Firm Leverage and the Employment Vulnerability Gap: Evidence from the U.S. Civil Rights Era

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Abstract

We study financial leverage as a transmission mechanism for unemployment risk during the Civil Rights era. We show firms increased leverage following civil rights regulation, increasing black workers’ exposure to unemployment fluctuations. Exposure increases because while high firm-specific leverage increases workers’ risk of unemployment (putting upward pressure on wages), high aggregate firm leverage weakens workers’ outside option – other firms – putting downward pressure on wages. Since unemployment risk increases during downturns while outside options increase during upturns, financial leverage puts countercyclical pressure on wages, amplifying unemployment fluctuations as a byproduct. Through this wage-leverage mechanism, we show firms contributed to black workers’ persistent employment vulnerability.

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). One aim of this literature is to consider how labor costs affect firm decisions about capital structure, taking into account the needs of and risks posed by the labor force. These studies, however, in large part fail to understand the distributional effects of these firm debt decisions — and in particular, how increasing leverage can increase the transmission of unemployment risk onto the workforce. Firm leverage decisions are consequential to workers, since financially distressed firms resort to restructuring to avoid being forced into bankruptcy by creditors (Jensen 1989). Restructuring plans 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 — that is, her outside option or negotiation benchmark.

In this paper, we analyze how capital structure regulates fluctuations in wages and aggregate unemployment volatility. We also show that the relationship between financial leverage, wages, and unemployment volatility: (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 lead to increases in corporate debt, potentially diminishing the efficacy of such institutional changes. Specifically, we show that this mechanism played an important role following labor reforms during the Civil Rights era which left black workers differentially more vulnerable to unemployment risk than white workers, creating an employment vulnerability gap.

Our main conceptual insight is that financial leverage is a transmission mechanism for unemployment risk because it directly alters the relationship between fluctuations in wages and fluctuations in unemployment. While high firm-specific financial leverage increases a worker’s risk of becoming unemployed (her unemployment risk), high aggregate firm financial leverage affects the

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1 Our work is motivated by several recently established key facts about firms and workers. First, Giroud & Mueller (2017) show that counties with more highly levered firms experience more layoffs in response to consumer demand shocks while Michaels et al. (2019) find a negative correlation between leverage and wages, both within firms and in the cross-section. 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). Schmieder & von Wachter (2010) find that workers hired at higher wages due to tighter labor market conditions experience higher risk of layoff.

2 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.
value of jobs throughout the labor market, workers’ outside option. Thus, leverage puts upward pressure on wages by increasing unemployment risk and puts downward pressure on wages by reducing workers’ outside options.

But this pressure of leverage on wages is countercyclical. This is because workers experience higher unemployment risk during downturns and, conversely, workers have better outside options during upturns. During economic upturns, workers’ outside options matter more for the determination of wages than firm-specific unemployment risk, making it less costly for firms to exploit the benefits of debt and bringing down high wages through leverage’s downward pressure on workers’ outside options. Conversely, during downturns, when outside options are already low, firms must compensate workers for their high leverage, bringing up low wages and reducing incentives for debt issuance. This implies firms have incentives to use debt procyclically. It also implies firms can hire more workers during already good times and must hire fewer workers during tough times, thus making unemployment more volatile. We provide a formalization of these dynamics in Section [5]. The dynamics in summary: leverage dampens fluctuations in wages and amplifies fluctuations in unemployment.

Exposure to unemployment fluctuations will not be borne by all workers equally; more levered firms and industries will exhibit more unemployment fluctuations. And to the extent that labor market reforms affect the capital structure of a firm (Matsa 2010), the group of workers that directly benefits from the reform may see those gains 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 the 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 era reforms. Civil Rights era reforms allow us to neatly trace the effects of labor reforms on capital structure and its redistribution effects through unemployment risk. The labor market impact of reforms enacted during this era is well-documented (Donohue & Heckman 1991; Chay 1998; Aneja & Avenancio-León 2019a&b), and occurred during a period of high economic growth and the highest job growth of any postwar decade. In addition, this time period saw a remarkable increase in corporate debt, increase that to this date cannot be fully explained (Graham et al. 2015). 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 of different groups of workers. However, using anti-discrimination
regulations, as we do, allows us to circumvent this difficulty by focusing on the relative wage bill change across two clearly defined groups of workers – black and white workers.

We paint a picture of the relationship between leverage, wages, and unemployment risk, using three sets of empirical tests and a model formalizing our mechanism. First and foremost, we causally test that the central variable of interest, corporate debt, increased in response to changes in Civil Rights era reforms – showing that the channel for transmission of unemployment risk was indeed triggered by this set of regulations. 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. By comparison, minority workers’ wages increased by about 13 percent. Crucially, we show that there is substantial heterogeneity in the responsiveness of leverage across different labor market conditions (e.g. capital-skill complementarity; market tightness) and different financial needs of the firm (e.g. short-term liquidity). Afterwards, we show that along with the increase in leverage came 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 to recover in terms of their employment levels. The same is 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 2012). There is still significant unexplained empirical variation in capital structure both cross-industry (Lemmon, Roberts & Zedner 2008) and in the time-series (DeAngelo & Roll 2015). Adding job-finding probability measures to the Lemmon, Roberts & Zedner (2008) analysis, we show that variations in labor market conditions have additional explanatory power over variation in capital structure. Measures of labor market conditions can expand to our current set of variables that help to conditionally explain the choice of capital structure.

Lastly, based on our empirical findings, we build a search-theoretic model à la Mortensen-Pissarides depicting: (i) the relationship between capital structure, wages, and unemployment risk; and (ii) the transmission of unemployment risk through different groups of workers.

This paper contributes to several lines of literature. First, it contributes 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 analyzing financial leverage as a possible mechanism enabling inequality between groups. Blacks’ unemployment rate has been persistently higher than the national average since the 1970s, despite the passage of civil rights regulation. Academic research to this point emphasizes both demand- and supply-based explanations for racial employment disparities. By documenting the role of corporate debt in transmitting unemployment risk, our findings show that other within-firm factors are also important to understand these labor market disparities.

Second, this paper 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 and finding support in modern work (Titman 1984; 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 2016). These two mechanisms may seem to be 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, based on a general equilibrium framework, these results do not require strategic (vis-à-vis workers) considerations and 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 what might seem a contradiction between survey findings and causal estimates (Matsa 2010 and subsequent 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 ‘60s and ‘70s and the role of the job-finding probability in explaining capital structure variation. And it contributes to the literature on the functioning of labor markets by adding financial leverage to the determinants of unemployment volatility (Shimer 2005 and others).

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 2018).

The Wealth of Nations, Book I, Chapter 10, paragraphs 14-19.
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-twentieth Century witnessed the largest recorded increase in the use of corporate debt. Graham et al. (2015), for example, show that aggregate leverage tripled from 1945 to 1970. However, there remains no complete accounting of these trends. Graham and coauthors 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 trends [...] must come from sources of variation not central to the existing capital structure literature.”

We propose one such factor contributing to the increased use of debt. Specifically, we hypothesize that increases in labor productivity due to changes in technology and worker skills, which led to unprecedented growth in real earnings, led firms to increase leverage. From the late ’40s to the ’70s, average earnings increased by nearly 25 percent per decade (Greenstone & Looney 2011). The slowdowns in both trends also occurred concurrently. If there is indeed a relationship between the trends depicted in Figure 1, it is strong enough to be observed by the naked eye; as such, the comovement between key labor and debt variables merits further study.

We will show that these trends are linked. Theoretically, productivity increases wages and in turn tightens the labor market. The upward pressure on wages and tightening of the labor market increases the outside option of workers. When the outside option of workers is high, greater firm leverage puts downward pressure on equilibrium wages (according to the wage-leverage relationship described in the introduction and formalized in Section 5 Eq. 16) and, hence, in equilibrium must increase. Using a few different empirical strategies, we will show that the relationship between labor market conditions and leverage holds in the data.

