.

This paper contributes to several lines of literature. First, in contributes to the literatures on Corporate Finance and Labor & Finance by characterizing the relationship between capital structure, wages, and unemployment risk. Despite the notion of compensating workers for layoff risk dating back to at least Adam Smith[3] – and finding support in modern work (Titman 1984;

[3] The Wealth of Nations, Book I, Chapter 10, paragraphs 14-19. Paragraph 15 states, for example: *"Employment is much more constant in some trades than in others[...] The high wages of those workmen, therefore, are not so much the recompence of their skill, as the compensation for the inconstancy of their employment."*

Agrawal and Matsa 2013) – recent work in Corporate Finance has also shown that firms use financial leverage strategically to improve their bargaining position against workers (Matsa 2010) and other stakeholders (Towner 2015). These two mechanisms are at odds. Yet, to the best of our knowledge, there is no other work, either in the Labor or Corporate Finance literature, attempting to discern when workers must be compensated for the increased risk of unemployment arising from higher debt ratios or when workers are willing to bargain their wages down to reduce the risk of unemployment. Importantly, since our mechanism is based on a general equilibrium framework, as opposed to using game-theoretic foundations, these results are consistent with survey evidence suggesting that CFOs do not give special emphasis to the firm's bargaining power *vis-à-vis* workers when making capital structure decisions (Graham & Harvey 2002). This reconciles a seeming contradiction between survey findings and causal estimates (Matsa 2010 and following papers).

This paper also contributes to the literature on the determinants of capital structure by documenting the importance of wage growth in explaining increased debt issuance in the 60's and 70's and the role of the job finding probability in explaining capital structure variation. It contributes to the literature on the functioning of labor markets by adding to the determinants of unemployment volatility (Shimer 2005 and others); to the literature on labor market disparities (Donohue & Heckman 1991 and others) by documenting previously unaccounted sources of labor market disparities; and to the literature on Equitable Finance, by documenting the relationship between financial leverage and inequality between groups.

2 Historical Context: Capital Structure and the Labor Market

In this Section, we discuss the setting for our study – including both the nationwide increase in corporate debt and earnings, as well as the institutional variation we utilize, civil rights laws.

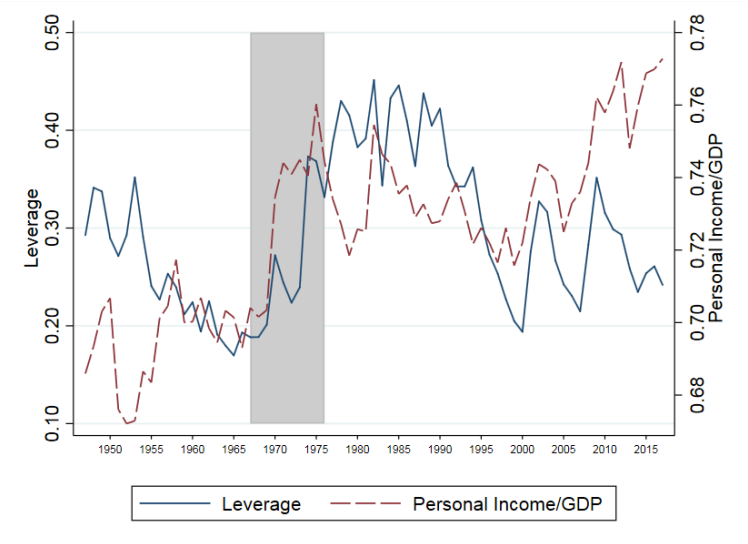
2.1 A New Era of Corporate Indebtedness

The mid-20th Century witnessed the largest recorded increase in the use debt of corporate debt. Graham et al. (2015), for example, show that aggregate leverage tripled from 1945 to 1970. How-

ever, there remains no complete accounting of these trends, as Graham and co-authors suggest: "none of the average or aggregate characteristics change over the century in a way that would support greater debt capacity" They urge further study: "any explanation for these secular trend ... must come from sources of variation not central to the existing capital structure literature."

Figure 1: Leverage and Personal Income in Later Half of 20th Century

This figure depicts leverage, based on total outstanding corporate debt over market cap, and personal income to GDP from the Federal Reserve Economic Data (FRED). Leverage and personal income exhibit dramatic increases in the late 60s and early 70s.



We propose one such factor contributing to the increased use of debt. Specifically, changes in labor productivity due to changes in technology and worker skills led to unprecedented growth in real earnings. From the late 40s to the 70s, average earnings increased by nearly 25% per decade (Greenstone & Looney, 2011). The slowdowns in both trends also occurred concurrently.

We show that these trends are linked. Theoretically, productivity increases wages, and in turn tightens the labor market. This leads to firm adjustments in capital structure (according to the wage-leverage relationship we describe in Section 6, Eqn. 16). Using a few different empirical strategies, we show that this relationship holds in the data. For now it suffices to say that if there is indeed a relationship between the trends depicted in Figures 3 and 4, it is strong enough to be observed by the naked eye; as such, the co-movement between key labor and debt variables merits further study.

Civil rights laws increased wages for a subset of (minority) workers. To some degree, these changes were transfers of wage income from whites to blacks. As such, these legal changes provide an useful setting to test the dynamics we conjecture.

2.2 Civil Rights Regulation & The Distributional Impact of Corporate Debt

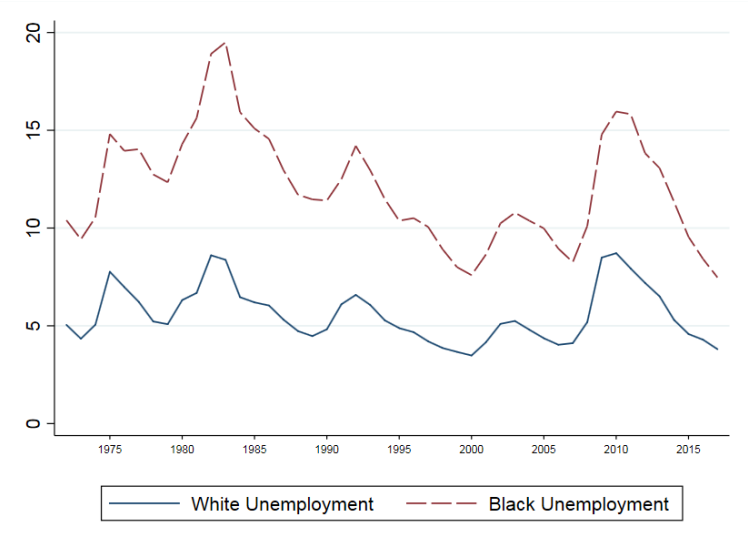
Understanding firm responses to equal pay laws is also important per se. Numerous policies at the local, state, and federal levels have increased the pay of minority workers, such as the Equal Pay Act (mandating equal pay across genders) and the American with Disabilities Act (mandating equal treatment of disabled workers). Yet, there has been little study of how firms respond to these implicit cost increases–or how firms' strategic responses affect the policies' beneficiaries. We bring evidence to bear on this topic by studying how firms responded to legal changes during the Civil Rights era–a period during which several federal laws put upward pressure on the earnings of black workers – including the Civil Rights Act (1964), Voting Rights Act (1965), Fair Labor Standards Act Amendments (1966), and Fair Housing Act (1968).

Black unemployment, however, has been roughly twice the overall unemployment rate since the 1960s (Figure 2). We show that the disproportionate levels of unemployment risk are an important undocumented source of structural challenges black workers face, and that firms' capital structure is yet another factor that may contribute to these disparities. A casual examination of overall firm debt levels and race-specific employment rates (Figure 3) suggests that levels of firm debt in the economy are negatively correlated with black-white unemployment differentials, as might be the case under differential exposure to unemployment risk arising from financial leverage. We explore this relationship empirically in Section (5) and theoretically in Section (6.7).

Our analysis suggests these trends arise in part because corporate structure is tightly linked to the probability and costs of firm distress (Wruck, 1990) and to unemployment risk (Giroud & Mueller, 2015). Namely, we provide an explanation for this observed relationship between highly

Figure 2: Unemployment Rates by Race

This figure plots the unemployment rates by race for workers 20 ages and above from the Federal Reserve Economic Data (FRED).



leveraged firms and reduced employment gaps between whites and blacks.[4] Corporate financing decisions thus generally may have implications for the relative labor market outcomes of different groups of workers, primarily for the unemployment risk each group bears. These differences are still prevalent today when unemployment differentials between blacks and whites are 20% higher in industries with lower levels of leverage. The findings we document in this section are not of pertinence only to the study of race in the labor market, but the insight translates to any instance in which multiple workers may be affected, adversely or not, by regulation. As such, these changes in financial policy have distributional consequences for the real economy.

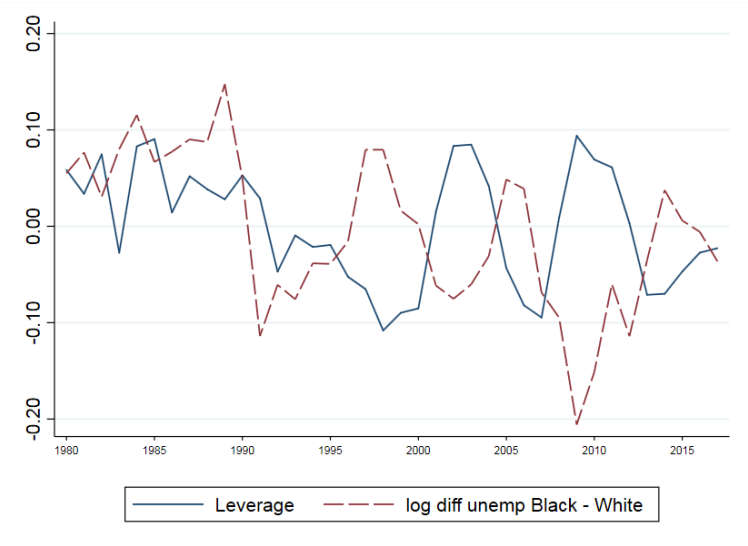
3 Empirical Framework & The Responsiveness of Corporate Debt

To study the relationship between unemployment risk and corporate debt we are required to confront this question: "Is corporate debt responsive to changes in the wage bill?" Answering this question presents some difficulties, though. First, as we remark throughout the paper, the relation-

[4] Previous work suggests that firms incur debt in response to increases in the bargaining power of workers (Matsa, 2010). We argue here along similar lines that firms will respond similarly to labor market institutional changes that increased the wages of black workers (such as Title VII of the Civil Rights Act and political re-enfranchisement that occurred through the Voting Rights Act).

Figure 3: Relationship Between Black-White Unemployment Differences and Leverage (Detrended)

This figure illustrates the relationship between the log difference of the unemployment rate between black and white workers against firm leverage. Series comes from the Federal Reserve Economic Data (FRED). Leverage and unemployment differentials move opposingly over the business cycle.



ship between wages and leverage depends on business cycle conditions, so we must be attentive to those. We will come to this soon enough in the Data subsection. The second difficulty is finding the right setting: we need exogenous variation not in the wage nor in employment, but in the total *wage bill* (the product of the two).

First, think about the reasoning. From our theoretical framework, in particular from the equilibrium debt condition, we know that changes in debt will stem from changes in the wage bill. Ideally, we could test this relationship using an unanticipated shock that increases wages. Understanding the impact of such a change, however, will only help us to the extent we can hold everything else constant. Since the underlying causes of wage increases often have an offsetting effect on employment, finding variation in the wage bill is difficult.

Next, let us consider an alternative. Beyond looking directly at changes in the overall wage bill, we can use variation that amounts to reallocation in the wage bill between two groups of workers: when the overall wage bill is going down, there is one group of workers for which the wage bill either goes up or goes down at a lower rate than the average (depicted in Figure 4). Changes in anti-discrimination policy could give us a way around this problem: the passage of anti-discrimination

regulation reduces both the unemployment differential and the wage gap between minority and majority workers which leads to an unequivocal relative increase in the wage bill for firms in industries with a higher minority share of the workforce. We formalize this intuition in Proposition 2 of Section (6).

To that end, we exploit the sharp increase in relative and absolute wages observed after the civil rights revolution of the 1960s. Important studies in labor economics document the impact of anti-discrimination laws (in particular, Title VII of the 1964 Civil Rights Act) on observed improvements in black wages over the second half of the twentieth century. Additionally, we show in a previous paper that the grant of political power bestowed by the Voting Rights Act of 1965 also had the effect of improving black wages.

To begin, we provide evidence that it is indeed true that the wage gap is decreased and that there are differential reductions in unemployment differentials according to the relative size of the minority workforce. To also convince readers of the impact of black voting rights on labor market outcomes, we provide evidence of the VRA's effect on black wages in Table 2. We then proceed to test our main specification of interest – this is, that leverage is differentially responsive to changes in anti-discrimination regulation depending on the minority share of the workforce.

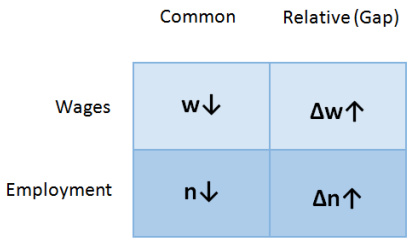
We test our theory by examining the effects of both the VRA and Title VII on the use of corporate debt. We expect that laws that raise minority wages will have the greatest impact on firm borrowing within industries that have a high presence of minority workers. The empirical specification is thus the following:

$$Lev_{ist} = \alpha + \beta_1 CRL_{st} + \beta_2 CRL \times ShareBlack_{st} + X'_{ist}\gamma + \eta_i + \xi_t + \epsilon_{ist} \tag{1}$$

In this empirical model, *CRL* indicates the presence of either the VRA or Civil Rights Act, Title VII (in other words, a "Civil Rights Law" – hence, "CRL") in state s and year y. The key variable of interest, however, is *CRL* $\times$ *Share Black*, or the interaction between the presence of civil rights legislation and the black share of labor in a given industry. Given our theoretical discussion

Figure 4: Breakdown of Effects in Proposed Testing Scenario

This figure breaks down the effect of a policy change that increases the overall cost of labor but increases the relative wage bill for one group of workers. The first column refers to the overall (or common) effect to all workers, and the second column refers to the *relative* increase in the wages and employment of one particular group.



above, we expect laws that raise minority wages to have the greatest impact on firm borrowing within industries that have a high presence of minority workers. η_i and ξ_t are firm and state year fixed effects, respectively. All regressions include robust standard errors clustered at the state level. X is a vector of state and firm-level control variables.

In our primary specification, we focus on book leverage instead of market leverage. Our choice is based on two documented facts in the empirical Corporate Finance literature. First, from a comprehensive survey looking at over 4,000 firms, Graham & Harvey (2002) have documented that CFOs make capital structure decisions looking at book leverage. Practitioners fear that, due to daily fluctuations in the value of debt and equity, having market leverage targets would require constant rebalancing. This is consistent with Welch (2004) findings that most variation in market leverage ratios are not a product of debt policies but of fluctuations in market values as US Corporations do not issue or repurchase debt and equity in response to these changes.

3.1 Data

To analyze the impact of labor market regulation on firms' financial policies, and in turn the effects on the macroeconomy, we combine data from several sources. First, we match state-level data on civil rights legislation with firms' balance sheet and income statement information from Compustat. Our main source of firm data is the widely-used Compustat database. The sample includes all firms with nonmissing observations for debt, total assets, market value, and the financial controls (listed

below). This leaves us with 260 firms in states covered by Section 5 of the Voting Rights Act and 1,323 in states not covered. Summary statistics are presented in Table 1. We then match our firm data to industry-race compositions, which are constructed using labor market information from the US Current Population Survey (CPS), and in particular the 4-digit NAICS industry code. We similarly construct industry-specific education and "years of experience" variables, by race, that are matched to Compustat firms (again using the CPS). These industry-specific variables are measured in the year 1960 – to provide us with pre-existing industry differences that are unaffected by treatment. The final sample includes all firms (excluding financials and utilities) with non-missing observations, which amounts to about 14,415 firm-years over the 1961-1982 period.

We analyze all firms over the period from 1961 through 1982. These years are chosen deliberately. As our model suggests (by the wage-leverage relationship), the level of responsiveness of leverage to regulation depends on labor market conditions. Because the job-finding rate varies at different points of the business cycle, we choose our dates of analysis to comprise a full business cycle. 1961 and 1982 are official business cycle "trough" dates as determined by the National Bureau of Economic Research. As we will show, however, our results are invariant to the choice of start and end dates.

