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Give Me Your Wired and Your Highly Skilled:
Measuring the Impact of Immigration Policy on Employers and Shareholders

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Abstract

This paper links finance theory to labor economics and political economy in the context of migration and immigration policy. Most research treating the impact of immigration has focused on the consequences for employees as measured by wages, earnings, and employment. Less is known about the impact on employers. We lack answers to basic questions concerning the quantitative impact of immigrants on employer profit, and which employers are most likely to gain (suffer) increased (reduced) profits as a result of immigration.

Using event study analysis, I measure the impact of immigration policy on the profit of employers and shareholders, particularly in those industries with high needs for skilled immigrants. The American Competitiveness and Workforce Improvement Act (ACWIA) of 1998 nearly doubled the available number of H-1B visas for skilled foreign workers in FY 1999. It was the first time that the U.S. government raised the annual cap of H-1B visa since 1990. I focus on this bill and analyze whether and by how much its passage increased shareholders' profit.

The empirical results show that employers and shareholders in the top H-1B visa user industries enjoyed significant and positive excess returns with the passage of the ACWIA of 1998. Shareholders in high-tech industries (the top users of H-1B visa, 80% of total) such as "Computers and related equipment", and "Computer and data processing services" gained, respectively, an average 21.54%(15.88% if weighted) and 22.77% (18.11% if weighted) in cumulative excess returns in the month after the Act was passed, while industries with little need for H-1B visas experienced no significant changes in cumulative excess returns. Robustness checks including international factor comparisons, semiparametric modeling and a sample-split Chow structural break test support the results.

Keywords: Skilled Immigrants, Immigration Policy, Employers, Shareholders, Event Study, H-1B visa.

JEL Classifications: J61, K31, G12

Appendix begins on page 41 and can be obtained at http://econweb.rutgers.edu/slin/AppAB.pdf

Give Me Your Wired and Your Highly Skilled[1]: Measuring the Impact of Immigration Policy on Employers and Shareholders

1. Introduction

Give me your tired, your poor,
Your huddled masses yearning to breathe free,
The wretched refuse of your teeming shore,
Send these, the homeless, tempest-tossed to me,
I lift my lamp beside the golden door![2]
——— Emma Lazarus , *The New Colossus.*

Since this poem was engraved on the Statue of Liberty in 1903, it has symbolized America's openness to all people, regardless of region of origin or skill level. However, immigrants are typically the first to blame in the face of economic strain, stagnant or collapsing income and joblessness.

Work by economists increasingly challenges this presumption. Most research treating the impact of immigration has focused on the consequences for employees as measured by wages, earnings, and employment. Less is known about the impact on employers. We lack answers to basic questions concerning the quantitative impact of immigrants on employer profit, and specifically on which employers are most likely to gain (suffer) increased (reduced) profits as a result of immigration.

This paper links finance theory to labor economics and political economy in the context of migration and immigration policy. By using event study analysis and the market model, I measure the impact of immigration policy on the profit of employers and shareholders. In particular, I focus on those industries with high needs for skilled immigrants. The American Competitiveness and Workforce Improvement Act (ACWIA) of 1998 nearly doubled the available number of H-1B visas for skilled foreign workers in FY[3] 1999. I focus on this bill and analyze whether and by how much its passage increases employers' profit.

The first studies linking finance and labor literature can be traced back to 1980s. Ruback

[1] The title is originated from William J. Holstein of U.S. News & World Report, "*Give Us Your Wired, Your Highly Skilled: Tech Firms Are Winning the Battle of the Visas"*, on October 5, 1998.
[2] "*The New Colossus*", written by Emma Lazarus in 1883, was engraved on a bronze plaque and mounted inside the Statue of Liberty in 1903.
[3] FY is the abbreviation of "fiscal year". The U.S. government's fiscal year begins on October 1 of the previous calendar year and ends on September 30 of the year with which it is numbered.

and Zimmerman (1984) show that successful union elections result in a 3.8% decline in shareholder equity of organized firms. Becker and Olson (1986) use event study to analyze the impact of strikes on shareholder equity, showing that strikes substantially affect shareholder. From 1962-82 the average strike involving 1,000 or more workers result in a 4.1% drop in shareholder equity, a decline of $72-87 million in 1980 dollars. Becker and Olson (1989) examine union-nonunion differences in the allocation of both firm profits and business risk to employees and shareholders finding over the period 1970-81 shareholders in unionized firms assumed less of the firm's business risk than shareholders in nonunion firms. Risk-adjusted returns to shareholders are lower in unionized firms than in nonunion firms. Card and Krueger (1995) analyze how the change of the minimum wage affects low-wage employers' profits. They focus on a large sample of publicly traded firms, finding that regulation increasing the minimum wage may have had a small negative effect on the value of such firms-on the order of 1-2%. However, after adjusting for overall market returns, their results provide mixed evidence that the value of these firm changes in response to legislative maneuvering on the minimum wage.

I begin by describing my estimation strategy in section 2. In section 3, I describe the H-1B visa program. Section 4 contains data and descriptive statistics and section 5 provides empirical results. In section 6 I check the robustness by comparing the results of industries with little need for skilled immigrants, international factor (Canada, UK and Germany), nonparametric modeling and structural break tests. Section 7 provides concluding remarks.

2. Empirical Methodology

2.1. Measuring the Welfare of Employers and Shareholders

To measure the impact of immigration policy on the welfare of employers and shareholders, the first question to address is which measure should be used to estimate their welfare. A central assumption in the finance literature is that if capital markets are efficient, and therefore the prices of capital assets are unbiased estimates of the present value of future profit streams generated by those assets (Fama, Fisher, Jensen and Roll (1969)), (Schwert (1981)).

Since a firm can be viewed as a bundle of capital assets, firm value or the present value of the shareholders' claim to this profit stream is a function of the expected future cash flow and the variance in the cash flow. The firm's economic profit at time t to employers and shareholders is simply the price of an individual share of common stock multiplied by the number of shares

outstanding. Changes in stock prices (returns) can be interpreted as an estimate of the change in the value of the firm caused by new information regarding the future profitability of the firm (Becker and Olson (1986)). Hence, shareholder returns over a given period are measured as the change in common stock prices during that period plus dividends paid.[4]

I use event study analysis and the market model to estimate employers' normal and abnormal returns[5] under the impact of immigration legislation. Figure 1 illustrates the time line of the event study. By defining $t = 0$ as the event day, $t = T_1 + 1$ to T_2 represents the event window, and $t = T_0 + 1$ to $t = T_1$ is the estimation window which is used to estimate the normal performance return of a firm.

The length of estimation window must be chosen first. Typically, 255 days is selected to correspond approximately to the number of trading days in a calendar year. For the event window, 20 days (10 days before/after the event day), 30 days (15 days before/after the event day) and 60 days (30 days before/after the event day) are usually used to see the pattern of abnormal returns before/after the event day. In order to fully understand the impact before and after the immigration legislation, I choose 60 days event window.

The abnormal return over the event window can be interpreted as a measure of the impact of the event on the value of the firm. Thus, the methodology employed implicitly assumes the event is exogenous with respect to the change in market value of the security. In other words, the revision in value of the firm is caused by the event which can be viewed as the change in the welfare of employers and shareholders.

2.2. Stock Market Evaluation – The Market Model

In examining the impact of skilled immigrants on shareholders, the effect of overall market factors can be removed by estimating a standard market model. Formally, a daily return market model can be expressed as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (1)$$

$$E[\varepsilon_{it}] = 0 \quad Var[\varepsilon_{it}] = \sigma^2_{\varepsilon_i},$$

[4] This paper only focuses on economic profits rather than accounting profits. Economic profits are the stream of net cash flows that accrue to shareholders. As owners of the firm's assets, they represent revenues minus operating costs and new investments. Shareholders' wealth is simply the present value of these net cash flows. Strictly speaking, firm value should also include the value of debt as well. This paper focuses, however, on the interests of shareholders since the claims of bondholders are largely fixed.

[5] In some research abnormal returns are called excess returns.

where R_{it} is the return on the common stock of firm i on day t, adjusted for stock splits and dividends; R_{mt} is the return on the value-weighted NYSE/AMEX/NASDAQ index on day t; α_i and β_i are regression coefficients; and ε_{it} is the error term of firm i on day t.

Under general conditions and assumptions under which asset returns are jointly multivariate normally distributed with mean μ and covariance matrix Ω for all t, ordinary least squares (OLS) is a consistent and efficient estimation procedure for the market model parameters.

The estimated abnormal return (AR), also known as prediction error, can be calculated for each firm i for each day t in the analysis period by

$$\begin{aligned} AR_{it} &\equiv \hat{\varepsilon}_{it} \\ &= R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \end{aligned} \tag{2}$$

where AR_{it} is the abnormal return of firm i on day t and $\hat{\alpha}_i$, $\hat{\beta}_i$ are estimates of α_i and β_i.

The abnormal returns (AR) are estimates of the abnormal returns to the stockholders of the sample of firms on each trading day. Mean abnormal returns ($\overline{AR}$) across all firms can be calculated for each day in the analysis period and the mean abnormal return of an industry is obtained. These averages are then accumulated to provide a series of cumulative mean abnormal returns (CAR) around each event. That is,

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} \overline{AR}_t \tag{3}$$

In order to draw inferences for the event of interest, the abnormal return observations must be aggregated. The aggregation is along two dimensions – through time and across firms.

