

**Employers in the Boom:
How Did the Hiring of Unskilled Workers Change during the 1990s?**

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Abstract

In this paper, we present evidence on how a wide range of employer attitudes and hiring behaviors with respect to unskilled workers changed over the decade of the 1990s. We use a unique source of data: a set of cross-sectional employer surveys administered over the period 1992–2001. We also try to disentangle the effects of labor market conditions from broader secular trends. The results indicate that employers became more willing to hire a range of disadvantaged workers during the boom—including minorities, workers with certain stigmas (such as welfare recipients), and those without recent experience or high school diplomas. The wages paid to newly hired unskilled workers also increased. On the other hand, employer demand for specific skill certification rose over time, as did their use of certain screens. The results suggest that the tight labor markets of the late 1990s, in conjunction with other secular changes, raised hiring costs and induced employers to shift toward screens that seemed relatively more cost-effective.

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I. INTRODUCTION

The benefits of the economic boom of the late 1990s seem to have been widely shared, especially in the labor market (Cherry and Rodgers, 2000; Hines et al., 2002; Mishel et al., 2002). Unemployment rates among most major demographic groups fell to their lowest levels in three decades, while real wages increased for virtually all workers, especially at the bottom of the labor market. This combination of tight labor markets and strong productivity growth benefited less-educated and/or minority workers, workers who were hurt by the economic dislocations of the preceding decades.

The notion that tight markets disproportionately benefit the least-educated and lowest-paid workers is, of course, not particularly new. Indeed, Hoynes (2000), Hines et al. (2002), and many others have consistently shown that employment (and, to a lesser extent, wages) for these groups is quite procyclical and also reacts strongly to local labor market shifts.¹ The dramatic gains that occurred in employment during this decade for single mothers and minority females have also been partly attributed to the strong economy, as well as other factors such as welfare reform and the growing generosity of the Earned Income Tax Credit (EITC).²

But not all disadvantaged groups benefited along all dimensions during the boom. The employment and labor force participation rates for young black men continued their long secular decline during the 1990s (Holzer and Offner, 2002). Moreover, their incarceration rates continued to rise, and the employment prospects of young men with criminal backgrounds continues to look very bleak (Holzer et al., 2002). Also, the coming of a recession during 2001 has generated questions about the extent to which

¹See also Bartik (2001) or Bound and Holzer (2000) for reviews of this extensive literature.

²See Blank and Schmidt (2002) and Meyer and Rosenbaum (2001).

the gains enjoyed during the boom will survive the downturn, and whether they will return with any recovery (Krueger and Solow, 2001).

Future trends in productivity or labor market tightness are difficult to predict, but one can learn some important lessons from a careful analysis of employer behavior during the boom. By studying how employers responded to the very tight labor markets of the late 1990s—in terms of changes in whom they were willing to hire, how they recruited and screened, and what wages they were willing to pay—we learn how employers adapt to different labor market conditions, who benefits from these changes, and which changes are likely to persist over time. In addition, a look at the extent to which changes persisted during the downturn of 2001 offers us some particular clues about the sustainability issue more broadly.

Of course, other developments likely occurred during the 1990s that affected employers and their behavior as well. These include the longer-term shift in demand toward more highly skilled labor that has characterized the past few decades (e.g., Autor et al., 1998). Also, changes in employer hiring procedures likely reflect new technologies and institutional developments, such as the growing use of the Internet and intermediary agencies such as temp services (see footnote 7 below). Thus, both the kinds of workers sought by employers and the methods they used to recruit and screen them might have changed over the past decade for secular as well as cyclical reasons.

In this paper we analyze changes in employer hiring attitudes and behavior during the boom. We do so using a unique source of data: a set of employer surveys that were administered in various large metropolitan areas over the period 1992–2001. The employer surveys administered in different time periods were each cross-sectional in nature, but have enough commonality in question design and sampling frame that we can do some meaningful analysis over time. Furthermore, by observing variations in employer behavior both within and across local labor markets and years, we can hopefully disentangle the effects of tight labor markets from other factors that were driving employer hiring behaviors during this period.

We analyze a fairly comprehensive set of employer outcomes and attitudes, including:

- the recent hiring of blacks and Latinos;
- expressed employer willingness to hire welfare recipients, ex-offenders, etc.;
- the extent to which employers required credentials, such as a high school diploma, previous work experience, and previous training in filling noncollege jobs;
- the use of various screens, such as tests and background checks, during the hiring process; and
- the starting wages paid to newly hired less-skilled workers.

In the next section, we briefly (and nontechnically) discuss the variety of dimensions along which we might expect employers to adapt their attitudes and behavior to very tight labor markets. After describing the data and econometric issues in the following section, we present summary data in numerical and graphical form that highlight the changes over time in these factors. We then present evidence from regression equations on how these changes were occurring over time in response to the economic boom. Our measures of labor market tightness will include the job vacancy rate at any establishment, measures of time trends, and/or local unemployment rates. And, since the job vacancy rate itself can reflect high turnover as well as net job growth and market tightness, we present some estimates in which one or both of the latter variables can be used as instruments for the vacancy rate.

Finally, we conclude with a summary and some speculation about the extent to which the observed changes will survive over time, and what they imply about the sustainability of positive changes for less-skilled workers.

II. HOW DO EMPLOYERS ADAPT TO TIGHT LABOR MARKETS? SOME CONSIDERATIONS

How might we expect employers to react to a very tight labor market, especially one in which many have difficulty finding and/or retaining qualified workers?

In a simple neoclassical model, the most obvious way for employers to relieve short-term worker “shortages” would be to raise wages.³ The extent to which wage increases are effective would then depend on the relevant elasticities of labor supply and demand, in the aggregate and within particular submarkets as well. But employers might not raise wages for a variety of reasons, including some associated with wage “stickiness” in the Keynesian literature.⁴ In these situations, the shortages will persist, or employers might use other means of resolving them.

For instance, instead of (or in addition to) raising wages, employers might try to increase their efforts at recruiting applicants and/or lower their standards during the screening process. Extra recruiting activity might involve soliciting more referrals from current workers or acquaintances, posting “help wanted” signs or newspaper ads, checking with private or public employment agencies, etc. Lower screening standards could entail putting less weight on credentials such as education or previous experience, as well as on stigmas (i.e., negative credentials) such as welfare reciprocity, criminal records, etc. The employer’s decision of whether to perform or how much weight to put on interviews, tests (for skills or drugs), background checks, etc. might be reconsidered as well.

The extent to which each of these strategies is pursued will depend on their direct costs (in time or money), their marginal effects on the applicant pool and hires, and the relative costs of forgone output (associated with a worker shortage) and forgone productivity (associated with the hiring of potentially less-productive workers).⁵ Some of these strategies (such as greater recruiting effort) may be relatively more successful for individual employers than in the aggregate, where the supply of current or new workers more broadly acts as a constraint on total hiring; in this case, the need of employers to increase overall worker supply might lead to a particular reliance on a change in their screening behavior.

³See Cohen (1998) for a good discussion of models in which labor market shortages might persist, as well as a range of measurement issues regarding these shortages.

⁴For a review of such models see, for instance, Davidson (1990).

⁵For search models that determine use of search methods by prospective employees or employers see Holzer (1987, 1988).

Of course, since individual worker productivity is not directly observed prior to hiring in most cases, employer decisions must be based on *expectations* of future productivity that derive from the screens they use to evaluate applicants. If employers know that some screens have less predictive power than others, they might decide that the marginal gains to the expected productivity of the hired worker no longer justify the use of certain credentials, relative to the cost they generate in forgone output.

Moreover, through such adjustments employers may permanently alter their screening practices. For example, the tight labor market might force employers to economize on or rationalize their use of screening mechanisms. And, if employers learn that the productivity of certain screens turns out to be somewhat less (or more) than they had originally anticipated, they may choose to use less (or more) of that screen, even after the tight market conditions abate over time. This might be particularly true of screens such as race or ethnicity, where the degree of discrimination (statistical or otherwise) might permanently decrease over time in response to temporary periods of tight labor markets.⁶

It is also possible that the use of some screens, or the demands for some credentials, might actually *increase* in tight labor markets. For instance, certain skilled workers may complement more unskilled workers—e.g., managers with greater supervisory skills might be needed to monitor and manage more unskilled workers, such as immigrants with poor education/language skills or welfare recipients. Similarly, certain screens (such as drug tests or background checks) might actually be complementary with the hiring of more unskilled workers.

With respect to the most recent boom, the likelihood that the use of certain screens increased in response to tight labor markets might have been reinforced by several secular trends. For instance, if the tight labor markets coincide with a period of secular increases in the demand for skilled labor (as likely occurred during the 1990s), the declines in the use of some screens might be mitigated while increases in

⁶For a review of models that incorporate employer learning into hiring and wage-setting in a “statistical discrimination” framework see Altonji and Blank (2000). Employer discrimination against blacks seems to have permanently declined after periods of very tight labor markets in World War II and the late 1960s, as we note below.

the use of other screens might occur more frequently. Also, there are periods in which technological and/or institutional changes make some screens much more cost-effective than they had been before. For instance, the 1990s have been associated with a greater use of temporary agencies and Internet searches for hiring by employers, as well as background checks and tests which are now less costly and more available (at least partly because of the Internet).⁷

Even in the absence of labor market tightness, employers might well have shifted some of their recruiting and screening behaviors, as the relative costs and/or expected productivity of using these agencies and the Internet were changing. But the fact that tight labor markets also characterized this period may have accelerated these behavioral shifts, if the returns associated with using new or improved recruiting or screening methods were greater because of this labor market tightness.

Thus, a period of tight labor markets such as the late 1990s might result in higher wages for some groups of workers, but also a range of different recruiting and screening activities on the part of employers that improve employment prospects for some but not all workers. Furthermore, the tight markets (and other contemporaneous changes in labor demand or the technology of screening) might result in less use of some screens and less demand for some credentials, but more use of others. Whether these behavioral shifts then persist over time will depend on the extent to which they are linked to market tightness, or result in new learning about the productivity of screens among employers.

III. DATA AND METHODS USED

The data used here are from a unique set of employer surveys that we developed and administered in various metropolitan areas over the period 1992–2001. While each survey was cross-sectional in nature, a good deal of commonality in sample and question design exists across the surveys. Thus, it is

⁷See, for instance, Katz and Krueger (1999), Kuhn and Skuterude (2001), Autor (2001), Freeman (2002), and Holzer et al. (2003).

possible to pool them and analyze employer behaviors over time as well as across and within areas and years.

The first survey was administered during the period 1992–94 to over 3,000 employers in four metropolitan areas: Atlanta, Boston, Detroit, and Los Angeles (Holzer, 1996). This survey was part of the larger effort known as the Multi-City Study of Urban Inequality (MCSUI), designed to analyze both employer and household behavior in the context of changing residential patterns and labor markets during the 1980s and 1990s.

The employer survey was administered over the phone to a sample of establishments drawn from listings of employers and also from household survey respondents. The respondent in each case was the person responsible for hiring unskilled workers at that establishment. The sample of establishments drawn from employer lists was stratified *ex ante* by size and chosen to reflect the distribution of workers across establishment size categories in the workforce. Thus, it is already implicitly weighted by size.⁸ Response rates were generally high (about 70 percent), and differed only modestly across observable characteristics of the employers (Holzer, 1996).

Survey questions focused on the overall characteristics of the firm's workforce (such as job vacancy rates, establishment size, use of collective bargaining, etc.), as well as the last worker hired at the establishment and the last job filled. Questions in the latter sections focused on tasks used on a daily basis on the job, recruiting and screening methods used to fill the job, demographics of the worker hired, and measures of his/her performance.

In the period 1997–99, another series of surveys was administered to nearly 4,000 employers in Michigan (Detroit as well as Flint and Grand Rapids) as well as in Chicago, Cleveland, Los Angeles, and Milwaukee (Holzer, 1999; Holzer and Stoll, 2001). This later round of surveys was designed primarily to

⁸Roughly 20 percent of establishments were in the 1–19 size category; about 40 percent were in the 20–99 category, while about 40 percent were in the 100 and above category. These fractions roughly correspond to the distribution of workers across establishment size categories that have been observed in a variety of data.

gauge employer demand for welfare recipients in the aftermath of the reform initiative passed by the federal government in 1996 and administered even earlier by many states. Finally, a newer version of the survey was administered to about 600 employers in Los Angeles during 2001 in order to elicit more information about employer demand for those with criminal records. While the two latter surveys include specific batteries of questions on the hiring of welfare recipients or ex-offenders (questions that did not appear in the earlier surveys), a large group of questions was included in each case from the 1992–94 survey instrument—especially regarding the last job filled and last worker hired into that job.