3.1.1 Additional Data Sources

We also use two additional sources of data to quantify the penetration of civil rights era changes such as VRA enfranchisement. First, we use the number of civil rights-related protests for each state and year between 1960 and 1990. The results (Table 5) suggest that after the passage of the VRA, corporate leverage is increased differentially more in industries with higher black participation when the number of protests is high. Second, we use data on racial violence as demonstrated by black lynchings by white citizens. During the civil rights era, one strategy employed to intimidate supporters of civil rights legislation was lynching. Consequently, lynching deteriorated the effectiveness of black enfranchisement and workplace economic gains by keeping blacks from

organizing socially, politically, or economically.[5] We use data on intensity of lynching to generate mitigating variation in the implementation of the VRA and Title VII. Table (5) shows that after the passage of the VRA, industries with high rates of black participation exhibited a lower increase in corporate leverage if the number of lynchings was high.

3.2 Antecedent Results: Effects on Employment and Wages

We begin with discussion of how firm debt relates to a firm's total wage bill. The equilibrium debt is tied to both components of the wage bill: total wages and overall employment. Firm borrowing decisions can be influenced by changes in either component. In the context of anti-discrimination regulation (which affects racial groups differently), we care not only about the absolute changes in a firm's wages/employment, but also in the compositional changes across groups.

First, we confirm that the labor market regulation we exploit indeed increased the cost of labor for firms. To this end, we evaluate the effect on wages using the empirical strategy developed in Aneja & Avenancio-León (2018). The results are presented in Table 2, and demonstrated the marked impact of the VRA on wages–to the tune of a 12-13% increase in relative black wages. Importantly, this effect is driven almost entirely by the increase in black wages; white wages are virtually unchanged. To alleviate concerns of endogeneity, we also compare the estimates here to estimates from our related paper, using recently-released administrative Decennial Census data to evaluate the labor market effects of the Voting Rights Act. In that paper, we utilize a cross-county border county design to reduce concerns about endogeneity. As suggested by Table 2.B, the border-county design confirms that the estimates are similar to results using full state-year samples. Given that there are no qualitative differences in the state and border county estimates, we are confident that the VRA had an important impact on at least one major component of firm labor.

[5] See, Williams (2019) documenting the effects of lynching on voting. The gravity and seriousness of lynching is demonstrated by the following quote: "Nationally, Presidents John F. Kennedy and his successor, Lyndon B. Johnson, were opposed to lynching. Johnson was also able to push through Congress a series of civil rights measures in the 1960s which aided the advancement of some blacks in American society. Although Congress showed some sensitivity to black issues and concerns with the passage of the 1965 Voting Rights Act and other civil rights bills during this period, an anti-lynching bill was not one of them."

Anti-discrimination laws for black workers will depend on the relative sizes of black and white workers in the labor market. In particular, this type of regulation should reduce the unemployment disparities more in places where minorities comprise a greater share of the labor force (Proposition 2 of Section 6). To test this formally, we estimate the following regression:

$$\%\Delta employees_{ist} = \alpha + \beta_1 VRA_{st} + \beta_2 VRA \times ShareBlack_{sjt} + \gamma X_{it} + \eta_i + \xi_t + \epsilon_{ist} \qquad (2)$$

where $\%\Delta employees_{ist}$ is the firm-level percentage change in employees, VRA_{st} is a dummy marking the application of the Voting Rights Act Section 5, and $VRA \times ShareBlack_{sjt}$ interacts VRA_{st} with the industry racial composition. $ShareBlack_{st}$ is absorbed in this regression. Table 3 shows the estimation results. Consistent with our intuition, $\beta_2 > 0$ meaning that as the black share of the labor supply increases, so does employment. The increase is of about 12 basis points per percent increase in the black labor share. In contrast, the baseline effect of VRA, β_1, is negative reflecting the relative decreases in wage bill for white workers. These effects, along with the effects on wages, are consistent with our formalization in Proposition 1 of Section (6) and with Figure 4, paving the way for clear directional predictions of the effects of the policy change on corporate debt.

Recall that debt must change if the total wage bill changes. Moreover, firm debt will decrease if and only if the firm's total wage bill declines. As such, we evaluate the effect the passage of anti-discrimination regulation has on overall employment for our sample of firms from Compustat. Table 3 shows that the effect of the VRA on total firm employment is negative. From Table 3, we can see that there is an overall reduction in total employment after the passage of the law. This reduction is partially offset by relatively higher minority employment. However, the marginal effect of an additional percent increase of black workers in a given industry is positive. In other words, the component common across industries is negative, and the relative component is positive. This statistical fact provides an interesting testable implication: we expect leverage to go down overall in states affected by passage of the VRA, but *increase* in black-concentrated industries.

These initial results on wages and employment have the following consequences for leverage

based on our theoretical framework: (1) since wages for majority-group workers are stable and employment decreases, the leverage will decline as a result of anti-discrimination laws for all firms; and (2) this reduction will be off-set as we move to industries with higher minority labor participation, as both their relative wages and relative employment increases at a faster rate than the baseline effect. We test these predictions in the next subsection.

3.3 Main Results: Impacts on Firm Leverage

As shown above, the passage of the Voting Rights Act in 1965 increased black wages both in absolute relative terms between 1965 and 1990. Having established this empirical fact, we now show that firm borrowing also responded to the passage of the increased cost of black labor.

We begin with our main results. The main prediction we test is that these laws (in particular, the stronger effect of anti-discrimination laws) have an impact on debt usage. We test this prediction using the primary empirical specification, Equation 1, discussed above. The core results are presented in Table 4. Firm-level leverage is the outcome variable.

Given the theoretical discussion above, we expect an exogenous increase in minority wages to have the strongest impact on firms within the most heavily-affected industries – i.e., industries with a high presence of minority workers. As such, $VRA \times ShareBlack$ is the coefficient of interest. Column (1) of Table 4 indicates that in states subject to civil rights legislation (which increases black wagesin this case, the VRA), increasing the fraction of blacks in an industry by 1 percent is associated with approximately 14 basis points increase in leverage. The impact of the VRA within heavily minority industries on leverage is also robust (slightly larger in magnitude, in fact) to the inclusion of state-year fixed effects, which allows us to account for unobserved state-specific shocks that may affect firm leverage (Column (2)). The results are even stronger when including controls for within-industry race-specific education averages and state population (with state and year fixed effects). These results are presented in Column (3) and indicate an 180-basis point increase in leverage for the minority-heavy industries. Collectively, these results give us confidence giving us confidence that firms are indeed changing their corporate policy after the VRA, and thhat the

results are not being driven by time-varying state characteristics that may affect firms debt-taking differently.

We also explore sources of heterogeneity in the effects of the civil rights regulation on financial leverage. First, we explore how firm leverage may respond differentially to legal changes depending on levels of latent racial hostility within the workfoce, which would tend to increase the flow cost of black worker hires. To this end, we exploit variation in racial lynch-mob violence across the South (i.e., the practice of killing primarily blacks by hanging). Tolnay and Beck describe the use of lynching in the South as a method of social control by whites.[6] Political historians similarly suggest a prominent role for lynching for both voter intimidation and labor coercion (Kousser, 1974). Moreover, both historical and recent econometric research suggesting that economic competition between white and black labor throughout the pre-civil rights era (Christian, 2015).

Given this evidence, we take the historical presence of lynching as a measure of (potentially latent) pressure on blacks not to vote. The presence of racial threat (as proxied by lynching) curtails mobilization resulting from civil rights laws such as the Voting Rights Act and Title VII. This in turn leads to weaker operationalization of political and economic rights, resulting in weaker effects on wages. Consequently, we should observe weaker effects on corporate leverage in areas where racial hostility is high.

Turning to Table 5, this is indeed what we observe. As in our main results, the coefficient on $VRA \times ShareBlack$ is positive and significant, indicating that civil rights laws affecting black wages have a strong effect on firm balance sheets. However, our primary coefficient of interest in this regression is $Lynch \times VRA \times ShareBlack$, which suggests in Column (1) that 1 additional lynching now reduces this effect by 2.9 basis points. The results in general hold with and without firm-level controls that may affect leverage.

We also exploit heterogeneity in minority activism that may increase civil rights legislation's effect on black wages. Presumably, this would have the opposite on firms as racial hostility. In

[6] And importantly, lynchings were not crime control.

particular, places that were more politically active in the civil rights movement may be relatively more affected by laws such as the VRA and Title VII, given that both of these laws require private action to achieve economic effects (or perhaps even activism). For example, protests may exert pressure on government, thus to the operationalization of civil rights. Hence, upward wage pressure will be higher when protests are higher. As a result, corporate leverage will be increased more.

The results indicate that areas that are relatively more "activated" by civil rights laws indeed observe differentially greater levels of firm debt, consistent with our main results. In Table 5, Column (1), the primary variable is now $Protests \times VRA \times ShareBlack$. The results indicate that areas with civil rights political activism (i.e., civil rights protest events) produce an additional positive effect on top of the VRA in black-heavy industry–an additional protest increases this effect by 5.5 basis points. These results hold when accounting for firm-specific traits as well as state-year fixed effects (Columns (2) and (3)).

3.3.1 Effects on Profitability

A reasonable alternative channel for us to consider is whether the VRA affects corporate structure through its effects on firm profitability unrelated the labor market. If so, we would expect to see profitability itself change. We provide evidence that this is not the case by examining its effect on three variables – net margin, EBITDA margin, and return on assets. The net margin, defined as net income over revenue, is a measure of profitability for each dollar earned. Ebitda margin is an equivalent measure excepts that it adds back to net income interest and taxes paid as well as depreciation and amortization. By adding back interest and taxes Ebitda margin measures the profitability that is translated to multiple stakeholders and not only shareholders. The importance of these measures is that they can point out changes in operational efficiency of the firm. Returns on assets, net income divided by total assets, on the other hand, allows to measure efficiency changes in the assets being managed. Changes in return on assets might be associated with capital-skill complementarity and decrease if lower skilled workers are being hired.

Table 6 provides results from the baseline specification, where each of the above measures is the outcome variable, instead of corporate leverage. The results in Columns (1)-(3) confirm that there are virtually no effects of the VRA in highly-affected industries on firm profitability. We interpret these results as increasing our confidence in the proposition labor market regulation affects leverage.

3.4 Interaction with Other Financial Channels

3.4.1 Financial Flexibility and Earnings Retention Policy

As we have stressed and is documented by Graham and Harvey (2002), preserving financial flexibility is an important concern to CFOs. As the firm becomes riskier, a higher capital structure may limit access to external funds both in the form of equity and debt. We can test whether the firm is indeed perceived as riskier by looking at the cost of debt to the firm. We use the interest expense to total debt ratio, as our measure for interest rate expense. A higher interest expense to total debt ratio indicates that bondholders are charging higher interest rates and might be regarding the firm as riskier. In column (5) of Table 6, we can observe that after passage of anti-discrimination regulation, firms with more black workers are perceived as riskier, paying around 1.7 more basis points per black worker percentage.

Do firms exert efforts to retain financial flexibility while still internalizing the labor market reaction to debt i.e. meeting the equilibrium debt condition? From a wage perspective, an increase in debt is equivalent to a reduction in equity, i.e. financial leverage, the ratio of debt to equity, increases. DeAngelo and DeAngelo (2007) makes the case that firms may pay substantial dividends to limit internal funds for insiders while maintaining financial flexibility. Their argument is about controlling agency costs but carries through to employment. If access to funds is threaten by increases in debt ratio, firms may want to adjust through other margins. Instead of increasing financial leverage, firms may resort to change their dividend payout policy.

The dividend payout is defined as dividends divided by net income. It is a measure of the proportion of money being paid out to shareholder in contrast with how much is reinvested. A higher dividend payout ratio indicates the firm is maximizing dividend payment, consistent with

our model. Recent work has shown that the dividend payout policy does internalize labor market conditions. In a recent paper, for example, Pezone (2017) argues that dividend payout policies are affected by labor market conditions and unemployment risk. In column (4) of Table 6, we see a similar effect.

3.4.2 Leverage and Short-Term Liquidity

A naive interpretation of our results is that increases in debt come not as a result of optimal firm policy but as a result of the firm being financially constrained. After an increase in the cost of labor, the story goes, firms lack the working capital needed to keep operations ongoing and as a result must borrow. While, this direct effect interpretation is *prima facie* reasonable, it fails to account for the fact that financially constrained firms have less access to borrowing to begin with. Therefore, if firms are simply responding optimally to their optimization program, firms whose financial constraint is slack should be borrowing more. And if firms are simply responding to cash shortfalls, financially constrained firms should be borrowing the most, instead. This juxtaposition of effects lends itself for a simple test.

We can measure the firms' ability to meet its short term obligations by the *current ratio*, which is to say, the ratio of assets that are due within one year to the liabilities that are also due within one year. A high current ratio means that the firms' financial constraint is slack, while a low current ratio means the opposite, that firms may have trouble meeting their obligations. The current ratio is widely used in practice and is the most general liquidity ratio.

Both current assets and current liabilities are available in Compustat. We compute the current ratio for each firm as:

$$CR = \log(CurrentAssets) - \log(CurrentLiabilities)$$

To run our test we do the following. First, we sort firms by current ratio and run regression (1) for the lowest and highest current ratio quartiles. The results are in Table 7. We see that most of the responsiveness of leverage to black workforce concentration comes from high current ratio

firms in over a 4-to-1 margin.

3.5 Interaction with Other Labor Market Channels

3.5.1 Leverage and Complementarity between Skill and Capital

Another motive for levering following an increase in the cost of labor is to substitute labor with capital. One line of thought argues that the differences in employment between minority and majority workers are due to differences in skill composition. If white workers are more skilled than their black counterparts, increasing the cost of hiring white workers through anti-discrimination laws would lead to substituting white workers with capital, not with black workers. Thus, if firms are optimizing with respect to differences in productivity, industries with high elasticities of substitution between skill and capital would increase leverage to increase investment. In contrast, if firms are increasing leverage because of changes in the labor market, industries with low elasticities of substitution between skill and capital (or, in other words, high capital-skill complementarities), those that are less able to mitigate the cost of labor regulations, should increase leverage the most. Moreover, changes in the cost of labor may increase the optimal investments, which would be reflected in increased borrowing. We proceed to test these hypotheses.

We follow the literature on complementarity between skilled and unskilled workers and assume the production function exhibits constant elasticity of substitution. In particular the functional form we adopt for this analysis is:

$$Y = A[aN^{\sigma} + (1-a)S^{1-\sigma}]^{\frac{1}{\sigma}}$$

where Y represents output, and skilled, S, and non-skilled labor, N, are the two factors of production. From this functional form it follows that a higher σ indicates greater substitutability while complementarity is suggested by lower values of σ. To examine capital-skill complementarity we can extend this production function to include a third input: capital (K). We do so by adopting a two level CES function. In particular, we use:

$$Y = A[aQ^{\rho} + (1-a)N^{1-\rho}]^{\frac{1}{\rho}}$$

$$Q = [bK^{\theta} + (1-b)S^{1-\theta}]^{\frac{1}{\theta}}$$

Under this specification, there is capital-skill complementarity if and only if $\rho > \theta$.

The intensity of use of skilled versus unskilled labor can be obtained from CPS. Using measures of schooling we classify individuals with 12 or fewer years of schooling as unskilled workers, and those with 16 or more years as skilled. We map the use of skilled and unskilled workers by industry and year to the broader US Commerce Department industry classification. This allows us to overcome insufficient data problem. We merge this classification to Compustat and use sales as our measure of output and total assets as our measure of capital. We follow the same approach using routine versus cognitive non-routine tasks instead of intensity of skill measured by education. In doing this we use the Dictionary of Occupational Titles (DOT) by occupation following Autor et al. (2003).

As we can observe in Table 8, the relative change in leverage for industries with high share of minority workers is positive for both, industries with high and low capital-skill complementarity. But is even higher in industries with low capital-skill complementarity which is consistent with a labor-driven theory of corporate debt.

3.5.2 Leverage and the Job Finding Probability

We have seen that corporate debt is responsive to changes in labor policy. Unfortunately, focusing on the average treatment effects misses all the heterogeneity in the response of corporate debt to wages. In the wage-leverage relationship we saw that the response of wages to changes in debt depends on the prevailing labor market conditions during the business cycle – a point we have been emphasizing constantly. More precisely, when the job finding probability is low, increasing debt requires compensating workers for the higher levels of distress risk in the form of a higher wage. When the job finding probability is high the opposite happens, equilibrium wages go down after increases in debt. If the threshold point at which the job finding probability passes from too low to too high changes across firms we should expect to see heterogeneous responses to changes in labor

policy.