To proceed, one first obtains the normal performance return (the 255 days estimation window) of firm i with equation (1). Second, calculate abnormal return of firm i on trading day t using equation (2). Third, calculate the mean of the abnormal returns of all firms in that particular industry on each trading day. Last, accumulate the mean abnormal returns across time using equation (3). From these steps, one can calculate the cumulative effect of immigration policy on the welfare of employers and shareholders.

2.3. Testing Abnormal Returns

After obtaining the mean abnormal returns ($\overline{AR}$) and cumulative mean abnormal returns (CAR)

of industries, one can test whether the abnormal returns are statistically different from zero. A common assumption used to formulate tests of statistical significance is that abnormal returns are normally distributed. Under the null hypothesis H_0 the event window sample abnormal returns (prediction errors) is

$$\hat{\varepsilon}_i^* \sim \mathrm{N}(0,\ \mathrm{V}_i) \qquad (4)$$

Equation (4) gives the distribution for any single abnormal return observation. V_i is the variance-covariance matrix of the estimated abnormal return $\hat{\varepsilon}_i^*$.

In the literature, many tests have been developed to check the abnormal return performance in an event study. The classic test statistic, proposed by Patell (1976), is referred to as the Patell t-test, used to test whether abnormal returns are significant from zero, assuming security returns are normally distributed.

Since abnormal returns are likely to be serially correlated, Mikkelson and Partch (1988) use a corrected version of the Patell t-test. The corrected test accounts for the fact that, within the window, abnormal returns for each stock are serial correlated. The serial correlation occurs because all the abnormal returns are functions of the same market model intercept and slope estimators. Brown and Warner (1980, 1985) suggest that, in general, event-study tests are well specified and reasonably powerful. However, they identify potential testing problems created by an event-induced increase in variance. They note that if the variance is underestimated, the test statistic will lead to rejection of the null hypothesis more frequently than it should, even when the mean abnormal performance is zero. To account for this issue, Boehmer , Musumeci and Poulsen (1991) introduce an empirical cross-sectional variance adjustment in place of the analytical variance of the total standardized prediction error. The test is often referred to as standardized cross-sectional test.

In addition to serial correlation, abnormal returns may also be cross-sectionally correlated. To account for this issue, Brown and Warner (1980) introduce a "crude dependence adjustment" test, also known as the time-series standard deviation test. Unlike the Patell t-test, the time series standard deviation test uses a single variance estimate for the entire portfolio. Therefore, the time series standard deviation test does not take account of unequal return variances across securities. Hence, the test avoids the potential problem of cross-sectional correlation of security returns.

A subsequent branch of studies involved testing the performance of robust tests that did not rely on an assumption of normally distributed returns for correct specification. The most successful among these tests is the nonparametric sign test. Nonparametric tests are motivated by concerns that non-normally distributed security returns may cause tests to be poorly specified and yield imprecise inferences. Therefore, besides the parametric tests described above, nonparametric tests can be used to supplement the validity of the results. This paper uses the general sign test. The nonparametric sign test is that for each trading day in the event period and for each window, the number of securities with positive and negative mean abnormal returns can be reported. Under the null hypothesis, the fraction of positive returns in the event window is the same as in the estimation period. For example, if 40% of market returns are positive in the estimation period, while 70% of firms have positive market returns on event day 1, the general sign test checks whether the difference between 70% and 40% is significant.

I use both parametric and nonparametric tests as described above. Test results are reported in section 5.

3. Background on the H-1B Visa Program

Nonimmigrant[6] temporary workers seeking employment in the United States are generally classified in the "H" visa category. The largest numbers of H visas are issued to temporary workers in specialty occupations, known as H-1B nonimmigrants. The regulations define a "specialty occupation" as requiring theoretical and practical application of a body of highly specialized knowledge in a field of human endeavor including, but not limited to, architecture, engineering, mathematics, physical sciences, social sciences, medicine and health, education, law, accounting, business specialties, theology, and the arts, and requiring the attainment of a bachelor's degree or its equivalent as a minimum.

The prospective H-1B nonimmigrants must demonstrate that they have the requisite education and work experience for the posted positions to the U.S. Citizenship and Immigration Services Bureau (USCIS)[7] in the Department of Homeland Security (DHS). USCIS then approves the petition for the H-1B nonimmigrant (assuming other immigration requirements are satisfied) for periods up to three years. An individual can stay a maximum of six years on an

[6] A nonimmigrant is an alien legally in the United States for a specific purpose and a temporary period of time.
[7] Formerly the Immigration and Naturalization Service (INS).

H-1B visa.

The H-1B program was established in 1990[8] to permit skilled foreigners to work in the United States. The program grew out of the H-1 visa program, which was created during the early 1950s to allow firms to hire temporary skilled foreign workers in the United States on a temporary basis. Beginning in 1970, employers were allowed to hire foreigners for permanent positions, and the number of visas issued increased as the U.S. economy boomed during the 1980s.

Under "The Immigration Act of 1990", visas for employment-based immigrants rose to 140,000 from the 58,000 cap established in 1976. The 1990 Act set an annual cap of 65,000 nonimmigrants entering the U.S. under H-1B visas. The Act required employers to pay H-1B workers the prevailing wage. In addition, the 1990 Act created three other new visa categories for skilled temporary workers–the H-1A visa for nurses, and O and P visas for prominent scientists, educators, artists, athletes and entertainers.[9]

Figure 2 illustrates the annual H-1B visa issuance cap since 1990. The American Competitiveness and Workforce Improvement Act of 1998 (ACWIA of 1998) added new attestation requirements for recruitment and layoff protections, but only applied them to "H-1B dependent" firms (generally defined as at least 15% of workforce are H-1Bs workers). All firms have to offer H-1Bs benefits as well as wages comparable to their U.S. workers. Education and training for U.S. workers is funded by a $500 fee paid by the employer for each H-1B worker that is hired. The ceiling was 115,000 in both FY 1999 and FY 2000, 107,500 in FY 2001, and back to 65,000 in FY 2002. In October, 2000, the Twenty-First Century Act of 2000 (AC21) raised the number of H-1B visas by 297,500 over three years. That is, AC21 raised the cap in FY 2001 from 107,500 to 195,000 and in FY 2002 from 65,000 to 195,000. The cap in FY 2003 was 195,000. Starting in FY 2004, the H-1B visa cap reverted back to 65,000 and presently remains at that level. In addition, AC21 excluded all H-1B nonimmigrants who work for universities and nonprofit research facilities from the new ceiling. A provision that would have exempted H-1B nonimmigrants with at least a master's degree from the numerical limits was dropped from the final bill. The H-1B Visa Reform Act of 2004 mandates that the first 20,000 H-1B petitions filed

[8] President George H.W. Bush's signing of the "The Immigration Act of 1990" is often considered the day H-1B was born.

[9] Zavodny, Madeline, 2003, The h-1b program and its effects on information technology workers, *Federal Reserve Bank of Atlanta Economic Review* Third Quarter.

on behalf of aliens with U.S.-earned masters' or higher degrees will be exempt from any fiscal year cap on available H-1B visas.

It is clear from Figure 2 that since 1990 the ACWIA of 1998 was the first time the annual H-1B visa cap was raised, nearly doubled the number of H-1B visas. As such, the ACWIA of 1998 is a good candidate to study the impact of the increased skilled immigrants on the welfare of employers and shareholders.

3.1. The American Competitiveness and Workforce Improvement Act of 1998

During the 1990s, the booming economy, low unemployment, and a shortage of skilled domestic workers dramatically increased U.S. employers' demand for skilled foreign workers. This trend was especially pronounced in the information technology (IT) and computer industries. For many years, the U.S. high-tech industry has been the dominant participant in the H-1B visa programs. Prior to 1998, the U.S. Congress capped the annual quota of new H-1B at 65,000. Because of this limitation, the existing H-1B visa program could no longer meet high-tech industry's voracious demand for foreign skilled workers. Since 1997, H-1B visas have been oversubscribed: the number of H-1B admissions reached the statutory cap of 65,000 before the end of each fiscal year, and employers petitioning late in the year were required to wait until the next fiscal year for the admission of approved workers.

The high-tech industry actively lobbied Congress to raise the annual cap on the number of H-1B visas granted to immigrants. However, the effort met vigorous opposition from a vocal minority in Congress, labor unions, and the White House. After months of wrangling, the White House and congressional supporters of the new H-1B bill finally reached a compromise in the fall of 1998. On October 21 of that year, President Clinton signed into law, the American Competitiveness and Workforce Improvement Act of 1998. The Act nearly doubled the available number of H-1B visas over the next three years.

3.2. Legislation History of ACWIA of 1998[10]

In early 1998, Republican Senator Spencer Abraham of Michigan sponsored legislation addressing the issue of the annual H-1B visa cap and the needs of the high-technology labor market; the Senate debated the matter in early 1998. The Senate, with little opposition, passed

[10] Hahm, Jung S., 2000, American competitiveness and workforce improvement act of 1998, *Cornell Law Review* 85, 1673-1701. describes the detailed legislation history. This section is drawn from the paper.

the American Competitiveness Act raising the annual cap on H-1B visas on May 18, 1998. However, the attempt to raise the H-1B visa cap met strong opposition in the House of Representatives from traditionally pro-labor Democrats and anti-immigration Republicans.[11] These legislators received the backing of labor unions[12] and professional engineering organizations such as the Institute of Electrical and Electronics Engineers-USA (IEEE-USA).[13] The opposition to the proposal transcended traditional party lines, forming an odd coalition of liberal, pro-labor Democrats and conservative, anti-immigration Republicans.