Civil rights laws increased wages for a subset of (minority) workers. As such, these legal changes provide a natural experiment to test the dynamics we conjecture. We will show that after the passage of civil rights laws, leverage increased predominantly in industries with a large fraction of minority workers.
2.2 The Distributional Impact of Debt: Black Employment Vulnerability

This increase in leverage is not costless to workers. We show that as a consequence, black workers were deferentially more exposed to unemployment risk during economic downturns. This relationship between leverage and black unemployment risk connect historical changes in the use of corporate debt to historical differences in unemployment rates between black and white workers.

Black unemployment 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 (4.2) and theoretically in Section (5.7).

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 2017). Namely, we provide an explanation for this observed relationship between highly leveraged firms and reduced employment gaps between whites and blacks. 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 percent 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 Did Firm Leverage Increase Following Civil Rights Regulation?

In this section we show that financial leverage increased following the passage of civil rights laws that improved the status of black Americans within the labor market. Between 1964 and and

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5 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).
1966, a suite of legislation was passed that raised the (relative) wages and employment prospects of black workers. A rich literature going back to the 1970s has documented the impact of anti-discrimination laws (in particular, the 1964 Civil Rights Act) and other laws (such as amendments to the Fair Labor Standards Act) on observed improvements in black wages over the second half of the twentieth century (Donohue & Heckman, 1991; Chay, 1998; Deronencourt & Lemontiuex, 2019). Moreover, recent work by the authors of this study show that the political enfranchisement of black Americans under the Voting Rights Act of 1965 (1965) complemented federal action – improving black wages at no cost to overall employment (Aneja & Avenancio-Leon 2019). We document in that work that the VRA improved black (relative) wages in the private sector by increasing access to public jobs and fiscal transfers, as well as by complementing federal policy aimed at desegregating private workplaces directly (through, for example, better legal enforcement).

3.1 Empirical Framework
3.1.1 Variation in Exposure to Civil Rights Laws

To test our hypotheses here, we rely on the findings of Aneja & Avenancio-Leon (2019) demonstrating that geographic variation in black political representation under Section 5 of the VRA represents a similar geographic variation in the overall strength of civil rights enforcement. Between 1965 and 2013, Section 5 gave federal authorities strong enforcement power to protect minorities’ right to vote in (primarily) the South, where discrimination had been most severe prior to the Civil Rights movement. “Covered” counties and states were required to “preclear” any change to electoral procedures with the U.S. Attorney General or the U.S. District Court for D.C. Prior to 2013, when the statute was struck down by the Supreme Court, Section 5 was considered the strongest provision of the statute; in the remainder of the paper, we will simply use VRA to refer to Section of the VRA.

The VRA’s variation in civil rights enforcement, which varies across state and year, in turns allows us to consider the effects of how the increasing strength of civil rights laws (such as the Economic Opportunity Act, the Civil Rights Act, and the Fair Labor Standards Act), which aimed to improve black economic status, affected firm use of corporate debt.

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6 The Economic Opportunity Act (EOA) marked the beginning of Lyndon Johnson’s War on Poverty, and included large fiscal transfers to localities for education, job training, and other aspects of poverty reduction. Title VII of the Civil Rights Act (CRA) was the first major law to ban discrimination in hiring or pay on the basis of race. The Fair Labor Standards Act (FLSA) Amendments raised the minimum wage nationwide. For a description of these laws, see Aneja & Avenancio-Leon (2019).
3.1.2 Reduced-Form Estimating Equation

We test our theory by examining the effects of civil rights enforcement (as proxied by variation in federal political rights enforcement under the VRA) on the use of corporate debt. We expect that laws that increase minority earnings will have their greatest effect on firm borrowing in industries that have a high share of minority workers. Our baseline empirical specification is thus the following:

\[
Lev_{ist} = \alpha + \beta_1 VRA_{st} + \beta_2 VRA \times ShareBlack_{st} + X'_{ist}\gamma + \eta_i + \xi_t + \epsilon_{ist} \quad (1)
\]

where \(VRA_{st}\) indicates the presence of VRA coverage in state \(s\) and year \(y\). As just described, we interpret \(VRA_{st}\) here as an exogeneous shifter of enforcement for all civil rights laws. The key variable of interest is \(VRA \times Share Black\), which denotes the interaction between improved civil rights enforcement and the pre-regulation black share of labor in a given industry. \(\eta_i\) and \(\xi_t\) 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.

Given our theoretical discussion above, we expect \(\beta_2\) to be positive — in other words, laws that raise minority wages to have the greatest impact on firm borrowing within industries that have a high presence of minority workers. 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, maintaining market leverage targets would require constant rebalancing. This is consistent with findings by Welch (2004) that most variation in market leverage ratios are not a product of debt policies but of fluctuations in market values as U.S. corporations do not issue or repurchase debt and equity in response to these changes.

3.2 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 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 the VRA 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 U.S. Current Population Survey (CPS) using the four-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 preexisting industry differences that are unaffected by treatment. The final sample (which excludes financials, utilities, and firms with missing observations) comprises 14,415 firm-years over the 1961-1982 period. The consensus view in labor economics suggests that black progress in the labor market subsided by this time (Bound & Freeman 1992).

We also use two additional sources of data to quantify the penetration of civil rights era changes (i.e., the intensive margin). First, we use the number of civil rights-related protests for each state and year between 1960 and 1990. Our hypothesis is that after the passage of civil rights regulations that target black workers, corporate leverage will increase relatively more in industries with higher black participation – in other words, where the number of protests is high. Conversely, we would expect that these laws will be less effective in places with high racial resentment. To test this, we use data on racial violence by white citizens through black lynchings. During the civil rights era, one strategy employed to intimidate supporters of civil rights legislation was lynching. Lynching eroded the effectiveness of black enfranchisement and workplace economic gains by keeping blacks from organizing socially, politically, or economically.

3.3 First Stage: Effects on Employment and Wages

Before turning to our main results regarding increases in firm leverage, we show that the labor market regulation we exploit indeed increased the cost of labor for firms. To this end, we begin by making reference to our related work on the effects of the Voting Rights Act (Aneja & Avenancio-León 2019b), as well as an extensive literature on several civil rights era reforms (Donohue & Heckman 1991; Chay 1998; Derenoncourt & Montialoux 2018). For reference, we include results on the effects of the Voting Rights Act on wages in the Appendix (Table A1). The VRA increases black relative wages by around 5.5 percent. Importantly, this effect is driven primarily by the

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7 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.”
increase in black wages.\footnote{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 \ref{tab:appendix}, 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.}

We also show that the impact of civil rights regulation on wage inequality is not offset by a reduction in employment. In fact, given that civil rights laws targeted both wage and hiring discrimination, we might expect increases in firm-level employment. Formally, we evaluate the following specification:

\[
\%\Delta_{\text{employees}}_{ist} = \alpha + \beta_1 VRA_{st} + \beta_2 VRA \times ShareBlack_{sjt} + \gamma X_{it} + \eta_i + \xi_t + \epsilon_{ist} \tag{2}
\]

where \(\%\Delta_{\text{employees}}_{ist}\) is the firm-level percentage change in employees, \(VRA_{st}\) is a dummy for VRA coverage, and \(VRA \times ShareBlack_{sjt}\) interacts \(VRA_{st}\) with the industry racial composition. \(ShareBlack_{st}\) is absorbed in this regression.

Table \ref{table:estimation} shows the estimation results. Civil rights regulation not only affects wage discrimination but also affects hiring discrimination. 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, \(\beta_1\), is negative, reflecting the relative decreases in the wage bill for white workers. The alignment of wage and employment effects along industrial race composition provides a clear direction on the increase of the total labor cost for firms, cost that will bear an impact on the financial leverage decisions made by the firm.