The four surveys have a core of common questions. These include: (a) the number of vacancies at the establishment that are available for immediate occupancy; (b) the industry and size of the establishment; (c) the occupation of the job that was most recently filled; (d) whether or not each of a set of tasks (including reading/writing, arithmetic, computer use, and speaking directly to customers) was done on that job on a daily basis; (e) the race, gender and education level of the person filling the job; (f) the percentage of applicants for that job from various race/gender groups; and (g) the starting wage paid on that job.

In addition, some additional questions were asked about employer hiring attitudes and practices. For instance, one set of questions inquired whether the employer would “definitely,” “probably,” “probably not,” or “definitely not” hire someone into that job with each of a set of stigmatizing characteristics—such as being a welfare recipient, having a criminal record, having only short-term or part-time work experience, having a GED or experience in a government training program, or having been unemployed for a year or more. Another set of questions asked whether each of a set of credentials—such as having a high school diploma, having recent work experience (general or specific to that job), or having training in that line of work—was “absolutely necessary,” “strongly preferred,” “mildly preferred,” or “not preferred at all” for the person hired into that job. Finally, a range of questions

was asked about recruitment and screening techniques, including whether any kind of test had been given to the applicants and whether criminal background checks had been done.⁹

With these data, the following models have been estimated to test for the effects of tight labor markets on hiring outcomes:

$$(1) Y_{ijkt} = f(X_j, X_k, VR_{kt}, MSA_k, TIME_t) + u_{ijkt}$$

$$(2) Y_{jkt} = g(X_j, X_k, VR_{kt}, MSA_k, TIME_t) + v_{jkt}$$

$$(3) W_{ijkt} = h(X_i, X_j, X_k, VR_{kt}, MSA_k, TIME_t, Y_{ijkt}, Y_{jkt}) + z_{ijkt}$$

where i , j , k , and t denote the person hired, the job filled, the establishment, and survey year, respectively.

The Y 's correspond to a set of outcomes reflecting the person hired in the first equation and the behaviors or attitudes of the employer in filling that job in the second equation. The former include (1) whether the last worker hired is black (with separate estimates provided for black males and black females) and (2) whether that worker is Hispanic. The latter include (1) whether the employer would be willing (definitely or probably) to fill that job with a welfare recipient, someone with a GED or government training, someone with only short-term or part-time work experience, an ex-offender, or someone who has experienced long-term unemployment; (2) whether the employer required ("absolutely necessary" or "strongly preferred") a high school diploma, recent work experience, or specific previous training or certification; and (3) whether (s)he used tests or background checks in filling the job.

These outcomes measure not only characteristics of employer demand for less-skilled workers but also the extent to which such demand increases might have resulted in the hiring of more disadvantaged workers *relative to others in the workforce*.¹⁰ They do not constitute an arbitrary or haphazard list, but

⁹Unfortunately, various questions that were asked about recruitment methods and especially Internet searches were not consistently available over the entire set of employer surveys.

¹⁰For instance, whether the last hired worker was black or Hispanic clearly measures hiring outcomes for minorities relative to whites. Other measures of screens used or acceptability of various kinds of candidates refer to workers who are underrepresented in the current workforce and therefore relatively more available in a tight labor market than those with stronger personal characteristics.

rather a fairly comprehensive set of measures that include actual employment outcomes as well as many of the screens used by employers (in terms of their own attitudes and behaviors) to generate them. A few of the attitudinal questions (especially those on willingness to hire welfare recipients, etc.) reflect *prospective* behavior by employers, but the rest focus on *actual* employer behaviors as well as outcomes.¹¹

In equation (3), W reflects the starting wage earned by the newly hired worker on that job (in natural logs). The X 's reflect characteristics of the person hired (such as age and education), the job (such as occupation/tasks and race of the applicant pool) or the establishment (industry or size) in the appropriate equation, while VR reflects the job vacancy rate of the establishment in the relevant year.¹² MSA reflects dummies for metropolitan areas in which the establishment is located while $TIME$ is a measure of time, either in the form of a time trend (usually quadratic) or one or more dummies.

Note that the outcomes considered in equations (1) and (2) for the person hired and job filled respectively enter the third equation for the wage of the worker hired as independent variables. The equations are estimated on a sample of jobs that do not require college degrees, to focus specifically on the hiring of less-educated workers.¹³ Equations (1) and (2) are estimated as linear probability models.

In these equations, VR represents a firm-specific measure of the extent of labor market tightness. When both MSA and $TIME$ controls are included in the equation, VR can be considered a within-area and within-year measure of such tightness. To the extent that we are interested in changes in labor market demand over time, we exclude $TIME$ from some of these equations. However, in a cross-section of firms

¹¹For some analysis of how these prospective demand measures correlate with actual hiring outcomes see Holzer and Stoll (2001) or Holzer et al. (2003). In most cases the correlations are quite strong.

¹²We define the job vacancy rate as $v/(v+e)$, where v refers to the number of currently vacant jobs at the establishment that are immediately available for occupancy, while e refers to the number of workers currently employed. VR and some other establishment characteristics (like size) are clearly time-varying, while others (such as location and industry) are time-fixed.

¹³In all of the surveys administered in the later 1990s or 2001, employers were asked only about recently filled jobs that do not require college degrees.

the vacancy rate is also likely to capture differences in turnover rates and gross hiring, which are likely correlated positively with demand for unskilled workers.

To deal with this possibility, we present some estimated versions of these equations in which we use a variety of instrumental variables (IV) for the vacancy rate. These IVs include (a) the unemployment rate for the MSA and year, (b) various measures of TIME, and/or (c) interactions between TIME and MSA.¹⁴ The case for identifying the demand effect through the local unemployment rate is very strong, though the predictive power of this instrument is somewhat weak (as we note below). The same can be said about interactions between time and MSA, since these capture area-specific changes over time that do not likely reflect technological changes in screening abilities that could affect employer behavior.

The case for identification on the basis of the noninteracted TIME measures is somewhat weaker, given that economy-wide changes over time might reflect factors other than labor market tightness. For instance, technological effects that reduce the costs of screening or shifts in demand toward more-skilled workers might raise screening rates or demands for credentials. A few of the outcomes considered below, such as the demographics of those hired, might reflect trends over time in labor supply as opposed to demand. Our controls for the demographics of the applicant pool should minimize this latter concern, though missing values (and potential measurement error) might reduce their effectiveness in doing so.¹⁵ Even on the demand side, employer attitudes toward some groups (such as welfare recipients) might have been growing more positive independently of tight markets.

We have also included an extensive set of controls for skills demanded on these jobs that help to mitigate this possibility. Furthermore, any shifts over time toward more screening or greater demands for more-skilled workers would generally lead to biases against the finding that tight markets raised the

¹⁴TIME (measured in quadratic form or in dummies) can be included in equations along with MSA- and year-specific unemployment rates or with MSA- and year-specific dummies, while the latter two measures clearly cannot be included together in the same equation.

¹⁵Since about a fourth of all establishments failed to report the race of the applicant pool, we inserted zeroes for missing values on this variable and added dummies to reflect missing cases.

demand for less-skilled workers disproportionately over time. The potential biases in the estimated effects of time on demand for Hispanic workers or welfare recipients noted above are positive, and therefore potentially harder to distinguish from the hypothesized effects of tight markets. But, given the control variables included for demographics of the applicant pool and the relatively short time period that we consider here, any biases attributed to secular supply shifts (especially for Hispanics) are not likely to be large in magnitude.

Perhaps most important, the equations in which we measure time as a set of dummies are somewhat less vulnerable to this potential criticism, since the boom applies most strongly to the period 1997–99 but not the observations for 2001. The downturn at the end of the period should enable us to distinguish the business cycle from other secular changes that should have continued to occur throughout the period. Thus, we use nonlinearities in the effects of time, as well as MSA-specific effects of time or unemployment, to distinguish business cycle effects from more secular trends in employer tastes or worker demographics, as we note below.

IV. EMPIRICAL RESULTS

A. Summary Outcomes

Some summary data on these employers and their hiring behaviors appear in Table 1, where we present means on our dependent and independent variables for the entire sample period. In particular, the former include data on the four sets of outcomes described above (i.e., race/gender of those hired, willingness to hire stigmatized applicants, how necessary are various credentials, and the use of tests and background checks). The latter include demographics of the applicant pool; occupation and tasks used in last noncollege job filled; industry, size and metropolitan area of the establishment; job vacancy rate; and year of the interview.

TABLE 1
Means on Employment Outcomes and their Determinants

1A: Outcomes

Demographics of Last Hired Worker

Black	0.23
Black Male	0.10
Black Female	0.12
Hispanic	0.19

Would Hire Each Type of Applicant (“Yes” or “Probably” = 1)

Welfare Recipient	0.95
GED or in Government Training Program	0.97
Only Short Term Work Experience	0.65
Unemployed 1 Year or More	0.82
Criminal Record	0.40

How Necessary Is Each Qualification (“Absolutely Necessary” or “Strongly Preferred” = 1)

High School Diploma	0.68
Previous Experience	0.58
Previous Training or Skill Certification	0.39

Tests/Background Check

Usually Check Criminal Background	0.52
Any Tests Given for Last Position	0.35

Wages

Starting Hourly Wages	\$9.86
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1B: Determinants*Demographics of Applicants for Last Position Filled*

Percent Black Men	0.10
Percent Black Women	0.09
Percent Hispanic	0.08

Last Hired Worker's Occupation

Managerial	0.03
Professional	0.06
Sales	0.15
Laborer	0.05
Service	0.21
Farm	0.01
Craft	0.07
Operator	0.12
Clerical	0.30

Tasks Performed on a Daily Basis for Last Hired Position

Arithmetic or Computations	0.59
Computer	0.47
Speaking to Customers	0.68
Reading or Writing	0.56

(table continues)

TABLE 1, continued

1B: Determinants, continued	
<i>Firm's Industry</i>	
Agriculture or Mining	0.01
Construction	0.03
Manufacturing	0.17
Transportation/Communications/Utilities	0.05
Retail Sales	0.21
Service	0.38
Public Administration	0.01
Wholesale Sales	0.06
Finance/Insurance/Real Estate	0.07
<i>Number of Employees in Firm</i>	
1–10	0.27
20–99	0.35
100–499	0.29
500 or More	0.09
<i>MSA</i>	
Atlanta	0.10
Boston	0.10
Los Angeles	0.27
Cleveland	0.09
Detroit	0.17
Flint	0.05
Grand Rapids	0.04
Chicago	0.09
Milwaukee	0.10
<i>Vacancies</i>	
Vacancy Rate	0.05
<i>Interview Year</i>	
1992	0.05
1993	0.26
1994	0.09
1997	0.09
1998	0.06
1999	0.34
2001	0.08

Note: The overall sample size is 7,914, but it is smaller for particular variables due to missing values. Since background checks were not included in the 1997–1999 surveys, the sample size for this question is 3,731.

The outcomes in Table 1A indicate that the percentages of workers recently hired into noncollege jobs in these metropolitan areas are about 20 percent black and 20 percent Hispanic. All else equal, employers have been willing to hire welfare recipients and those with GEDs or government training into most jobs, but they are much less willing to do so with ex-offenders. High school diplomas have been required or strongly preferred on most jobs, while training or skill certification has been demanded somewhat less frequently. Background checks and tests have been used in roughly one-half and one-third of cases, respectively.