Under pressure from labor unions and pro-labor Democrats, the White House initially opposed the new H-1B visa bill due to concerns over the perceived inadequacy of the job-protection provisions in the original bill. As the House of Representatives prepared to consider the bill before the August recess, the White House issued a public veto threat and listed changes that have to be sought into the bill." After months of wrangling and intense negotiations, the White House and the congressional supporters of the bill reached a compromise on September 23, 1998, in which they agreed to raise the H-1B visa cap while including additional protective measures for American workers. The House passed the new H-1B visa bill the next day. However, the bill faced an unexpected sudden death in the Senate on October 9, when a small number of senators led by Democrat Tom Harkin of Iowa blocked the vote.[14] After a skillful legislative maneuver by its supporters, the H-1B visa bill made a remarkable,

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[11] Patrick Buchanan, Commentary, *Sellout of High-Tech Jobs*, Washington Times, August 19, 1998, at A17 (criticizing the H-1B visa program for transforming the American workplace into the "Asian environment," and the Silicon Valley companies for failing to "Americanize" their labor force); Spencer Abraham and David McIntosh, Commentary, *Why America Needs Temporary Foreign Workers*, Washington Times, September 1, 1998, at A16 ("On this issue [of H-1B visas], Pat Buchanan... [is] wrong, and America's innovators are right."); William Branigin, *House Sets Aside Bill to Allow Hiring of More Foreign Workers: Measure Sought by High-Tech Firms Had Split GOP*, Washington Post, August 1, 1998, at A2 (discussing the split among Republicans on the issue of raising the H-1B visa cap).

[12] William J. Holstein, *Give Us Your Wired, Your Highly Skilled: Tech Firms Are Winning the Battle of the Visas*, U.S. News & World Report, October 5, 1998, at 53 (reporting the demands of labor organizations like the Communications Workers of America and the AFL-CIO that "Americans displaced by global competition or downsizings ought to have first priority in taking the high-paying jobs").

[13] John R. Reinert, Commentary, *Trojan Horse in the Free Labor Market?*, Washington Times, Sept. 26, 1998, at C2 (asserting that the H-1B visa program hurts U.S. engineers); Zitner, *supra* note 16, at C1 (quoting IEEE-USA president John Reinert as stating that "[the evidence doesn't suggest that there is a labor shortage, and there is no need to increase the number of visas"). According to IEEE-USA, a report by an outplacement firm showed that high-tech industries have laid off 143,000 workers in 1998, more than any other sector of the economy; Robert MacMillan, *H-1B Visa Bill Ready for Passage*, Newsbytes, October 8, 1998, available at LEXIS, News Library, Wire Service Stories File (reporting IEEE-USA president-elect Paul Kostek's argument that "it's bizarre policy to give the industries laying off the most US workers special access to an expanded foreign guest-worker program").

[14] *Bill to Bring Technology Workers to U.S. Dies*, New York Times, Oct. 10, 1998, at C2 (reporting the 11th-hour death of the H-1B visa bill); Ashley Dunn, *Plan to Increase High-Tech Work Visas Dies in Senate*, L.A. Times, October 10, 1998, at C1.

eleventh-hour comeback as part of the omnibus appropriations bill on October 15.[15] On October 21, 1998, President Clinton signed the controversial compromise H-1B visa bill into law: the American Competitiveness and Workforce Improvement Act of 1998.

4. Data and Descriptive Statistics

To measure the impact of the ACWIA of 1998 on employers, determining which firm/industry received how many H-1B visas is crucial. However, the USCIS does not provide a detailed accounting of the number of H-1B visas issued during FY 1999. The ACWIA of 1998 requires that information about successful H-1B visa applications be submitted each year to Congress. The first report (*Report on Characteristics of Specialty Occupation Workers (H-1B)*) was submitted to Congress for those workers approved for H-1B status in FY 2000. The FY 2000 report only shows the distribution of beneficiaries by major occupation group. It wasn't until FY 2001 that the report included the specific industries employing the most H-1B workers. The other source of data is the study by Lowell and Christian (2000). They report that in 1999 fully 80% of the top H-1B users are in the IT industries, the balance being non-IT. Among the non-IT companies there is no large, single sector but there are clear lines of business: 7% of the top H-1B firms are in business/management consulting, another 4% are in executive/temporary placement services, and nearly 6% are in accounting/ engineering services.

Because the data in detailed industry is not available in FY 1999, I use 1% 2001 to 2008 American Community Survey (ACS) and 5% 1980, 1900, 2000 Integrated Public Use Microdata Series USA (IPUMS-USA) to get the top H-1B visa user industries and cross validate by using the Report on Characteristics of Specialty Occupation Workers (H-1B) of USCIS from FY 2000 to FY 2009 and the study of Lowell and Christian (2000). Table 1 indicates the distribution of beneficiaries by major occupation group. Nearly 55% of all H-1B petitions approved in FY 2000 were accounted for by computer-related occupations. The second and third most numerous occupation groups, in order, are architecture, engineering, and surveying and administrative specializations. The former group includes computer and systems engineers while the latter

[15] Mark Leibovich, *High Tech Is King of the Hill: Rash of Legislative Wins Has Industry Celebrating*, Washington Post, October 16, 1998, at F1 ("Technology lobbyists, executives and congressional supporters managed to attach the bill to the broader budget package."). Tom Abate and Jon Swartz, *11th-Hour Victory For Tech / Visa increase, R&D tax measure in budget bill*, San Francisco Chronicle, October 16, 1998 ("The high-tech industry was in high spirits yesterday after scoring a series of 11th-hour legislative victories -- just days after it looked like its political agenda might get shut out.")

contains accountants and management systems analysts.

Table 2 shows the H-1B petitions approved by detailed industry (4-digits NAICS[16] code) from FY 2001 to FY 2008. The IT industries are the top H-1B user in the past ten years. The remaining balance goes to Colleges and universities, Architectural, Engineering, Management and Research industries.

Using ACS and IPUMS-USA data, I summarize the top 10 industries (3-digits NAICS code) which hire skilled foreign workers by number and by percentage in the Appendix Table B11 and Table B12. In 2000, the top 10 industries are Computers and related equipment, Computer and data processing services, Research, development, and testing services, Colleges and universities, Electrical machinery, equipment, and supplies, Management and public relations services, Engineering, architectural, and surveying services, Radio, TV, and computer stores, Security, commodity brokerage, and investment companies and Hospitals. Since there were only five and two firms publicly traded in College and universities, and Radio, TV and computer stores industry, respectively, during the estimation period. I drop the two industries in my analysis.

Although the H-1B visa user data was incomplete in FY 1999, by cross validation I show that the top H-1B visa user industries which will be used to analyze the impact of immigration policy, the ACWIA of 1998, are 1) Computers and related equipment, 2) Computer and data processing services, 3) Research, development, and testing services, 4) Electrical machinery, equipment, and supplies, 5) Management and public relations services, 6) Engineering, architectural, and surveying services, and 7) Security, commodity brokerage, and investment companies.

It is also of interest to understand the trends and statistics of skilled immigrants in the United States. Using ACS and IPUSM-USA data, I define a person as an immigrant if he or she was born in a foreign country. The term "foreign born" refers to people residing in the United States at the time of the census who were not US citizens at birth. The foreign-born population includes naturalized citizens, lawful permanent immigrants, refugees and asylums, legal nonimmigrants (including those on student, work, or other temporary visas), and persons residing in the country without authorization. I restrict the analysis to individuals who age 25 to 64, not self-employed or working without pay and not residing in group quarters. Skilled immigrants are defined as those who have 13 or greater years of schooling. Person weight is used

[16] NAICS stands for North American Industrial Classification System.

throughout the paper.

4.1. Source of Region

Table B3 and Table B4 in the Appendix B summarize the source of region of skilled immigrants. From 1980 to 2000, the largest number and proportion of skilled immigrants come from Europe. In 1980, 31.84% of immigrants were from Europe; then it decreased to 24.39% in 1990 and to 22.02% in 2000. Despite the decreasing trend, Europe is still the largest source region of skilled immigrants in the last three decades. Other important sources of regions of skilled immigrants are East Asia (average 12.15%), Southeast Asia (average 13.71%) and India/Southwest Asia (average 8.71%). Note that the trend of the three regions is increasing over time.

4.2. Occupation

Table B5 and Table B6 show seven general occupations of skilled immigrants in the United States. In Table B5, most skilled immigrants work as managerial and professional specialty (average 44.25%) from 1980 to 2000. The second most popular occupation is technical, sales and administrative support (average 31.05%).

Besides the seven general occupations, we may be interested in the detailed occupations. There are approximately 900 occupations which can be identified from the survey data. Table B9 and Table B10 summarize the detailed occupations for skilled immigrants. In Table B9, managers and administrators have the largest number of skilled immigrants in 1980, 1990 and 2000. Registered nurses, salespersons occupation also have many skilled immigrants in 1980 and 1990. Note that in 2000, computer software developers and computer system analysts have the most skilled immigrants. By percentage, physicians, physical scientists and engineers are the highest percentage occupations among skilled immigrants. Note that physicians averages 24.17% from 1980 to 2000. Physical scientists is even as high as 40% in 2000.

