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AN EMPIRICAL TEST OF TASTE-BASED DISCRIMINATION CHANGES IN ETHNIC PREFERENCES AND THEIR EFFECT ON ADMISSIONS TO THE NYSE DURING WORLD WAR I

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An Empirical Test of Taste-based Discrimination: Changes in Ethnic Preferences and their Effect on Admissions to the NYSE during World War I

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ABSTRACT

A significant challenge to empirically testing theories of discrimination has been the difficulty of identifying taste-based discrimination and of distinguishing it clearly from statistical discrimination. This paper addresses this problem through a two-part empirical test of taste-based discrimination. First, it constructs measures of revealed preferences, which establish that World War I created a strong and persistent shock to ethnic preferences that effectively switched the status of German Americans to an ethnic minority. Second, the paper uses this shock to ethnic preferences to identify the effects of taste-based discrimination at the example of traders at the New York Stock Exchange (NYSE). A new data set of more than 4,000 applications for seats on the NYSE reveals that the War more than doubled the probability that German applicants would be rejected (relative to Anglo-Saxons). The mechanism of taste-based discrimination is surprising: Prices are unaffected by ethnic preferences, and discrimination operates instead entirely through admissions.

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Although empirical tests of discrimination have shown that minorities are disadvantaged in hiring decisions (e.g., Goldin and Rouse, 2000; Bertrand and Mullainathan 2004)[1] it has proven difficult to establish whether such differences result from biased preferences and thus reflect taste-based discrimination (Becker 1957). Taste-based discrimination is especially hard to distinguish from statistical discrimination (Phelps, 1972; Arrow 1973; and Aigner and Cain, 1977), where ethnicity serves as a signal for unobservable productivity differences.[2] The greatest obstacle to identifying the effects of taste-based discrimination in labor markets has been the lack of exogenous shocks to ethnic preferences.

This paper presents a two-part test of taste-based discrimination that exploits exactly such a shock. First, it shows that World War I (1914-1918) created a shock to ethnic preferences, which effectively switched German Americans from a well-assimilated mainstream ethnicity to an ethnic minority. Then, the empirical analysis uses this change in preferences to identify the effects of taste-based discrimination on an elite community that should be less vulnerable to discrimination: applicants for membership in New York Stock Exchange (NYSE).

Three measures of revealed preferences establish that World War I resulted in a large and persistent shock to ethnic preferences. The first measure is constructed from the records of 1,800 performances at the Metropolitan Opera in New York. These data

[1] Goldin and Rouse (2000) find that gender discrimination limits the hiring of female musicians in major orchestras, while Bertrand and Mullainathan (2004) show that applicants with black-sounding names are less likely to be invited for job interviews.

[2] The most direct empirical tests of statistical versus taste-based discrimination come from laboratory experiments and the market for sports cards: Fershtman and Gneezy (2001) show that differential treatment is based on poor information (rather than tastes) by randomly assigning ethnicities to players in a dictator game. In contrast, Nardinelli and Simon (1990) show that collectors of baseball cards pay more for cards featuring white players, even controlling for performance. Combining experimental evidence with data on buyers and sellers of sports cards, List (2004) finds that lower offers to minority sellers reflect statistical, rather than taste-based discrimination.

reveal that the share of operas by German-language composers fell from 50 to less than 10 percent at the beginning of the war, and did not recover until the late 1920s. The second measure is constructed from the names of newborn boys in the U.S. Census. These data show that the frequency of German-sounding names dropped dramatically after the beginning of the war. The third measure relates to the consumption of ethnic foods. It reveals that the consumption of *sauerkraut* declined to almost zero after the beginning of World War I.

The empirical analysis uses this shock to preferences to test for taste-based discrimination among applicants to the NYSE. To trade at the NYSE, applicants must buy one of a limited number of memberships or seats. Prospective buyers negotiate a purchase price with a seat owner who wants to leave the Exchange. The sale, however, is conditional on the remaining members' assessment of the buyer's "personal and financial integrity." This paper uses a differences-in-differences approach to test whether the probability of approval was affected by a shift in ethnic preferences.

Data on more than 4,000 applications to the NYSE between 1883 and 1936 show that the war more than doubled the probability that German Americans would be rejected (relative to Anglo-Saxons). In regressions of the probability of rejection on ethnicity variables and a variety of controls, interaction terms between World War I and German ethnicity are consistently large, positive, and significant. No other ethnicity variables yield significant effects. Results of differential treatment are robust to controls for stock market conditions through time-fixed effects.