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 offset as we move to industries with higher minority labor participation, as both their relative wages and relative employment increase at a faster rate than the baseline effect. We test these predictions in the next subsection.

### 3.4 Main Results: Impacts on Firm Leverage

An increasing number of papers have documented the importance of workers’ bargaining power (Matsa 2010) and other labor protections (e.g., Simintzi et al. 2015) to firm leverage decisions.
One interpretation of these studies is that leverage increases as a strategic response of the firm vis-à-vis workers. Another possible interpretation is that changes in labor cost affect the operational flexibility of the firm, and thus changing the calculus CFOs make when deciding an optimal capital structure (Graham & Harvey 2002 show that CFOs place important emphasis on financial flexibility). And of course, both interpretation can operate simultaneously. In Section 5.7 Proposition 2, we show that changes in the cost of hiring affect the equilibrium leverage of firms as long as the firm has other incentives to take on or not take on debt. It is not the intent of this study to tease out why leverage increases as a response to increases in labor cost, but rather to document its role in affecting distributional outcomes.

Having shown that civil rights laws increased black wages and overall firm employment, we now show that firm borrowing also responded to this increase in the cost of black labor. The core results are presented in Table 3. Firm-level leverage is the outcome variable. Given the conceptual 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 3 indicates that in states subject to civil rights legislation, increasing the fraction of blacks in an industry by 1 percent is associated with an approximately 14 basis points increase in leverage. The impact of the VRA within minority-heavy 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 a 180-basis point increase in leverage for the minority-heavy industries. Collectively, these results suggest that firms did indeed change their corporate policy after the VRA, and that the results are not being driven by time-varying state characteristics that may affect firms’ use of debt 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 workforce, 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). Given this evidence, we take the

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9 Beck and Tolnay (1990) describe the use of lynching in the South as a method of social control by whites. And importantly, lynchings were not crime control. Political historians similarly suggest a prominent role for lynching for both voter intimidation and labor coercion (Kousser 1974). Moreover, both historical and recent econometric
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) counteracts legal enforcement of civil rights laws, dampening effects on wages. Consequently, we should observe weaker effects on corporate leverage in areas where racial hostility is high.

Turning to Table 4, 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 one 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, which we would expect to have the opposite effect on firms as racial hostility. In particular, places that were more politically active may be relatively more affected by civil right laws. For example, protests may function much like voting, exerting pressure on government to enforce civil rights (Andrews 2001). Hence, upward wage pressure will be higher when protests are higher. As a result, corporate leverage will increase 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 4, 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)).

### 3.4.1 Effects on Profitability

A reasonable alternative channel for us to consider is whether civil rights laws affect corporate structure through their effects on firm profitability unrelated to 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. The EBITDA

research suggests that economic competition between white and black labor pre-civil rights era was an underlying motivation (Christian 2015).
margin is an equivalent measure except that it adds back to net income interest and taxes paid as well as depreciation and amortization. By adding back interest and taxes, the 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 us to measure efficiency changes in the assets being managed. Changes in returns on assets might be associated with capital-skill complementarity and decrease if lower skilled workers are being hired.

Table 5 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. These results provide further support to the proposition labor market regulation affects leverage.

### 3.5 Interaction with Other Financial Channels

#### 3.5.1 Financial Flexibility and Earnings Retention Policy

In this subsection we consider the relationship between increased black labor costs and the financial flexibility of the firm. Graham & Harvey (2002) document that preserving financial flexibility is an important concern to CFOs. As the firm becomes riskier, higher leverage 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 may be regarding the firm as riskier. In Column (5) of Table 5, we observe that firms with more black workers are perceived as riskier, paying around 1.7 more basis points per black worker percentage.

DeAngelo and DeAngelo (2007) make 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 threatened by increases in debt ratio, firms may want to adjust through other margins. Instead of increasing financial leverage, firms may resort to changing their dividend payout policy. In Column (4) of Table 5 we see a similar effect.

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The dividend payout is defined as dividends divided by net income. It is a measure of the proportion of money being paid out to shareholders in contrast with how much is reinvested. Recent work has shown that the dividend payout policy does internalize labor market conditions. For example, Pezone (2017) argues that dividend payout policies are affected by labor market conditions and unemployment risk.
3.5.2 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 operating 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 to 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:

$$CR = \log(\text{CurrentAssets}) - \log(\text{CurrentLiabilities})$$

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 6. The increase in leverage is about four times larger in high current ratio firms.

3.6 Interaction with Other Labor Market Channels
3.6.1 Leverage and Complementarity between Skill and Capital

Another motive for levering up following an increase in the cost of labor is to substitute labor with capital. For example, if white workers were 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, \(S\), skilled labor, and \(N\), nonskilled labor, are the two factors of production. From this functional form it follows that a higher \(\sigma\) indicates greater substitutability while complementarity is suggested by lower values of \(\sigma\). 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 U.S. Commerce Department industry classification. This allows us to overcome the 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 nonroutine 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 7, the relative change in leverage for industries with a high share of minority workers is positive for both, industries with high and low capital-skill complementarity. But it is even higher in industries with low capital-skill complementarity, which is consistent with a labor-driven theory of corporate debt.
3.6.2 Leverage and the Job-Finding Probability

We have thus far seen that corporate debt is responsive to changes in labor costs on average. However, estimating average treatment effects masks potential heterogeneity in the response of corporate debt to wages. As we previously discussed conceptually, and will show formally in Section 5, the relationship between wages and leverage depends on the prevailing labor market conditions. More precisely, high firm-specific leverage increases workers’ risk of unemployment putting upward pressure on wages, and high aggregate firm leverage weakens the worker’s outside option by increasing distress risk in all firms – thus putting downward pressure on wages. During downturns, when the job-finding probability is low, increasing debt entails compensating workers for the higher levels of distress risk in the form of a higher wage. During upturns, when the job-finding probability is high, the opposite happens; equilibrium wages go down after increases in aggregate 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 market regulations.

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. 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. That is, our job-finding probability measure is:

\[
JFR_{it}^{\text{proxy}} = JFR_i \times JFR_t
\]

We then create a dummy indicating whether the \(JFR_{it}^{\text{proxy}}\) is above or below median and proceed to estimate:

\[
Lev_{ist} = \alpha + \beta_1 VRA_{st} 1_{\text{med}}^+ + \beta_2 VRA_{st} 1_{\text{med}}^- + \beta_3 VRA \times ShareBlack_{st} 1_{\text{med}}^+ + \beta_4 VRA \times ShareBlack_{st} 1_{\text{med}}^- + X'_{ist} \gamma + \eta_i + \xi_t + \epsilon_{ist}
\]

(3)

where \(1_{\text{med}}^+ = 1(JFR_{it}^{\text{proxy}} \geq \text{median}_{JFR})\) and \(1_{\text{med}}^- = 1(JFR_{it}^{\text{proxy}} < \text{median}_{JFR})\) are sets of 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.
dummies indicating whether the job-finding probability is above or below median, respectively. The results are presented in Table 8. 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.

4 Employment Vulnerability: The Feedback Between Leverage and Employment Conditions

In the last section we showed that firm leverage increases following the passage of civil rights era regulation, and that increases in leverage were disproportionately concentrated in industries with high concentration of black workers. How does this increase in leverage affect workers? Conceptually, we have discussed how high leverage amplifies unemployment fluctuations, and hence how black workers are more exposed to unemployment risk. This section and the next dig deeper into this relationship and what it means for minority workers.

In this section we provide three stylized facts concerning leverage and employment conditions: (i) labor market conditions predict changes in the capital structure of the firm; (ii) downturns affect firm employment growth the most when leverage is high, i.e. leverage increases unemployment risk; and (iii) in the relationship between downturns, leverage, and firm employment growth, black workers are disproportionately affected. The next section, which formalizes our conceptual analysis, provides a theoretical foundation for these stylized facts and highlights more implications of the relationship between leverage and unemployment fluctuations.