4.3. Industry

For the purpose of understanding the impact of skilled immigrants on the welfare of employers, knowing which industries hire the largest number and highest percentage of skilled immigrant is particularly important. Table B7 summarizes the thirteen general industries in which immigrants are likely to work. The industry that has the largest number of skilled immigrants is professional and related services (average 32.8% from 1980 to 2000). The second and the third largest are

manufacturing and retalesale trade. Manufacturing averages 18.15% and the trend is decreasing over time. On the other hand, retalesale trade averages 10.88% and the trend is increasing.

Table B11 reports the top 10 (by number and by percentage) detailed industries which hire skilled immigrants. The table shows an important fact that hospitals, colleges and universities, elementary and secondary schools have the largest number of skilled immigrants from 1980 to 2000. In terms of percentages, in 1980, engineering, architectural, and surveying services, colleges and universities have the highest percentage of skilled immigrants. Starting 1990, computer related industries (computers and related equipment, computer and data processing services) and research, development, and testing services gradually become the industries hiring the highest percentage of skilled immigrants. The importance of skilled immigrants in the computer related industries has been growing over time. Take computers and related equipment industry for example. In 1980, the percentage of skilled immigrants in the industry was 6.95%, and then it increased to 11.67% in 1990 and 19.19% in 2000. The other computer related industry, computer and data processing services, also has 18.57% skilled immigrants among all employees.

5. Empirical Results

This paper estimates the impact of the legislation of ACWIA of 1998 on the returns of employers and shareholders. Stock returns are obtained from the Center for Research on Security Prices (CRSP). The industries used are Computers and related equipment, Computer and data processing services, Research, development, and testing services, Electrical machinery, equipment, and supplies, Management and public relations services, Engineering, architectural, and surveying services, Security, commodity brokerage, and investment companies. The list includes IT and non-IT industries and is consistent to the data in section 4. The event day (day 0) of October 15, 1998 is chosen because the bill made an eleventh-hour comeback after a sudden death on October 9.

Thirty trading days window before and after the event day are used to see if the passage of ACWIA of 1998 has a positive or negative impact on top H-1B user firms. The procedure of calculating mean abnormal returns and testing for abnormal returns are described in section 2. Empirical results are summarized in Table 1. Daily individual industry results are reported in the Table B13 to Table B19 of Appendix B.

In Table 1, Computers and related equipment industry (Apple, Sprint, Seagate, etc.) has a -0.09% mean abnormal return between day -30 to day 0, and a 0.72% mean abnormal return between day 1 and day 30. When accumulating mean abnormal returns from day 1 to day 30, Computers and related equipment industry has a 21.54% cumulative abnormal return in the month with the passage of the bill. The four statistical tests of null hypothesis zero mean returns all reject the null and are significant at 0.1% level. Cumulative mean abnormal returns from day -30 to day 0 is -2.83% and not significant in the four tests. Computer and data processing services industry (Oracle, Microsoft, Compaq, Yahoo, etc.) has a -0.27% mean abnormal return between day -30 to day 0, and a 0.76% mean abnormal return between day 1 and day 30. When accumulating mean abnormal returns from day 1 to day 30, Computer and data processing services industry has a 22.77% cumulative abnormal return in the month after the bill was passed in the Senate. The four statistical tests all reject the null and are significant at 0.1% level. In short, the IT industry (80% of total H-1B visas in FY 1999) benefited from the passage of the ACWIA of 1998. The remaining 20% H-1B visa recipients (non-IT industries) such as Electrical machinery, equipment, and supplies, Management and public relations services, Engineering, architectural, and surveying services, Security, commodity brokerage, and investment companies all gained from this Act shown in Table 1.

Examining the returns graphically and comparing the patterns across industries is extremely helpful in interpreting the results. Figure 3 shows the graphs of mean abnormal return (dash line) and cumulative mean abnormal return (solid line) for the seven top H-1B visa user industries. The graphs show that the returns were affected by the legislation of ACWIA of 1998. All seven industries in Figure 3 show a similar trend of rising cumulative mean abnormal returns after the event day (October 15, 1998), the day which the H-1B visa bill made an eleventh-hour comeback. On October 21, 1998 (day 4), the day that President Clinton signed the H-1B visa bill did not show a particular effect, which is not surprising since the information had already been anticipated by the market.

Note that September 29, 1998 (day -12) shows a significant drop in cumulative returns. This is due to the fact that on this day the Fed cut the interest rate by 25 basis points for the first time since 1996. Investors were disappointed, believing that the Fed didn't cut the federal funds rate enough, and the market was anticipating a much higher decrease of the interest rate (*The Wall Street Journal* and *The New York Times*).

One question concerning the over 20% cumulative mean abnormal returns within a month may be too high in some industries (such as Computer and related equipment, Computer data processing services, Electrical machinery, equipment and supplies). One way to address this issue is to use weighted returns. Cowan (2003) defines the weighted cumulative abnormal returns from T_1 to T_2 as,

$$WCAR_{T_1,T_2} = \sum_{j=1}^{N} \sum_{t=T_1}^{T_2} w_j AR_{jt},$$

and

$$w_j = \frac{(\sum_{t=T_1}^{T_2} s_{AR_{jt}}^2)^{-\frac{1}{2}}}{\sum_{i=1}^{N} (\sum_{t=T_1}^{T_2} s_{AR_{it}}^2)^{-\frac{1}{2}}}$$

where s_{AR}^2 is the variance of abnormal returns. I report the weighted and unweighted cumulative mean abnormal returns of five different windows in Table 2. When using weighted returns, the cumulative mean abnormal returns of Computer and related equipment, Computer data processing services, Electrical machinery, equipment and supplies drop to 15.88%, 18.11% and 15.68%, respectively.

In sum, the ACWIA of 1998 had a positive impact on the returns of top H-1B user industries. Shareholders of high-tech companies (top users of H-1B visa, 80% of total) such as Computers and related equipment, Computer and data processing services enjoyed an average 21.54% and 22.77% cumulative excess return in the month after the Act was passed. On the other hand, shareholders of non-high-tech industries (remaining balance of H-1B visa) such as Security, commodity brokerage, and investment companies had a 4% lower average cumulative excess in the same period.

6. Robustness

6.1. Industry with Little Need for H-1B Visas

Figure 4 shows the patterns of mean abnormal returns and cumulative mean abnormal returns of industries with little need for H-1B visas. These industries can be used to compare my findings in the last section. Under the same time window, the patterns are different compared to the top

H-1B user industries in Figure 3[17]. In other words, the ACWIA of 1998 has no significant effect on industries with little need for H-1B visas as shown in Table 3. These industries include Farm-product raw materials, Nonmetallic mining and quarrying except fuels, Sawmills, planning mills and millwork, Metal mining and Bowling centers, etc. Detailed estimation results are reported in Table B20 to Table B24 of Appendix B.

6.2. International Condition - Canada, UK and Germany

One could attribute the increased abnormal returns to international macroeconomic condition. In particular, Canada is often regarded as a highly-correlated market with the U.S. In this section I check if the abnormal returns of the interested industries in other countries during the same event window have the similar patterns as U.S. after the event day.

The correlations between the United States and other stock markets are summarized in Table 4. Generally the three studies show the correlation between U.S., Canada, U.K., Germany and Japan is around 0.72-0.8, 0.4-0.73, 0.42-0.49 and 0.12-0.33, respectively. Hence, in Table 5 and Figure 5, I report the results of mean abnormal returns and cumulative means abnormal return of high-tech industries in Canada, U.K. and Germany during the same event window. The data for Canada are from Canadian Financial Market Research Centre (CFMRC), U.K. and Germany data are from Global Financial Data. Two U.S. computer industries are for comparisons.

Figure 5 shows that high-tech industries in Canada, U.K. and Germany do not have significant and increasing patterns after the event day of October 15, 1998. For European markets, the IT sector in U.K. does not show an increasing trend of cumulative abnormal returns and the German market shows mixed results (not as consistent as US high-tech industries) after the event day. Hence, the doubt that the significant and positive abnormal returns might be driven by international condition can be ruled out.

6.3. Nonparametric Model[18]

One crucial question about the financial market is that financial data are generally not normally distributed. In particular, financial return distributions are often characterized as fat-tailed and skewed in empirical research. To address this issue, I use a nonparametric least squares model

[17] Note that some industries hire both large numbers of skilled and low-skilled immigrants. For example, hospitals, hotels and motels, all construction and eating and drinking places. Hence, for comparison, using the industries that hire large number of medium-skilled or low-skilled immigrants may misinterpret the results.

without assuming the functional form of right hand side variables to estimate the return generating process. The model is

$$Y_i = G(X_i\beta_0) + \varepsilon_i \tag{5}$$

where G is some unknown function, $E(\varepsilon_i \mid X_i) = 0$ and $E(Y_i \mid X_i) = G(X_i\beta_0)$. Then, the least squares estimates can be found by

$$\underset{\beta}{Min} \sum [Y_i - G(X_i\beta)]^2 \tag{6}$$

Hence, the abnormal return can be obtained by getting the conditional expectation $E(Y_i \mid X_i)$ after subtracting it from Y_i. In other words, the abnormal return (prediction error) is

$$AR_{it} = Y_{it} - \hat{G}(\beta) \tag{7}$$

Figure 6 shows the results of this model. From the pattern of the graphs, the nonparametric least squares model catches the abnormal returns very well. It shows the top H-1B visa user industries have rising cumulative mean abnormal returns after the day when the ACWIA of 1998 was passed in the Senate.