In terms of characteristics of the jobs held and establishments, most are clerical/sales or service jobs in the retail trade and service sectors (though nontrivial fractions of these jobs are also blue-collar or in construction/manufacturing as well). Blacks are hired in rough proportion to their representation in the pool of applicants, while Hispanics are somewhat overrepresented among recent hires.¹⁶ Daily customer contact occurs for roughly two-thirds of these jobs, while reading, performing arithmetic, and using computers are each done quite frequently as well. The range of large metropolitan areas represented here is fairly wide (in terms of region and demographic mixes), and the years covered are as described above. Starting hourly wages have averaged nearly \$10 per hour (in 2001 dollars) over this period.¹⁷

Overall, we have a set of jobs that do not require a high level of skill, but where the need for elementary cognitive and social/verbal skills is not trivial. Finally, we have an average job vacancy rate of .05, which seems somewhat high compared to other summaries of such rates in the past (Abraham, 1983; Holzer, 1989), though the *median* rate (.02) falls well below that level.¹⁸

¹⁶Since Hispanics are hired in relatively greater proportions than their representation in applicant pools, this indicates a relative inclination on the part of employers to hire them relative to other workers. At least some of this greater representation, however, is accounted for by missing values in the applicant pool measure.

¹⁷Nominal wages have been deflated using the CPI-U-RS series, which corrects to some extent for the overstatement of inflation in other CPI measures.

¹⁸The high mean job vacancy rates reported here are very comparable to those observed in a report issued by the Minnesota Department of Employment Security (2001), based on a survey of employers in that state in 2000.

Since the job vacancy rate is our key measure of the labor market tightness experienced by individual establishments, we present a bit more data on it as well. Part A of Table 2 presents mean vacancy rates by year, as well as mean unemployment rates for the metropolitan areas used in this sample. Part B then presents means on the various hiring outcomes under consideration here, separately for firms that are above and below the median vacancy rate for the sample.

The results of Table 2A indicate that average vacancy and unemployment rates are inversely related to one another over time, as expected. Furthermore, in Figure 1 we plot these measures across metropolitan areas as well as time, and indicate an inverse relationship as well.¹⁹ This suggests at least the possibility that the local unemployment could serve as a plausible instrumental variable for the establishment's job vacancy rate, if needed. Table 2A also indicates the general upward drift in job vacancy rates over time, and downward drift in unemployment rates, which are both at least partially reversed in 2001 in Los Angeles.

The data in Table 2B, however, present a fairly mixed picture on the relationships between job vacancy rates and other hiring outcomes. For instance, blacks are more frequently hired at firms with higher vacancy rates, but the opposite appears true for Hispanics.²⁰ Stigmatized workers are generally hired a bit more frequently at firms with higher vacancy rates, while differences in demand for qualifications across these categories are mixed. Finally, we note that tests are used more at firms with high vacancy rates.

These results raise questions about whether observed differences by job vacancy rates represent differences in labor market tightness as opposed to cross-sectional differences in turnover rates and other factors. On the other hand, they imply that the component of vacancy rates that varies over time likely reflects variation in labor market tightness.

¹⁹The outlying data point in that figure, indicating both a high vacancy and high unemployment rate, represents Flint, Michigan, in 1999. The figure is based on a relatively small sample of only about 140 employers.

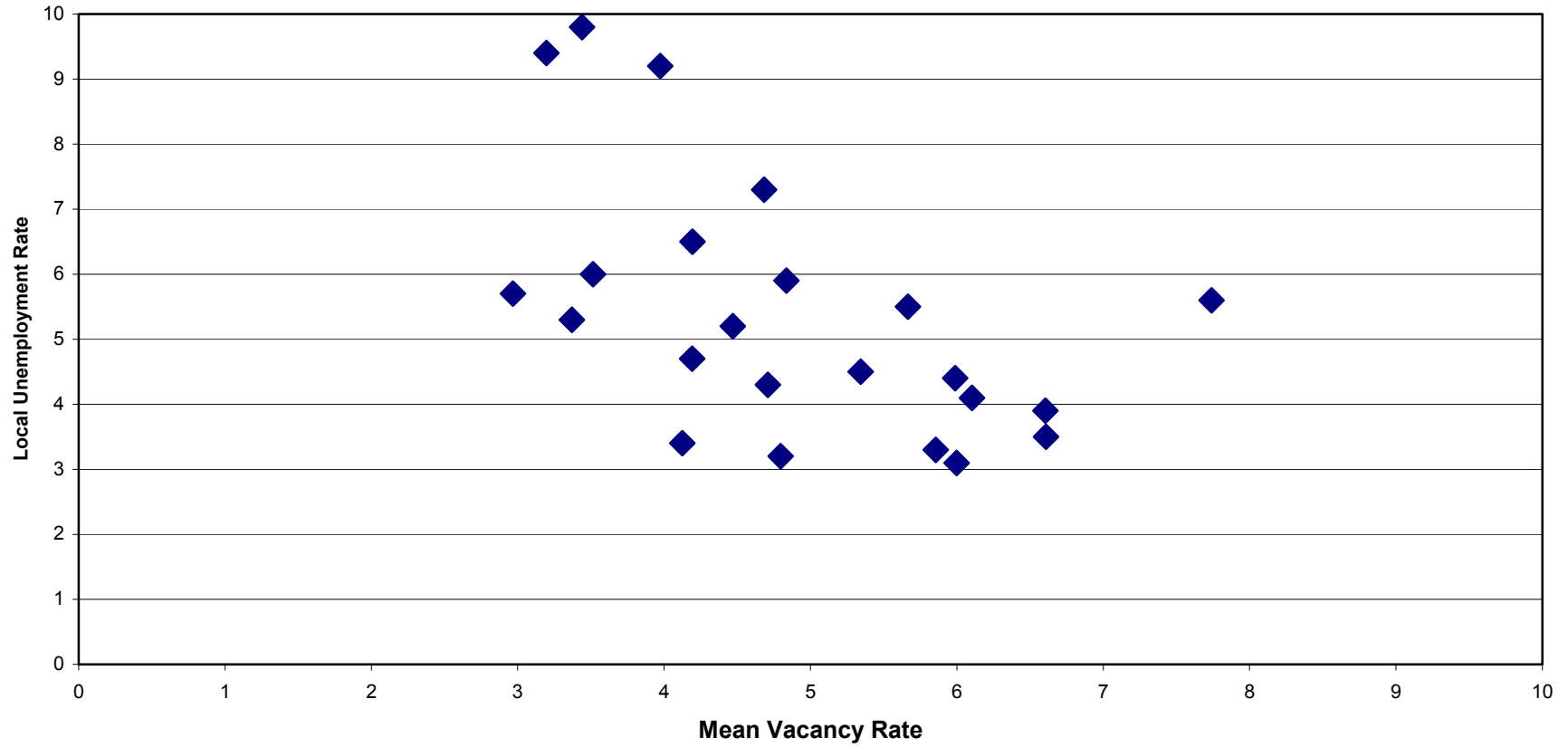
²⁰It is, of course, possible that turnover rates are endogenous with respect to the demographics of those who are employed across establishments.

TABLE 2
Vacancy Rates and Correlates

2A: Vacancy Rate and Unemployment Rate by Interview Year		
Interview Year	Vacancy Rate	Unemployment Rate
1992	3.97	9.20
1993	3.68	6.91
1994	3.85	6.95
1997	5.66	4.25
1998	5.07	4.86
1999	5.72	4.29
2001	2.97	5.70

2B: Outcomes by Vacancy Rate		
Outcomes	Mean for Above Median VR Firms	Mean for Below Median VR Firms
<i>Demographics of Last Hired Worker</i>		
Black	0.27	0.18
Male	0.12	0.09
Female	0.15	0.09
Hispanic	0.17	0.21
<i>Would Hire Each Type of Applicant ("Yes" or "Probably" = 1)</i>		
Welfare recipient	0.96	0.94
GED or in government training program	0.98	0.96
Only short term work experience	0.66	0.64
Unemployed 1 year or more	0.81	0.83
Criminal record	0.40	0.39
<i>How Necessary Is Each Qualification ("Absolutely Necessary" or "Strongly Preferred" = 1)</i>		
High school diploma	0.69	0.67
Previous experience	0.56	0.60
Previous training or skill certification	0.39	0.39
<i>Tests/Background Check</i>		
Usually check criminal background	0.56	0.49
Any tests given for last position	0.39	0.30

Figure 1: Local Unemployment Rate by Mean Vacancy Rate



How do our outcome measures on employer hiring attitudes and behaviors vary with time?

Figures 2A–2D plot trends over time in the demographics of those hired, stated employer willingness to hire stigmatized groups, credentials sought, and use of tests/background checks by employers in filling noncollege jobs.

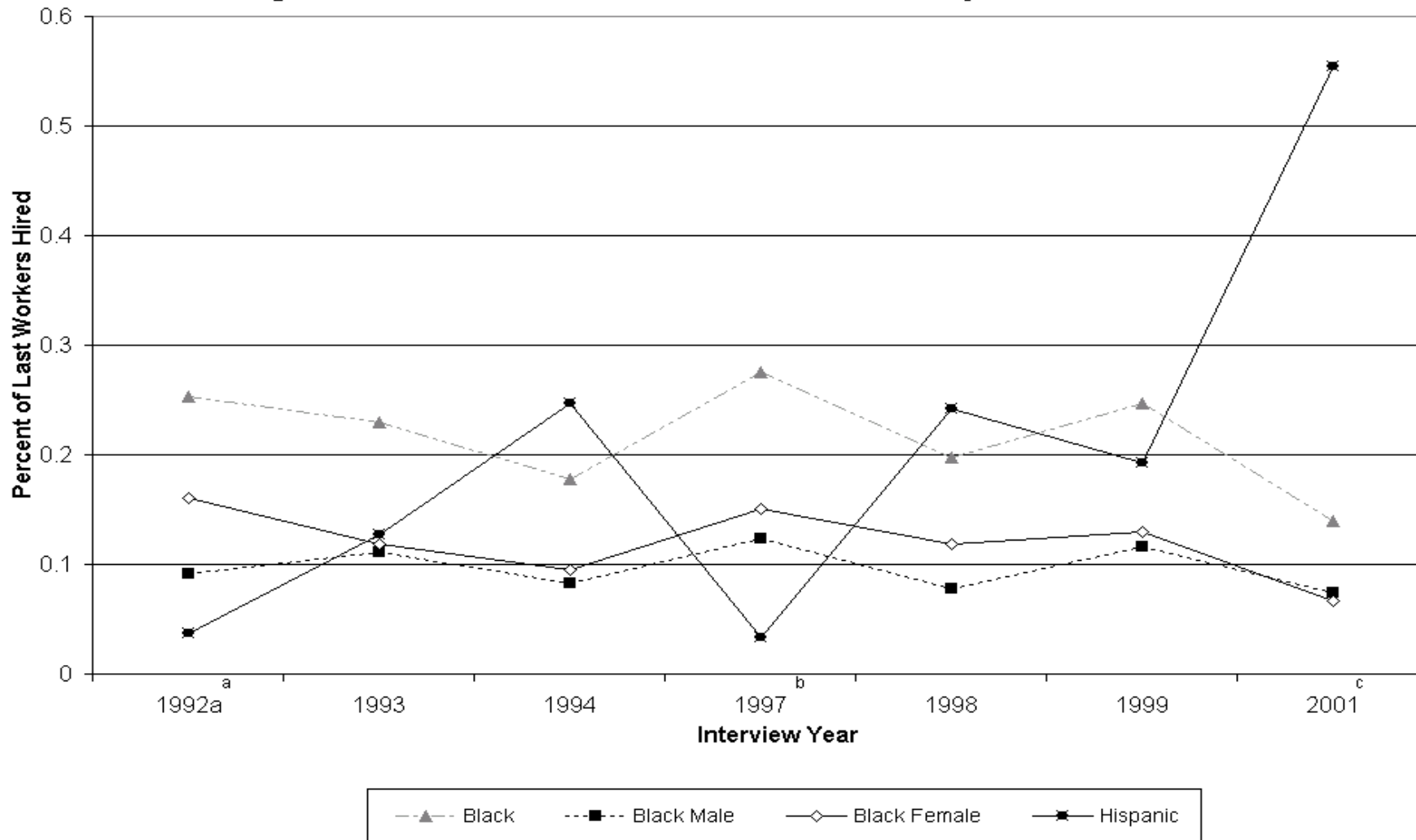
The results in Figure 2A for race/gender of the last hired worker seem to show little obvious pattern over time—especially since the geographic composition of metropolitan areas varies over time. In particular, the data points for 1992 and 1997 represent Detroit and surrounding areas only, while those for 2001 represent Los Angeles only.