To assess the amplifying or mitigating effects of the job finding probability we proxy for the job-finding probability at the industry level using aggregate level job finding probabilities from CPS and cross-industry estimates from Hall (2005a). Time series estimates of the job finding probability at an industry level are unavailable during our time period.[7] However, the ordering of industries by job finding probability changes little over time. Thus, we proxy for the job finding probability at the industry level by using the product of the global job-finding probability time series and the cross-industry estimates of the job finding probability. This is, our job finding probability measure is:

$$JFR_{it}^{proxy} = JFR_i \times JFR_t$$

We then create a dummy indicating whether the JFR^{proxy} is above or below median and proceed to estimate:

$$Lev_{ist} = \alpha + \beta_1 VRA_{st} \mathbb{1}_{med}^{+} + \beta_2 VRA_{st} \mathbb{1}_{med}^{-}$$

$$+ \beta_3 VRA \times ShareBlack_{st} \mathbb{1}_{med}^{+} + \beta_4 VRA \times ShareBlack_{st} \mathbb{1}_{med}^{-} + X_{ist}'\gamma + \eta_i + \xi_t + \epsilon_{ist} \qquad (3)$$

where $\mathbb{1}_{med}^{+} = \mathbb{1}(JFR_{it}^{proxy} \geq median_{JFR})$ and $\mathbb{1}_{med}^{-} = \mathbb{1}(JFR_{it}^{proxy} < median_{JFR})$ are sets of dummies indicating whether the job finding probability is above or below median, respectively. The results are presented in Table 9. During periods with high job finding probability firms increase debt by more than 30 basis points per percent share of black labor force. In contrast, during periods of low job finding probability the increase in debt per percent share of black labor force is around 20 basis points.

[7] Estimates of the job finding probability at an industry level can be constructed after 1994. We will use these in our out-of-sample tests in the next section to show that changes in the job finding probability predict changes in leverage.

4 The Job Finding Rate and Variations in Capital Structure

In this section, we assess whether labor market conditions explain changes in capital structure. We use the job finding probability as our measure of labor market conditions. The job finding probability summarizes both unemployment and available vacancies, and it is the appropriate object of study as we will show in Section (6). Changes in the job finding probability should explain changes in debt-equity ratio, and as such, we use the job finding probability as our proxy for labor market conditions. We also want to make sure the explanatory power of the job finding probability survives the inclusion of controls shown to explain variation in capital structure. In that regard, we follow Lemmon, Roberts & Zender (2008) and include as controls: size, market-to-book ratio, tangibility, profitability and an indicator for dividend paying firms.

We compute the job-finding probability by industry-year based on data from the CPS, following Shimer (2012). Assume the arrival rate of job offers follows a Poisson process with rate $f_t \equiv -log(1 - F_t)$, we construct the job finding probability measure, F_t, as:

$$F_t = 1 - \frac{u_t - u_t^s}{u_{t-1}}$$

where u_t is the unemployment rate at time t, and u_t^s is the short term unemployment rate at time t (workers unemployed for less than one period). In the CPS, unemployed workers are asked how long they have been unemployed. We take as our measure of short-term unemployment the number of workers unemployed for four weeks or less.

Our results are shown in Table 10. A 1% increase in the job finding probability is associated with around 5 to 6 basis points change in leverage in the next quarter. The results are robust to the inclusion of several firm-level controls such as size, market-to-book ratio, tangibility, profitability and an indicator for dividend paying firms and different fixed effects (industry, firm, year). Moreover, the inclusion of the job finding probability as a factor has little effect on the magnitude of other controls, suggesting that the variation captured is largely orthogonal to those.

5 Who Bears the Burden of Unemployment Risk?

One of the core takeaways from the theoretical analysis above is that leverage is an important conduit for unemployment risk. When discussing the role of financial leverage on unemployment risk it helps to see what the firm's employment response is following periods of high unemployment. As we have mentioned, Giroud & Mueller (2016) have shown that following consumer demand shocks, counties exhibited more layoffs where prevalence of highly leverage firms was high. We should expect that response to be generalizable to business cycle fluctuations and be salient after changes in unemployment rates. We follow an approach similar to Hoynes et al (2012) and run regressions of the form:

$$\%\Delta employees_{ist} = \alpha + \beta_1 Lev_{it} + \beta_2 UR_{st} + \beta_3 UR_{st} \times Lev_{it} + \eta_i + \xi_t + \epsilon_{ist} \tag{4}$$

and

$$\begin{aligned} \%\Delta employees_{ist} = \alpha + \beta_1 Lev_{it} + \beta_2 UR_{st} + \beta_3 BlackUR_{st} + \beta_4 WhiteUR_{st} \\ +\beta_5 UR_{st} \times Lev_{it} + \beta_6 BlackUR_{st} \times Lev_{it} + \beta_7 WhiteUR_{st} \times Lev_{it} + \eta_i + \xi_t + \epsilon_{ist} \end{aligned} \tag{5}$$

where UR_{st} is the total unemployment rate by year and state, $BlackUR_{st}$ is the black unemployment rate, and $WhiteUR_{st}$ is the white unemployment rate, all of them computed by year and state; Lev_{it} is the financial leverage of each firm at each year; η_i denote firm fixed effects; and ξ_t denote time fixed effects. Unemployment rates by race, state and year are retrieved from the Current Population Survey (CPS).

This estimation strategy speaks to the sensitivity of employment growth to leverage over the business cycle. The first regression equation captures the firm's employment response following changes in unemployment and the extent to which financial leverage amplifies or mitigates that response. The second regression equation decomposes that response by race.

Table 11 shows our results. In Panel A, we can see that, following increases (decreases) in unemployment, firm level employment growth decreases (increases) more in firm with high leverage

which is consistent with our discussion of the wage-leverage relationship and captures the unemployment risk associated with high levels of leverage. What is more interesting is that most of the correlation of unemployment with employment growth stems from its connection with financial leverage. This effects subsist after applying varying levels of fixed effects. In Panel B, we decompose this effects by black and white unemployment. The interpretation of this is: "when black or white unemployment is high, are firms and firm employment recovering or worsening?" As before, the interaction of unemployment and financial leverage has a high negative correlation with employment growth. A key difference, though, is that this correlation is not the same for black and white unemployment. The correlation between the interaction of black unemployment and leverage, and employment growth is close to zero, whereas the correlation between the interaction of white unemployment and leverage, and employment growth largely offsets the beta form Leverage $\times$ Unemployment. This is partly driven by firms with high black share of its labor force having more leverage. It also suggests that when white unemployment is high, firms are already on its way to recovering.

6 An Equilibrium Model of Wages, Unemployment, and Debt

6.1 From the Firm Balance Sheet to Unemployment

There is now a large body of empirical work relating labor markets with corporate leverage. Bronars & Deere show evidence that firms use debt to increase the bargaining position of shareholders against unions. Using variation in state level collective bargaining laws, Matsa (2010) shows that firms with higher collective bargaining coverage increase have higher leverage. Relatedly, firms operating in states with high unemployment insurance exhibit the same behavior (Agrawal & Matsa 2013). Similar results have been found regarding other stakeholders (Towner 2015).

At a more micro level, the bargaining literature has provided supporting evidence of the mechanisms driving the interaction between the firm and the labor market. Hall & Krueger (2012) found evidence supporting bargaining for wages inside firms. Using a detailed dataset on wages in

the airline industry, Benmelech et al (2012) show that firms in financial distress obtain more wage concessions. At a microtheory level, Stole & Zwiebel (1996) put forward a framework characterizing intra-firm bargaining between workers and employers, where workers bargaining power decreases as hiring increases since the marginal product of labor of each additional employee goes down. At a macro level, Cahuc & Wasmer (2001) have shown that Stole & Zwiebel (1996) findings still hold under search-theoretical frameworks of the labor market while Monacelli et al (2011) incorporate debt into a search-frictions employment model.

Our choice of framework is driven by both pragmatic and conceptual reasons. First, the Mortensen-Pissarides framework has a long tradition in labor economics and offers the substantive advantage of explaining unemployment as a separate object from participation in the labor force. Second, from a corporate finance perspective, there is by now extensive evidence that changes in labor policy affect capital structure decisions one way or the other. Yet, survey evidence (Graham & Harvey, 2002) documents that the main concern of CFOs when setting capital structure policy regards sustaining access to external funds and their position vis-à-vis creditors (e.g. financial flexibility and credit ratings); in contrast, bargaining with workers finds little or no support as a policy factor taken in consideration by CFOs when setting capital structure policy. This evidence suggests that if labor market conditions have an effect in capital structure, such effect must arise from changes in the equilibrium outcomes rather than from strategic behavior.

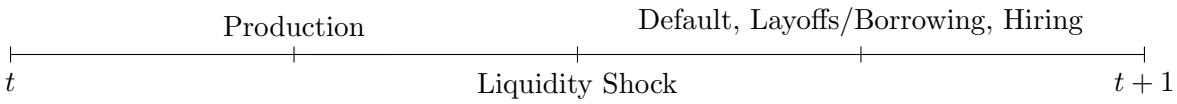
6.2 Environment Description and Timing of Events

We consider an economy where firms adjust through a productive margin, employment, and through a non-productive margin, choice of capital structure. While capital structure does not directly affect production, it does affect profits by enabling benefits in the form of tax shields, distress costs if the firm undergoes financial hardship, or changes in wages as is central to this paper. Denote firm employment by n. The firm produces according to a function $f(n)$ that is both increasing and concave in employment, i.e. $f'(n) > 0$ and $f''(n) < 0$. In order to get employees, the firm must post vacancies at a flow cost γ. Matches arise according to $m(u, v)$ which is increasing and concave

function of both unemployed workers (u) and vacancies (v), and exhibits returns to scale. The arrival rate for workers is defined as $\frac{m(u,v)}{u} \equiv m(\theta)$, where $\theta = \frac{v}{u}$ is the labor market tightness. The hiring rate per vacancy is defined as $\frac{m(u,v)}{v} = \frac{m(\theta)}{\theta} \equiv q(\theta)$. The arrival rate of job offers for workers is increasing in labor market tightness, $m_\theta(\theta) > 0$, while the hiring rate decreases with labor market tightness, $q_\theta(\theta) < 0$. The separation rate, or the exit rate from employment to unemployment, is exogenous and equal to δ if the firm does not default, and δ^D if the firm does. The wage for each group is determined by (Nash) bargaining between the employer and each employee. Search on the job is not allowed.

The firm holds total debt B and can issue additional debt, ΔI. In doing so, the firm considers the tax rate, τ and distress costs c. The probability of default, λ, is endogenous and depends on the firm's profits and on the total debt. We will address the determination process of λ in section 6.6. The discount rate, r, is exogenous. The prevailing interest rate, R, incorporates the probability of default, λ, and, thus generally differs from the discount rate. Financial markets are competitive which implies lending earns zero profits. Hence $e^R(1-\lambda) = e^r$ and $R = r - log(1-\lambda)$.

The timeline of the event is as follows:



At time t, the firm engages in production and makes a decision to post additional vacancies and borrow additional debt. During the production phase, the firm receives an interim mean zero liquidity shock[8], ϵ_t, that is independently and identically distributed across time and orthogonal to the firm attributes. The firm defaults if it is unable to service debt. If the firm defaults, it incurs in distress costs c, suspends hiring efforts, and is unable to claim tax benefits from debt. The separation rate changes from δ to δ^D. There are complementarities between debt and labor

[8] We refer to liquidity shock as a short-run solvency or non-economic financial shock. See, for example, Maksimovic & Titman (1991), Andrade & Kaplan (1998), Phillips & Sertsios (2012).

bnB^{ω}, governed by parameters b and ω, that can be thought as arising from investments, and are consistent with our findings in section 3.5.1. Complementarities make it possible for firms to transition to a new equilibrium. Suspending hiring efforts can be thought of as stop interviewing candidates or stop receiving applications because during their search workers realize the firm is in distress as in Brown & Matsa (2013). If the firm does not default, it issues new debt, continues hiring and collects tax benefits. Separations stay at δ and the firm incurs in no distress costs.

6.3 Job Creation and Equilibrium Debt

The firm maximizes the total surplus for investors – both bondholders and equity holders. Total surplus consists of production net of wages plus tax benefits from debt minus distress costs minus the flow cost of maintaining unfilled vacancies. The firm problem solves:

$$rV(n,B) = \max_{v,\Delta I}\{f(n) - w(n,B)n + bnB^{\omega} + \tau RB(1-\lambda) - \lambda cB - (1-\lambda)v\gamma + \frac{dV}{dt}\}$$

$$= \max_{v,\Delta I}\{f(n) - w(n,B)n + bnB^{\omega} + \tau RB(1-\lambda) - \lambda cB - (1-\lambda)v\gamma + V_n\dot{n} + V_\theta\dot{\theta} + V_B\dot{B}\} \quad (6)$$

where employment and debt satisfy the laws of motion, $\dot{n} = (1-\lambda)q(\theta)v - \delta(1-\lambda)n - \lambda\delta^D n$ and $\dot{B} = \Delta I$, respectively. The first and second term are standard. The third and fourth terms, represent the tax shield advantage and distress costs, respectively. The fifth term represents the hiring cost if the firm survives.

We want to find relationships characterizing job creation and borrowing in equilibrium. The first order conditions with respect to each groups' employment and firm debt yield:

$$V_n(n,B) = \frac{\gamma}{q(\theta)} \quad (7a)$$

$$V_B(n,B) = 0 \quad (7b)$$

$V_n(n,B)$ is the marginal value to the firm of adding an additional worker from group i whereas $V_B(n,B)$ is the value to the firm of increasing total debt by \$1. Equation (7a) is standard and signifies that the marginal value of adding one employee must equal the search cost of making the match. Equation (7b) states that the marginal cost of an additional dollar of debt must equal

zero; which is to say, different from hiring, there are no costs or benefits to *issue* debt. We can see, however, that there are benefits and costs to having debt, like there are benefits and costs to employment. Use the envelope condition and the fact that the market steady state satisfies, $\dot{\theta} = \dot{n} = 0$, and obtain:

$$V_n(n, B) = \frac{f'(n) + bB^{\omega} - w(n) - \frac{\partial w(n)}{\partial n} n}{r + \delta(1 - \lambda) + \lambda\delta^D} \tag{8a}$$

$$V_B(n, B) = \frac{(b\omega B^{\omega-1} - \frac{\partial w(n)}{\partial B})n + \{\tau R(1 - \lambda) - \lambda c\} + \{(\tau B(1 - R)) - (cB - \gamma v)\}\frac{\partial \lambda}{\partial B}}{r} \tag{8b}$$

Equations (8a) and (8b) tell us how the *levels* of debt and employment affect the firm. Equation (8a) differs from the standard model in two regards. First it incorporates, the Stole & Zwiebel (1996) insight that all workers wages are determined at the marginal value of the marginal worker. This effect is referred to as intra-firm bargaining and is reflected by the term $-\frac{\partial w(n)}{\partial n} n$. The second aspect to notice is that the marginal value of a worker internalizes the unemployment risk faced by workers. This is given by the term in the denominator $(\delta(1 - \lambda) + \lambda\delta^D)$. A higher distress risk, λ leads to lower hiring value for the firm which can be interpreted as distress risk being transferred to the workforce in the form of unemployment risk.

Equation (7a) states that the value of a filled vacancy must equal the cost of filling it, while equation (8a) states it must equal its marginal revenue. Equating them yields the familiar job creation condition:

$$\frac{f'(n) + bB^{\omega} - w(n) - \frac{\partial w(n)}{\partial n} n}{r + \delta(1 - \lambda) + \lambda\delta^D} = \frac{\gamma}{q(\theta)} \tag{9}$$

We also want to know the value of debt in relation to employment cost. From eqs. (7b) and (8b), the equilibrium condition for debt is given by:

$$\{\tau R(1 - \lambda) - \lambda c\} + \{(\tau B(1 - R)) - (cB - \gamma v)\}\frac{\partial \lambda}{\partial B} = (\frac{\partial w(n)}{\partial B} - b\omega B^{\omega-1})n \tag{10}$$

Equation (10) states that the tax benefit of debt plus the savings in hiring costs if the firm fails minus distress costs and tax benefits foregone must equal the change in the equilibrium wage bill resulting from debt increases. From a trade-off theory of capital structure point of view, the left hand side of equation (10) captures the trade-off between taxes and distress costs, while the

right hand side term dampens or amplifies the effect according to labor market conditions. This is meaningful. A capital structure chosen to account for static distress costs and tax shields will still exhibit fluctuations stemming from changes in the labor market. We will explore more carefully the change in wages with respect debt increases in section (6.6).