6.4. Testing Structural Breaks

I apply the work by Doornik and Hendry (1997) using break-point Chow test and sample-split Chow test to test for structural change. By assuming that a structural break may have occurred in period T_B, the sample-split and break-point Chow tests compare the estimates from the observations associated with the period before T_B with those obtained after T_B. More precisely, the model is estimated by OLS from the full sample of T observations as well as from the first T_1 and the last T_2 observations, where $T_1 < T_B$ and $T_2 \le T - T_B$.

The sample-split test statistics is

$$\lambda_{SS} = (T_1 + T_2)[\log \hat{\sigma}^2_{1,2} - \log\{(T_1 + T_2)^{-1}(T_1\hat{\sigma}^2_{(1)} + T_2\hat{\sigma}^2_{(2)})\}],$$

and the break-point test statistics is,

$$\lambda_{BP} = (T_1 + T_2)\log \hat{\sigma}^2_{1,2} - T_1 \log \hat{\sigma}^2_{(1)} - T_2 \log \hat{\sigma}^2_{(2)}.$$

These test statistics compare the residual variance estimate from a constant coefficient

[18] Besides the benchmark single factor market model and nonparametric model, I estimate the normal returns by multi-factor modeling using Fama and French (1993) three-factor model and Carhart (1997) Fama-French-momentum four-factor model. The results are reported in Appendix A.

model with the residual variance estimate of a model that allows for a change in the parameters. As such, they check whether there are significant differences in the estimates before and after T_B. The sample-split test checks the null hypothesis that the AR coefficients and deterministic terms do not change during the sample period, whereas the break-point test checks in addition the constancy of the white noise variance.

By searching every data point, I perform the two Chow tests not only for a single break date but over a range of the time points. Figure 7 provides the results graphically by using bootstrapped p-values with 2,000 replications. It is obvious that Computer and related equipment industry has a break point on the event day. Management and public relation services industry also has a break point on the event day.

7. Concluding Remarks

Immigration is a contentious issue in the industrialized nations of the world. Many of the key questions in the debate on immigration policy are economic. Most attention has been paid to the potential adverse effect and possible benefits of immigration on labor market outcomes of employees (Friedberg and Hunt (1995)). Less attention, however, is devoted to the consequences of immigration on employers. This paper uses event study analysis to measure the economic impact of immigration policy on the profit of employers and shareholders. The American Competitiveness and Workforce Improvement Act (ACWIA) of 1998 nearly doubled the available number of H-1B visas for skilled foreign workers in FY 1999. It was the first time that the U.S. government raised the annual cap of H-1B visa since 1990. I focus on this bill and analyze whether and by how much it increased shareholders' profit.

The empirical results show that employers and shareholders in the top H-1B visa user industries enjoyed significant and positive abnormal returns with the passage of the ACWIA of 1998. High-tech industries (top users of H-1B visa, 80% of total) such as "Computers and related equipment", and "Computer and data processing services" gained, respectively, an average 21.54% and 22.77% in cumulative abnormal returns in the month with the passage of the Act. Using weighted returns, the estimated mean cumulative abnormal returns are 15.88% for "Computers and related equipment" and 18.11% for and "Computer and data processing services industries", respectively. Industries with little need for H-1B visas experienced no significant changes in cumulative abnormal returns. Robustness checks which include controlling for

international condition, nonparametric modeling, sample-split and break-point Chow tests support the results.

In sum, top H-1B visa user industries benefited from the passage of the skilled immigration policy - the ACWIA of 1998. Raising H-1B visa cap had a positive and significant impact on the returns of top H-1B visa user industries. This paper contributes to the literature by answering the quantitative effect of immigration policy on employers. In fact, top H-1B visa user industries gained more than the increased 50,000 visas in FY 1999. Not only had their profits increased, but also acquired skilled workers which can enhance productivity of the firm. In other words, hiring more skilled foreign workers helps U.S. industries improve their international competitiveness. It has the policy implication that if the skilled foreign workers and domestic U.S. workers are complement, when these high-skilled jobs are brought to the U.S., other jobs related to them may be created and filled by U.S. citizens. The results can be applied to other industries such as pharmaceutical companies and hospitals. My findings can help policymakers evaluate immigration policy from the perspective of employers.

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Table 1 Estimation Results of Top H-1B Visa User Industries

Industry	Day	N	Mean Abnormal Return	Cumulative Mean Abnormal Return	Positive: Negative	Standard Normal Test	Standard Cross-section Test	Time-Series (CDA) t Test	Generalized Sign Test	Firms
Computers and related equipment	(-30,0)	47	-0.09%	-2.83%	25:22	-0.413	-0.284	-0.697	0.847	Apple, Sprint, Seagate, Lexmark, Gateway, etc.
	(+1,+30)	47	0.72%	21.54%	36:11	6.618***	4.748***	5.396***	4.062***	
Computer and data processing services	(-30,0)	584	-0.27%	-8.33%	220:364	-7.821***	-6.535***	-1.968*	-3.983***	Oracle, Microsoft, Compaq, Yahoo, Novell, Sandata, etc.
	(+1,+30)	584	0.76%	22.77%	423:161	18.958***	12.972***	5.469***	12.875***	
Research, development and testing services	(-30,0)	81	0.17%	5.17%	44:37	1.827*	1.315$	1.272	1.191	Atlantic Pharmaceuticals, Pacific Biometrics, Megabios, Opinion Research, Pharmchem, etc.
	(+1,+30)	81	0.52%	15.69%	58:23	6.075***	4.318***	3.925***	4.305***	
Electrical machinery, equipment and	(-30,0)	346	-0.04%	-1.26%	163:183	-1.797*	-1.549$	-0.315	-0.124	Texas Instruments, Emerson Electric, Bell Industries, Integrated
	(+1,+30)	346	0.82%	24.49%	277:69	20.482***	12.819***	6.243***	12.149***	
Management and public relations services	(-30,0)	52	-0.30%	-9.31%	24:28	-3.794***	-1.988*	-2.364**	0.034	Randers Group, Market Facts, Dental Care Alliance, Right Management Consultants, etc.
	(+1,+30)	52	0.44%	13.19%	34:18	4.731***	3.517***	3.404***	2.816**	
Engineering, architectural	(-30,0)	24	-0.09%	-2.79%	9:15	-1.669*	-1.559$	-0.396	-0.683	Cam Designs, Waste Systems International,

Industry	Day	N	Mean Abnormal Return	Cumulative Mean Abnormal Return	Positive: Negative	Standard Normal Test	Standard Cross-section Test	Time-Series (CDA) t Test	Generalized Sign Test	Firms
and surveying services	(+1,+30)	24	0.81%	24.13%	19:5	4.329***	3.924***	3.478***	3.425***	Wavetech, etc.
Security, commodity brokerage	(-30,0)	1363	-0.07%	-2.05%	701:662	-3.322***	-2.657**	-1.383$	3.686***	Smith Barney, Sovereign Bancorp, Fidelity Bancorp, etc.
and investment companies	(+1,+30)	1363	0.13%	4.00%	823:540	12.477***	11.725***	2.750**	10.312***	

Note: The symbols $, *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01 and 0.001levels, respectively, using a generic one-tail test.

Table 2 Weighted and Unweighted Cumulative Mean Abnormal Returns

Industry		Event Window				
		(-30,0)	(+1,+5)	(+1,+10)	(+1,+20)	(+1,+30)
Computers and related equipment	Mean Abnormal Return	-0.09%	1.46%	1.07%	0.93%	0.72%
	Cumulative Abnormal Return	-2.83%	7.28%	10.71%	18.54%	21.54%
	Weighted Cumulative Abnormal Return	-1.08%	5.24%	8.25%	13.68%	15.88%
Computer and data processing services	Mean Abnormal Return	-0.27%	1.28%	1.17%	0.98%	0.76%
	Cumulative Abnormal Return	-8.33%	6.39%	11.67%	19.58%	22.77%
	Weighted Cumulative Abnormal Return	-7.52%	5.86%	10.59%	16.59%	18.11%
Research, development and testing services	Mean Abnormal Return	0.17%	0.23%	0.79%	0.76%	0.52%
	Cumulative Abnormal Return	5.17%	1.15%	7.88%	15.22%	15.70%
	Weighted Cumulative Abnormal Return	4.18%	2.51%	8.65%	13.92%	14.10%
Electrical machinery, equipment and supplies	Mean Abnormal Return	-0.04%	1.54%	1.61%	1.18%	0.82%
	Cumulative Abnormal Return	-1.26%	7.69%	16.10%	23.51%	24.56%
	Weighted Cumulative Abnormal Return	-1.96%	7.30%	14.65%	20.83%	21.42%
Management and public relations services	Mean Abnormal Return	-0.30%	0.92%	0.96%	0.54%	0.44%
	Cumulative Abnormal Return	-9.31%	4.60%	9.57%	10.84%	13.20%

	Weighted Cumulative Abnormal Return	-8.99%	4.21%	8.41%	10.44%	11.37%
Engineering, architectural and surveying services	Mean Abnormal Return	-0.09%	0.00%	1.20%	1.08%	0.81%
	Cumulative Abnormal Return	-2.79%	0.01%	11.97%	21.58%	24.15%
	Weighted Cumulative Abnormal Return	-6.36%	3.02%	8.08%	15.00%	15.68%
Security, commodity brokerage and investment companies	Mean Abnormal Return	-0.07%	0.41%	0.31%	0.21%	0.13%
	Cumulative Abnormal Return	-2.05%	2.05%	3.08%	4.22%	4.00%
	Weighted Cumulative Abnormal Return	-0.44%	1.53%	2.09%	3.06%	2.71%

Source: Numbers are compiled by author.