4.1 The Job-Finding Rate and Variations in Capital Structure

We build on our findings from the previous section and assess whether labor market conditions explain changes in capital structure. We again 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 5. 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). Assuming 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:

\[
F_t = 1 - \frac{u_t - u^s_t}{u_{t-1}}
\]

where \( u_t \) is the unemployment rate at time \( t \), and \( u^s_t \) 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 9. A 1 percent 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, 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.

4.2 Who Bears the Burden of Unemployment Risk?

Because compensation for unemployment risk increases during downturns while outside options increase during upturns, financial leverage dampens fluctuations in wages and amplifies fluctuations in unemployment as a byproduct. Thus 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 (2017) have shown that following consumer demand shocks, counties exhibited more layoffs where highly leveraged firms were prevalent. We should expect that response to be generalizable to business-cycle fluctuations and salient after changes in unemployment rates. We follow an approach similar to Hoynes et al. (2012) and run regressions of the form:

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

and

\[
\% \Delta employees_{ist} = \alpha + \beta_1 Lev_{it} + \beta_2 UR_{st} + \beta_3 BlackUR_{st} + \beta_4 WhiteUR_{st} + \beta_5 UR_{st} \times Lev_{it} + \beta_6 BlackUR_{st} \times Lev_{it} + \beta_7 WhiteUR_{st} \times Lev_{it} + \eta_i + \xi_t + \epsilon_{ist}
\]  

19
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; $\eta_i$ denotes firm fixed effects; and $\xi_t$ denotes time fixed effects. Unemployment rates by race, state and year are retrieved from the CPS.

This estimation strategy is designed to test 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 10 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 also interesting is that most of the correlation of unemployment with employment growth stems from its connection with financial leverage. This effect persists after applying varying levels of fixed effects.

In Panel B, we decompose this effect 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 with leverage, and employment growth is close to zero, whereas the correlation between the interaction of white unemployment with leverage, and employment growth largely offsets the beta form $\text{Leverage} \times \text{Unemployment}$. This is partly driven by firms with a high black share of its labor force having more leverage. It also suggests that when white unemployment is high, firms are already on the way to recovery.

5 Zooming In: A Model of Debt, Wages, and Unemployment Risk

In this section we provide theoretical foundations for the relationship between firm leverage, wages, and unemployment, that eventually lead to increases in unemployment fluctuations. We also explore the distributional effects of this relationship. This latter points is of significant importance to appreciate the full extent of the implications stemming from increases in leverage following the passage of civil rights era regulation.
5.1 From the Firm Balance Sheet to Unemployment

There is a large body of empirical work relating labor markets with corporate leverage. Bronars & Deere (1991) 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 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 2016).

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 intrafirm 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 the findings of Stole & Zwiebel (1996) still hold under search-theoretical frameworks of the labor market. Monacelli et al. (2011) and Michaels et al. (2019) labor and financial frictions. Our model has a more limited scope intended to complement the empirical analysis; it is also substantively different, especially in its focus on unemployment fluctuations and on labor market segmentation along racial lines.

Our choice of framework is both pragmatically and conceptually motivated. 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 on capital structure, such effect must arise from changes in the equilibrium outcomes rather than from strategic behavior.
5.2 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 \( \gamma \). Matches arise according to \( m(u,v) \) which is an 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, \( \frac{m(\theta)}{\theta} > 0 \), while the hiring rate decreases with labor market tightness, \( q(\theta) < 0 \). The separation rate, or the exit rate from employment to unemployment, is exogenous and equal to \( \delta \) if the firm does not default, and \( \delta^D \) if the firm does. The wage for each group is determined by (Nash) bargaining between the employer and each employee, which we will address below shortly. Search on the job is not allowed.

The firm holds total debt \( B \) and can issue additional debt, \( \Delta I \). In doing so, the firm considers the tax rate, \( \tau \), and distress costs, \( c \). The probability of default, \( \lambda \), is endogenous and depends on the firm’s profits and on the total debt. We will address the determination process of \( \lambda \) in Section 5.6. The discount rate, \( r \), is exogenous. The prevailing interest rate, \( R \), incorporates the probability of default, \( \lambda \), 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:

\[
\begin{array}{c c c c}
  \text{Production} & \text{Default, Layoffs/Borrowing, Hiring} \\
  t & \text{Liquidity Shock} & t + 1
\end{array}
\]

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\(^{12}\) \( \epsilon_t \), 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

\(^{12}\) We refer to liquidity shock as a short-run solvency or noneconomic financial shock. See, for example, Maksimovic & Titman (1991), Andrade & Kaplan (1998), Phillips & Sertsios (2012).
incurs in distress costs $c$, suspends hiring efforts, and is unable to claim tax benefits from debt. The separation rate changes from $\delta$ to $\delta^D$. There are complementarities between debt and labor $bnB^\omega$, governed by parameters $b$ and $\omega$, that can be thought as arising from investments, and are consistent with our findings in section 3.6.1. 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 $\delta$, and the firm incurs in no distress costs.

5.3 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:

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

where employment and debt satisfy the laws of motion, $\dot{n} = (1 - \lambda)q(\theta)v - \delta(1 - \lambda)n - \lambda\delta^Dn$ and $\dot{B} = \Delta I$, respectively. The first, second, and third term are production, employment costs, and debt-labor complementarities, respectively. The fourth and fifth terms represent the tax shield advantage and distress costs, respectively. The sixth 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 in equilibrium 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:

\[ V_n(n, B) = f'(n) + bB^\omega - w(n) - \frac{\partial w(n)}{\partial n}n \frac{r + \delta(1 - \lambda) + \lambda \delta D}{n} \]  \hspace{1cm} (8a) 
\[ V_B(n, B) = \left( b\omega B^\omega - \frac{\partial w(n)}{\partial B} \right) n + \left\{ \tau R(1 - \lambda) - \lambda c \right\} + \left\{ (\tau B(1 - R)) - (cB - \gamma v) \right\} \frac{\partial \lambda}{\partial B} \]  \hspace{1cm} (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 intrafirm 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, \( \lambda \), 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:

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

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:

\[ \left\{ \tau R(1 - \lambda) - \lambda c \right\} + \left\{ (\tau B(1 - R)) - (cB - \gamma v) \right\} \frac{\partial \lambda}{\partial B} = \left( \frac{\partial w(n)}{\partial B} - b\omega B^\omega - 1 \right) n \]  \hspace{1cm} (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 to debt increases in section 5.6.
5.4 Wage Determination

Equations (9) and (10) provide general relationships governing the creation of jobs and the issuance of debt, and their 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 $\beta$ denote the bargaining power of a worker. Then, by the Nash-sharing rule\footnote{The Nash-sharing rule stems from maximizing $(W - U)^{\beta}V^\alpha_n$.}

$$\beta V_\alpha(n, B) = (1 - \beta)(W - U) \quad (11)$$

The value of employment and unemployment to the worker follow:

$$rW = w + \left( (1 - \lambda)\delta + \lambda\delta^D \right)(U - W)$$
$$rU = l + m(\theta)(1 - \lambda)(W - U)$$

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

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

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) intrafirm bargaining into a search-theoretical framework. The compensation profile set by the firm takes the form:

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

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

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:

$$w(n) = \frac{\beta}{1 - \beta} \frac{\gamma}{q(\theta)} [r + (\delta + m(\theta))(1 - \lambda) + \lambda \delta^D] + l$$  \hspace{1cm} (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, $n$. Negative $\alpha - 1$ 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 ($\gamma$) 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:

$$\left(\frac{\alpha}{1 + \alpha \beta - \beta}\right) n^{\alpha - 1} + b B^w = \frac{\gamma}{q(\theta)} \left[ \frac{1}{1 - \beta} (r + \delta(1 - \lambda) + \lambda \delta^D) + \frac{\beta}{1 - \beta} m(\theta)(1 - \lambda) \right] + l$$ \hspace{1cm} (14)

So far our setup contains a fivetuple $(n, \theta, w, B, \lambda)$ 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:

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

### 5.5 Equilibrium and 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 (9, 10, 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 this in Appendix D.