Changes in productivity cannot explain the increase in rejections. Specifically, one may worry that the war lowered the productivity of German American traders if they

were more dependent on business with Germany. To test this, I examine rates of business failures and exits from the Exchange. These data show that Germans who were already members did not fail in business or exit the NYSE at higher rates than other members. Moreover, the share of German applicants increased after 1914, which suggests that Germans did not perceive their productivity to be at risk.

The data also show that Jewish Germans suffered an even stronger effect than did other Germans. All Jewish applicants were also more likely to be rejected at all times. These findings indicate that the war amplified an existing ethnic bias.

At the same time, the empirical results suggest that discrimination operates through a mechanism that is somewhat unexpected. The data indicate that prices remain unaffected by taste-based discrimination, even though admissions change substantially. This difference stems from the structure of the admissions process. Applicants negotiate prices with sellers who exit the Exchange, but they are evaluated by their future peers, whom they cannot compensate. Similar set-ups are present in many labor market settings where co-workers hold discriminatory tastes. The results of this paper suggest that taste-based discrimination will continue to affect the labor market outcomes of minorities in such settings, even if regulation ensures equality in wages.

The rest of this paper is organized as follows. Section I describes the NYSE's process of admissions. Section II introduces the data on admissions and on seat prices. Section III presents three alternative measures to quantify changes in ethnic preferences. Section IV summarizes the results of linear probability and logit regressions of rejections on applicants' ethnicities and controls. Section V presents comparable regressions for seat prices, and section VI concludes.

I. The NYSE's Process of Admissions

The first mention of the New York Stock Exchange occurred in *The Diary, or Loudon's Register* in March 1792:

> The Stock Exchange Office is opened at No.22 Wall Street for the accommodation of the dealers in Stock, and in which Public Sales will be held daily at noon… (Eames 1894, p.13)

Only two months later, on May 17, traders agreed to deal exclusively with each other. By 1879, the Exchange had grown to include 1,100 traders (Eames 1894, pp.14 and 43).[3] Membership remained constant until 1929, when the NYSE granted every member the right to sell one quarter of a new membership during the so-called Quarter Dividend Sale, which increased the number of seats to 1,375 (Davis, Neale, and White 2007).

Francis L. Eames, President of the Exchange from 1894 to 1898, describes the basic requirements of membership:

> Any person, at least twenty-one years of age, and a citizen of the United States, may buy a membership in the Stock Exchange from any member desiring to sell, subject to the approval of the Committee of Admissions. (Eames 1894, p.68)

Eighty percent of all transactions between 1883 and 1936 were negotiated directly between sellers and prospective buyers. The remaining twenty percent were sold in an anonymous auction, which was administered by the Committee of Admissions. These seats were typically owned by a member who had died, failed in business, or been expelled. Then,

> …his membership may be sold by the Committee, creditors who are members of the Exchange having a first lien upon the proceeds. (Eames 1894, p.68)

[3] Seats had become saleable in 1869, when the first memberships sold for 8,000 dollars (ca. 100,000 dollars in 2005). Seats *within* the Exchange had become saleable eight years earlier, in October 1861. At that time, each member occupied a specific chair on the trading floor (Eames 1894, p.43). The leasing of seats is a recent phenomenon, which the NYSE began to permit in 1978.

In both types of transactions, the NYSE receives a fixed initiation fee from the buyer, which is independent of the purchase price. This fee remained stable at around 20,000 year 2005 dollars.

Once buyers and sellers have agreed on a price, the NYSE's 15-member Committee of Admissions evaluates the buyer's "personal and financial integrity" (Eames 1894, p.51). Sellers deal with applicants only for as long as it takes to negotiate the price of the seat. The remaining members, however, who are represented by the Committee, evaluate buyers as potential trading partners. An anonymous trader explains the importance of trust in this setting:

> Character is essential to the Stock Exchange member. He buys and sells in a milling, excited crowd around a trading post, and his contracts are oral. None is written and he must stand by his word of today, even though his transaction will show him a loss tomorrow. (*New York Times*, August 24, 1924)

To ascertain a buyer's integrity, the NYSE interviews the applicant along with two members who recommend him "in every way as a proper person to be admitted to the Exchange" (*Minutes of the Committee of Admissions* 1904).[4] The committee also asks whether the sponsors would "accept (the applicant's) uncertified check for $20,000 (equivalent to 2.8 million in 2005 U.S. dollars) if he were alone in business and a member of the Exchange" (*Minutes of the Committee of Admissions* 1904).[5] Buyers also confirm that they are in good health and not currently members of a competing exchange.