Table 3 Estimation Results of Industries with Little Need for H-1B Visas

Industry	Day	Mean Abnormal Return	Cumulative Mean Abnormal Return	Standard Normal Test	Standard Cross-section Test	Time-Series (CDA) t Test	Generalized Sign Test	Firms
Metal Mining	(-30,0)	1.01%	31.45%	13.022***	8.984***	3.764***	7.733***	Alanco Environmental Resources Corp., Sunshine Mining & Refining Corp., etc.
	(+1,+30)	0.17%	5.09%	0.643	0.495	0.628	-0.446	
Logging	(-30,0)	-0.07%	-2.32%	-0.506	-0.365	-0.428	-0.678	Crown Pacific Partners, Deltic Timber Corp., Alliance Forest Products Inc.
	(+1,+30)	0.51%	15.28%	3.131***	1.458$	2.908**	1.635$	
Bowling centers	(-30,0)	-0.22%	-6.72%	-0.512	-0.512	-0.562	-0.739	Bowl America Inc., etc.
	(+1,+30)	-0.14%	-4.33%	-0.335	-0.335	-0.368	-0.739	
Wood building and mobile homes	(-30,0)	-0.09%	-2.87%	-1.145	-0.799	-0.469	0.024	Midland Company, Lindal Cedar Homes Inc., Liberty Homes Inc., etc.
	(+1,+30)	0.07%	2.04%	0.507	0.457	0.34	0.024	
Farm supplies	(-30,0)	-0.77%	-23.95%	-2.092*	-2.092*	-2.143*	-0.899	Pioneer Hi Bred Intl Inc.
	(+1,+30)	0.12%	3.46%	0.306	0.306	0.314	1.112	
Sawmills, planning mills and workmills	(-30,0)	0.34%	10.41%	1.872*	1.883*	1.688*	2.064*	Pope & Talbot Inc., Rayonier Inc., Reed International Plc., etc.
	(+1,+30)	0.06%	1.67%	0.349	0.726	0.275	1.063	
Nonmetallic mining and quarrying, except fuels	(-30,0)	0.60%	18.56%	0.912	0.586	1.531$	0.531	Canyon Resources Corp., De Beers Cons Mines Ltd., Calmat Co., etc.
	(+1,+30)	-0.07%	-2.04%	0.055	0.022	-0.174	0.531	
Farm-products raw materials	(-30,0)	0.10%	3.13%	0.355	0.184	0.476	0.517	Universal Corporation, Standard Commercial Corp., Dimon Inc.
	(+1,+30)	-0.12%	-3.69%	-0.427	-0.222	-0.578	-0.639	
Fishing, hunting, and trapping	(-30,0)	-0.90%	-27.75%	-1.885*	-1.885*	-3.220***	-0.824	Omega Protein Corp.
	(+1,+30)	0.34%	10.23%	0.708	0.708	1.209	1.213	

Source: Numbers are compiled by author.

Table 4 Correlations between U.S. and Other Stock Markets

	Ramchand and Susmel (1998)	Knif, Kolari and Pynnonen (2005)	Fasnacht and Loubergé (2007)
Canada	0.798	N/A	0.72
U.K.	0.725	0.402	0.51
Germany	0.428	0.455	0.49
Japan	0.240	0.119	0.33
World	0.863	0.782	N/A

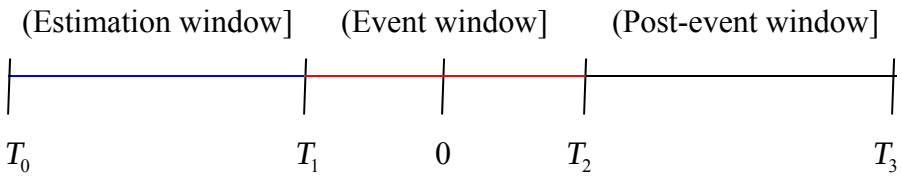
Note: Ramchand and Susmel (1998) uses weekly return data from January 1980 to January 1990. Knif, Kolari and Pynnonen (2005) uses daily return data from December 31, 1989 to January 31, 2005. Fasnacht and Loubergé (2007) uses weekly return data from January 1973 to March 2006.

Table 5 Abnormal Returns and Cumulative Mean Abnormal Returns of High-tech Industries in U.S., Canada, U.K. and Germany

		U.S.					Canada				
		(-30,0)	**(+1,+5)**	**(+1,+10)**	**(+1,+20)**	**(+1,+30)**	**(-30,0)**	**(+1,+5)**	**(+1,+10)**	**(+1,+20)**	**(+1,+30)**
Computers and related equipment	**AR**	-0.09%	1.46%	1.07%	0.93%	0.72%	-0.86%	-0.12%	0.59%	0.34%	0.48%
	CAR	-2.83%	7.28%	10.71%	18.54%	21.54%	-26.61%	-0.59%	5.85%	6.73%	14.30%
Computer and data processing services	**AR**	-0.27%	1.28%	1.17%	0.98%	0.76%	-0.34%	-0.61%	-0.05%	-0.12%	-0.08%
	CAR	-8.33%	6.39%	11.67%	19.58%	22.77%	-10.61%	-3.04%	-0.47%	-2.34%	-2.33%
		U.K.					**Germany**				
Information Technology	**AR**	-0.68%	-0.14%	0.31%	-0.11%	0.05%	-0.32%	-0.02%	0.43%	0.73%	0.51%
	CAR	-20.94%	-0.72%	3.12%	-2.19%	1.60%	-9.86%	-0.08%	4.30%	14.57%	15.31%
Telecommunication	**AR**	-0.19%	0.11%	0.20%	0.13%	0.13%	0.26%	-1.75%	-1.57%	-0.81%	-0.44%
	CAR	-5.90%	0.53%	1.98%	2.55%	3.97%	8.20%	-8.74%	-15.67%	-16.24%	-13.20%

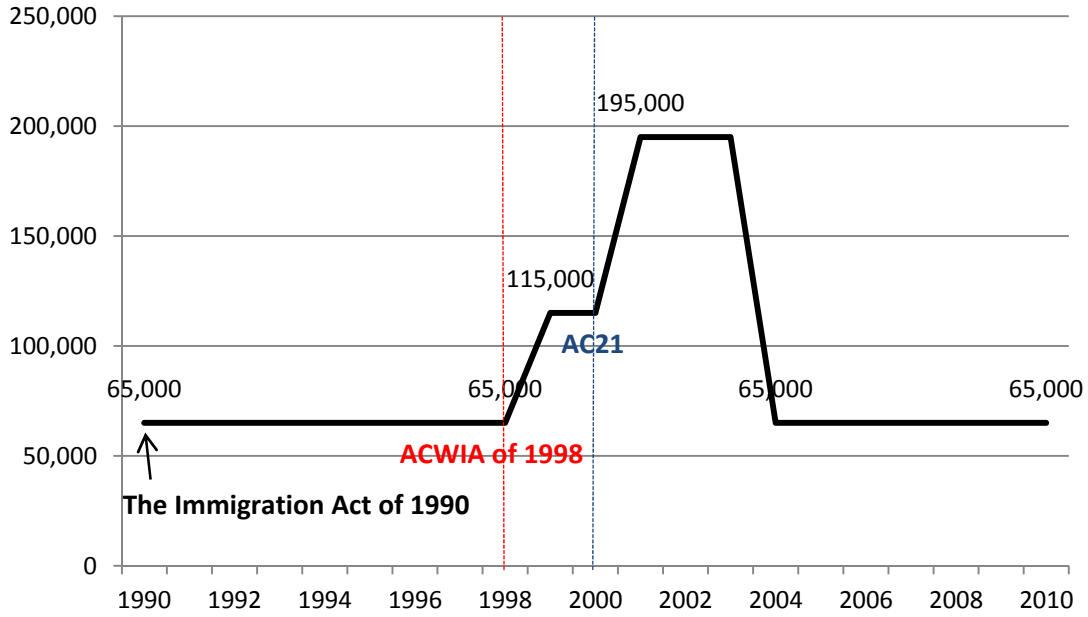
Source: Numbers are compiled by author.

Figure 1 Time Line for an Event Study



Note: Estimation window ($T_0 - T_1$) = 255 days corresponds approximately to the number of trading days in a calendar year. Event widow ($T_1 - T_2$) = 60 days plus an event day t=0.

Figure 2 Annual H-1B Visa Issuance Cap: 1990-2010



Source: USCIS (U.S. Citizenship and Immigration Services).