5.6 Wage-Leverage Relationship

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

\[
\frac{\partial w}{\partial B} = \frac{\gamma}{\theta} \frac{\beta}{1 - \beta} \frac{d\lambda}{dB} (\delta^D - m(\theta) - \delta)
\]

(16)

The interpretation of this 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 the 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 (4.1). Second, there is what we loosely refer to as its “gatekeeping” function. The job-finding probability regulates whether there is compensation for unemployment risk or reduction in their compensation. This gatekeeping 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\(^\text{14}\) 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

\(^{14}\) Recall, \( m(\theta) \) is increasing in labor market tightness, and the Beveridge curve has a slope close to -1.
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 2017). This
channel provides a new theoretical microfoundation for wage inertia.\footnote{For other relevant work generating wage rigidities see: Hall & Milgrom (2008), Christiano et al. (2016), and Eliaz & Spiegler (2013).}

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 & Harvey
2002). Intuitively, a firm is interchanging operating leverage and financial leverage. Formally,
assume for tractability shocks to the liquidity of the firm follow a Type I Extreme Value Distribu-
tion\footnote{We follow a line of work that applies tools drawn from discrete choice models. See Train (2009).} For $\epsilon \sim \text{Gumbel}(0, 1)$, $P(\epsilon \leq x) = e^{x(c \gamma + c \gamma)}$, where $c \gamma \approx .577$ is the Euler-Mascheroni constant. Hence, the distress risk is given by $\lambda(B) = e^{(BR-\Pi+c \gamma)}$. After taking derivatives and rearranging:

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

(17)

where $f_{\lambda}$ is the density function of the Gumbel distribution, and $h_{\lambda}$ 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.

5.7 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 market institutions.\footnote{17} 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 nonproductivity 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 \( m(u,v) \equiv \theta u \) where \( \theta = v u \) is the labor market tightness. The hiring rate per vacancy is defined as \( m(u,v) \equiv q(\theta) \equiv \theta \equiv q(\theta) \). The arrival rate of job offers for workers is increasing in labor market tightness, \( \theta \equiv q(\theta) > 0 \), while the hiring rate decreases with labor market tightness, \( q(\theta) < 0 \). 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, \( \gamma \) 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 \[5.2\]-\[5.6\].

Following a straightforward extension to the preceding subsections\footnote{18} the equilibrium obeys:

\[
\frac{f'(n_a + n_b) - w_i(n_i) - \frac{\partial w_i(n_a + n_b + n_i)}{\partial n_i} n_i - \frac{\partial w_i(n_b + n_a + n_i)}{\partial n_i} n_i}{r + \delta(1 - \lambda) + \lambda \delta D} = \frac{\gamma_i}{q(\theta_i)} \quad \text{(Job Creation)}
\]

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

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

\[
u_i = \frac{\delta(1 - \lambda) + \lambda \delta D}{(\delta + m(\theta_i))(1 - \lambda) + \lambda \delta D} \quad \text{(Steady State)}
\]

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

\footnote{17} For a review of segmented labor markets, see Taubman & Wachter (1987).
\footnote{18} See Appendix E for details.
worker decreases.

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

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

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 (Labor Market Gaps):** Let group \( b \) be discriminated against in hiring or employment relative to group \( a \). Then:

(i) **Unemployment Gap:** Unemployment for group \( a \) is strictly lower than unemployment for group \( b \). That 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 Gap:** The unemployment volatility for group \( b \) is higher than the unemployment volatility for group \( a \).

Relationship \( \text{(Equilibrium } \theta) \) also reflects that in equilibrium policies about employment and policies about debt are taken jointly. Since \( \alpha < 1 \), an increase in distress risk \( \lambda \) 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 (Increase in Debt):** Let \( L_b^i > L_b^j \) be the minority workforce size under different scenarios \( i, j \). Let there be a policy change \( P \) that equalizes the flow cost of posting a vacancy for both groups of workers. This is, for \( \gamma_b^i > \gamma_a^i \), \( P : (\gamma_a^i, \gamma_b^i) \rightarrow (\gamma_{t+1}^i, \gamma_{t+1}^i) \). Then, equilibrium debt at time \( t + 1 \) is higher under scenario \( i \) than \( j \), i.e. \( B_{t+1}^i > B_{t+1}^j \).

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.

6 Discussion and Concluding Remarks

To summarize briefly, our conceptual framework highlights several connections between labor and financial markets. Our main empirical findings can be summarized as: (i) corporate debt responds to exogenous changes in the price of labor (Tables 3–8); (ii) aggregate labor market conditions explain variation in firm leverage (Table 9), and are heterogeneous across the business cycle; and (iii) these policy-induced shifts in firm leverage increase unemployment risk and can lead to the redistribution of labor income across groups (Table 10). We now briefly discuss four main implications:

1. Corporate Debt-Driven Distributional Effects of Unemployment Risk. The leverage-employment relationship bears on broader questions about labor market inequality. Leverage-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 be 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 today. These include anti-discrimination protections (Chay 1998), minimum wages (Dube et al. 2010), and wrongful-discharge laws (Autor et al. 2006). Discussions about targeted laws governing the labor market – in 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 deter-

19 In the appendix, we elaborate on why costs arising from discrimination can be rewritten as increases in the flow cost of posting a vacancy.
mining the burden of legislation on workers, one should consider whether increased distress costs of firm debt mean that the redistributive benefits of active labor market interventions are partially offset by firm debt response.

II. 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 4.2, the burden of unemployment risk that is linked to corporate debt is not shared equally between whites and blacks – during periods of high unemployment, heavily-leveraged firms respond by employing more white workers, but not more black workers. This finding ties our work to the 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 has been persistently lower, and their unemployment rate persistently higher, since the 1970s (after civil rights laws were passed).

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 & Charles 2018) has led to renewed discussions about labor market policies that eliminate labor market disparities. Given the possibility that firms may transmit any demand-side regulations into unemployment risk, policymakers should consider these costs to black workers when evaluating 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).

III. The Job-Finding Probability and Cyclicality of Debt. As documented in Section 4.1, debt is highly responsive to changes in the job-finding probability. 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 & Mueller (2017) suggest, firm-specific safety net policies may make sense during periods of high unemployment –
for example, policy should perhaps target firms concentrated in heavily leveraged industries. This targeting, our mechanism suggests, should be sensitive to the state of the business cycle.

IV. Wage Growth and Increase in Debt. Our results show that the substantial changes to the wage structure from 1950–1970 are linked to the tripling of firm debt during that period. Annual earnings increased from $21 to $39 thousand, and a back-of-the-envelope calculation suggests that approximately 60 percent of the observed debt increase during this period was due to these increases in workers’ compensation.

In this paper, we set out to study the response of capital structure to changes in labor market policy. Our work makes a few concrete contributions. First, by virtue of our setting, this paper contributes to the literature on the longlasting 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. Second, our analysis characterizes the role of financial leverage as a transmission mechanism for unemployment risk. Third, we provide a novel mechanism for explaining different phenomena in the labor markets: low wage volatility, high unemployment fluctuations. And lastly, 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 corporate capital structure and other firm financial policies have been shaped by significant social changes in the twentieth century. We hope our findings encourage future work on the relationship between capital structure and unemployment fluctuations and any resulting employment vulnerability.
References


[26] 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.


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Figure 1: Leverage and Personal Income in Latter 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.

Figure 2: Unemployment Rates by Race

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

![Graph showing relationship between leverage and unemployment differences](image)

**Figure 4:** Absolute and Relative Wage Responses Following Civil Rights Regulation

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.