But some clearer trends can be found in the other parts of Figure 2. For instance:

- Stated employer willingness to hire welfare recipients and those with only short-term work experience appears to have risen modestly over time, though less of a clear trend is discernible for other groups of disadvantaged or stigmatized workers (Figure 2B).
- Employer demands for general credentials such as a high school diploma and especially previous work experience clearly declined over time, while their demand for training or skill certification shows a more mixed trend (Figure 2C).
- The use of tests shows some increases over time as well, while checking backgrounds first declines and then increases sharply (Figure 2D).

Since the aggregate trends over time measured in Figures 2A–2D could reflect changes in sample composition over time (especially as the metropolitan areas covered by the survey change), we also present some results that hold geographic area constant. In Figures 3A–3D, we present data on the same outcomes, but we limit ourselves to the two metropolitan areas for which we have data at distinctly different points in time: Detroit (1992–93 and 1997–99) and Los Angeles (1993–94, 1998–99, and 2001). In Figures 3B–3D, most of the results described above for the pooled set of metropolitan areas seem to hold up within Detroit and Los Angeles as well. Thus, willingness to hire welfare recipients and those with only short-term work experience has risen somewhat, while it has not for those with criminal records. The necessity of high school diplomas and previous experience has declined while the results for

Figure 2A : Race and Gender of Last Worker Hired By Interview Year

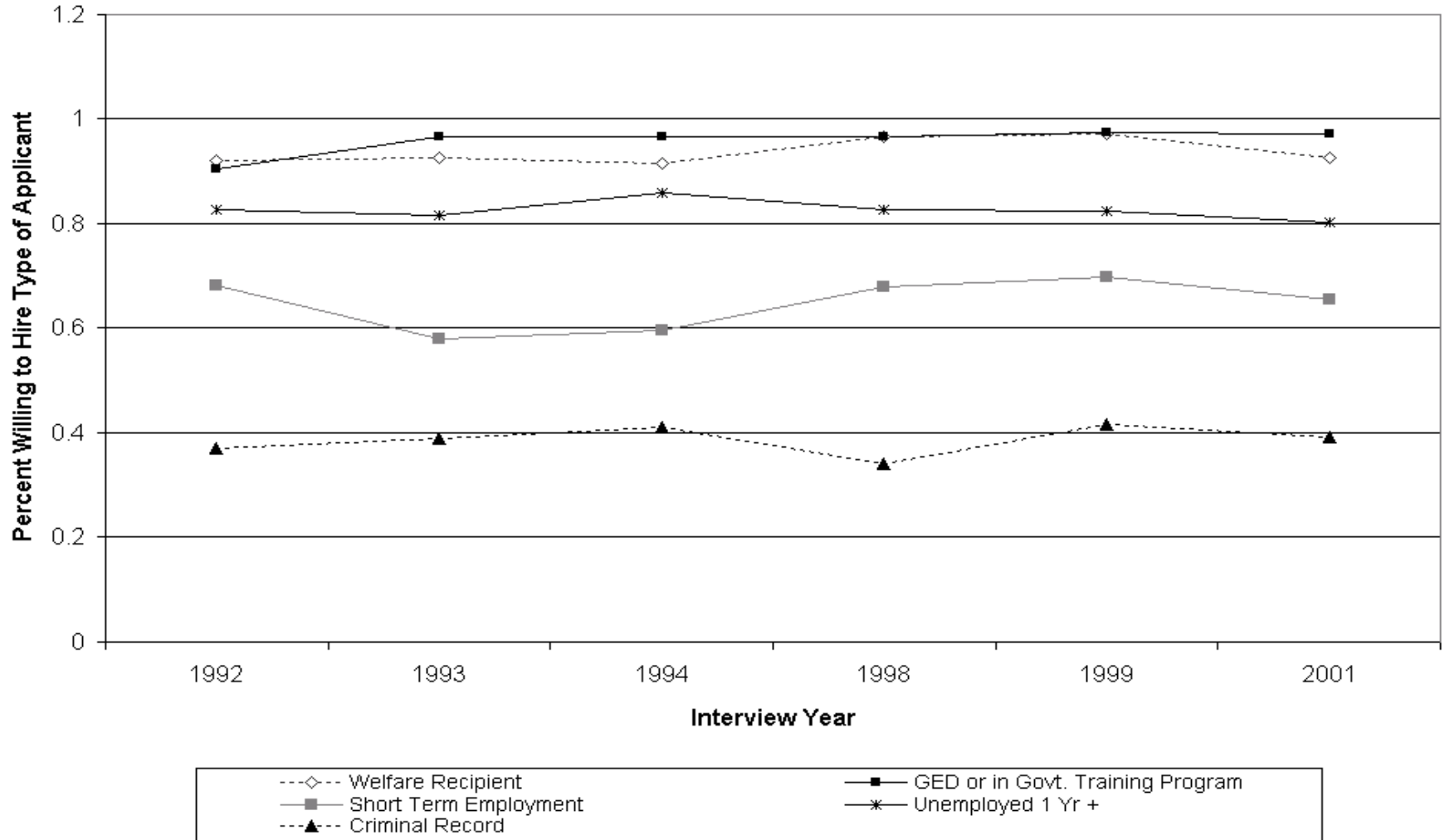


a All 1992 observations are from Detroit portion of the 1992-1994 Multi-City Hiring Survey

b All 1997 observations are from Michigan 1997 Survey.

c All 2001 observations are from Los Angeles 2001 Survey.

Figure 2B: Willing to Hire Type of Applicant by Interview Year



Note: 1997 is omitted because questions were not asked.

Figure 2C : How Necessary Are Qualifications By Interview Year

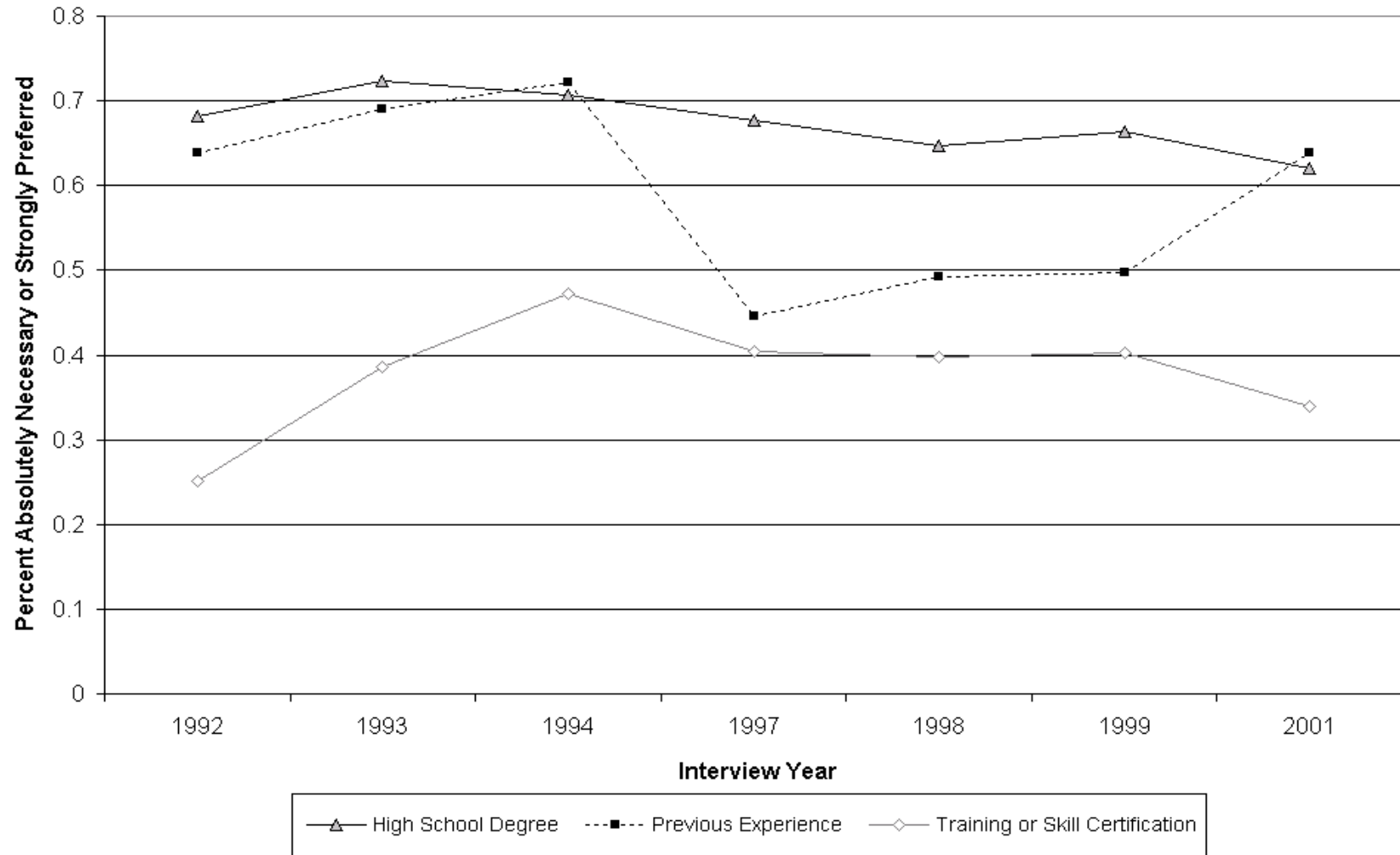
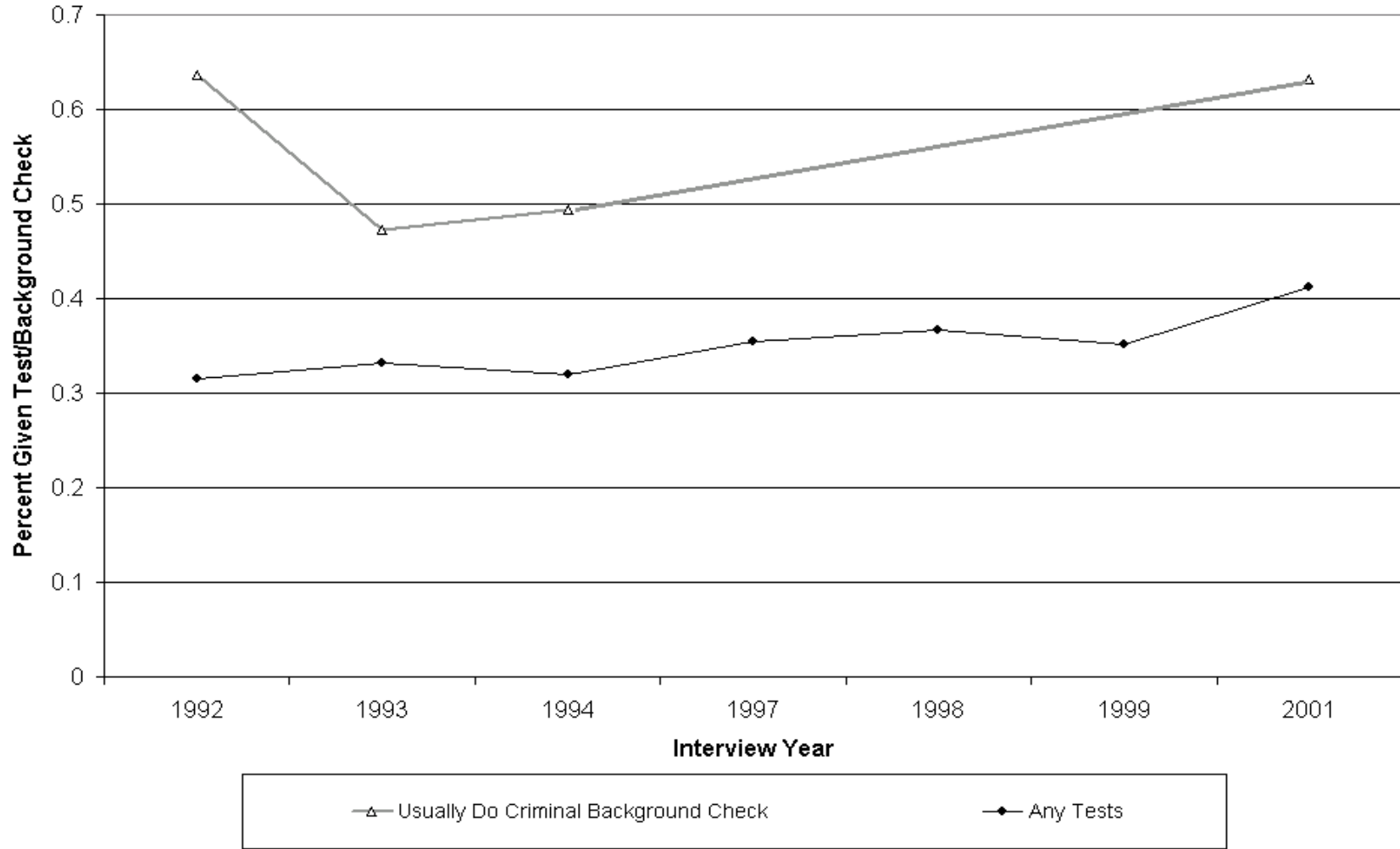


Figure 2D: Tests and Background Check for Last Worker Hired By Interview Year



training or skill certification are mixed. Use of tests or criminal checks has risen over time—the latter being especially true in Los Angeles in 2001.²¹

The trends in employer demands for stigmatized workers or credentials and their use of screens therefore seem somewhat mixed. Employer demands for minorities and welfare recipients have risen but not for the long-term unemployed or for ex-offenders. Demands for high school diplomas and general experience have declined, but have increased for previous training or skill certification. The use of tests seems to be rising while other credentials are being used less extensively.