Figure 3 Mean Abnormal Return and Cumulative Mean Abnormal Return of Top H-1B Visa User Industries

Figure 4 Mean Abnormal Returns and Cumulative Mean Abnormal Returns of Industries with Little Need for H-1B Visas

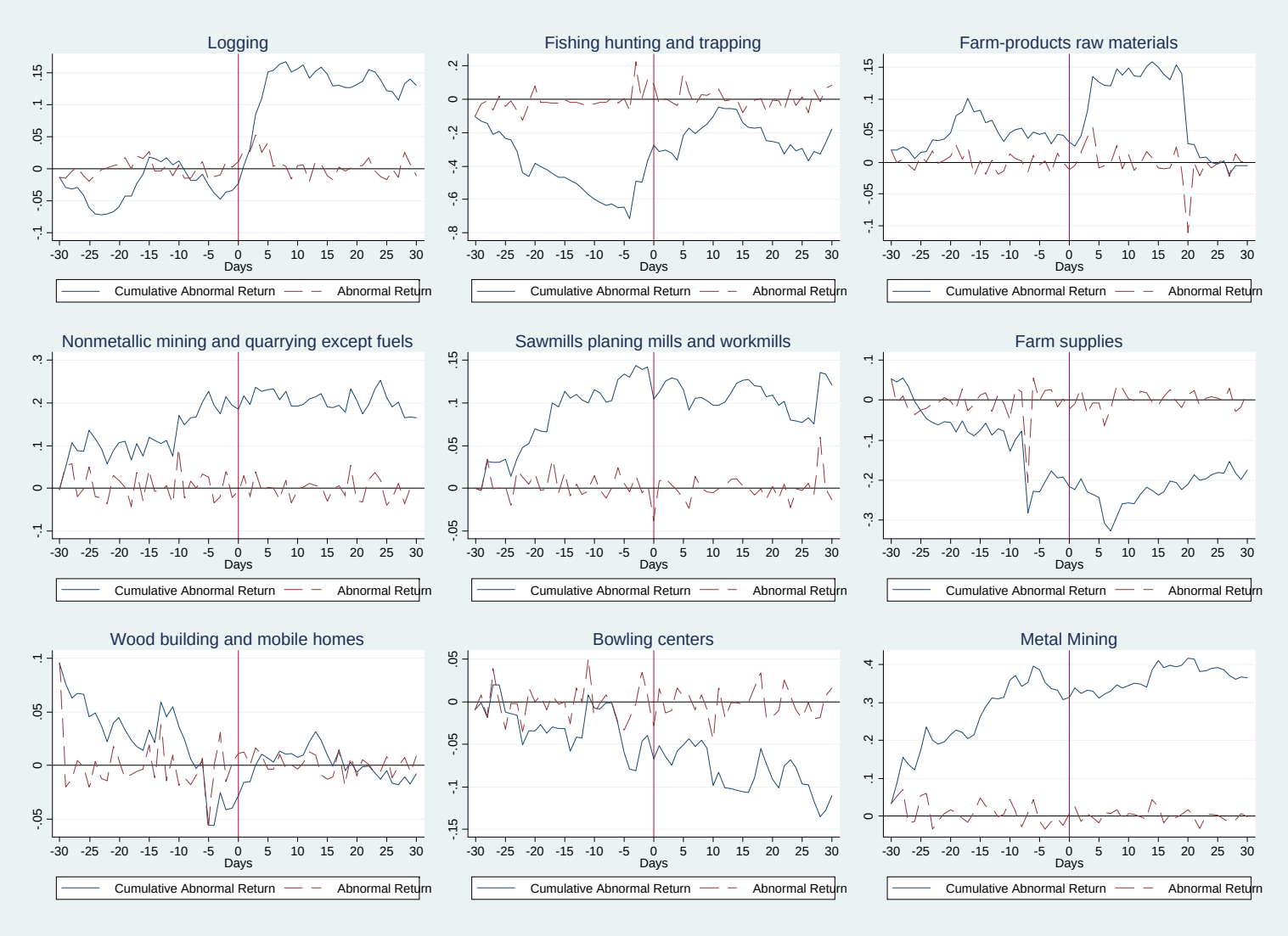


Figure 5 Mean Abnormal Returns and Cumulative Mean Abnormal Returns of High-tech industries in U.S., Canada, U.K. and Germany

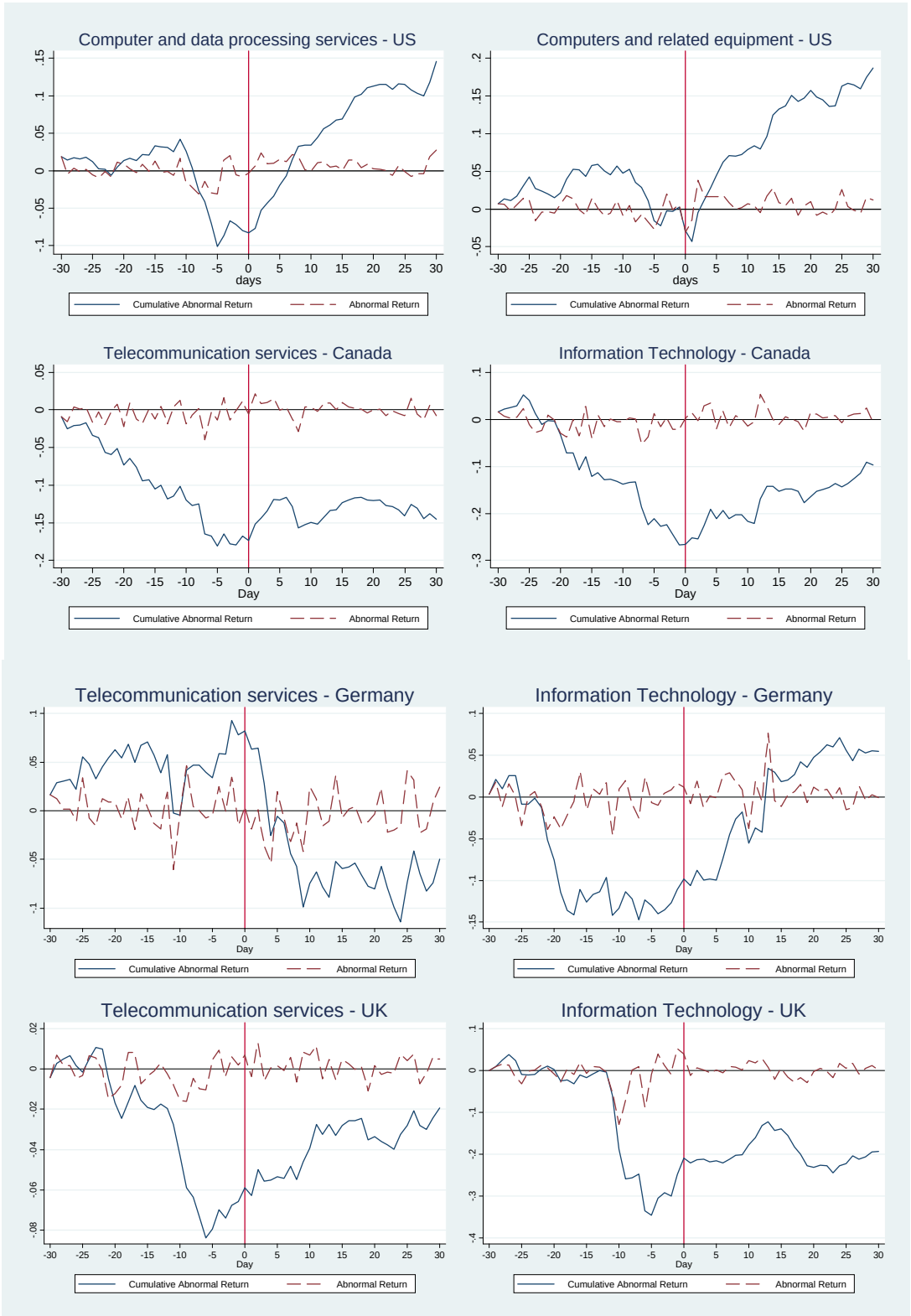
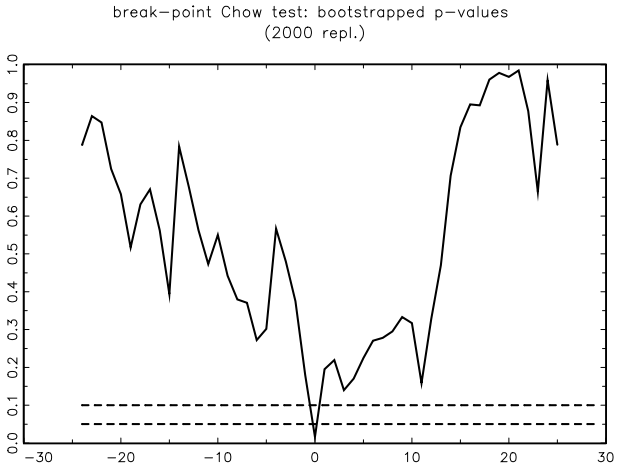
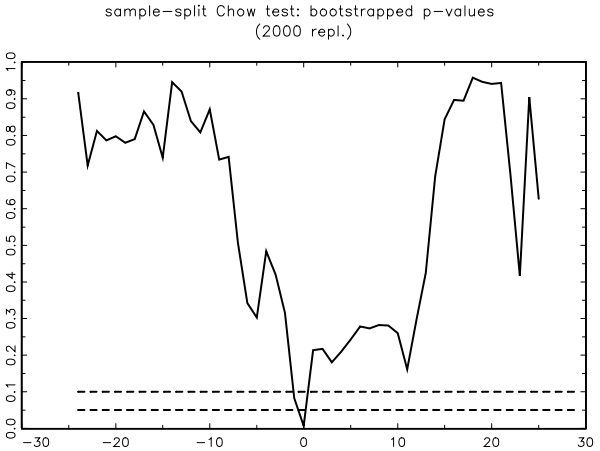