<table>
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<tr>
<th></th>
<th>Common</th>
<th>Relative (Gap)</th>
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<tr>
<td>Wages</td>
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<td>Δw↑</td>
</tr>
<tr>
<td>Employment</td>
<td>n↓</td>
<td>Δn↑</td>
</tr>
</tbody>
</table>
Figure 5: Leverage Increases following Civil Rights Regulation (No Variation in Enforcement)

The figure plots increases in corporate leverage per proportion of black workers with 1964 (passage of the Civil Rights Act) as the starting date. The Civil Rights Act applied nationally at once with no geographical variation and time variation in implementation, unlike the Voting Rights Act. 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 Civil Rights Enforcement 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

<table>
<thead>
<tr>
<th></th>
<th>VRA Mean</th>
<th>VRA Std Dev</th>
<th>Non VRA Mean</th>
<th>Non VRA Std Dev</th>
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<td>3.29</td>
<td>13.16</td>
<td>3.05</td>
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<td>Potential Experience</td>
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<td>12.31</td>
<td>22.38</td>
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#### Panel B: Financial Variables

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<td>4.65</td>
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<tr>
<td>Firm-Years</td>
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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 long-term 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: Civil Rights Enforcement and Firm-Level Employment Growth

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<td>.0664</td>
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Notes: This table reports estimates of ordinary least squares regressions relating the VRA (our proxy for civil rights enforcement), racial composition of an industry, and corporate leverage. The primary variable of interest, VRA × Proportion Black, is the interaction between a VRA indicator and the fraction of a given industry’s (2-digit) overall employment that is black. Corporate leverage, firm employment, and total assets come from Compustat. Black employment by industry is derived from the 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) and (4) control for state × year fixed effects. Columns (1)–(3) include firm fixed effects. Errors clustered at the state level. * p < 0.10, ** p < 0.05, *** p < 0.01.
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**Notes:** This table reports estimates of OLS estimates from a regression relating the interaction of the VRA and industry-level black workforce to corporate leverage. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from CPS. Errors are clustered at the state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Table 4: Civil Rights Enforcement and Corporate Leverage: Heterogeneity by Level of Activism and Racial Resentment

<table>
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<td>Lynch × VRA × Prop Black</td>
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<td>-.0024***</td>
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<td>(.0002)</td>
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<td>VRA × Proportion Black</td>
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<td>.2011**</td>
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<tr>
<td>Protests × VRA</td>
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<td>(.0016)</td>
<td>(.0018)</td>
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Notes: This table reports estimates of OLS estimates of heterogeneous effects, based on a regression relating the triple interaction of the VRA, industry-level black workforce, and pre-Civil Rights era racial violence (the number of black lynchings) to corporate leverage. All firm-level measures come from Compustat. Black employment by industry comes from the CPS. All column controls for firm employment, and state, year and firm fixed effects. Errors clustered at the state level. * p < 0.10, ** p < 0.05, *** p < 0.01.
Table 5: Civil Rights Enforcement and Firm-Level Financial Performance

Panel A: Profitability

<table>
<thead>
<tr>
<th>Outcome:</th>
<th>(1) ROA</th>
<th>(2) ROA</th>
<th>(3) Net Earnings(%)</th>
<th>(4) Net Earnings(%)</th>
<th>(5) EBITDA(%)</th>
<th>(6) EBITDA(%)</th>
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<tbody>
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<td>VRA x Proportion Black</td>
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<td>-.0272***</td>
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<td>(.0495)</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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Panel B: Debt Management

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<th>(3) Retained Earnings(%)</th>
<th>(4) Retained Earnings(%)</th>
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<td>11.1528***</td>
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Notes: This table reports estimates of OLS estimates from a regression relating the interaction of the VRA and industry-level black workforce to other firm-level financial outcomes. Panel A focuses on firm profitability measures, while Panel B focuses on debt management-related outcomes. All (profitability and debt management) firm-level measures come from Compustat. Black employment by industry comes from the CPS. All column controls for firm employment, and state, year and firm fixed effects. Errors are clustered at the state level. * p < 0.10, ** p < 0.05, *** p < 0.01
Table 6: Civil Rights Enforcement and Short-Term Liquidity

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<th>(6) Low</th>
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<th>(8) Low</th>
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<td>5.6646***</td>
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Notes: This table reports estimates of OLS estimates from a regression relating the interaction of the VRA and industry-level black workforce to corporate leverage by current ratio. Corporate leverage, firm employment and total assets come from Compustat. Black employment by industry comes from the CPS. Errors clustered at the state level. * p < 0.10, ** p < 0.05, *** p < 0.01
Table 7: Civil Rights Enforcement and Corporate Leverage: Effects by Capital-Skill Complementarity

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<th>(4) Low</th>
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<th>(6) Low</th>
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Notes: This table reports estimates of OLS estimates from a regression relating the interaction of the VRA and industry-level black workforce to corporate leverage, by capital-skill complementarity. Corporate leverage, firm employment, and total assets come from Compustat. Black employment by industry comes from the CPS. Errors clustered at the state level. * p < 0.10, ** p < 0.05, *** p < 0.01
Table 8: Civil Rights Enforcement and Corporate Leverage: Heterogeneous Effects by Job-Finding Probability

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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 No Yes Yes No No
Trends No No No Yes No No
Restricted Sample No No No Yes Yes Yes

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. * p < 0.10, ** p < 0.05, *** p < 0.01
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<td>(-9.99)</td>
<td>(-10.04)</td>
<td>(-12.41)</td>
<td>(-9.97)</td>
<td>(-12.33)</td>
<td></td>
</tr>
<tr>
<td>Tangibility</td>
<td>0.0327</td>
<td>0.0300</td>
<td>0.0304</td>
<td>0.0285</td>
<td>0.0291</td>
<td>0.0544</td>
<td>0.0370</td>
<td>0.0556</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(12.73)</td>
<td>(11.53)</td>
<td>(11.70)</td>
<td>(10.93)</td>
<td>(11.13)</td>
<td>(4.92)</td>
<td>(10.23)</td>
<td>(4.96)</td>
<td></td>
</tr>
<tr>
<td>Dividend Payer</td>
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<td>0.0098</td>
<td>0.0202</td>
<td>0.0123</td>
<td>0.0182</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.13)</td>
<td>(6.47)</td>
<td>(7.11)</td>
<td>(7.98)</td>
<td>(6.40)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry median lev.</td>
<td>-0.0065</td>
<td>-0.0060</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.35)</td>
<td>(-1.25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N: 349532 349532 349532 349532 349532 349532 348825 349532 348825
Adj. R²: 0.0062 0.0002 0.0064 0.0081 0.0065 0.0081 0.0244 0.0067 0.0257
Firm FX: No No No No Yes No Yes No Yes
Year FX: No No No Yes No Yes No No Yes
Industry FX: No No No No Yes No Yes Yes Yes

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, market-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. * p < 0.10, ** p < 0.05, *** p < 0.01
Table 10: Effects of Aggregate Unemployment and Leverage on Firm-Level Employment Growth

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

<table>
<thead>
<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage x Unemployment</td>
<td>-.6738**</td>
<td>-.6668**</td>
<td>-.8623***</td>
<td>-.8358***</td>
</tr>
<tr>
<td></td>
<td>(.2994)</td>
<td>(.3162)</td>
<td>(.2893)</td>
<td>(.3065)</td>
</tr>
<tr>
<td>Leverage</td>
<td>-.1837***</td>
<td>-.1862***</td>
<td>-.1918***</td>
<td>-.1954***</td>
</tr>
<tr>
<td></td>
<td>(.0132)</td>
<td>(.0128)</td>
<td>(.0131)</td>
<td>(.0132)</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>.0304</td>
<td>.0001</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td></td>
<td>(.1248)</td>
<td>(.1253)</td>
<td>(.1248)</td>
<td>(.1253)</td>
</tr>
<tr>
<td>Total Assets</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td></td>
<td>(.0000)</td>
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</tr>
<tr>
<td>N</td>
<td>42797</td>
<td>42548</td>
<td>42130</td>
<td>41865</td>
</tr>
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</table>