This pattern is quite consistent with a situation such as that described above (in Section II), in which labor market tightness has coincided with a secular rise in demand for skilled labor and growing availability (or reduced costs) of certain screens tests or background checks. In this case, employers might respond to market tightness and declining applicant pools by economizing on their use of screens whose predictive power with respect to employee performance is fairly low (such as race or general education and experience), and substitute instead other screens that they increasingly view as being less costly or more effective (such as specific training and tests/background checks). Disadvantaged groups that are generally seen as being work-ready and reliable, such as welfare recipients and those with short-term work experience, might also now be acceptable to employers facing tight labor markets, while others (such as ex-offenders or the long-term unemployed) about whom strong doubts remain are not.²²

A few other results are also apparent in Figure 3 that did not appear earlier. For instance:

- The employment of black males and females has risen in Detroit over time, while in Los Angeles it has risen for both black males and Hispanics (Figure 3A).
- At least some factors, such as willingness to hire welfare recipients and demand for general experience, follow distinctly cyclical patterns in Los Angeles, with demand for the less-skilled declining with the downturn of 2001.

²¹In Holzer et al. (2003), we show that background checks were more frequently done in 2001 than in earlier years, but especially after September 11.

²²Figure 2B shows that welfare recipients are acceptable to the vast majority of employers of less-skilled workers, while ex-offenders are reported as acceptable by only about 40 percent of them. For more evidence on and discussion of employer aversion to ex-offenders relative to welfare recipients see Holzer et al. (2002).

Figure 3A: Race of Last Worker Hired by Interview Year and MSA for Detroit and Los Angeles

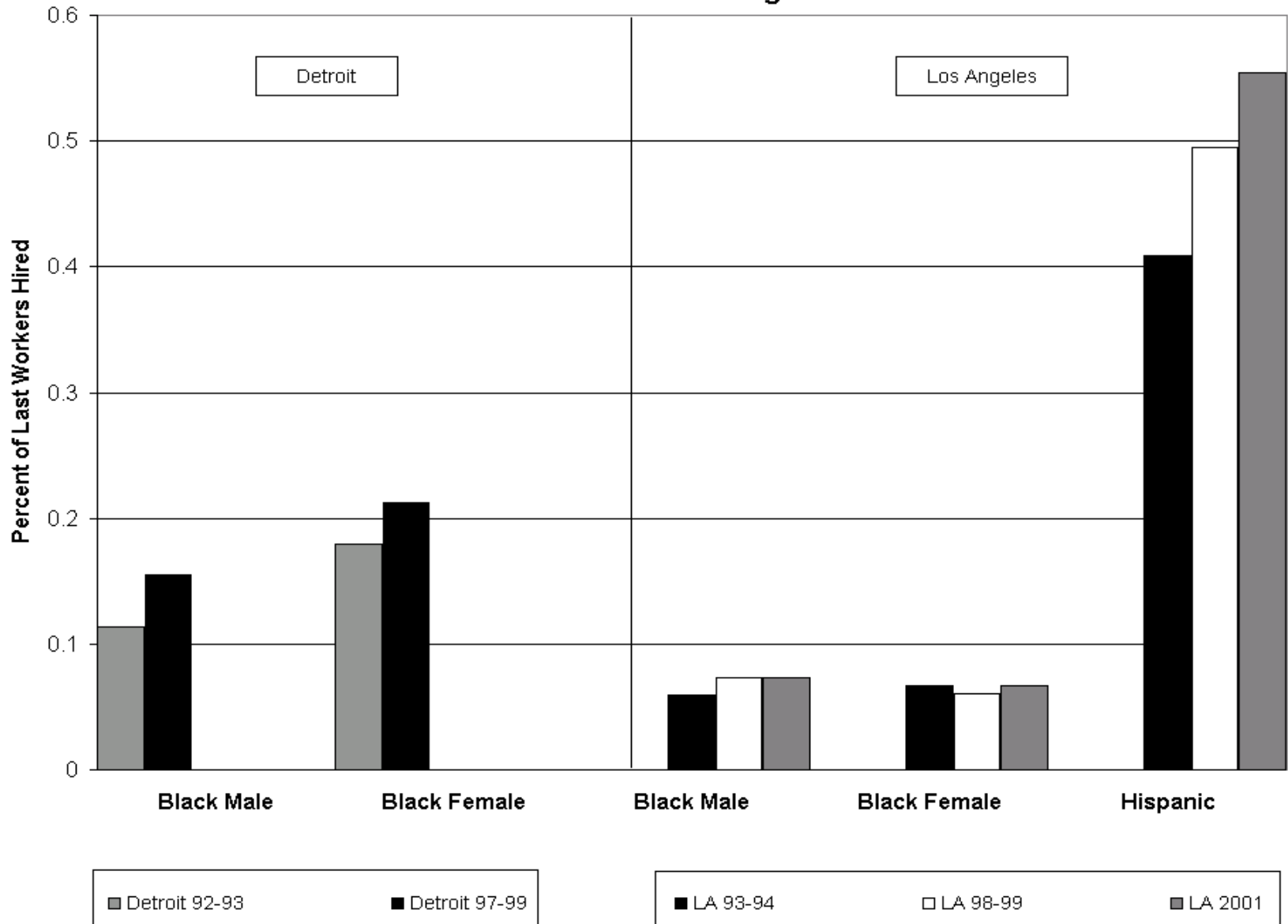


Figure 3B: Willing to Hire Type of Applicant by Interview Year and MSA for Detroit and Los Angeles

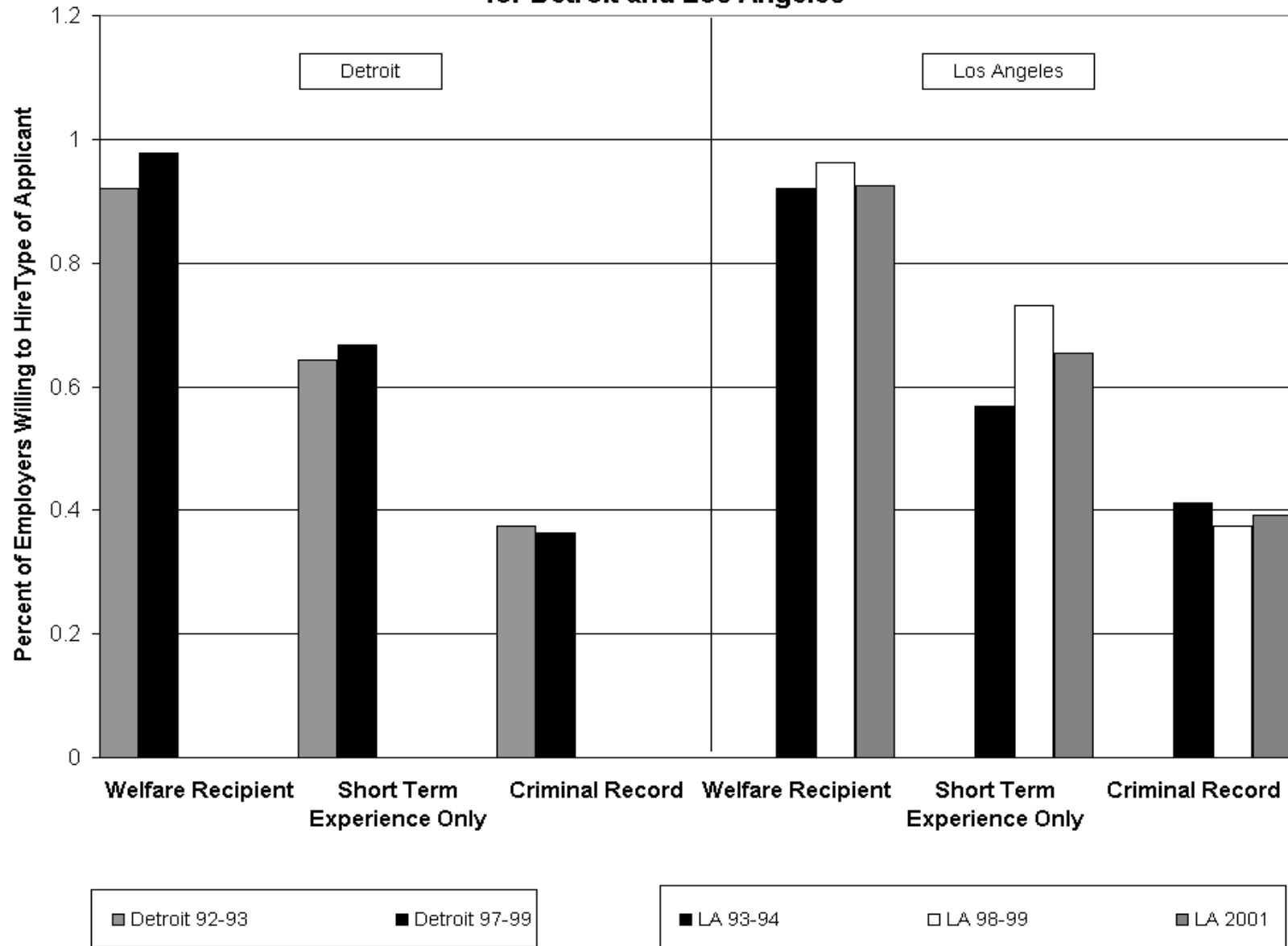


Figure 3C: How Necessary are Qualifications by Interview Year and MSA for Detroit and Los Angeles