6.4 Wage Determination

Equations (9) & (10) provide general relationships governing the creation of jobs and the issuance of debt, and its relationship with wage and employment. They say little, however, about the wage formation process, which matters if we are to understand the role of capital structure in the labor markets. The costs associated with search puts workers and the firm in a position of dual monopoly. When a match is formed it produces a quasi-rent that must be distributed according to a bargaining protocol. Many protocols have been suggested in the last few years, e.g. Hall & Milgrom (2008). For simplicity, we will conform to tradition and adopt Nash bargaining (Pissarides, 2000).

Let W and U denote the present-discounted value of the expected income stream of employed and unemployed workers, respectively. Let β denote the bargaining power of a worker. Then, by the Nash-sharing rule[9]:

$$\beta V_n(n, B) = (1 - \beta)(W - U) \tag{11}$$

The value of employment and unemployment to the worker follow:

$$rW = w + \big((1 - \lambda)\delta + \lambda\delta^D\big)(U - W)$$

$$rU = l + m(\theta)(1 - \lambda)(W - U)$$

where l are benefits from unemployment including leisure and unemployment insurance. Plugging these into equation (11) and using equations (8a) yields the partial first order differential equations:

$$w(n) = (1 - \beta)rU + \beta[f'(n) + bB^{\omega} - \frac{\partial w(n)}{\partial n}n]$$

[9] The Nash-sharing rule stems from maximizing $(W - U)^{\beta}V_n^{1-\beta}$.

Assume a simple Cobb-Douglas production function of the form $f(n) = n^{\alpha}$ for $\alpha \in (0, 1]$. We follow Cahuc & Wasmer (2001) in incorporating Stole & Zwiebel (1996) intra-firm bargaining into a search-theoretical framework. The compensation profile set by the firm takes the form:

$$w(n) = (1-\beta)rU + bB^{\omega} + \int_0^1 z^{\frac{1-\beta}{\beta}} \alpha n^{\alpha-1} z^{\alpha-1} dz = (1-\beta)rU + \frac{\beta\alpha}{1-\beta+\alpha\beta} n^{\alpha-1} + bB^{\omega}$$

$$= (1-\beta)l + \beta\frac{\gamma}{q(\theta)}(1-\lambda)m(\theta) + \frac{\beta\alpha}{1-\beta+\alpha\beta} n^{\alpha-1} + \beta bB^{\omega} \tag{12}$$

This yields a wage that is dependent on the value of the unemployment claim and the marginal product of adding an additional worker. Wages are also related to the level of labor market tightness in the economy. From equations (7a) and the sharing rule (11), the worker demands:

$$w(n) = \frac{\beta}{1-\beta}\frac{\gamma}{q(\theta)}[r + (\delta + m(\theta))(1-\lambda) + \lambda\delta^{D}] + l \tag{13}$$

Jointly, equations (12) and (13) provide the market equilibrium wage. Our analysis highlights that the equilibrium wage level in the labor market depends on the total hiring level, n. $\alpha - 1$ being negative indicates that the marginal product of additional workers is decreasing; so, the equilibrium wage decreases as the total number hired increases. The second expression indicates: (1) if hiring costs (γ) increase, wages go up, (2) with higher (worker) discount rates, wages go down because the worker's continuation value of a work claim increases, and (3) if the separation rate (i.e., the likelihood of losing your job) increases, the equilibrium wage goes up.

By combining these two we relate the equilibrium tightness with the equilibrium employment for each group:

$$\Big(\frac{\alpha}{1+\alpha\beta-\beta}\Big) n^{\alpha-1} + bB^{\omega} = \frac{\gamma}{q(\theta)}[\frac{1}{1-\beta}(r + \delta(1-\lambda) + \lambda\delta^{D}) + \frac{\beta}{1-\beta} m(\theta)(1-\lambda)] + l \tag{14}$$

So far our setup contains a five-tuple $(n, \theta, w, B, \lambda)$ in three equations (Equilibrium Debt eq. 10, Job Creation eq. 9, and Wage Equation 13). We know unemployment in the steady state must

satisfy $\dot{u} = (\delta(1-\lambda) + \lambda\delta^D)(1-u) - m(\theta)(1-\lambda)u = 0$, which yields:

$$u = \frac{\delta(1-\lambda) + \lambda\delta^D}{(\delta + m(\theta))(1-\lambda) + \lambda\delta^D}. \tag{15}$$

6.5 Equilibrium & Financial Distress Risk

Definition: An *equilibrium* consists of a tuple of employment, labor market tightness, wage, total debt, and distress risk $(n, \theta, w, B, \lambda)$ satisfying free entry of firms, competitive financial markets and equations and equations (10, 9, 13 & 15).

Since the equilibrium has only four conditions for five variables, infinitely many combinations constitute an equilibrium for varying levels of distress risk. To select an equilibrium, we specify a determination process for distress risk. We will define financial distress risk as the probability that a firm optimizing production is unable to service debt:

$$\lambda = P(\epsilon \leq RB - \Pi^*)$$

The equilibrium of this decentralized economy shares the same efficiency concerns of the canonical MP model. We discuss in appendix D.

6.6 Wage Leverage Relationship

The relationship between wages and leverage deserves careful attention. Differencing the wage equation (13) with respect to debt yields:

$$\frac{\partial w}{\partial B} = \frac{\gamma}{q(\theta)} \frac{\beta}{1-\beta} \frac{d\lambda}{dB} \big(\delta^D - m(\theta) - \delta\big) \tag{16}$$

The interpretation of these equation is useful in our context. Shimer (2012) has documented that fluctuations in the labor markets arise predominantly from the job finding probability while the exit probability (separation rate) is fairly stable – hence, we will concentrate our analysis on the former. When $m(\theta) + \delta > \delta^D$ there is a trade-off between costs associated with higher debt and gains arising from bargaining with workers. Notice that a high job finding probability increases

the value of being unemployed by making the worker's outside option more attractive. An increase in equilibrium distress risk reduces the value of being employed, of course, but it also reduces the unemployment value (her outside option) for the worker. If the job finding probability is high the reduction in the value of unemployment is higher than the drop in the value of employment, and hence equilibrium wage will decrease. Conversely, if the job finding probability is low distress risk has little effect on the outside option of the worker and, as a consequence, reducing the continuation value of employment will require paying a higher wage. So the first thing we must observe from this equation is the importance of the job finding probability.

The importance of the job finding probability comes in two flavors. First, there is a direct effect: increases in the job finding probability must be associated with more debt issuance. We will explore this more in detail in sections (2) and (4). Second, there is what we loosely refer to as its "gate-keeping" function. The job finding probability regulates whether there is compensation for unemployment risk or reduction in their compensation. This gate keeping role leads us to the second important observation about the relationship between leverage and wages: it amplifies unemployment volatility and dampens fluctuations in wages. When the job finding probability is high, unemployment is low[10], and increases in debt reduces compensation for workers, leading to even lower unemployment. Conversely, a low job finding probability comes during periods of high unemployment and through the debt channel implies even higher unemployment. This amplification effect increases the volatility of unemployment. The amplifying effect of downturns due to leverage was clearly seen during the Great Recession (see, for example, Giroud & Mueller 2016). This channel provides a new theoretical micro-foundation for wage inertia.[11]

A related third point is more subtle. The response of wages to increases in leverage also affects the financial flexibility of firms (which is what CFOs mostly care about; see Graham and Harvey, 2002). Intuitively, a firm is interchanging operating leverage and financial leverage. Formally,

[10] Recall, $m(\theta)$ is increasing in labor market tightness and the Beveridge curve has a slope close to -1.

[11] For other relevant work generating wage rigidities see: Hall & Milgrom (2008), Christiano et al. (2016), and Eliaz & Spiegler (2013).

assume for tractability shocks to the liquidity of the firm follow a Type I Extreme Value Distribution[12]. For $\epsilon \sim \text{Gumbel}(0,1)$, $P(\epsilon \leq x) = e^{e^{-(x+c_\gamma)}}$, where $c_\gamma \approx .577$ is the Euler-Mascheroni constant. Hence, the distress risk is given by $\lambda(B) = e^{e^{-(BR-\Pi+c_\gamma)}}$. After taking derivatives and rearranging:

$$\frac{d\lambda}{dB} = \frac{f_\lambda}{1 - Bh_\lambda}\Big(\frac{\partial w}{\partial B}N + R\Big) \tag{17}$$

where f_λ is the density function of the Gumbel distribution, and h_λ is the hazard rate which falls between 0 and 1 for the Gumbel distribution. We can see the default rate is mitigated by the response of wages to debt increases.

Equation (17) together with equation (10) jointly determine the equilibrium level of debt in the economy. Eq. (17) states, again, the change in distress risk should become smaller as the job finding probability increases. We would expect the benefits of bargaining to be more salient when the matching rate, $m(\theta)$ is the highest. Shimer (2005) and Hall (2005a) provide estimates of the job finding rate all the way back to 1968. It happens that the job finding rate during that period is the highest recorded.

6.7 Multiple Groups

In order to talk about the distribution of unemployment risk and the role leverage plays in it we must consider a framework with at least more than one group of workers. Cahuc & Wasmer (2001) provide a useful framework for the analysis of labor markets in the context of search and match models à la Mortensen-Pissarides with vacancies assigned across multiple groups. This is particularly useful in the context of profiling and leads to an analysis analogous to the segmented labor markets literature. This literature has provided a large body of empirical research that documents persistent divisions among American workers: divisions by race, sex, education, industry, etc. In the segmented markets literature groups seem to operate in different labor markets, with different working conditions, different promotional opportunities, different wages, and different

[12] We follow a line of work that applies tools drawn from discrete choice models, such as Kline (2008), Artuc et al. (2010), Kennan & Walker (2011) and Godorow-Reich (2014).

market institutions.[13] With respect to race, for example, racial/ethnic minority workers are present in secondary, subordinate primary and independent primary segments; as a result, they often face distinct segments within those submarkets. Certain jobs are "race-typed," segregated by prejudice and by labor market institutions.

With this in mind, we now consider an economy where workers differ only along a non-productivity dimension, $i \in \{a, b\}$ under which they can be tagged. Each dimension contains an identical continuum of infinitely lived workers of measure one. The employer interviews candidates with full information of their type, or equivalently, posts vacancies (v_i) for each group. The production function with $n = n_a + n_b$ workers is $pf(n)$, with $f'(n) > 0$ and $f''(n) < 0$. The matching function, $m(u, v)$ is increasing and concave in both unemployed workers (u) and vacancies (v), and has constant returns to scale. The arrival rate for workers is defined as $\frac{m(u,v)}{u} \equiv m(\theta)$, where $\theta = \frac{v}{u}$ is the labor market tightness. The hiring rate per vacancy is defined as $\frac{m(u,v)}{v} = \frac{m(\theta)}{\theta} \equiv q(\theta)$. The arrival rate of job offers for workers is increasing in labor market tightness, $m_\theta(\theta) > 0$, while the hiring rate decreases with labor market tightness, $q_\theta(\theta) < 0$. The wage for each group is determined by bargaining between the employer and each employee of all groups. While the flow cost of posting a vacancy, γ_i and labor market tightness might differ across groups, the marginal product of labor is the same for each worker. For simplicity of notation, assume no complementarities between debt and labor ($b = 0$). The rest of the environment follows subsections [6.2]-[6.6].

Following a straightforward extension to the preceding subsections[14], the equilibrium obeys:

$$\frac{f'(n_a + n_b) - w_i(n_i) - \frac{\partial w_i(n_b+n_a)}{\partial n_i} n_i - \frac{\partial w_b(n_b+n_a)}{\partial n_i} n_{-i}}{r + \delta(1-\lambda) + \lambda\delta^D} = \frac{\gamma_i}{q(\theta_i)} \qquad \text{(Job Creation)}$$

$$\tau(r + \lambda + rR) + (\gamma_a v_a + \gamma_b v_b)\frac{\partial \lambda}{\partial B} - (c + \tau B(1-R))\frac{\partial \lambda}{\partial B} = \frac{\partial w_a(n_b + n_a)}{\partial B} n_a + \frac{\partial w_b(n_b + n_a)}{\partial B} n_b \qquad \text{(Equilibrium Debt)}$$

$$w_i(n_a + n_b) = \frac{\beta_i}{1 - \beta_i}\frac{\gamma_i}{q(\theta_i)}[r + (\delta + m(\theta_i))(1-\lambda) + \lambda\delta^D] + l \qquad \text{(Wage Equation)}$$

$$u_i = \frac{\delta(1-\lambda) + \lambda\delta^D}{(\delta + m(\theta_i))(1-\lambda) + \lambda\delta^D}. \qquad \text{(Steady State)}$$

[13] For a review of segmented labor markets, see Taubman and Wachter (1984).
[14] See appendix E for details

When thinking about multiple groups, the job creation condition states that changes in the employment of one group will affect both groups because the marginal productivity of the marginal worker decreases.

As before, the wage equation and job creation condition can be combined to yield the equilibrium tightness:

$$(\frac{\alpha}{1+\alpha\beta-\beta})(n_a+n_b)^{\alpha-1} = \frac{\gamma_i}{q(\theta_i)}[\frac{1}{1-\beta}(r+\delta(1-\lambda)+\lambda\delta^D)+\frac{\beta}{1-\beta}m(\theta_i)(1-\lambda)]+l \quad \text{(Equilibrium } \theta\text{)}$$

In appendix E.1 we show that group b being discriminated against is equivalent to $\gamma_b > \gamma_a$. From these relationships we can derive some basic properties of an environment with discrimination. These properties will be particularly important in the context of our calibration.

Proposition 1: Let group b be discriminated against in hiring or employment relative to group a. Then:

(i) *Unemployment Differential:* Unemployment for group a is strictly lower than unemployment for group b. This is, $u_b - u_a > 0$.

(ii) *Wage Gap:* The equilibrium wage for group a is higher than the equilibrium wage for group b.

(iii) *Unemployment Volatility:* The unemployment volatility for group b is higher than the unemployment volatility for group a.

Relationship (Equilibrium θ) also reflects that in equilibrium policies about employment and policies about debt are taken jointly. Since $\alpha < 1$, an increase in distress risk λ implies an increase in employment. In the context of a firm responding to employment regulation that increases the cost of labor, this relationship states that adjustments through the debt policy margin can mitigate the response through the employment channel.

What about differential employment response amongst groups? That will depend in the sensitivity of each labor market tightness to hiring. As it happens, the group with lowest bargaining power has higher labor market tightness sensitivity to hiring.

Proposition 2: Let $L_b^i > L_b^j$ be the minority workforce size under different scenarios i, j. Let

there be a policy change P such that the flow cost of posting a vacancy for both groups is equated. This is, for $\gamma_b^t > \gamma_a^t$, $P : (\gamma_a^t, \gamma_b^t) \to (\gamma^{t+1}, \gamma^{t+1})$. Then, $B_i^{t+1} > B_j^{t+1}$.

In other words, leverage is higher when the minority share of the workforce is higher.

This proposition gives us a clear mapping to anti-discrimination regulation as we have discussed throughout the paper.[15]

7 Discussion

To summarize briefly, our conceptual framework highlights several connections between labor and financial markets. This is an important contribution given that these findings of these two fields are not often considered in a unified manner. This paper suggests a link between the two. Our main empirical findings can be summarized as: (1) corporate debt responds to exogenous changes in the price of labor (Tables 4-9), (2) labor market conditions explain variation in leverage (Table 10), and are heterogeneous across the business cycle, and (3) these policy-induced shifts in firm leverage increase unemployment risk and can lead to the redistribution of labor income across groups (Table 11). We now briefly discuss four main implications that can inform future research.

I. Wage Growth and Increase in Debt. Our results that wage growth in the economy affects firm balance sheets. This finding – both the context and the substantive result – implicates long-run trends in corporate debt. Our results show that the substantial changes to the wage structure from 1950-1970 is linked to the tripling of firm debt during that period. Annual earnings increased from $21 to $39 thousand, and a back of the envelop calculation suggests that approximately 60increases in workers' compensation.