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

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage x Unemployment</td>
<td>-1.9404*</td>
<td>-1.8986*</td>
<td>-1.6414</td>
<td>-1.8455</td>
<td>-2.5562***</td>
</tr>
<tr>
<td></td>
<td>(1.1398)</td>
<td>(1.1663)</td>
<td>(1.2247)</td>
<td>(1.3184)</td>
<td>(6.9157)</td>
</tr>
<tr>
<td>Leverage x White Unemp</td>
<td>1.2405</td>
<td>1.2149</td>
<td>.7561</td>
<td>1.0215</td>
<td>2.4083***</td>
</tr>
<tr>
<td></td>
<td>(1.1761)</td>
<td>(1.1996)</td>
<td>(1.2410)</td>
<td>(1.3281)</td>
<td>(7.7557)</td>
</tr>
<tr>
<td>Leverage x Black Unemp</td>
<td>.0745*</td>
<td>.0766**</td>
<td>.0570</td>
<td>.0648</td>
<td>.0585</td>
</tr>
<tr>
<td></td>
<td>(.0394)</td>
<td>(.0361)</td>
<td>(.0450)</td>
<td>(.0452)</td>
<td>(.0425)</td>
</tr>
<tr>
<td>Leverage</td>
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<td>-.1850***</td>
<td>-.1940***</td>
<td>-.1968***</td>
<td>-.0870***</td>
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<td></td>
<td>(.0142)</td>
<td>(.0136)</td>
<td>(.0141)</td>
<td>(.0140)</td>
<td>(.0058)</td>
</tr>
<tr>
<td>Unemployment Rate</td>
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<td>-.1940</td>
<td>.2262</td>
<td>.2184</td>
<td>.2399</td>
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<tr>
<td></td>
<td>(.2505)</td>
<td>(.2246)</td>
<td>(.2399)</td>
<td>(.2399)</td>
<td>(.2399)</td>
</tr>
<tr>
<td>White Unemployment</td>
<td>.1162</td>
<td>.2184</td>
<td>.2399</td>
<td>.2399</td>
<td>.2399</td>
</tr>
<tr>
<td></td>
<td>(.2416)</td>
<td>(.2416)</td>
<td>(.2416)</td>
<td>(.2416)</td>
<td>(.2416)</td>
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<td>Black Unemployment</td>
<td>-.0012</td>
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<td>.0209</td>
<td>.0178</td>
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<tr>
<td></td>
<td>(.0009)</td>
<td>(.0013)</td>
<td>(.0009)</td>
<td>(.0009)</td>
<td>(.0009)</td>
</tr>
<tr>
<td>Black Population</td>
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<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td></td>
<td>(.0000)</td>
<td>(.0000)</td>
<td>(.0000)</td>
<td>(.0000)</td>
<td>(.0000)</td>
</tr>
<tr>
<td>Mean Education</td>
<td>.0090***</td>
<td>.0090***</td>
<td>.0090***</td>
<td>.0090***</td>
<td>.0090***</td>
</tr>
<tr>
<td></td>
<td>(.0024)</td>
<td>(.0024)</td>
<td>(.0024)</td>
<td>(.0024)</td>
<td>(.0024)</td>
</tr>
<tr>
<td>Mean Wage</td>
<td>-.0707***</td>
<td>-.0707***</td>
<td>-.0707***</td>
<td>-.0707***</td>
<td>-.0707***</td>
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<tr>
<td></td>
<td>(.0181)</td>
<td>(.0181)</td>
<td>(.0181)</td>
<td>(.0181)</td>
<td>(.0181)</td>
</tr>
<tr>
<td>Mean Education Black</td>
<td>-.0013</td>
<td>-.0013</td>
<td>-.0013</td>
<td>-.0013</td>
<td>-.0013</td>
</tr>
<tr>
<td></td>
<td>(.0018)</td>
<td>(.0018)</td>
<td>(.0018)</td>
<td>(.0018)</td>
<td>(.0018)</td>
</tr>
<tr>
<td>Total Assets</td>
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<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td></td>
<td>(.0000)</td>
<td>(.0000)</td>
<td>(.0000)</td>
<td>(.0000)</td>
<td>(.0000)</td>
</tr>
<tr>
<td>N</td>
<td>40521</td>
<td>40293</td>
<td>39942</td>
<td>39588</td>
<td>40719</td>
</tr>
</tbody>
</table>

**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. * p < 0.10, ** p < 0.05, *** p < 0.01.
Online Appendix
### A Additional Tables

#### A.1: Voting Rights Act on Wages

**Panel A: Effect on Wages**

<table>
<thead>
<tr>
<th></th>
<th>(1) Wage Residual</th>
<th>(2) Education</th>
<th>(3) Wage</th>
<th>(4) Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRA</td>
<td>.1324***</td>
<td>1.8736***</td>
<td>.3027***</td>
<td>.2829***</td>
</tr>
<tr>
<td></td>
<td>(.0258)</td>
<td>(.2381)</td>
<td>(.0383)</td>
<td>(.0354)</td>
</tr>
<tr>
<td>White x VRA</td>
<td>-.1371***</td>
<td>-.20719***</td>
<td>-.2496***</td>
<td>-.2486***</td>
</tr>
<tr>
<td></td>
<td>(.0262)</td>
<td>(.1001)</td>
<td>(.0227)</td>
<td>(.0207)</td>
</tr>
<tr>
<td>N</td>
<td>1009252</td>
<td>1009252</td>
<td>1009252</td>
<td>1009252</td>
</tr>
<tr>
<td>R²</td>
<td>.0109</td>
<td>.0902</td>
<td>.5118</td>
<td>.5040</td>
</tr>
</tbody>
</table>

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

Source: Aneja & Avenancio-León (2019b)

<table>
<thead>
<tr>
<th></th>
<th>(1) Interior Counties</th>
<th>(2) Border Counties</th>
<th>(3) Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>White x VRA</td>
<td>-.075***</td>
<td>-.09***</td>
<td>-.011</td>
</tr>
<tr>
<td></td>
<td>(.01)</td>
<td>(.029)</td>
<td>(.008)</td>
</tr>
<tr>
<td>N</td>
<td>3770000</td>
<td>670000</td>
<td>670000</td>
</tr>
<tr>
<td>R²</td>
<td>.034</td>
<td>.01</td>
<td>.01</td>
</tr>
</tbody>
</table>

**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. Specifications include year, county-race fixed effects, individual education, years worked, and squared(years worked) as documented in Aneja & Avenancio-León (2019b). There are no meaningful differences between effects at border counties and interior counties. * p < 0.10, ** p < 0.05, *** p < 0.01
### Table A2: Effects Excluding 1972 States

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
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<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRA x Proportion Black</td>
<td>.2358**</td>
<td>.2477</td>
<td>.2712***</td>
<td>.2874***</td>
<td>.2964**</td>
<td>.2712***</td>
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<tr>
<td></td>
<td>(.0938)</td>
<td>(.1839)</td>
<td>(.0283)</td>
<td>(.0726)</td>
<td>(.0840)</td>
<td>(.0292)</td>
</tr>
<tr>
<td>VRA</td>
<td>-.0546***</td>
<td>-.0367</td>
<td>-.0321</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.0082)</td>
<td>(.0381)</td>
<td>(.0276)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
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<td>13069</td>
<td>13964</td>
<td>12920</td>
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<td>3291</td>
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<td>Firm FX</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Year FX</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>State-Year FX</td>
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<td>No</td>
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<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
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<td>Texas</td>
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<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
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<td>Arizona</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>South Only</td>
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<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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), and (5) control for state and year fixed effects. Columns (2), (4), and (6) controls for state × year fixed effects. All columns include firm fixed effects. Errors clustered at the state level. * p < 0.10, ** p < 0.05, *** p < 0.01.
B Discrimination Regulation Costs