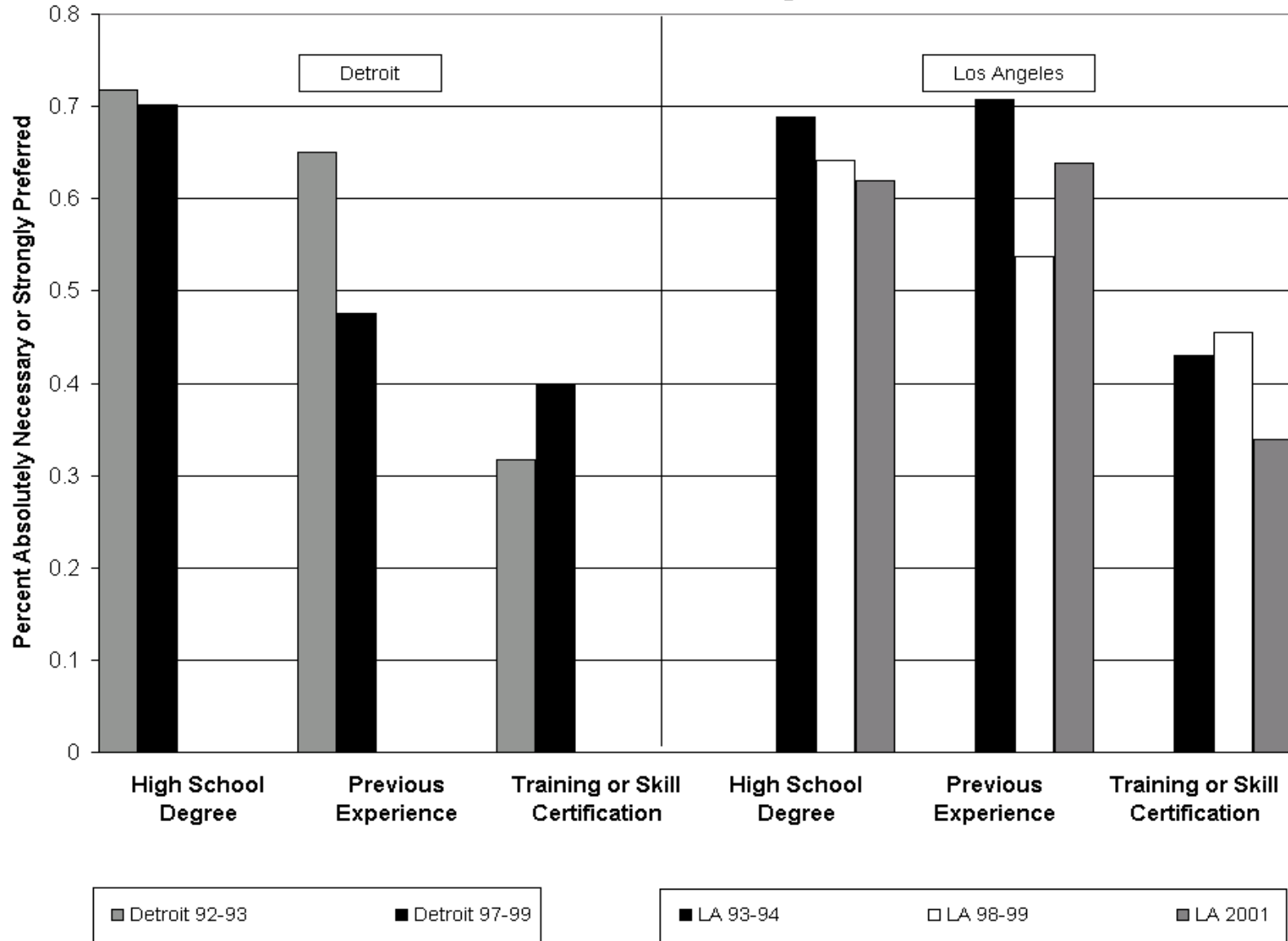
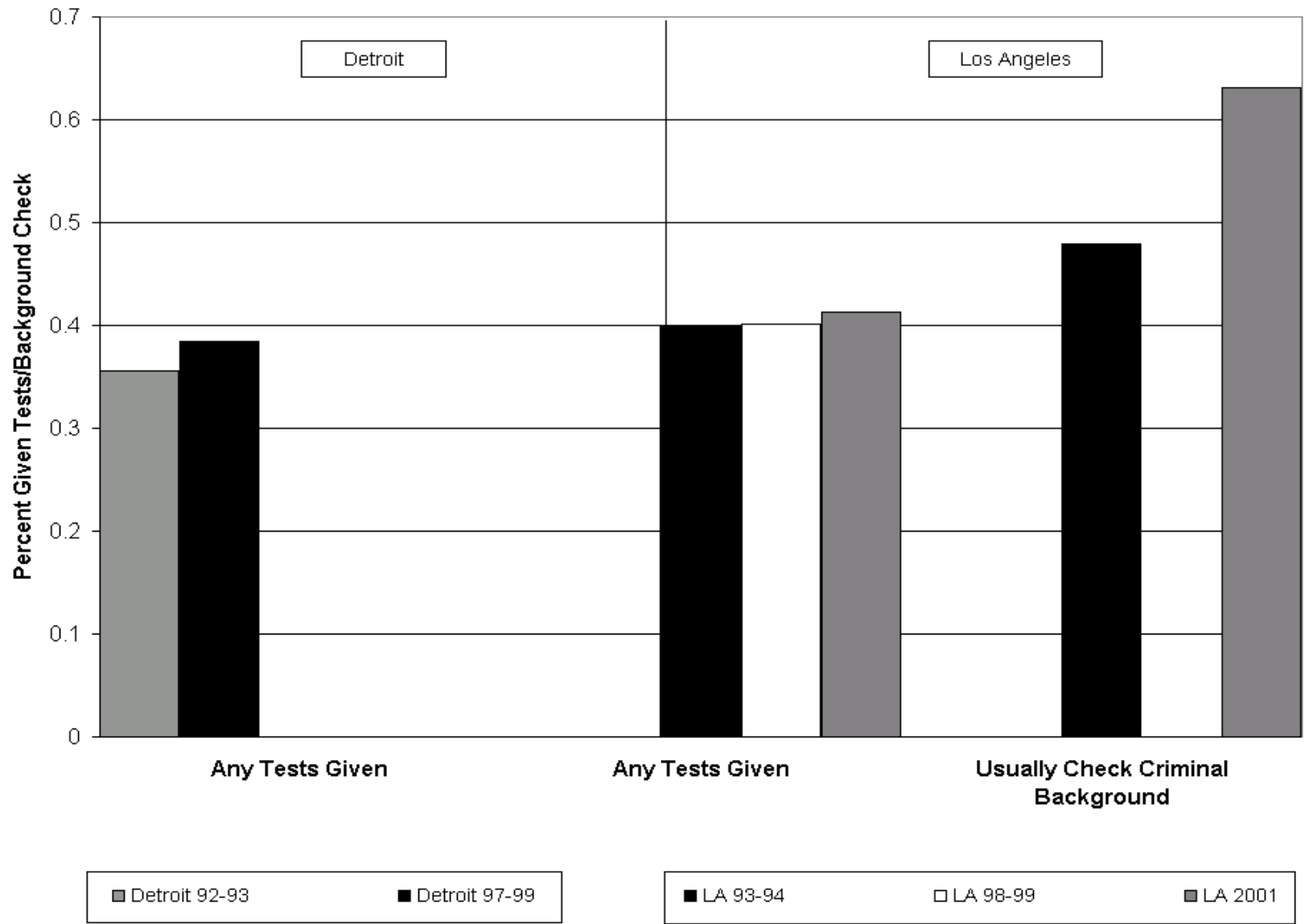


Figure 3D: Tests and Background Check for Last Worker Hired by Interview Year and MSA for Detroit and Los Angeles



We note again that, since the results by race and ethnicity reflect the demographics of the last hired worker, they indicate that employer demand for minorities rose relative to that for whites during the boom period. It is possible that the employment trends for Hispanics and black females described here represent labor supply shifts (reflecting immigration, welfare reform, and the like), but this is much less plausible for black men. Indeed, the labor force participation rates of that group did not grow greatly over the decade, and declined relative to the other groups in the labor market.²³ And, at least for Latinos, the increases in employment observed over a span of just a few years appear too large to be attributable to supply shifts alone.

Thus, these results strongly suggest a decline in discriminatory employer hiring *behavior toward minorities during the very tight labor markets of the late 1990s*. Such a decline would be fully consistent with past experiences (such as the periods during World War II and the late 1960s), and also with discrimination that is either driven by employer preferences or more statistical in nature.²⁴ Of course, whether this interpretation of the empirical results is correct needs to be explored more fully, as we do below.

With regard to black females, observed increases in employment could reflect supply shifts induced by welfare reform and other factors. However, the decline in willingness to hire welfare recipients or those without work experience during the downturn of 2001 is hard to reconcile with a story that is purely secular in nature. Thus, the hypothesis that these changes in employer behavior are at least partly driven by cyclical shifts in labor demand and market tightness seems well-supported in the summary data.

²³See Holzer and Offner (2002).

²⁴All else equal, tight labor markets impose higher costs on employers who choose to discriminate, whether such discrimination is based on tastes (i.e., Becker's discrimination coefficient d) or on the weaker predictive power of employer screens with regard to minorities. See Altonji and Blank (2000) for more discussions of these models and their implications. They also review the evidence, based on audit studies and more traditional statistical methods, of persistent hiring discrimination against minorities in the absence of tight markets.

B. Regression Results: OLS Equations for Hiring

To what extent do these results hold up when we control for other characteristics of jobs and establishments that might vary over time? We begin with a set of OLS regressions for hiring behaviors and outcomes—i.e., equations (1) and (2) above. Table 3 presents regressions for demographics of the last worker hired, willingness to hire stigmatized workers, whether credentials are required (or strongly preferred), and use of tests or criminal background checks, respectively. All of these dependent variables are dichotomous, and results presented are from linear probability models.

Results from six specifications are presented. In the first, time appears in quadratic form, while the second specification includes dummy variables for the periods 1997–99 and 2001, respectively (with 1992–94 used as the reference period).²⁵ In the third specification, the job vacancy rate for the establishment is used to measure market tightness while time measures are omitted, and in the fourth the local unemployment rate (i.e., for the relevant MSA and year) is included in place of the job vacancy rate. Finally, the fifth and sixth specifications include the job vacancy rate along with the year dummies or the local unemployment rate, respectively. All equations include controls for the characteristics of jobs and establishments listed in part B of Table 1.²⁶ In particular, the inclusion not only of observed skill requirements but also of MSA dummies and the applicant pools as controls suggests that we have controlled for many of the determinants of skill needs and supply-driven demographics that clearly affect the outcomes discussed here.

A number of interesting results appear in Table 3. The estimated effects of time on hiring are quite consistent with what we observed in Figures 1 and 2. In particular, the employment of Hispanics has clearly risen over time, as has employer willingness to hire stigmatized groups such as welfare recipients and those with only short-term employment (but not ex-offenders or those with GEDs/government

²⁵Since slack labor markets were observed at both the beginning and end of this overall period, the quadratic functional form is a reasonable representation of this pattern.

²⁶Dummy variables for missing values on the applicant measures are included as well.

TABLE 3
OLS Regressions

3A: Demographics of Last Hired Worker

<i>Outcome</i>		<i>Year</i>	<i>Year²</i>	<i>1997–1999</i>	<i>2001</i>	<i>Vacancy Rate</i>	<i>Unemployment Rate</i>	<i>R²</i>	<i>N</i>
Black	(1)	-0.005 (0.012)	0.001 (0.001)	- -	- -	- -	- -	0.29	6619
	(2)	- -	- -	0.020 (0.017)	0.001 (0.020)	- -	- -	0.29	6619
	(3)	- -	- -	- -	- -	0.145*** (0.043)	- -	0.29	6619
	(4)	- -	- -	- -	- -	- -	-0.116 (0.364)	0.29	6619
	(5)	- -	- -	0.018 (0.017)	0.002 (0.020)	0.143*** (0.043)	- -	0.29	6619
	(6)	- -	- -	- -	- -	0.145*** (0.043)	-0.078 (0.364)	0.29	6619
Black male	(1)	-0.003 (0.009)	0.000 (0.001)	- -	- -	- -	- -	0.21	6603
	(2)	- -	- -	0.012 (0.013)	0.006 (0.015)	- -	- -	0.21	6603
	(3)	- -	- -	- -	- -	0.083** (0.033)	- -	0.21	6603
	(4)	- -	- -	- -	- -	- -	-0.151 (0.280)	0.21	6603
	(5)	- -	- -	0.011 (0.013)	0.006 (0.015)	0.082** (0.033)	- -	0.21	6603
	(6)	- -	- -	- -	- -	0.083** (0.033)	-0.129 (0.280)	0.21	6603
Black female	(1)	-0.001 (0.010)	0.000 (0.001)	- -	- -	- -	- -	0.23	6603
	(2)	- -	- -	0.009 (0.014)	-0.003 (0.016)	- -	- -	0.23	6603
	(3)	- -	- -	- -	- -	0.060* (0.035)	- -	0.23	6603
	(4)	- -	- -	- -	- -	- -	-0.004 (0.294)	0.23	6603
	(5)	- -	- -	0.008 (0.014)	-0.003 (0.016)	0.059* (0.035)	- -	0.23	6603
	(6)	- -	- -	- -	- -	0.060* (0.035)	0.012 (0.294)	0.23	6603

(table continues)