While analyze the within-firm variation, however, this has significant downstream consequences (some of which we highlight below). Because workers in part determine debt, they also affect incentives to default. As such, fluctuations in the value of a worker may in turn increase distress costs

[15] In the appendix, we elaborate on why costs arising from discrimination can be rewritten as increases in the flow cost of posting a vacancy.

and risk. This highlights a connection between firms balance sheets and aggregate employment. This connection also may have implications for understanding the declining share of labor in GDP (an empirical regularity across many countries). For example, to the extent reduced labor costs decrease distress risks, reduced leverage can help explain the cyclicality of the labor force. For example, Schoefer (2015) documents how manufacturing industries, which demonstrated the largest decrease in the labor share of income, exhibited the largest declines in employment cyclicality.

II. The Job Finding Probability and Cyclicality of Debt. As documented in section 4, debt is highly responsive to changes in the job finding probability. The responsiveness of debt to changes in the job finding probability works as an amplifying effects to shocks in the economy. The heterogeneous role of the job-finding probability has important implications for understanding the role of financial leverage as a risk propagation mechanism within the business cycle. When the job-finding rate is high, debt issuance by firms will reduce pay but also reduce unemployment. On the other hand, when the job-finding rate is low, high leverage will drive workers to demand higher compensation leading to increases in unemployment. Although related, this mechanism is different from the fact that during economic downturns firms are more likely to fail. This nuance has implications for how and what labor policies are targeted during recessions. Thus, similar to what Giroud and Mueller (2016) suggest, firm-specific safety net policies may make sense during periods of high unemploymentfor example, policy should perhaps target firms concentrated in heavily leveraged industries. This targeting, our mechanism suggest, should be sensitive to the state of the business cycle.

III. Corporate Debt-Driven Distributional Effects of Unemployment Risk. The leverage-employment relationship also bears on broader questions about labor market inequality. Leveraged-related distress costs are borne disproportionately by the intended beneficiaries of redistributive policies. Protective labor laws that increase wages can also potentially increase corporate debt, which increases unemployment risk for targeted workers – thus highlighting how capital structure can potentially stifle income redistribution. This highlights an unanticipated Catch-22 that

minority workers face with respect to progressive labor policy: wage and employment benefits come at the expense of greater within-firm employment uncertainty. This trade-off potentially applies in a wide array of settings: workers may the beneficiaries of targeted labor legislation, but still end up facing greater unemployment risk if firms respond by increasing debt. This can perversely lead workers to face a lower value of their employment claim, an important implication of the wage-debt relationship.

Policymakers should thus consider how increasing the take-home pay of certain workers may ultimately reduce long-run earnings by increasing unemployment risk. This policy trade-off implicates a myriad of targeted labor market regulations being evaluated by labor economists to today. These include anti-discrimination protections (Chay 1998), minimum wages (Dube et al., 2013), wrongful-discharge laws (Autor et al., 2006). Discussions about targeted laws governing the labor market – and particular those laws that aim to improve the economic status of specific marginalized groups – should consider firm responses in their designs. Our findings suggest that when determining the burden of legislation on workers, one should consider whether increased bankruptcy costs of firm debt mean that the redistributive benefits of active labor market interventions are partially offset by firm debt response.

IV. Trends in Minority Labor Market Performance: A related empirical policy implication of note based on our analysis is the influence of corporate policy over patterns of labor market inequality. As we show in Section 7, the burden of unemployment risk that is linked to corporate debt is not shared equally between whites and blacksduring periods of high unemployment, heavily-leveraged firms respond by employing more white workers, but not more black workers. This finding ties our work to generations-old debate about what factors have influenced black-white disparities in employment over the past century. Compared to whites, Blacks labor-force participation rate have been persistently lower and their unemployment rate persistently higher since the 1970s (after civil rights laws were passed).

While academic research to this point emphasizes both demand- and supply-based explanations

for racial employment disparities,[16] our findings suggest that policy makers should also consider the role of firm debt. In terms of policy, our findings again underscore the previous policy point that policymakers should consider the firm responses ex ante in the design of remedial labor laws that target wages. The general relationship between labor protections and corporate leverage by extension means that certain blacks have borne the increased burden of unemployment risk in recent decades. The reemergence of labor market disparities with respect to income (for example, see Bayer and Charles, 2017) has led to renewed discussions about labor market policies that eliminate labor market disparities. Given the possibility for firms to transmit any demand-side regulations into unemployment risk, policymakers should incorporate these costs to black workers when considering the benefits of anti-discrimination *vis- à-vis*, for example, interventions that focus on the supply-side (for example, increasing presence of racial minorities in STEM fields).

8 Conclusion

We set out to study the response of capital structure to changes in labor policy during this period for several reasons. First, as documented by Graham et al. (2015), most of the changes capital structure during the 20th century occurred during this period. While there is no shortage of studies documenting effects associated with recessions and financial panics and their underlying causes, there is less work targeted towards regime shifts that at first glance cause few direct observable changes to the economy. The changes that happened during the second half of the 20th century may have carried dormant risks in the form of increased levels of financial leverage that are important to understand for today's economy. Second, understanding the dynamic between capital structure and the labor markets has important consequences for the differential employment conditions between blacks and whites. These conditions exhibit cyclical behavior akin to that of unemployment

[16] Supply-based explanations include rising employer demand for skills and declining industrialization/unionism – both of which account only part for the deterioration in employment rates and earnings observed among young Blacks (Holzer 1999). Other factors include residual labor-market discrimination as well as spatial factors (Miller, 2016).

fluctuations.

Our work makes a few concrete contributions. First, it connects the role of financial distress with labor markets. Second, it provides a novel yet simple mechanism for explaining different phenomena in the labor markets: low wage volatility, high unemployment fluctuations. Third, we contribute to the corporate finance literature by characterizing the influence of the job finding probability on the firm choice of capital structure and showing how the corporate capital structure and other firm financial policies has been shaped by significant social changes in the 20th century. And lastly, by virtue of our setting, this paper contributes to the literature on the long lasting effects of the Civil Rights Movement regulation in the macro-economy; specifically, while previous work on anti-discrimination laws have focused exclusively on worker outcomes, we examine how firms respond to such laws, and argue that firm responses can also affect minority outcomes.

References

[1] Agrawal, Ashwini K., and David A. Matsa, 2013, Labor unemployment risk and corporate financing decisions, Journal of Financial Economics 108, 449-470.

[2] Andrade, G., and S. Kaplan. 1998. How Costly Is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions That Become Distressed, Journal of Finance 53, 1443-1493.

[3] Benmelech, Efraim, Nittai K. Bergman, and Ricardo J. Enriquez, 2012, Negotiating with labor under financial distress, Review of Corporate Finance Studies 1, 28-67.

[4] Berk, Jonathan B., Richard Stanton, and Josef Zechner, 2010, Human Capital, Bankruptcy, and Capital Structure, Journal of Finance 65, 891-926.

[5] Bronars, Stephen G. and Donald R. Deere, 1991, The threat of unionization, the use of debt, and the preservation of shareholder wealth, The Quarterly Journal of Economics 106, 231-254.

[6] Brown, Jennifer and David Matsa, 2013, Boarding a Sinking Ship? An Investigation of Job Applications to Distressed Firms, Working Paper.

[7] Cahuc, Pierre, and Etienne Wasmer, 2001, Does Intrafirm Bargaining Matter in the Large Firm's Matching Model?, Macroeconomic Dynamics (5) 2001, 742-747.

[8] Christiano, Lawrence J., Martin S. Eichenbaum, and Mathias Trabandt, 2016, Unemployment and Business Cycles, Econometrica 84(4), 1523-1569.

[9] DeAngelo, Harry and Linda DeAngelo, 1991, Union negotiations and corporate policy: A study of labor concessions in the domestic steel industry during the 1980s, Journal of Financial Economics 30, 3-43.

[10] DeAngelo, Harry and Linda DeAngelo, 2007, Capital Structure, Payout Policy, and Financial Flexibility, Working Paper.

[11] DeAngelo, Harry and Richard Roll, 2015, How Stable Are Corporate Capital Structures?, The

Journal of Finance 70, 373-418.

[12] Eliaz, Kfir, and Ran Spiegler, 2013, Reference Dependence and Labor-Market Fluctuations, NBER Macroeconomics Annual.

[13] Giroud, Xavier, and Holger Mueller, 2017, Firm Leverage, Consumer Demand, and Employment Losses during the Great Recession, Quarterly Journal of Economics, forthcoming.

[14] Graham, John R., and Campbell Harvey, 2002, How do CFOs make capital budgeting and capital structure decisions? Journal of Applied Corporate Finance 15, 8-23.

[15] Graham, John R., Mark T. Leary, and Michael R. Roberts, 2015, A century of capital structure: The leveraging of corporate America, Journal of Financial Economics 118(3), 658-683.

[16] Hagedorn, Marcus, and Iourii Manovskii, 2008, The Cyclical Behavior of Equilibrium Unemployment and Vacancies Revisited, American Economic Review 98(4), 1692-1706.

[17] Hall, Robert E., 2005a, Job Loss, Job Finding, and Unemployment in the U.S. Economy over the Past Fifty Years, NBER Macroeconomics Annual, 101-137.

[18] Hall, Robert E., 2005b, Employment Fluctuations with Equilibrium Wage Stickiness, American Economic Review, 95(1), 50-65.

[19] Hall, Robert E. and Paul R. Milgrom, 2008, The Limited Influence of Unemployment on the Wage Bargain, American Economic Review 98(4), 1653-74.

[20] Hennessy, Christopher A. and Dmitry Livdan, 2009, Debt, bargaining, and credibility in firm-supplier relationships, Journal of Financial Economics 93, 382-399.

[21] Hennessy, Christopher A., and Toni M. Whited, 2005, Debt dynamics, Journal of Finance 60,1129-1165.

[22] Hennessy, Christopher A., and Toni M. Whited, 2007, How costly is exterrnal financing? Evidence from a structural estimation, Journal of Finance 62, 1705-1745.

[23] Hosios, Arthur J., 1990, On the Efficiency of Matching and Related Models of Search and

Unemployment, Review of Economic Studies 57(2), 279-98.

[24] Jensen, Michael, 1989, Active investors, LBOs and privatization of bankruptcy, Journal of Applied Corporate Finance 2, 35-44.

[25] Kang, Jun-Koo, and Anil Shivdasani, 1997, Corporate restructuring during performance declines in Japan, Journal of Financial Economics 46, 29-65.

[26] Kim, Hyunseob, 2015, How Does Labor Market Size Affect Firm Capital Structure? Evidence from Large Plant Openings, Working Paper.

[27] Leary, Mark T., and Michael R. Roberts, 2005, Do firms rebalance their capital structures? Journal of Finance 60, 2575-2619.

[28] Leary, Mark T., and Michael R. Roberts, 2014, Do peer firms affect corporate financial policy? Journal of Finance 69, 139-178.

[29] Lemmon, Michael L., Michael R. Roberts, and Jaime F. Zender, 2008, Back to the beginning: Persistence and the cross-section of corporate capital structure, Journal of Finance 63, 1575-1608.

[30] Matsa, David A., 2010, Capital structure as a strategic variable: Evidence from collective bargaining, Journal of Finance 65, 1197-1232.

[31] Maksimovic, V., and Sheridan Titman. 1991. Financial Policy and Reputation for Product Quality, Review of Financial Studies 4, 175-200.

[32] Michaels, Ryan, T. Beau Page, and Toni M. Whited, 2016, Labor and Capital Dynamics under Financing Frictions, Working Paper.

[33] Myers, Stewart C., 1984, The capital structure puzzle, Journal of Finance 39, 575-592.

[34] Ofek, Eli, 1993, Capital structure and firm response to poor performance: An empirical analysis, Journal of Financial Economics 34, 3-30.

A., Looking into the Black Box: A Survey of the Matching Function, Journal of Economic

Literature 39(2), 390-431.

[35] Pezone, Vincenzo, 2017, Unemployment Risk and Payout Policies, Working Paper.

[36] Pissarides, Christopher, 2000, Equilibrium Unemployment Theory, The MIT Press.

[37] Rajan, Raghuram G., and Luigi Zingales, 1995, What Do We Know about Capital Structure? Some Evidence from International Data, Journal of Finance 50, 1421-1460.

[38] Schoefer, Benjamin, 2015, The Financial Channel of Wage Rigidity, Working Paper.

[39] Shimer, Robert, 2005, The Cyclical Behavior of Equilibrium Unemployment and Vacancies, American Economic Review 95(1), 25-49.

[40] Shimer, Robert, 2012, Reassessing the Ins and Outs of Unemployment, Review of Economic Dynamics 15(2), 127-148.

[41] Simintzi, Elena, Vikrant Vig, and Paola Volpin, 2015, Labor Protection and Leverage, Review of Financial Studies 28, 368-414.

[42] Stole, Lars A. and Jeffrey Zwiebel, 1996, Intrafirm Bargaining under Non-binding Contracts, Review of Economic Studies 63, 375-410.

[43] Titman, Sheridan, 1984, The effect of capital structure on a firms liquidation decision, Journal of Financial Economics 13, 137-151.

[44] Titman, Sheridan, and Roberto Wessels, 1988, The determinants of capital structure choice, Journal of Finance 43, 1-19.

[45] Towner, Mitch, 2016, Debt and Bargaining Outcomes: Evidence from U.S. Hospitals, Working Paper.

[46] Welch, Ivo, 2004, Capital structure and stock returns, Journal of Political Economy 112, 106-132.

Figure 5: Effects of Civil Rights Act on Debt and Leverage

The figure plots the impact of the Voting Rights Act on Corporate Leverage per proportion of black workers. The lines represent a 95% confidence interval when clustering at the state-level. We consider a 10 year window spanning 5 years before the passage of the VRA to 5 years after its passage.