Figure 6 Mean Abnormal Return and Cumulative Mean Abnormal Return of Nonparametric Model

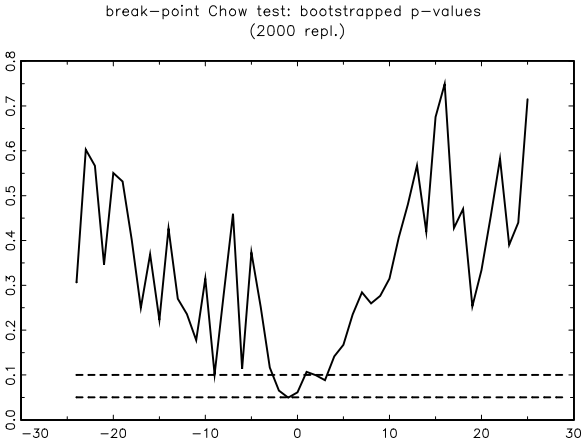
Figure 7 Structural Break Tests

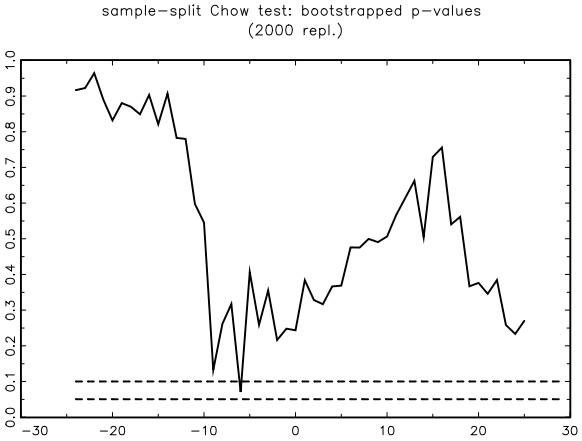
1. Computers and related equipment



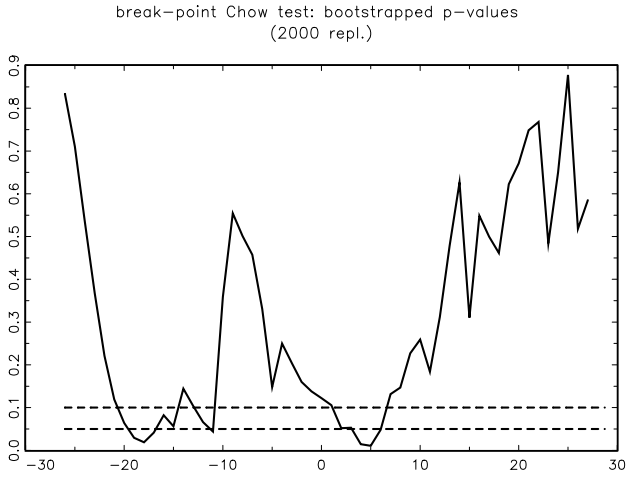


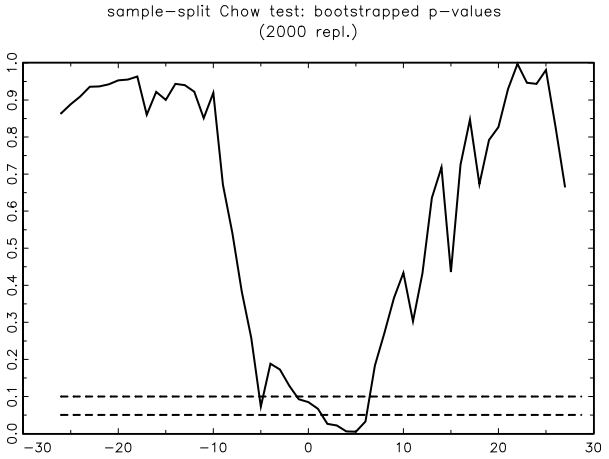
2. Computer and data processing services



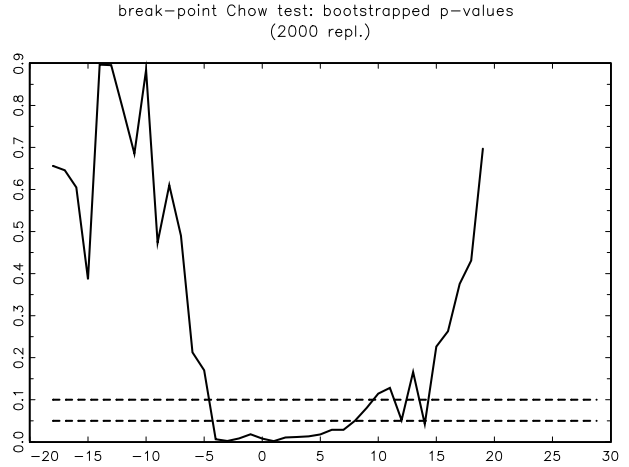


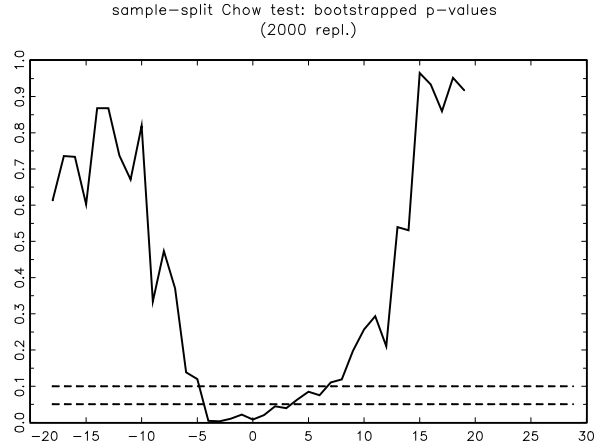
3. Research, development, and testing services



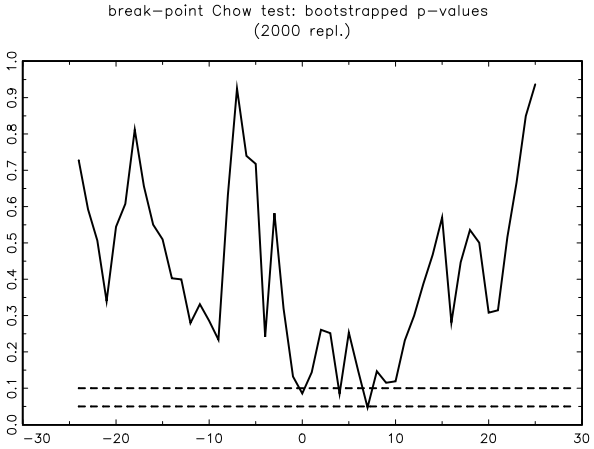


4. Electrical machinery, equipment, and supplies

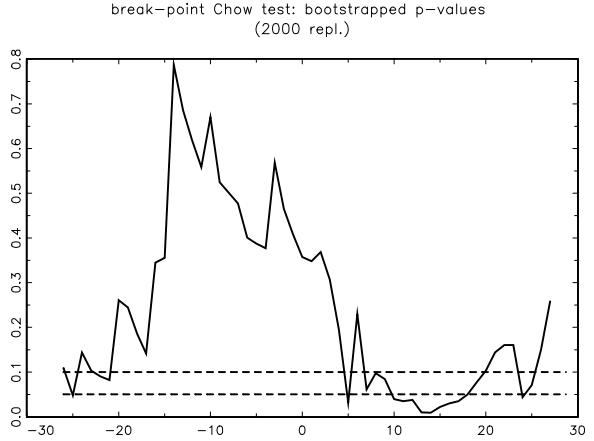


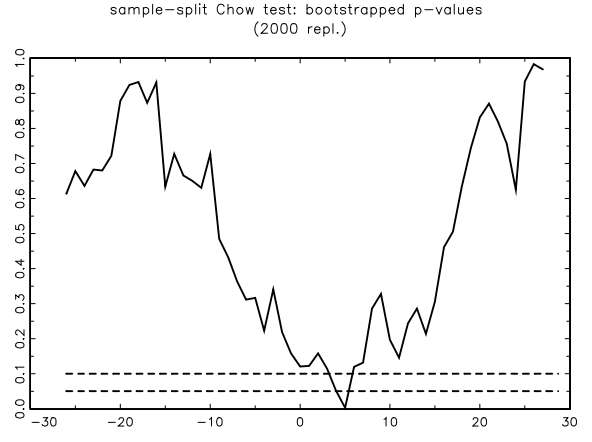


5. Management and public relations services



6. Engineering, architectural, and surveying services





7. Security, commodity brokerage, and investment companies