TABLE 3, continued

<i>Outcome</i>		<i>Year</i>	<i>Year²</i>	<i>1997–1999</i>	<i>2001</i>	<i>Vacancy Rate</i>	<i>Unemployment Rate</i>	<i>R²</i>	<i>N</i>
Hispanic	(1)	0.041*** (0.011)	-0.002** (0.001)	- -	- -	- -	- -	0.30	6619
	(2)	- -	- -	0.114*** (0.016)	0.060*** (0.018)	- -	- -	0.30	6619
	(3)	- -	- -	- -	- -	0.005 (0.041)	- -	0.30	6619
	(4)	- -	- -	- -	- -	- -	-2.147*** (0.340)	0.30	6619
	(5)	- -	- -	0.115*** (0.016)	0.060*** (0.018)	-0.008 (0.041)	- -	0.30	6619
	(6)	- -	- -	- -	- -	-0.003 (0.041)	-2.148*** (0.340)	0.30	6619
3B : Would Hire Each Type of Applicant (“Yes” or “Probably” = 1)									
Welfare recipient	(1)	0.018* (0.009)	-0.001* (0.001)	- -	- -	- -	- -	0.03	5765
	(2)	- -	- -	0.050*** (0.012)	0.003 (0.013)	- -	- -	0.04	5765
	(3)	- -	- -	- -	- -	-0.056* (0.029)	- -	0.03	5765
	(4)	- -	- -	- -	- -	- -	-0.515** (0.251)	0.03	5765
	(5)	- -	- -	0.052*** (0.012)	0.003 (0.013)	-0.062** (0.029)	- -	0.04	5765
	(6)	- -	- -	- -	- -	-0.058** (0.029)	-0.532** (0.251)	0.03	5765
GED or in government training program	(1)	0.008 (0.007)	-0.001 (0.001)	- -	- -	- -	- -	0.02	5804
	(2)	- -	- -	0.005 (0.009)	-0.008 (0.010)	- -	- -	0.02	5804
	(3)	- -	- -	- -	- -	0.030 (0.022)	- -	0.02	5804
	(4)	- -	- -	- -	- -	- -	-0.052 (0.192)	0.02	5804
	(5)	- -	- -	0.004 (0.009)	-0.008 (0.010)	0.029 (0.022)	- -	0.02	5804
	(6)	- -	- -	- -	- -	0.030 (0.022)	-0.046 (0.192)	0.02	5804

(table continues)

TABLE 3, continued

<i>Outcome</i>		<i>Year</i>	<i>Year²</i>	<i>1997–1999</i>	<i>2001</i>	<i>Vacancy Rate</i>	<i>Unemployment Rate</i>	<i>R²</i>	<i>N</i>
Short term work experience only	(1)	0.042** (0.019)	-0.003* (0.002)	- -	- -	- -	- -	0.04	5793
	(2)	- -	- -	0.112*** (0.025)	0.047* (0.027)	- -	- -	0.04	5793
	(3)	- -	- -	- -	- -	0.045 (0.061)	- -	0.04	5793
	(4)	- -	- -	- -	- -	- -	-1.798*** (0.526)	0.04	5793
	(5)	- -	- -	0.112*** (0.025)	0.047* (0.027)	0.035 (0.061)	- -	0.04	5793
	(6)	- -	- -	- -	- -	0.039 (0.061)	-1.789*** (0.526)	0.04	5793
Unemployed one year or more	(1)	0.025 (0.016)	-0.003** (0.001)	- -	- -	- -	- -	0.02	5697
	(2)	- -	- -	-0.023 (0.021)	-0.073*** (0.022)	- -	- -	0.02	5697
	(3)	- -	- -	- -	- -	-0.111** (0.050)	- -	0.02	5697
	(4)	- -	- -	- -	- -	- -	1.065** (0.429)	0.02	5697
	(5)	- -	- -	-0.021 (0.021)	-0.073*** (0.022)	-0.111** (0.050)	- -	0.02	5697
	(6)	- -	- -	- -	- -	-0.107** (0.050)	1.035** (0.429)	0.02	5697
Criminal record	(1)	-0.023 (0.020)	0.002 (0.002)	- -	- -	- -	- -	0.05	5474
	(2)	- -	- -	-0.035 (0.027)	-0.026 (0.027)	- -	- -	0.05	5474
	(3)	- -	- -	- -	- -	0.072 (0.061)	- -	0.05	5474
	(4)	- -	- -	- -	- -	- -	0.744 (0.533)	0.05	5474
	(5)	- -	- -	-0.037 (0.027)	-0.026 (0.027)	0.076 (0.061)	- -	0.05	5474
	(6)	- -	- -	- -	- -	0.076 (0.061)	0.767 (0.534)	0.05	5474

(table continues)

TABLE 3, continued

<i>Outcome</i>	<i>Year</i>	<i>Year²</i>	<i>1997–1999</i>	<i>2001</i>	<i>Vacancy Rate</i>	<i>Unemployment Rate</i>	<i>R²</i>	<i>N</i>	
3C: How Necessary Is Each Qualification (“Absolutely Necessary” or “Strongly Preferred” = 1)									
High school graduate	(1)	-0.003 (0.014)	0.000 (0.001)	-	-	-	-	0.20	6895
	(2)	-	-	-0.026 (0.020)	-0.005 (0.023)	-	-	0.20	6895
	(3)	-	-	-	-	-0.200*** (0.050)	-	0.20	6895
	(4)	-	-	-	-	-	0.299 (0.420)	0.20	6895
	(5)	-	-	-0.022 (0.020)	-0.006 (0.023)	-0.198*** (0.050)	-	0.20	6895
	(6)	-	-	-	-	-0.200*** (0.050)	0.248 (0.420)	0.20	6895
Previous experience	(1)	-0.074*** (0.015)	0.006*** (0.001)	-	-	-	-	0.13	7170
	(2)	-	-	-0.146*** (0.022)	-0.046* (0.025)	-	-	0.13	7170
	(3)	-	-	-	-	-0.113** (0.054)	-	0.12	7170
	(4)	-	-	-	-	-	2.391*** (0.454)	0.13	7170
	(5)	-	-	-0.145*** (0.022)	-0.046* (0.025)	-0.098* (0.054)	-	0.13	7170
	(6)	-	-	-	-	-0.105* (0.054)	2.366*** (0.454)	0.13	7170
Previous training or skill certification	(1)	0.088*** (0.015)	-0.008*** (0.001)	-	-	-	-	0.10	7151
	(2)	-	-	0.073*** (0.022)	-0.050** (0.025)	-	-	0.10	7151
	(3)	-	-	-	-	-0.044 (0.055)	-	0.10	7151
	(4)	-	-	-	-	-	-0.939** (0.457)	0.10	7151
	(5)	-	-	0.074*** (0.022)	-0.050** (0.025)	-0.055 (0.055)	-	0.10	7151
	(6)	-	-	-	-	-0.047 (0.055)	-0.950** (0.457)	0.10	7151

(table continues)

TABLE 3, continued

<i>Outcome</i>	<i>Year</i>	<i>Year²</i>	<i>1997–1999</i>	<i>2001</i>	<i>Vacancy Rate</i>	<i>Unemployment Rate</i>	<i>R²</i>	<i>N</i>
3D: Tests/Background Check								
Usually check criminal background	(1)	-0.064** (0.030)	0.007*** (0.002)	- -	- -	- -	- -	0.13 3577
	(2)	- -	- -	0.000 (0.000)	0.149*** (0.027)	- -	- -	0.13 3577
	(3)	- -	- -	- -	- -	-0.020 (0.077)	- -	0.12 3577
	(4)	- -	- -	- -	- -	- -	-2.632*** (0.633)	0.12 3577
	(5)	- -	- -	0.000 (0.000)	0.149*** (0.027)	-0.016 (0.077)	- -	0.13 3577
	(6)	- -	- -	- -	- -	-0.021 (0.077)	-2.632*** (0.633)	0.12 3577
Any tests given for last position	(1)	0.013 (0.015)	-0.001 (0.001)	- -	- -	- -	- -	0.06 7145
	(2)	- -	- -	0.036* (0.022)	0.026 (0.025)	- -	- -	0.06 7145
	(3)	- -	- -	- -	- -	0.198*** (0.054)	- -	0.07 7145
	(4)	- -	- -	- -	- -	- -	-0.807* (0.454)	0.06 7145
	(5)	- -	- -	0.033 (0.022)	0.027 (0.025)	0.195*** (0.054)	- -	0.07 7145
	(6)	- -	- -	- -	- -	0.195*** (0.054)	-0.761* (0.454)	0.07 7145

Notes: Regressions also include all control variables listed in part B of Table 1. Standard errors are in parentheses.

* Significant at 10%; ** significant at 5%; *** significant at 1%.

training). Employer demand for previous experience has declined while demand for training or skill certification has risen, and effects on testing and background checking are more mixed.

Comparing the boom period (1997–99) with the earlier years, the employment of blacks (especially black males) is also stronger (and marginally significant) in the former period. These results hold up even when other measures of employer demand for skills are included in the equation as additional controls.²⁷ The interpretation that these results reflect a decline in discriminatory behavior against minorities by employers during the boom period is thus strengthened by these findings.

As for other results, we find that employer demand for high school graduates is marginally lower in the boom period, and the use of tests marginally higher as well. Quite important, most of the positive effects are stronger in the 1997–99 period (relative to earlier in the decade) than in 2001, suggesting again that labor market tightness might be driving the results. Interestingly, the use of criminal background checks rises strongly in 2001, as we have noted elsewhere (Holzer et al., 2003).²⁸

The effects of local unemployment rates on employer attitudes and behavior are generally consistent with these findings as well. Specifically, employer demand for Hispanics, welfare recipients, and the short-term employed, as well as those without recent work experience, declines with rising unemployment rates; the hiring of black males declines as well, though not significantly. The demand for previous training and the use of tests/background checks decline with higher unemployment, suggesting that some of the changes over time in these measures may be driven at least partly by cyclical forces as well as secular ones.

²⁷For instance, when the other measures of employer attitudes and behavior that we consider outcomes in Table 3 are added into the equations for black males and Hispanics as independent variables, the coefficients on the dummy variable for the period 1997–99 remain strongly significant for Hispanics (.139 (.021)) and marginally significant for black males (.022 (.017)). Coefficients on the dummy for 2001 are considerably smaller in both cases: .058 and -.001, respectively. Thus, the observed changes in relative demand for minority groups are not fully accounted for by changes in employer demands for human capital credentials, stigmatizing characteristics, or screening behaviors.

²⁸The strongly positive coefficient on the quadratic term in the equations for background checking indicates the relative growth of background checking in 2001 that we noted above.

And, as earlier, the effects of job vacancy rates on employer hiring are more mixed—they are positively associated with the hiring of blacks but not Hispanics; they are negatively associated with employer willingness to hire some of the stigmatized groups, but also negatively correlated with employer requirements that applicants have high school diplomas and previous experience; and they are positively associated with the use of tests (but not criminal backgrounds). These results do not seem fully consistent with the notion that vacancy rates reflect net employment growth and labor market tightness at establishments, nor simply with high turnover and lower skill requirements.

C. Regression Results: IV Equations for Hiring

Given the fact that job vacancy rates at the establishment level likely reflect a range of forces, we now present IV estimates of the effects of labor market tightness that might be operating through time and/or job vacancy rates. As noted earlier, we present estimates of equations (1) and (2) in which the job vacancy rate is endogenous, and where the local unemployment rate, time, and/or interactions between time and metropolitan area are used as instruments. While the local unemployment rate or TIME*MSA interactions are most justifiable as instruments, their explanatory power (with respect to the vacancy rate) when used alone was quite limited. Thus, we supplement these instruments with various nonlinear versions of time, to separate cyclical from secular effects, as well.