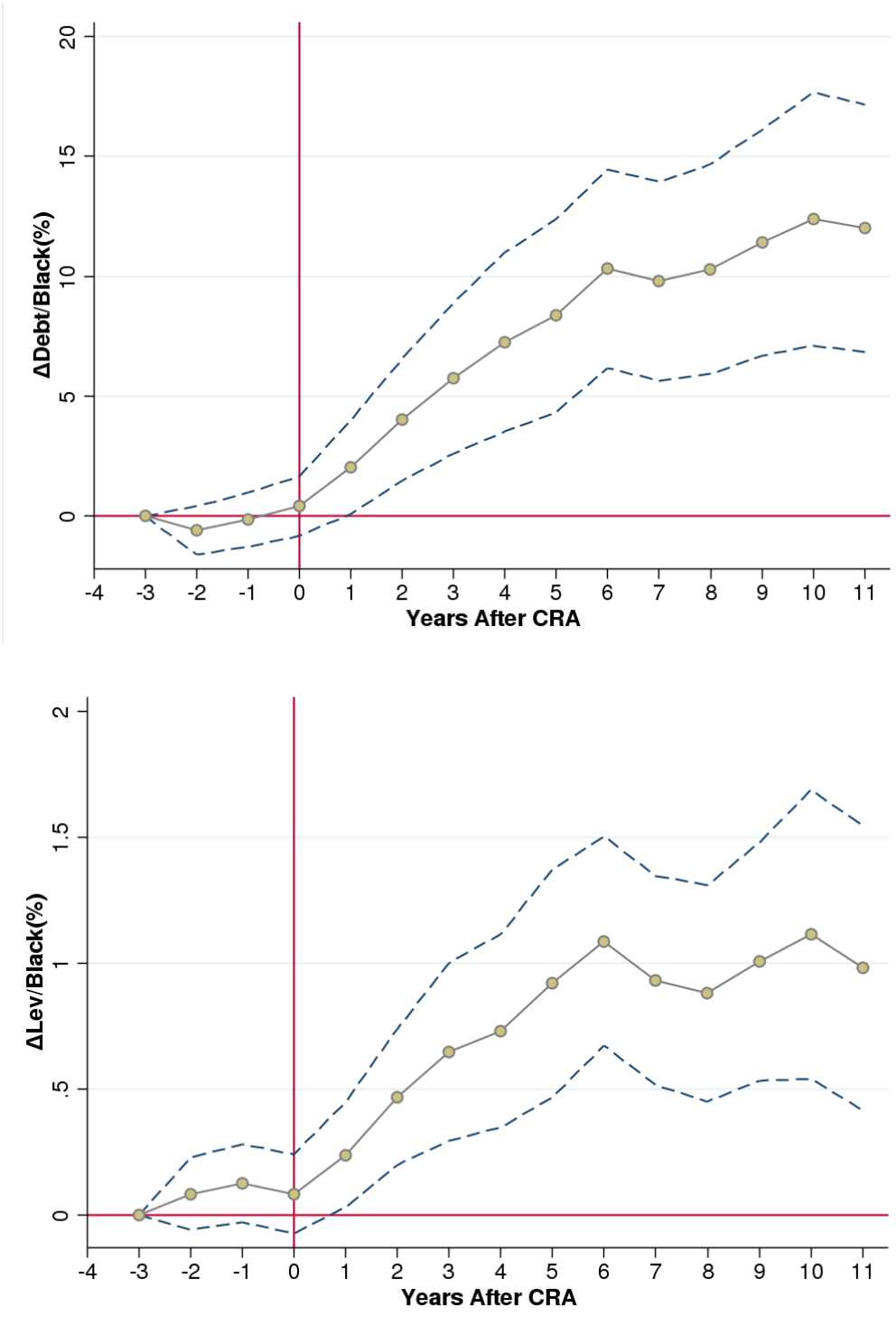
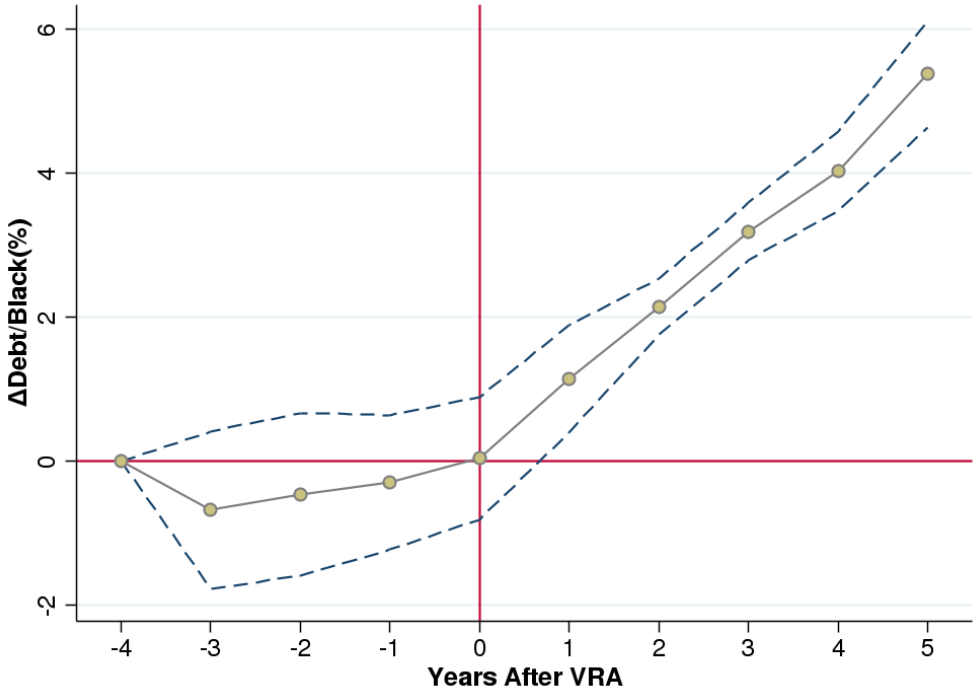


Figure 6: Effects of Voting Rights Act on Debt and Leverage

The figure plots the impact of the Voting Rights Act on Corporate Leverage per proportion of black workers. The lines represent a 95% confidence interval when clustering at the state-level. We consider a 10 year window spanning 5 years before the passage of the VRA to 5 years after its passage.



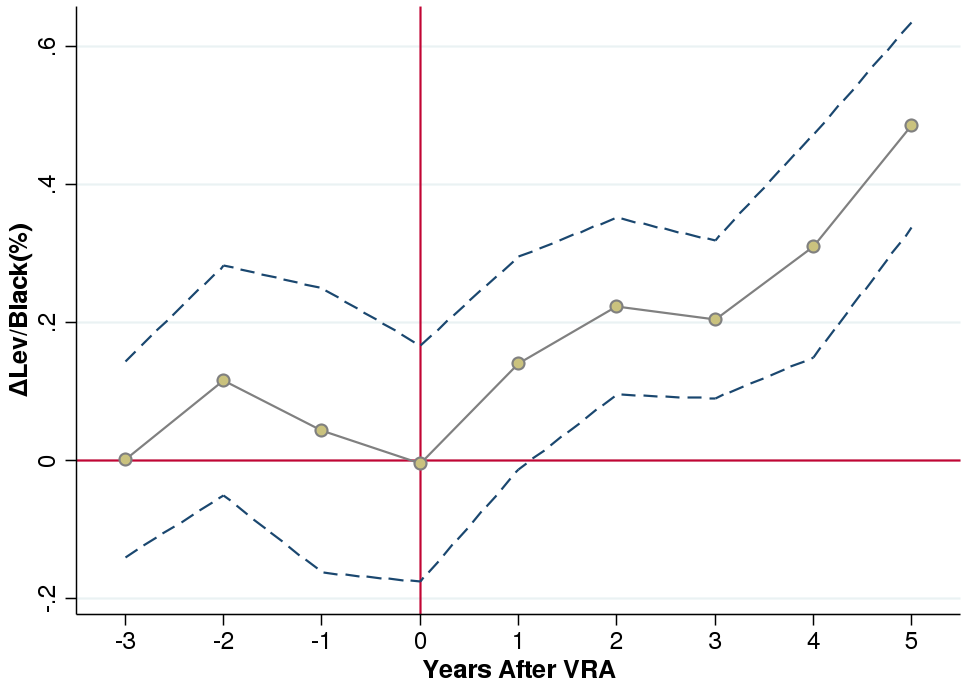


Table 1: Sample Statistics

Panel A: Worker Traits

	(1) VRA			(2) Non VRA		
	Observations	Mean	Std Dev	Observations	Mean	Std Dev
Education	179068	12.88	3.29	1017339	13.16	3.05
Potential Experience	179068	22.06	12.31	1017339	22.38	12.28
Wage and salary income	179068	34683.88	38148.86	1017339	34293.02	39328.51
Observations	179068			1017339		

Panel B: Financial Variables

	VRA					Non VRA				
	Mean	SD	25th	Median	75th	Mean	SD	25th	Median	75th
Book Leverage	0.55	0.19	0.42	0.55	0.67	0.54	0.19	0.41	0.54	0.66
Market Leverage	0.51	0.25	0.32	0.51	0.71	0.52	0.24	0.32	0.53	0.71
Market-to-Book	1.55	1.57	0.60	1.03	1.94	1.50	1.57	0.58	0.97	1.78
ROA	0.05	0.15	0.03	0.06	0.09	0.04	0.14	0.02	0.05	0.08
Log Sales	4.68	2.06	3.50	4.65	5.91	4.54	2.08	3.08	4.49	5.90
Fixed Assets(%)	0.64	0.35	0.38	0.63	0.94	0.57	0.32	0.34	0.55	0.78
Cash/Short Term Investments	59.59	330.07	1.37	5.24	18.59	39.66	183.77	1.00	4.03	18.08
Total Assets	794.68	3751.16	29.03	81.75	297.26	569.11	2062.38	19.11	68.27	269.5
Firms	260					1323				
Firm-Years	2341					12074				

NOTES: Sample statistics for states subject or not subject to section 5 of the Voting Rights Act. Panel A provides descriptive statistics obtained from the Current Population Survey (CPS). Traits include education levels, potential experience, and wages. Panel B provides descriptive statistics for firms retrieved from Compustat. Book leverage is debt (long term and short term debt) over debt + equity. Market leverage is debt over debt+ market value (market price times shares outstanding). Market to book is market value over total assets less longterm debt plus deferred taxes and investment tax credits. Total assets is in millions ($). Return on assets (ROA) is net income over total assets. Fixed assets is property, plant and equipment scaled by total assets. The unit of observation is firm-year.

Table 2: Voting Rights Act on Wages

Panel A: Effect on Wages

	(1) Wage Residual	(2) Education	(3) Wage	(4) Income
VRA	.1324***	1.8736***	.3027***	.2829***
	(.0258)	(.2381)	(.0383)	(.0354)
White x VRA	-.1371***	-2.0719***	-.2496***	-.2486***
	(.0262)	(.1001)	(.0227)	(.0207)
N	1009252	1009252	1009252	1009252
R^2	.0109	.0902	.5118	.5040

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel B: Comparison of Effects: Border Sample v. Full Sample

Source: Avenancio-Leon & Aneja (2018)

	(1) Interior Counties	(2) Border Counties	(3) Difference
White x VRA	-.075***	-.09***	-.011
	(.01)	(.029)	(.008)
N	3770000	670000	670000
R^2	.034	.01	.01

All regressions control for individual education, years worked, and squared(years worked).
All regressions include year and county-race fixed effects.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Panel A reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, and human capital measures. Data comes from CPS. Column (1) presents the estimates on wages after controlling for Mincerian traits. Column (2) reports estimates on education. Column (3) reports effects on wages. Column (4) reports effects on income. All columns use state and year fixed effects. Errors clustered at the state level. Panel B evaluates validity of difference-in-differences with treatments at the state level. There are no meaningful differences between effects at border counties and interior counties.

Table 3: Voting Rights Act on Firm Level Employment Growth

	(1)	(2)	(3)	(4)
VRA × Proportion Black	.1208*	.1356*	.0664	.0811
	(.0666)	(.0740)	(.1174)	(.1173)
VRA	-.0158*		-.0238	
	(.0085)		(.0162)	
N	13728	13728	13728	13728
Firm FX	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes
State-Year FX	No	Yes	No	Yes
Industry-Year FX	No	No	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTES: This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, and corporate leverage. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from CPS. Column (1) presents the estimates controlling for total firm employment. Column (2) controls for firm employment and size. Columns (1) & (2) control for state and year fixed effects. Columns (3) & (4) control for state × year fixed effects. Columns (1)-(3) include firm fixed effects. Errors clustered at the state level.

Table 4: Voting Rights Act on Corporate Leverage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VRA x Proportion Black	.2910***	.3105***	.2851***	.3017***	.1265	.3037***	.3087*
	(.0700)	(.0672)	(.0220)	(.0200)	(.0789)	(.1068)	(.1586)
VRA	-.0531***	-.0574***				-.0539***	
	(.0080)	(.0087)				(.0094)	
Employment		.0002		.0003			-.0001
		(.0004)		(.0005)			(.0005)
Total Assets		.0000***		.0000***			.0000**
		(.0000)		(.0000)			(.0000)
N	14295	14295	14145	14145	13828	14295	13828
Firm FX	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Year FX	No	No	Yes	Yes	Yes	No	Yes
Industry-Year FX	No	No	No	No	Yes	No	Yes
Controls	No	Yes	No	Yes	No	No	Yes
Trends	No	No	No	No	No	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTES: This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, and corporate leverage. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from CPS. Errors clustered at the state level.

Table 5: Voting Rights Act on Corporate Leverage – Heterogeneity

	(1)	(2)	(3)	(4)	(5)
Prot × VRA × Prop Black	.0055***	.0037**	.0028		
	(.0014)	(.0016)	(.0018)		
Lynch × VRA × Prop Black				-.0029***	-.0024***
				(.0001)	(.0002)
VRA × Proportion Black	.3113**	.3030***	.2011**	.9469***	.7265***
	(.1256)	(.1114)	(.0994)	(.0350)	(.0453)
VRA	-.0926	-.1369*	.0000	.0866***	.1680***
	(.0696)	(.0734)	(.)	(.0207)	(.0319)
Protests	.0003	.0005	.0014***		
	(.0003)	(.0004)	(.0000)		
Protests × Prop Black	.0111	.0228	.0338***		
	(.0208)	(.0241)	(.0022)		
Protests × VRA	-.0018	-.0024	.0047***		
	(.0016)	(.0018)	(.0001)		
Lynchings × VRA				-.0004***	-.0006***
				(.0001)	(.0001)
Lynchings × Prop Black				.0000	.0000
				(.)	(.)
Firm Employment		-.0001			.0004
		(.0003)			(.0004)
Total Assets		.0000***			.0000***
		(.0000)			(.0000)
N	12259	11354	12259	3217	2958

Standard errors in parentheses
Errors clustered at the state level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTES: This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, the number of lynchings predating the passage of VRA and corporate leverage. All firm level measures come from Compustat. Black employment by industry comes from CPS. All column controls for firm employment, and state, year and firm fixed effects. Errors clustered at the state level.

Table 6: Effects of Voting Rights Act on Firm Level Measures

Panel A: Profitability

	(1) ROA	(2) ROA	(3) Net Earnings(%)	(4) Net Earnings(%)	(5) EBITDA(%)	(6) EBITDA(%)
VRA x Proportion Black	-.0236*	-.0272***	-.1005***	-.1395***	.0309	.0053
	(.0139)	(.0065)	(.0224)	(.0495)	(.0661)	(.0330)
VRA	-.0001		-.0012		-.0114*	
	(.0031)		(.0040)		(.0059)	
N	14275	14126	14271	14122	14219	14070
Firm FX	Yes	Yes	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes	Yes	Yes
State-Year FX	No	Yes	No	Yes	No	Yes
Controls	No	Yes	No	Yes	No	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel B: Debt Management

	(1) Interest(%)	(2) Interest(%)	(3) Retained Earnings(%)	(4) Retained Earnings(%)
VRA x Proportion Black	.0424***	.0384***	11.1528***	10.2060**
	(.0050)	(.0026)	(3.7549)	(4.4459)
VRA	-.0056***		-1.6463**	
	(.0009)		(.7646)	
N	13973	13823	14266	14117
Firm FX	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes
State-Year FX	No	Yes	No	Yes
Controls	No	Yes	No	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, and profitability measures of the firm. All firm level measures come from Compustat. Black employment by industry comes from CPS. All column controls for firm employment, and state, year and firm fixed effects. Errors clustered at the state level.

Table 7: Voting Rights Act on Corporate Leverage by Short-Term Liquidity

	(1) High	(2) High	(3) High	(4) High	(5) Low	(6) Low	(7) Low	(8) Low
VRA x Proportion Black	5.8000***	5.6646***	7.8091***	5.8022***	-.0421	-.2279*	-.3041	.0428
	(1.4425)	(1.5688)	(.2349)	(1.6140)	(.0919)	(.1325)	(.2041)	(.1125)
VRA	-.3918***	-.3850***		-.3806**	.0507*	.0625**		.0397
	(.1048)	(.1116)		(.1481)	(.0261)	(.0241)		(.0500)
N	1859	1859	1663	577	2795	2795	2552	721
Firm FX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Year FX	No	No	Yes	No	No	No	Yes	No
Controls	No	Yes	No	No	No	Yes	No	No
Trends	No	Yes	No	No	No	Yes	No	No
Restricted Sample	No	No	No	Yes	No	No	No	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, and corporate leverage by Current Ratio. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from CPS. Errors clustered at the state level.

Table 8: Voting Rights Act on Corporate Leverage by Capital-Skill Complementarity

	(1)	(2)	(3)	(4)	(5)	(6)
	High	High	High	Low	Low	Low
VRA x Proportion Black	1.8417***	1.4639***	2.0433***	.2274***	.1584**	.1540
	(.3179)	(.2451)	(.3509)	(.0704)	(.0689)	(.1170)
VRA	-.2003***		-.1957***	-.0462***		-.0467**
	(.0452)		(.0455)	(.0158)		(.0180)
Employment			.0007			-.0004
			(.0006)			(.0004)
Total Assets			.0000***			.0000**
			(.0000)			(.0000)
N	5149	4926	5149	9075	8900	9075
Firm FX	Yes	Yes	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes	Yes	Yes
State-Year FX	No	Yes	No	No	Yes	No
Controls	No	No	Yes	No	No	Yes
Trends	No	No	Yes	No	No	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTES: This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, and corporate leverage by Capital-Skill complementarity. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from CPS. Errors clustered at the state level.

Table 9: Voting Rights Act on Corporate Leverage by Job Finding Probability

	(1)	(2)	(3)	(4)	(5)	(6)
VRA x Black—JFR Low	.1907***	.2148***	.2136***	.1615	.2202**	
	(.0551)	(.0524)	(.0230)	(.1152)	(.0835)	
VRA x Black—JFR High	.3359***	.3523***	.3559***	.3040***		.3112***
	(.0929)	(.0921)	(.0547)	(.1008)		(.1072)
VRA—JFR Low	-.0584***	-.0640***	.0127	-.0614***	-.0674***	
	(.0087)	(.0091)	(.0123)	(.0110)	(.0190)	
VRA—JFR High	-.0459***	-.0500***	.0000	-.0476***		-.0418***
	(.0143)	(.0149)	(.)	(.0159)		(.0119)
N	13306	13306	13133	13306	6790	6391
Firm FX	Yes	Yes	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes	Yes	Yes
State-Year FX	No	No	Yes	No	No	No
Controls	No	Yes	Yes	Yes	No	No
Trends	No	No	No	Yes	No	No
Restricted Sample	No	No	No	No	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTES: This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, and corporate leverage by Job Finding Probability. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from CPS. Errors clustered at the state level.