Typically, the Committee meets every two weeks, interviews two to three applicants, and decides on them in the next meeting. Until 1936, anonymous ballots are

[4] I use male pronouns because there were no female applicants to the NYSE during this period. The first female trader, Muriel Siebert, entered the Exchange in 1967.
[5] Prices are converted to real prices using nominal GDP per capita (Williamson 2007).

recorded as white balls in favor of an applicant and black balls against. If more than one third of the votes are black balls, the application is rejected.[6]

II. World War I as a Shock to Preferences

World War I created a shift in ethnic preferences that can be used to identify the potential effects of taste-based discrimination. Prior to 1914, German Americans were a prominent part of the ethnic mainstream.

> Public opinion had come to accept the Germans as one of the most assimilable and reputable of immigrant groups. Repeatedly, older Americans praised them as law-abiding, speedily assimilated, and strongly patriotic….In 1908, a group of professional people, in rating the traits of various immigrant nationalities, ranked the Germans above the English and in some respects judged them superior to the native whites. (Higham 1998, p.196)

After August 5, 1914, when Germany attacked Belgium, respect gave way to hostility. On April 5, 1918, *The St. Louis Globe-Democrat* reports the attack of Robert Praeger: "German Enemy of U.S. hanged by mob."[7] Praeger's was the only lynching, but other types of abuse, such as tarring and feathering, occurred dozens of times. Frank Brocke, a German American farmer, recalls in an interview:

> I would say you suffered more for the fact if you were of German descent more than anything else (sic). That was the hardest part we had to play with it…there was a lot of propaganda against the German people. And we had to be so careful…It was just that there was a lot of hatred against the Germans and if you were German, you were a little bit tinted, I guess. (Oral history project of the *Latah County Historical Society*, http://users.moscow.com/lchs/)

During the war Germans were also barred from many social clubs that they had previously dominated. In New York, the Chemists' Club, the Lamb Club, and the New York Athletic Club expelled all German-born members, and banned the use of German on their premises (*New York Times*, April 11, 20, and May 5, 1918). The war's effect on

[6] To vote, the Committee required a quorum of 10 members.
[7] Hickey 1969. Also see *Chicago Daily Tribune* (April 5, 1918) and *New York Times* (April 4, 1918).

the use of the German language persisted well into the 1920s. In 1916, 13,800 students studied German in Cincinnati; by 1917, this number had fallen to 7,000. Mothers lobbied to prohibit the teaching of German, and in 1919, it became illegal to teach German in Ohio, Iowa, and Nebraska (Wittke 1936, pp.179-190). These prohibitions remained in place until 1923, when the Supreme Court ruled them to be unconstitutional (*Meyer vs. State of Nebraska*, 262 U.S. 390, 1923).[8]

To measure the strength and persistence of these changes in tastes, I construct two quantitative measures of ethnic preferences. The first measure counts the share of operas by German-language composers.

A. The Share of German-language Operas at the Met

In the early years of the 20th century, German-language composers dominated the repertoire of the Metropolitan Opera (Figure 1). In 1910, 19 in 44 operas were by German-language composers.[9] Nine of these were by Richard Wagner, including *Lohengrin*, *Tannhäuser*, and *Tristan und Isolde*. From 1910 until early 1917, half of the

[8] Changes in the circulation of ethnic newspapers confirm this shift in status. At a time when the number of mother-tongue publications increased among 13 major ethnic groups, the circulation of German-language publications decreased (Kirschbaum 1986, p.72; Wittke 1936, p.115). In May 1918, the American Defense Society and the American Relief Legion petitioned President Wilson to ban the publication of German language newspapers (*New York Times*, May 9, 1918). Moreover, American cities, such as Portland, Oregon, renamed any German-sounding streets, so that Portland's Kaiser Street became Marne Way (*New York Time*s, June 2, 1918; Wittke 1936, p.184). In June 1918, Representative Smith of Michigan introduced a bill demanding that towns named Berlin, Germantown, or Bismarck be renamed Liberty or Victory. Berlin, Iowa, was christened Lincoln and East Germantown, Indiana, became Pershing.

[9] Data are collected from historical schedules of performances in the online archives of the *Metropolitan Opera* in New York. German composers include Carl Maria von Weber, Engelbert Humperdinck, Friedrich Handel, Friedrich von Flotow, Giacomo Meyerbeer, Hermann Goetz, Jacques Offenbach, Ludwig van Beethoven, Max von Schillings, Peter Cornelius, Richard Strauss, and Richard Wagner. German-language composers further include Austrian composers Wolfgang Amadeus Mozart, Ernst Krenek, Franz von Suppé, Johann Strauss Jr. and Franz Schubert and the Bohemian Christoph W. von Gluck. Composers are assigned to ethnicities based on their country of birth, which means that Beethoven and Handel are counted as German, even though Beethoven was also active in Vienna and Handel in London. Multiple performances of the same opera are counted as one. In addition to opera houses, concert halls and radio stations also avoided German music, and musicians who performed German pieces risked violent protest (*New York Times*, October 3 and 19, 1919).