B.1 Statistical Discrimination as a Search Cost

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 an employee’s 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, the firm’s financial outlook recurrently appears as a critical factor 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 [the employee’s] concerns, Rykoff [the 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)


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


California


Colorado


Florida


Indiana


Massachusetts


Michigan


New York


North Carolina


Oklahoma


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 – that 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 to 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:

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

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:

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

and

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

Plugging these into (24) equations yields:

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

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:

\[
rV(n_b, n_a, B) = \max_{v_b, v_a, \Delta I} \{f(n_b + n_a) - w(n_b + n_a)n_b - w(n_b + n_a)n_a + \tau RB(1 - \lambda) + (1 - \lambda)(\tau R \Delta I - (v_a + v_b)\gamma) + \frac{dV_b}{dt} + \frac{dV_a}{dt} + \frac{dV_B}{dt} \}
\]

58
\[ J_{n_b}(n_b, n_a, B) \equiv V_{n_b}(n_b, n_a, B) = \frac{\gamma}{q(\theta_b)} \]  
(27a)
\[ J_{n_a}(n_b, n_a, B) \equiv V_{n_a}(n_b, n_a, B) = \frac{\gamma}{q(\theta_a)} \]  
(27b)
\[ J_B(n_b, n_a, B) \equiv V_B(n_b, n_a, B) = -\tau R \]  
(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, \( \dot{n}_i = 0 \ ni = 0 \), we obtain:

\[ J_{n_b}(n_b, n_a, B) = \frac{f'(n_b + n_a) - w(n_b) - \frac{\partial w_b(n_b+n_a)}{\partial n_b} n_b - \frac{\partial w_a(n_b+n_a)}{\partial n_a} n_a}{r + \delta(1 - \lambda) + \delta D \lambda} \]  
(28a)
\[ J_{n_a}(n_b, n_a, B) = \frac{f'(n_b + n_a) - w(n_a) - \frac{\partial w_a(n_b+n_a)}{\partial n_a} n_a - \frac{\partial w_b(n_b+n_a)}{\partial n_b} n_b}{r + \delta(1 - \lambda) + \delta D \lambda} \]  
(28b)
\[ J_B(n_b, n_a, B) = \frac{-\frac{\partial w_a(n_b+n_a)}{\partial B} n_a - \frac{\partial w_b(n_b+n_a)}{\partial B} n_b + \tau(r + \lambda)(\tau B(1 - R) - c) + \gamma(v_a + v_b)}{r} \]  
(28c)

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

\[ \frac{pf'(n_b + n_a) - w(n_i) - \frac{\partial w_i(n_b+n_a)}{\partial n_i} n_i - \frac{\partial w_b(n_b+n_a)}{\partial n_a} n_{-i}}{r + \delta(1 - \lambda) + \lambda D} = \frac{\gamma}{q(\theta_i)} \]  
(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 (8-b) yields the partial first order differential equations:

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

\[ 20 \] 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) intrafirm bargaining into a search-theoretical framework. The wage equation takes the form:

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

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:

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

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

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

### E.1 Discrimination

There are 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 the difficulty in finding the right talent for the position (statistical discrimination). Let that cost be denoted by $d$. Then, the value function of the firm solves:

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

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

Which leads to the first order condition for group $b$:

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

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:

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

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

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

\[ w_b = (1 - \beta)b - \beta d + \frac{\gamma_a}{q(\theta_a)}(1 - \lambda)m(\theta) + \frac{\beta \alpha}{1 - \beta + \alpha \beta}(n_a + n_b)^{\alpha - 1} \]

which leads to the following equilibrium tightness condition:

\[ \left(\frac{\alpha}{1 + \alpha \beta - \beta}\right)(n_a + n_b)^{\alpha - 1} = \frac{\gamma_a}{q(\theta_a)} \left[ \frac{1}{1 - \beta}(r + \lambda \delta D) + \frac{\beta m(\theta_a)(1 - \lambda)}{1 - \beta} \right] = \frac{\gamma_b}{q(\theta_b)} \left[ \frac{1}{1 - \beta}(r + \lambda \delta D) + \frac{\beta m(\theta_b)(1 - \lambda)}{1 - \beta} \right] \]

(Equilibrium \( \theta \))

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

**Proposition 1 (Labor Market Gaps):** Let group \( b \) be discriminated against in hiring or employment relative to group \( a \). Then:

(i) **Unemployment Gap:** 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 Gap:** The unemployment volatility for group \( b \) is higher than the unemployment volatility for group \( a \).

**Proof:** (i) 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:

\[ \frac{\gamma_a}{q(\theta_a)} \left[ \frac{1}{1 - \beta}(r + \lambda \delta D) + \frac{\beta m(\theta_a)(1 - \lambda)}{1 - \beta} \right] = \frac{\gamma_b}{q(\theta_b)} \left[ \frac{1}{1 - \beta}(r + \lambda \delta D) + \frac{\beta m(\theta_b)(1 - \lambda)}{1 - \beta} \right] \]

Since \( \gamma_b > \gamma_a \) and \( m(\theta) \) and \( \frac{1}{q(\theta)} \) are increasing functions of \( \theta \), 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:

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

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

\[ = \frac{\gamma_b}{q(\theta_b)} \left[ \frac{1}{1 - \beta}(r + \delta(1 - \lambda) + \lambda \delta D) + \frac{\beta m(\theta_b)(1 - \lambda)}{1 - \beta} \right] + l - \frac{\gamma_b}{q(\theta_b)} (r + \delta(1 - \lambda) + \lambda \delta D) \]

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

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

\[
\frac{\partial B}{\partial n} = \frac{\delta (1 - \lambda) + \lambda \delta D}{(\delta + m(\theta))(1 - \lambda) + \lambda \delta D}
\]

Since \( m(\theta) \) is concave in \( \theta \), and \( \theta_a > \theta_b \), it suffices to show that the elasticity of \( \theta_b \) with respect to changes in productivity is higher than the elasticity of \( \theta_a \). Equivalently, we must show that \( \frac{\partial \theta_a}{\partial \theta_b} < 1 \). 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 \( \theta_a > \theta_b \). Hence, \( \frac{\theta_a}{\theta_b} > \frac{\gamma_a}{\gamma_b} \). Since \( m(\theta) \) is concave, an increase in \( \theta_a \) implies an increase in \( \theta_b \) 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 \( \frac{\theta_a}{\theta_b} \to \frac{\gamma_a}{\gamma_b} \).

Proposition 2 (Increase in Debt): Let \( L_i^t > L_j^t \) be the minority workforce size under different scenarios \( i, j \). Let there be a policy change \( P \) that equalizes the flow cost of posting a vacancy for both groups of workers. That is, for \( \gamma_b^t > \gamma_a^t \), \( P : (\gamma_a^t, \gamma_b^t) \to (\gamma_a^{t+1}, \gamma_b^{t+1}) \). Then, equilibrium debt at time \( t + 1 \) is higher under scenario \( i \) than \( j \), i.e. \( B_i^{t+1} > B_j^{t+1} \).

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:

\[
\frac{\partial}{\partial n_i} \left( \frac{\partial w_i(n_b + n_a)}{B} n_a + \frac{\partial w_b(n_b + n_a)}{B} n_b \right) = -\frac{\gamma}{q(\theta_i)} (\delta D - \delta) \frac{\partial \lambda}{\partial B}
\]

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 \( P(\gamma_a^t, \gamma_b^t) = (\gamma_a^{t+1}, \gamma_b^{t+1}) \) implies that either \( \theta_a \) decreases, \( \theta_b \) increases, or a combination of the two. From the job creation condition for group \( a \), an increase in flow cost from \( \gamma_a \) to \( \gamma \) 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 $\theta$, $\frac{d\theta}{dn_i} < \frac{d\theta}{dn_j}$ 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. □