Table 10: Predictive Power of Job Finding Probability on Debt Issuance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
JFR		.0558***	.0625***	.0554***	.0633***	.0581***	.0745***	.0559***	.0328**
		(8.11)	(8.84)	(4.75)	(8.91)	(4.96)	(8.51)	(7.64)	(2.46)
Profitability	-.3160***		-.3185***	-.3150***	-.3191***	-.3153***	-.1499***	-.3164***	-.1445***
	(-15.28)		(-15.39)	(-15.25)	(-15.40)	(-15.25)	(-5.77)	(-15.15)	(-5.56)
Log(Sales)	-.0068***		-.0072***	-.0068***	-.0074***	-.0070***	-.0204***	-.0094***	-.0211***
	(-7.27)		(-7.74)	(-7.31)	(-7.94)	(-7.48)	(-9.40)	(-8.65)	(-9.69)
Size	.0058***		.0067***	.0058***	.0060***	.0051***	.0242***	.0078***	.0223***
	(6.77)		(7.78)	(6.64)	(6.79)	(5.73)	(10.09)	(7.57)	(8.73)
Market-to-Book	-.0062***		-.0062***	-.0062***	-.0062***	-.0062***	-.0109***	-.0062***	-.0108***
	(-9.94)		(-9.94)	(-9.99)	(-9.99)	(-10.04)	(-12.41)	(-9.97)	(-12.33)
Tangibility	.0327***		.0300***	.0304***	.0285***	.0291***	.0544***	.0370***	.0556***
	(12.73)		(11.53)	(11.70)	(10.93)	(11.13)	(4.92)	(10.23)	(4.96)
Dividend Payer					.0108***	.0098***	.0202***	.0123***	.0182***
					(7.13)	(6.47)	(7.11)	(7.98)	(6.40)
Industry median lev.					-.0065	-.0060			
					(-1.35)	(-1.25)			
N	349532	349532	349532	349532	349532	349532	348825	349532	348825
Adj. R^2	.0062	.0002	.0064	.0081	.0065	.0081	.0244	.0067	.0257
Firm FX	No	No	No	No	No	No	Yes	No	Yes
Year FX	No	No	No	Yes	No	Yes	No	No	Yes
Industry FX	No	No	No	No	No	No	No	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTES: This table reports estimates of ordinary least squares regressions consistent with Lemmon, Roberts, and Zedner (2008), incorporating Job Finding Probabilities as a factor explaining corporate leverage. Corporate leverage, profitability, log(sales), size, maket-to-book, tangibility, dividend payer indicator, and industry median leverage all come from Compustat. Job Finding Probabilities come from CPS. Errors clustered at the industry level.

Table 11: Effects of Aggregate Unemployment and Leverage on Firm Level Employment Growth

Panel A: Heterogeneous Effects of Leverage on Firm Employment Growth by Aggregate Unemployment

	(1)	(2)	(3)	(4)
Leverage x Unemployment	-.6738**	-.6668**	-.8623***	-.8358***
	(.2994)	(.3162)	(.2893)	(.3065)
Leverage	-.1837***	-.1862***	-.1918***	-.1954***
	(.0132)	(.0128)	(.0131)	(.0132)
Unemployment Rate	.0304		.0001	
	(.1248)		(.1253)	
Total Assets	.0000	.0000	.0000	.0000
	(.0000)	(.0000)	(.0000)	(.0000)
N	42797	42548	42130	41865
Firm FX	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes
State-Year FX	No	Yes	No	Yes
Industry-Year FX	No	No	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel B: Heterogeneous Effects of Leverage on Firm Employment Growth by Aggregate Black & White Unemployment

	(1)	(2)	(3)	(4)	(5)
Leverage x Unemployment	-1.9404*	-1.8986	-1.6414	-1.8455	-2.5562***
	(1.1398)	(1.1663)	(1.2247)	(1.3184)	(.6915)
Leverage x White Unemp	1.2405	1.2149	.7561	1.0215	2.4083***
	(1.1761)	(1.1996)	(1.2410)	(1.3281)	(.7755)
Leverage x Black Unemp	.0745*	.0766**	.0570	.0648	.0585
	(.0394)	(.0361)	(.0450)	(.0452)	(.0425)
Leverage	-.1835***	-.1850***	-.1940***	-.1968***	-.0870***
	(.0142)	(.0136)	(.0141)	(.0140)	(.0058)
Unemployment Rate	-.0732		-.1940		
	(.2505)		(.2262)		
White Unemployment	.1162		.2184		
	(.2416)		(.2399)		
Black Unemployment	-.0012		-.0137		
	(.0209)		(.0178)		
Black Population					.0000
					(.)
Mean Education					.0090***
					(.0024)
Mean Wage					-.0707***
					(.0181)
Mean Education Black					-.0013
					(.0018)
Total Assets	.0000	.0000	.0000	.0000	-.0000
	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
N	40521	40293	39842	39588	40719
Firm FX	Yes	Yes	Yes	Yes	No
Year FX	Yes	Yes	Yes	Yes	Yes
State-Year FX	No	Yes	No	Yes	Yes
Industry-Year FX	No	No	Yes	Yes	No

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

NOTES: This table reports estimates of ordinary least squares regressions following Hoynes et al (2012) relating firm-level employment growth to firm leverage and aggregate unemployment. In Panel A, the unemployment rate is the overall rate at the state level; in Panel B Black and White Unemployment are the group-specific rates, also measured at the state level. Unemployment by industry comes from CPS. Errors clustered at the state level.

Appendix

A Additional Tables

Table A.1: Effects Excluding 1972 States

This table reports estimates of ordinary least squares regressions relating passage of the Voting Rights Act, the participation rate of black workers, and corporate leverage. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from CPS. Column (2) controls for firm employment and size. Columns (1), (3) & (5) control for state and year fixed effects. Columns (2), (4) & (6) controls for state × year fixed effects. All columns include firm fixed effects. Errors clustered at the state level.

	(1)	(2)	(3)	(4)	(5)	(6)
VRA x Proportion Black	.2358**	.2477	.2712***	.2874***	.2364**	.2712***
	(.0938)	(.1839)	(.0283)	(.0726)	(.0840)	(.0292)
VRA	-.0546***	-.0367			-.0321	
	(.0082)	(.0381)			(.0276)	
N	14113	13069	13964	12920	3304	3291
Firm FX	Yes	Yes	Yes	Yes	Yes	Yes
Year FX	Yes	Yes	Yes	Yes	Yes	Yes
State-Year FX	No	No	Yes	Yes	No	Yes
Texas	Yes	No	Yes	No	Yes	Yes
Arizona	No	Yes	No	Yes	Yes	Yes
South Only	No	No	No	No	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B Discrimination Regulation Costs

B.1 Statistical Discrimination as a Search Costs

Interpretation of statistical discrimination as a search cost has support on the literature. For example, Donohue (2007) remarks:

> [A] portion of equal opportunity law has been directed at preventing employers from relying on race or sex as proxies for productivity in making hiring decisions. Employers wish to use these proxies because they provide cheap, albeit imperfect, information about the quality of workers. Spending more money to select the workforce would presumably yield a more productive set of employees, but employers would forsake these gains in a non-Title VII world because they are outweighed by the added costs.

C Workers, Job Security, and Firms' Financial Stability: Anecdotal Evidence

Fraud litigation provides ample anecdotal evidence of the role financial stability plays in the employees decision to accept a job and a level of compensation. Although the anecdotal evidence from legal cases is highly selected (allegation of wrongdoing; case brought to court; for most cases, case evaluated in appeals), it does provide insight into the bargaining process between employers and employees. Although laws protecting against fraud vary from state to state, and hence the outcome of the case, the statement of facts is virtually the same: financial strength of the company, job security, firms financial outlook recurrently appear as important factors in the decision to accept a job offer. Misrepresentation of these facts supersedes employment at will and is generally against the law.

C.1 Sample Statement of Facts and View of the Court

Lazar v. Superior Court, 12 Cal. 4th 631 (Cal. 1996), in finding that misrepresentation about the financial condition of a firm constitutes cause for action for fraud, reads:

> In response to Lazar's [employee] concerns, Rykoff [employer] made representations to Lazar that led him to believe he would continue to be employed by Rykoff so long as he performed his job and achieved goals. [] *Rykoff further represented that the company was very strong financially and anticipated solid growth and a stable, profitable future.* In particular, Rykoff represented that the department in which Lazar would work was a growth division within the company and that Rykoff had plans to expand it. []
>
> Lazar asked for a written employment contract, but was refused. Rykoff stated a written contract was unnecessary because "our word is our bond." In or about February 1990, Lazar accepted Rykoff's offer of employment on terms including the foregoing.
>
> Rykoff's representations to Lazar regarding the terms on which he would be retained, Rykoff's financial health and Lazar's potential compensation were false and, when making them, Rykoff's agents knew they were false. Rykoff had in the immediately preceding period experienced its worst economic performance in recent history, and the company's financial outlook was pessimistic. In fact, Rykoff was planning an operational merger that would eliminate Lazar's position. Rykoff had no intention of retaining Lazar so

> long as he performed adequately. Instead, Rykoff secretly intended to treat Lazar as if he were an "at will" employee, subject to termination without cause. (Italics ours)

The courts view on financial stability and employment at-will is more clearly stated in Clement-Rowe v. Mich. Health Care Corp., 538 N.W.2d 20 (Mich. Ct. App. 1995):

> Today's employment market is both tenuous and difficult. Nearly all employment is at-will. The economic well-being and financial stability of a potential employer is an important factor in accepting a job offer. Consequently, an employer who succeeds in asserting its economic health to attract qualified employees knowing the assertions are untrue may not later hide behind an at-will employment contract. Neither may it be permitted to avoid liability after omitting to disclose, when asked, known economic instability which later leads to economically-based layoffs.

C.2 Sample of Cases

Federal Conti v. Pneumatic Prod. Corp., 977 F.2d 978 (6th Cir. 1992) Clay v. Koch, No. C95-1289-FMS, 1996 U.S. Dist. LEXIS 10677 (N.D. Cal. Jul. 22, 1996) Longnecker v. Ore Sorters, Inc. 634 F. Supp. 1077 (N.D. Ga. 1986) Varity Corp. v. Howe et al. (94-1471), 516 U.S. 489 (1996)

California Lazar v. Superior Court, 12 Cal. 4th 631 (Cal. 1996) Lenk v. Total-West., Inc., 108 Cal. Rptr.2d 34 (Cal. Ct. App. 2001)

Colorado Austin v. U.S. West, Inc. 926 P.2d 181 (Colo. Ct. App. 1996)

Florida Williams v. Peak Resorts Int'l., Inc., 676 So.2d 513 (Fla. Dist. Ct. App. 1996)

Indiana Tutwiler v. Snodgrass, 428 N.E.2d 1291 (Ind. Ct. App. 1981)

Massachusetts

Webber Y. Frelonic Corp., No. 92-1437, 1994 Mass. Super. LEXIS 28 (Mass. Super. Ct. Oct. 7, 1994)

Michigan Jabour v. Hollowell v. Career Decisions, Inc., 298 N.W.2d 915 (Mich. Ct. App. 1980) Clement-Rowe v. Mich. Health Care Corp., 538 N.W.2d 20 (Mich. Ct. App. 1995) McCreery v. Seacor, 921 F. Supp. 489 (D. Mich. 1996) Ciraulo v. AT&T Info. Sys., Inc., No. 95-CV-71166-DT, 1996 U.S. Dist. LEXIS 16929 (E.D. Mich. Oct. 23, 1996) Hord v. Envtl. Research Inst. of Mich., 617 N.W.2d 543 (Mich. 2000) Sneyd v. Int'l Paper Co., 142 F. Supp. 2d 819 (E.D. Mich. 2001)

New York Doehla v. Wathne Ltd. Inc., No. 98- CIV-6087-CSH, 2000 WL 987280 (S.D.N.Y Jul. 17, 2000) **North Carolina** Wilson v. Popp Yam Corp., 680 F. Supp. 208 (W.D.N.C. 1988) **Ohio** Rice v. Cleveland Telecomm., No. 58926, 1991 Ohio App. LEXIS 3577 (Ohio Ct. App. Jul. 18, 1991) **Oklahoma** Stehm v. The Nordam Group Inc., 170 P.3d 546 2007 OK CIV APP 94 **Pennsylvania** Lokay v. Lehigh Valley Coop. Farmers, Inc., 492 A.2d 405 (Pa. 1985) Titelman v. Rite Aid Corp., No. 00-2865, 2001 U.S. Dist. LEXIS 24049 (E.D. Pa. Nov. 9, 2001)

Texas Stephanz v. Laird, 846 S.W.2d 895 (Tex. App. 1993)

D Efficiency

In this section we corroborate that the Hosios (1990) condition for efficiency holds in our model. We follow the standard treatment in the literature. The social planner maximizes the total surplus in the economy – this is, she sets to maximize total production plus the outside value of the unemployed less search costs. Note that the social planner is indifferent as of how the proceeds of production are distributed and, hence, wages are not part of the social planner's objective.

$$\max_{u,\theta} \int_0^\infty e^{-rt}[f(n) + ub - \lambda c - (1-\lambda)\theta u\gamma]dt$$

s.t.

$$\dot{u} = [\delta(1-\lambda) + \lambda](1-u) - (1-\lambda)\theta q(\theta)u$$

From the Hamiltonian

$$H := e^{-rt}[f(n) + ub - \lambda c - (1-\lambda)\theta u\gamma] + \mu\{[\delta(1-\lambda) + \lambda](1-u) - (1-\lambda)\theta q(\theta)u\}$$

we obtain the Euler equations that, together with the law of motion for unemployment above, define the optimal path for optimal unemployment and market tightness:

$$H_\theta = -e^{-rt}(1-\lambda)u\gamma - \mu(1-\lambda)uq(\theta)\big(1-\eta(\theta)\big) = 0 \tag{23}$$

and

$$H_u = -e^{-rt}[f'(n) - b(1-\lambda)\theta\gamma] - \mu[\delta(1-\lambda) + \lambda + (1-\lambda)\theta q(\theta)] = \dot{\mu} \tag{24}$$

From (23) it follows that:

$$\mu = -\frac{e^{-rt}\gamma}{q(\theta)\big(1-\eta(\theta)\big)}$$

and

$$\dot{\mu} = r\frac{e^{-rt}\gamma}{q(\theta)\big(1-\eta(\theta)\big)}$$

Plugging these into (24)equations yields:

$$\big(1-\eta(\theta)\big)\{f'(n) - b + (1-\lambda)\theta\gamma\} - \frac{\gamma}{q(\theta)}[\delta(1-\lambda) + \lambda + (1-\lambda)\theta q(\theta) + r] = 0 \tag{25}$$

Note that this equals equation 15 if and only if $\eta(\theta) = \beta$, which is exactly the standard Hosios (1990) condition in the literature.

E Framework with Multiple Groups

The value function of the firm solves:

$$rV(n_b, n_a, B) = \max_{v_b, v_a, \Delta I} \{f(n_b + n_a) - w(n_b + n_a)n_b - w(n_b + n_a)n_a$$

$$+\tau RB(1-\lambda) + (1-\lambda)\big(\tau R\Delta I - (v_a + v_b)\gamma\big) + \frac{dV_b}{dt} + \frac{dV_a}{dt} + \frac{dV_B}{dt}\}$$

$$= \max_{v_b, v_a, \Delta I} \{ f(n_b + n_a) - w_b(n_b + n_a)n_b - w_a(n_b + n_a)n_a \tag{26}$$

$$+ V_{n_b}[q(\theta_b)v_b - \delta n_b] + V_{n_a}[q(\theta_a)v_a - \delta n_a]\} - (v_a + v_b)\gamma + \Delta I + V_{\theta_b}\dot{\theta}_b + V_{\theta_a}\dot{\theta}_a + V_B\dot{B}$$

where δ denotes the separation rate[17] and employment and debt satisfy the laws of motion, $\dot{n}_i = (1-\lambda)q(\theta_i)v_i - \big(\delta(1-\lambda) + \delta^D\lambda\big)n_i$ and $\dot{B} = \Delta I$, respectively.