Table 4 presents results from six specifications. In the first two, we use the local unemployment rate and time as the instruments—with time measured as a set of individual year dummies in the first and in quadratic form in the second. In the third, we use the local unemployment rate and time dummies as instruments, but then include a linear time trend among the controls as well. This enables us to use nonlinearities in the effects of time to separate labor market effects from other secular developments. In the fourth specification, we use only the local unemployment rate as the instrument and control for time with dummies. Finally, the fifth and sixth specifications are identical to the third and fourth, except that

TABLE 4
Instrumental Variables Regressions

<i>Outcome</i>	<i>Vacancy Rate</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
4A: Demographics						
Black	0.782 (0.767)	-0.001 (0.871)	0.587 (0.828)	-1.229 (2.009)	0.568 (0.679)	-0.017 (0.986)
Black male	0.445 (0.582)	0.003 (0.666)	0.261 (0.632)	-0.360 (1.461)	0.606 (0.528)	0.966 (0.799)
Black female	0.381 (0.612)	0.068 (0.700)	0.357 (0.666)	-0.684 (1.567)	-0.026 (0.545)	-0.961 (0.850)
Hispanic	4.557*** (1.199)	4.151*** (1.310)	2.917*** (1.026)	5.202 (3.253)	1.419** (0.686)	0.126 (0.918)
4B: Would Hire Each Type of Applicant (“Yes” or “Probably” = 1)						
Welfare recipient	1.261** (0.563)	1.283** (0.650)	1.145* (0.686)	0.000 (0.000)	1.002* (0.598)	-0.573 (1.116)
Criminal record	0.420 (0.952)	-1.766 (1.233)	-0.150 (1.097)	- -	-0.100 (1.009)	1.053 (1.921)
Short term experience only	3.234** (1.341)	3.329** (1.577)	2.508* (1.419)	- -	2.634** (1.230)	2.219 (2.085)
Unemployed one year or more	0.497 (0.854)	0.354 (0.963)	1.699 (1.094)	- -	0.742 (0.891)	-2.621 (2.033)
GED or in government training program	0.652 (0.441)	0.646 (0.506)	0.613 (0.486)	- -	0.244 (0.413)	-1.328 (0.972)
4C: How Necessary Is Each Qualification (“Absolutely Necessary” or “Strongly Preferred” = 1)						
Previous training or skill certification	5.306*** (1.507)	6.344*** (1.981)	5.871*** (1.752)	5.328 (3.537)	3.045*** (1.053)	-0.121 (1.246)
Previous experience	-4.150*** (1.284)	-5.872*** (1.809)	-3.227** (1.273)	-8.206* (4.600)	-2.036** (0.931)	-2.252* (1.361)
High school graduate	-1.134 (0.896)	-0.839 (1.043)	-0.959 (0.974)	2.193 (2.350)	-0.755 (0.780)	0.420 (1.110)
4D: Tests/Background Check						
Usually check criminal background	-6.532** (3.284)	-8.353** (4.236)	-5.372* (2.927)	-0.646 (4.514)	-5.204* (2.871)	0.213 (4.447)
Any tests given for last position	0.787 (0.966)	0.948 (1.148)	0.535 (1.037)	2.180 (2.555)	0.266 (0.852)	0.387 (1.263)

Notes: Coefficients on the endogenous job vacancy rate are presented here for six different specifications of equations for each outcome. The instruments in each case are: (1) local unemployment rate (for the relevant MSA/year) and year dummies; (2) local unemployment rate and quadratic time trend; (3) same as (1), but with a linear time trend also included among the control variables; (4) local unemployment rate only (year dummies included among controls); (5) same as (3), but with year*MSA dummies in place of the local unemployment rate; (6) same as (4), but with year*MSA dummies in place of the local unemployment rate. All other control variables used in OLS regressions of Table 3 are included here as well.

we replace the local unemployment rate with a set of interactions between dummies for time and metropolitan area.²⁹

Results across these six specifications are somewhat mixed and statistical significance levels vary, but some generally clear patterns do emerge. For instance, the instrumented job vacancy rate now has generally positive effects on the hiring of black males, though these effects are mostly not significant. Effects on the hiring of Hispanics, on the other hand, are positive and generally significant. Effects on the willingness of employers to hire from stigmatized groups are generally positive and most frequently significant in the cases of welfare recipients and the short-term unemployed. Effects on employer demand for general experience are generally negative and fairly significant; those for high school diplomas are also mostly negative but generally not significant, while those for training or skill certification remain mostly positive and significant. The last finding confirms once again that the rising demand for skill certification over time at least partly reflects labor market tightness, and not just secular changes in the demand for skilled labor. Even in those equations where we include some linear controls for time, the results hold up reasonably well. Finally, effects of market tightness on the use of criminal background checks are mostly negative, while those for tests are positive but mostly not significant.

Thus, while the IV results are not fully conclusive, they do provide broad support for the notion that tight labor markets during the 1990s led employers to hire more minorities or applicants from stigmatized groups and to demand fewer general credentials. At the same time, their demands for specific training and skills rose and their use of various screens changed in a variety of ways. The fact that most results are robust to the use of a range of instruments generates greater confidence in their validity.

²⁹F-statistics for the instruments in the first stage equations are 10.01, 19.24, 19.24, 38.09, 5.06, and 4.91, respectively. The R-squared statistics are in the range of .005–.015 in all cases.

D. Regression Results: Wage Equations

The previous results have focused on the effects of tight labor markets in the 1990s on the hiring behaviors and attitudes of employers. Of course, another mechanism through which employers might adjust to market tightness is the payment of higher wages, in this case to less-skilled workers. As is well-known, their wages fell relative to those of more highly skilled workers throughout the 1980s and early 1990s, and by some estimates even fell in real terms. Any positive effects in the later 1990s might be attributed at least partly to higher productivity growth or minimum wages. Here we test for whether our measures of market tightness contributed to these higher wages as well.

Table 5 presents our estimated versions of equation (3) above. In part A of that table, we present the results of specifications comparable to those of Table 3. In particular, we present the effects of time, the vacancy rate, and/or the local unemployment rate on $\ln(\text{starting hourly wages})$ for newly hired noncollege workers. Control variables include all of those used earlier in Tables 3–4, as well as some additional personal characteristics (i.e., age and education) of the last worker hired and the employer attitudes and behaviors that appeared as dependent variables in equations (1) and (2). In part B, we present IV estimates of the effects of the job vacancy rate on $\ln(\text{wages})$, using the same instruments as in Table 4.

The results of Table 5A indicate that starting wages of newly hired noncollege workers rose with time during the 1990s. Indeed, wages in the period 1997–99 were about 6 percent higher than during the early 1990s. Whereas this might partly reflect the effects of minimum wage increases in 1996–97, it seems unlikely that those increases alone had such significant effects on this broad group of employees. On the other hand, wages of workers in 2001 were a bit lower than during the boom—i.e., just 5 percent higher than in the early 1990s. Estimates of the effects of the local unemployment rate suggest that at least part of the effect observed over time is cyclical, with wages rising about 1.3 percent with every percentage-point decline in the unemployment rate. Finally, the firm’s vacancy rate had no effect, as

TABLE 5
Ln (Wages) Regressions

	Year	Year ²	1997–1999	2001	Vacancy Rate	Unemployment Rate	R ²	N
5A: OLS Regressions								
(1)	0.015 (0.015)	-0.001 (0.001)	- -	- -	- -	- -	0.42	3882
(2)	- -	- -	0.062*** (0.020)	0.049** (0.020)	- -	- -	0.42	3882
(3)	- -	- -	- -	- -	-0.017 (0.048)	- -	0.41	3882
(4)	- -	- -	- -	- -	- -	-1.252*** (0.403)	0.42	3882
(5)	- -	- -	0.063*** (0.020)	0.049** (0.020)	-0.027 (0.048)	- -	0.42	3882
(6)	- -	- -	- -	- -	-0.025 (0.048)	-1.263*** (0.404)	0.42	3882

5B: Instrumented Variables Regressions

	(1)	(2)	(3)	(4)	(5)	(6)
Vacancy rate	2.515*** (0.884)	2.625*** (0.946)	1.933* (1.122)	6.504 (11.445)	1.895* (1.023)	2.531 (2.579)

Notes: Each regression also includes all control variables used in regressions from Tables 3 and 4, as well as the outcome variables in those equations. The specifications in part A of this table match those of Table 3, while those in part B match those of Table 4.

might be expected (since it reflects not only market tightness but turnover that is likely to be negatively correlated with skills or wages).

The IV estimates in Table 5B generally imply that tight markets contributed to higher wages. In particular, the instrumented job vacancy rate has a positive effect on wages in all versions of the equation, with effects that are significant in most cases.

V. CONCLUSION

The booming economy of the 1990s generated well-known pressures on employers, who apparently had great difficulty finding workers. But these changes also occurred in the context of a secular increase in the demand for skills in the labor market, and technological changes in the nature of employer recruiting and screening.

In this paper we use unique data, based on surveys of employers over the period 1992–2001, to test for how the tight markets of the late 1990s affected employer hiring and wage-paying behavior with regard to less-skilled workers. Using our data, we can test for the effects of market tightness on the extent to which employers hired blacks and Hispanics into jobs that did not require college; their expressed willingness to hire various other groups of stigmatized workers, such as welfare recipients and those with criminal records; the extent to which they demanded credentials of new employees, such as high school diplomas, general experience, and previous training or skill certification; and their use of various screens, such as tests or background checks. In addition, we analyze the effects of tight markets on starting wages for these workers.

The results indicate that employer demand for many groups of disadvantaged workers—including minorities, others with particular stigmas (such as welfare recipients or those with only short-term employment), and those with poor general experience and education—rose during the boom. Only where the stigmas were more severe (e.g., those with criminal records or long-term unemployment) were these effects not observed. The wages paid to newly hired unskilled workers rose as well in response to tight

labor markets. On the other hand, employer demand for specific skill certification rose, as did their use of certain screens such as tests (and also background checks at the end of the period).

While some questions may remain about our ability to disentangle cyclical from secular effects, and those driven by developments on the demand side of the labor market as opposed to the supply side, the robustness of our findings with respect to a variety of estimation techniques and variables gives us greater confidence in their validity. The nonlinearity in business cycle effects over time that is generated by the recent economic downturn, and reflected in our data for 2001, strengthens our confidence in these results as well.

The results are broadly consistent with the view that, as workers were becoming less available in the late 1990s, employers were forced to rationalize the processes by which they screen workers. Very general credentials—such as recent work experience or high school diplomas—that might be only weakly tied to labor market performance were sought less frequently, while the specific skills needed on the job were sought more often. Discrimination on the basis of race or ethnicity likely declined for similar reasons. Similarly, personal characteristics that were viewed by employers as being less threatening to performance—such as welfare reciprocity—became smaller impediments to employment, while those viewed as being potentially more threatening—such as criminal backgrounds—did not. And, as new technologies made various tests (and eventually even background checks) less costly and/or more effective, employers used these more frequently as well. The likelihood that employer demand for a range of skills continued to rise during the 1990s despite the boom, and that background checks and tests were becoming increasingly available and less costly, no doubt reinforced the trend toward greater reliance on previous training and tests that we observed.

Will these changes in hiring survive the recent economic downturn, and will they persist into the future? Our data show that many of the changes in hiring patterns and wage payments instituted at the peak of the boom (i.e., during 1997–99) weakened during the following period of slack in 2001, though most were not completely eliminated. Historically, changes in employment outcomes by race during

periods of very tight labor markets (such as during World War II and the late 1960s) have not been completely reversed during periods of slack that followed, even though those gains have sometimes tended to plateau afterwards (Holzer, 2000). To the extent that employers changed their hiring behaviors in ways that brought them new information about prospective employment pools and ways of accessing them, there is reason to think that at least some of these behaviors will persist over time.

Looking to the future, an extended period of tight labor markets will no doubt reemerge as the economy recovers from the current downturn and with the pending retirements of baby boomers (D'Amico and Judy, 1997; Ellwood, 2001). This implies relatively good news for many less-skilled workers, who might see their hiring prospects improve once again and their wages rise with the next recovery.

At the same time, some caution is in order, and some caveats need to be acknowledged. To the extent that demands for skills will also continue rising and that Internet technologies for recruiting and screening will continue to develop (Freeman, 2002; Autor, 2001), the labor market gains experienced by disadvantaged workers may be tempered. If the productivity gains of the past decade prove temporary, it may become difficult to maintain the level of market tightness achieved in the 1990s over the longer term. The groups for whom labor demand did not rise in the past decade may see little progress ahead. And, as we have learned from the recent experiences of young black men, downward trends in labor force activity (or labor *supply*) among disadvantaged workers can persist even when the demand side of the economy is booming.

Thus, the net effects of these conflicting factors on the future prospects of less-educated workers remain to be seen.

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