The first term captures revenue from production. The second and third terms are the wages paid to each worker group. The wages for each group–say, group a–depend on the number of *both* types of workers hired $(n_a + n_b)$ because we assume diminishing marginal returns to labor and constant productivity across worker types. The fourth and fifth terms are hiring costs and borrowing costs, respectively.

We want to find relationships characterizing job creation and borrowing in equilibrium. The first order conditions with respect to each groups' employment and firm debt yield:

$$J_{n_b}(n_b, n_a, B) \equiv V_{n_b}(n_b, n_a, B) = \frac{\gamma}{q(\theta_b)} \tag{27a}$$

$$J_{n_a}(n_b, n_a, B) \equiv V_{n_a}(n_b, n_a, B) = \frac{\gamma}{q(\theta_a)} \tag{27b}$$

$$J_B(n_b, n_a, B) \equiv V_B(n_b, n_a, B) = -\tau R \tag{27c}$$

$J_{n_i}(n_b, n_a, B)$ is the marginal value to the firm of adding an additional worker from group i whereas $J_B(n_b, n_a, B)$ is the value to the firm of increasing total debt by \$1. Using the envelope condition and the fact that the market steady state satisfies, $\dot{\theta}_i = 0$ $\dot{n}_i = 0$, we obtain:

$$J_{n_b}(n_b, n_a, B) = \frac{f'(n_b + n_a) - w(n_b) - \frac{\partial w_b(n_b+n_a)}{\partial n_b}n_b - \frac{\partial w_a(n_b+n_a)}{\partial n_b}n_a}{r + \delta(1-\lambda) + \delta^D\lambda} \tag{28a}$$

$$J_{n_a}(n_b, n_a, B) = \frac{f'(n_b + n_a) - w(n_a) - \frac{\partial w_a(n_b+n_a)}{\partial n_a}n_a - \frac{\partial w_b(n_b+n_a)}{\partial n_a}n_b}{r + \delta(1-\lambda) + \delta^D\lambda} \tag{28b}$$

$$J_B(n_b, n_a, B) = \frac{-\frac{\partial w_a(n_b+n_a)}{\partial B}n_a - \frac{\partial w_b(n_b+n_a)}{\partial B}n_b + \tau(r+\lambda)(\tau B(1-R) - c + \gamma(v_a + v_b)}{r} \tag{28c}$$

We can obtain the job creation condition for each group from (7a-b) and (8a-b):

$$\frac{pf'(n_b + n_a) - w(n_i) - \frac{\partial w_i(n_b+n_a)}{\partial n_i}n_i - \frac{\partial w_b(n_b+n_a)}{\partial n_i}n_{-i}}{r + \delta(1-\lambda) + \lambda\delta^D} = \frac{\gamma}{q(\theta_i)} \qquad \text{(Job Creation)}$$

The value of employment and unemployment to the worker follow:

$$rW^i = w_i + \delta(U^i - W^i)$$
$$rU^i = b + m(\theta_i)(W^i - U^i)$$

Plugging these into equation (11) and using equations (8a-b) yields the partial first order differential equations:

$$w_i(n_a, n_b) = (1-\beta)rU_i + \beta[pf'(n_b + n_a) - \frac{\partial w_a(n_b + n_a)}{\partial n_i}n_a - \frac{\partial w_b(n_b + n_a)}{\partial n_i}n_b]$$

[17] We take the separation rate as exogenous in this section.

Assume a simple Cobb-Douglas production function of the form $f(n_b, n_a) = (n_b+n_a)^\alpha$ for $\alpha \in (0, 1]$. We follow Cahuc & Wasmer (2001) in incorporating Stole & Zwiebel (1996) intra-firm bargaining into a search-theoretical framework. The wage equation takes the form:

$$w_i(n_a, n_b) = (1-\beta)rU_i + \int_0^1 z^{\frac{1-\beta}{\beta}} \alpha(n_a+n_b)^{\alpha-1} z^{\alpha-1} dz = (1-\beta)rU_i + \frac{\beta\alpha}{1-\beta+\alpha\beta}(n_a+n_b)^{\alpha-1}$$

This yields a wage that is dependent on the value of the unemployment claim and the marginal product of adding an additional worker. Wages are also related to the level of labor market tightness in the economy. From equations (7a-b) and the sharing rule (11), we obtain:

$$w_i(n_a+n_b) = \frac{\beta_i}{1-\beta_i}\frac{\gamma}{q(\theta_i)}[r + (\delta + m(\theta_i))(1-\lambda) + \lambda\delta^D] + l \qquad \text{(Wage Equation)}$$

By combining these two we relate the equilibrium tightness with the equilibrium employment for each group:

$$(\frac{\alpha}{1+\alpha\beta_i-\beta_i})(n_a+n_b)^{\alpha-1} = \frac{\gamma}{q(\theta_i)}[\frac{1}{1-\beta_i}(r+\delta(1-\lambda)) + \frac{\beta_i}{1-\beta_i}m(\theta_i)(1-\lambda)] + l \qquad \text{(Equilibrium } \theta\text{)}$$

E.1 Discrimination

There is many ways in which discrimination can be thought about within a search frictions environment with multiple groups. Discrimination can occur at the hiring or at the operation level. When there is discrimination there is a cost associated in hiring a worker from one of the two groups. Without loss, assume discrimination is against group b. The cost can come from taste in hiring or that it is harder to find the right talent for the position (statistical discrimination). Let that cost be denoted by d. Then, the value function of the firm solves:

$$rV(n_b, n_a, B) = \max_{v_b, v_a, \Delta I} \{f(n_b+n_a) - w(n_b+n_a)n_b - w(n_b+n_a)n_a$$

$$+\tau RB(1-\lambda) + (1-\lambda)\big(\tau R\Delta I - (v_a+v_b)\gamma\big) - dv_b + \frac{dV_b}{dt} + \frac{dV_a}{dt} + \frac{dV_B}{dt}\}$$

Which leads to the first order condition for group b:

$$J_{n_b}(n_b, n_a, B) \equiv V_{n_b}(n_b, n_a, B) = \frac{\gamma+d}{q(\theta_b)} \equiv \frac{\gamma_b}{q(\theta_b)} \tag{32}$$

This says that discrimination in hiring is isomorphic to having higher flow cost of posting a vacancy, $\gamma_b > \gamma_a$, for the group discriminated against.

When discrimination is at the operation level, there is a flow cost of operations per group b worker employed, n_b. This leads to the following optimization problem for the firm:

$$rV(n_b, n_a, B) = \max_{v_b, v_a, \Delta I} \{f(n_b+n_a) - w(n_b+n_a)n_b - w(n_b+n_a)n_a - dn_b$$

$$+\tau RB(1-\lambda) + (1-\lambda)\big(\tau R\Delta I - (v_a+v_b)\gamma\big) + \frac{dV_b}{dt} + \frac{dV_a}{dt} + \frac{dV_B}{dt}\}$$

After taking the envelop condition and following the same steps as in the previous subsection, the compensation profile for group b is:

$$w_b = (1-\beta)b - \beta d + \beta\frac{\gamma}{q(\theta)}(1-\lambda)m(\theta) + \frac{\beta\alpha}{1-\beta+\alpha\beta}(n_a+n_b)^{\alpha-1}$$

which leads to the following equilibrium tightness condition:

$$(\frac{\alpha}{1+\alpha\beta-\beta})(n_a+n_b)^{\alpha-1} = \frac{\gamma}{q(\theta_b)}[\frac{1}{1-\beta}(r+\delta(1-\lambda)+\lambda\delta_D)+\frac{\beta}{1-\beta}m(\theta_b)(1-\lambda)]+l+d. \text{ (Equilibrium } \theta)$$

Now we can proceed to show some properties about the relative labor conditions of both groups.

Proposition 1: Let group b be discriminated against in hiring or employment relative to group a. Then:

(i) *Unemployment Differential:* Unemployment for group a is strictly lower than unemployment for group b. This is, $u_b - u_a > 0$.

(ii) *Wage Gap:* The equilibrium wage for group a is higher than the equilibrium wage for group b.

(iii) *Unemployment Volatility:* The unemployment volatility for group b is higher than the unemployment volatility for group a.

Proof: (i) (a) Consider the case of discrimination in hiring. It follows that $\gamma_b > \gamma_a$. Using the equilibrium tightness conditions for both groups a and b we obtain:

$$\frac{\gamma_a}{q(\theta_a)}[\frac{1}{1-\beta}(r+\delta(1-\lambda)+\lambda\delta_D)+\frac{\beta}{1-\beta}m(\theta_a)(1-\lambda)] = \frac{\gamma_b}{q(\theta_b)}[\frac{1}{1-\beta}(r+\delta(1-\lambda)+\lambda\delta_D)+\frac{\beta}{1-\beta}m(\theta_b)(1-\lambda)] \tag{34}$$

Since $\gamma_b > \gamma_a$ and $m(\theta)$ and $\frac{1}{q(\theta)}$ are increasing functions of θ, it must follow that $\theta_a > \theta_b$. Therefore:

$$u_b = \frac{\delta(1-\lambda)+\lambda\delta^D}{(\delta+m(\theta_b))(1-\lambda)+\lambda\delta^D} > \frac{\delta(1-\lambda)+\lambda\delta^D}{(\delta+m(\theta_a))(1-\lambda)+\lambda\delta^D} = u_a$$

The same arguments follow under discrimination in employment.

(ii) From (i) $\theta_a > \theta_b$. Consider equation (34). Since $\theta_a > \theta_b$ and $m(\theta)$ is increasing, it follows that $\frac{\gamma_a}{q(\theta_a)} < \frac{\gamma_b}{q(\theta_b)}$. Therefore:

$$w_a = \frac{\beta}{1-\beta}\frac{\gamma_a}{q(\theta_a)}[(r+\delta(1-\lambda)+\lambda\delta_D)+m(\theta_a)(1-\lambda)]+l$$

$$= \frac{\gamma_a}{q(\theta_a)}[\frac{1}{1-\beta}(r+\delta(1-\lambda)+\lambda\delta_D)+\frac{\beta}{1-\beta}m(\theta_a)(1-\lambda)]+l-\frac{\gamma_a}{q(\theta_a)}(r+\delta(1-\lambda)+\lambda\delta_D)$$

$$= \frac{\gamma_b}{q(\theta_b)}[\frac{1}{1-\beta}(r+\delta(1-\lambda)+\lambda\delta_D)+\frac{\beta}{1-\beta}m(\theta_b)(1-\lambda)]+l-\frac{\gamma_a}{q(\theta_a)}(r+\delta(1-\lambda)+\lambda\delta_D)$$

$$> \frac{\gamma_b}{q(\theta_b)}[\frac{1}{1-\beta}(r+\delta(1-\lambda)+\lambda\delta_D)+\frac{\beta}{1-\beta}m(\theta_b)(1-\lambda)]+l-\frac{\gamma_b}{q(\theta_b)}(r+\delta(1-\lambda)+\lambda\delta_D)$$

$$= \frac{\beta}{1-\beta}\frac{\gamma_b}{q(\theta_a)}[(r+\delta(1-\lambda)+\lambda\delta_D)+m(\theta_b)(1-\lambda)]+l = w_b$$

where in the third equality we use equation (34) and in the inequality se used the fact that $\frac{\gamma_b}{q(\theta_b)} > \frac{\gamma_a}{q(\theta_a)}$.

(iii) From the job creation condition, an increase in productivity p entails an increase in labor market tightness and hence employment. Recall that equilibrium unemployment satisfies:

$$u = \frac{\delta(1-\lambda) + \lambda\delta^D}{(\delta + m(\theta))(1-\lambda) + \lambda\delta^D}$$

Since $m(\theta)$ is concave in θ, and $\theta_a > \theta_b$, it suffices to show that the elasticity of θ_b with respect to changes in productivity is higher than the elasticity of θ_a. Equivalently, we must show that $\frac{\frac{d\theta_a}{\theta_a}}{\frac{d\theta_b}{\theta_b}} < 1$. It suffices to show that $\frac{\theta_a}{\theta_b}$ converges to a constant from above.

Consider again equation (34). Define $A_0 = \frac{1}{1-\beta}(r + \delta(1-\lambda) + \lambda\delta_D)$ and $A_1 = \frac{\beta}{1-\beta}(1-\lambda)$ and recall that $q(\theta) = \frac{m(\theta)}{\theta}$. Equation (34) can be rewritten as:

$$\frac{\gamma_b}{\gamma_a} = \left(\frac{m(\theta_b)A_1 + A_0}{m(\theta_a)A_1 + A_0}\right)\frac{\theta_a}{\theta_b}$$

The left-hand side of the equation is greater than 1 courtesy of our assumption, $\gamma_b > \gamma_a$. The term in parenthesis is smaller than one since $m(\theta)$ is increasing and $\theta_a > \theta_b$. Hence, $\frac{\theta_a}{\theta_b} > \frac{\gamma_b}{\gamma_a}$. Since $m(\theta)$ is concave, an increase in θ_a implies an increase in θ_b of at least equal proportion. In the limit, as $\theta_a \to \infty$, $\frac{m(\theta_b)A_1+A_0}{m(\theta_a)A_1+A_0} \to 1$ and $\frac{\theta_a}{\theta_b} \to \frac{\gamma_b}{\gamma_a}$. □

Proposition 2: Let $L_b^i > L_b^j$ be the minority workforce size under different scenarios i, j. Let there be a policy change P such that the flow cost of posting a vacancy for both groups is equated. This is, for $\gamma_b^t > \gamma_a^t$, $P : (\gamma_a^t, \gamma_b^t) \to (\gamma^{t+1}, \gamma^{t+1})$. Then, $B_i^{t+1} > B_j^{t+1}$.

Proof: We proceed in three steps. First, we show that leverage increases with hiring. Second, we show that the smaller the difference between the flow cost of posting a vacancy for each group, the smaller will be the difference in labor market tightness between each group. Third, we show that the labor market tightness sensitivity to hiring determines the change in hiring and that this sensitivity changes with the size of the workforce.

(i) To show that leverage increases with hiring, consider the job creation and equilibrium debt conditions. Differentiating the job creation condition with respect to B and rearranging, yields:

$$\frac{\partial}{\partial n_i}\Big(\frac{\partial w_a(n_b+n_a)}{\partial B}n_a + \frac{\partial w_b(n_b+n_a)}{\partial B}n_b\Big) = -\frac{\gamma}{q(\theta_i)}(\delta^D - \delta)\frac{\partial\lambda}{\partial B}$$

which is always negative. This means that the higher the level of employment, the higher the downward pressure on wages. It follows from the equilibrium debt condition that leverage must increase with hiring.

(ii) Consider equation (34). An flow cost equating policy $P(\gamma_a^t, \gamma_b^t) = (\gamma^{t+1}, \gamma^{t+1})$ implies that either θ_a decreases, θ_b increases or a combination of the two. From the job creation condition for group a, an increase in flow cost from γ_a to γ entails a reduction in group a employment. By the Stole & Zwiebel bargaining protocol, a reduction in group a employment means that the firm will be hiring at a higher marginal value. This implies, by the job creation condition of group b that employment for group b will increase. How much will employment in group a decrease and employment in group b increase will depend on the sensitivity of labor market tightness to hiring for each group.

(iii) Recall that total employment for group i is given by:

$$n_i = \frac{(1-\lambda)m(\theta_i)L_i}{(\delta + m(\theta_i))(1-\lambda) + \lambda\delta^D}$$

Implicitly differencing and rearranging yields:

$$\frac{dm(\theta)}{dn} = \frac{(\delta + m(\theta))(1-\lambda) + \lambda\delta^D}{L(1-\lambda)u}$$

which goes to zero as L increases. Since $m(\theta)$ is monotonically increasing in θ, $\frac{d\theta}{dn_i} < \frac{d\theta}{dn_j}$ for $L_i > L_j$.

When the minority group has a relatively larger share of the workforce, the minority labor market tightness sensitivity to hiring is lower while the majority labor market tightness sensitivity to hiring is higher. This implies, by (ii), that employment for the minority group will increase relatively more when its share is relatively larger and, conversely, the majority group will decrease relatively less. This implies a higher equilibrium employment. Since employment is higher, by(i), leverage is relatively higher when the minority group has a larger share of the workforce. □