Met's operas were German. In 1917 however, the share of German-language operas declined from 9 in 10 operas prior to the declaration of war to 4 in 33 afterwards. This change is especially dramatic considering that it can take several years to prepare an opera.[10] In fact, two of the four German-language operas, Wagner's *Meistersinger* and *Tristan und Isolde*, were performed within a week after the declaration of war. The librettos of the two remaining German operas, Gluck's *Iphigenie* and Flotow's *Martha*, were translated into Italian. In 1918, only 3 in 40 operas were by German composers.

Recitals of German-language music continued to decline for a few years after the Armistice at Compiègne on November 11, 1918. In 1919, only 7 percent of the Met's repertoire featured German-language composers. In the following years, the proportion of German-language pieces recovered slowly, with 10 percent in 1920, 12 in 1921, and 13 percent in 1922. It took until 1923 for the share of German operas to recover to 25 percent of the Met's repertoire.

The data also suggest that World War II did not have a similar effect on preferences. In fact, the share of German-language operas continued to increase up to 46 percent in 1945. In that year, Hans W. Heinsheimer observed:

> The War – in marked contrast to World War I – has not interfered with the production of opera in German. One of the marked highlights of last season was the complete presentation of Wagner's 'Ring,' so successful that the whole circle had to be repeated. Again, the greatest box office success of the current year has been a magnificent production of 'Meistersinger,' a magnificent success for conductor George Szell, and the stage manager, Herbert Graf. The works of Richard Strauss likewise are much in the public favour. (Heinsheimer 1945, p.8)

Thus, the opera data indicate that only the First World War created a significant shock to ethnic preferences.

[10] E.g., *New York Times*, January 20, 2008, citing *Opera America.*

B. Children Named Wilhelm and Otto

Another measure of ethnic preferences can be derived from naming practices, which have been found to reflect attitudes towards ethnicities (Lieberson 2000). To construct these data, I count newborns named Otto or Wilhelm between 1910 and 1919 (*United States Census* 1920). Both Otto and Wilhelm have prominent German connotations: Otto von Bismarck was Prussia's Prime Minister from 1862 to 1890 and German Chancellor from 1867 to 1890. Bismarck's namesake was Otto I, King of the Germans from 936 to 973, who was succeeded by a long line of Ottos. Wilhelm II was German Emperor at the beginning of the war; he had followed his grandfather Wilhelm I (1797 – 1888) to the German throne.

The number of boys named Otto and Wilhelm declined sharply after 1914 (Figure 2). From 1915 to 1916, Otto dropped by 34.7 percent, from 2,133 to 1,394, and Wilhelm declined by 35.0 percent from to 140 to 91. At the same time, the number of boys named William, as the English equivalent to Wilhelm, increased by 3 percent from 2,269 to 2,345.[11]

C. Sauerkraut

Data on the consumption of ethnic foods yield additional evidence for a change in taste. U.S. consumption of *sauerkraut* – a traditional German cabbage dish – declined by 75 percent between 1914 and 1918, causing New York's grocers to complain that "There is enough sauerkraut in stock at the present time to feed a good-sized German army" (*New York Times*, April 25, 1918, p.10). Other ethnically German foods were renamed to

[11] As a further robustness check, I have compared the number of boys named Heinrich and Henry in the U.S. Census of 1910, 1920, and 1930. While the number of Heinrichs declines between 1910 and 1920 and recovers only after 1920, the number of Henrys continues to increase during World War I.

rescue sales. Butchers marketed hamburgers as "liberty steaks"; pretzel manufacturers argued that pretzels had originated in an Italian cloister, and cheese merchants demonstrated that limburger came from Belgium (Wittke 1936, p.186).

Thus, changes in the consumption of ethnic German foods underscore the evidence from operas and naming practices, confirming that the war created a strong and persistent shift in ethnic preferences. I exploit this shift to assess the impact of taste-based discrimination, using the example of traders at the NYSE.

III. The NYSE Data

The data consist of 5,097 applications to the NYSE between December 27, 1883 and December 31, 1936, as well as separate data on the ethnicities of buyers and sellers. From 1883, all attempted sales were recorded in a ledger of transactions, which can be accessed at the NYSE archives in New York. An entry in the ledger consists of the buyer's name, the seller's name, the price of the seat, the date of the application, the date of the decision, the decision, and the number of black balls and white balls that were cast.

A. Description of the NYSE Data

This data set expands existing information on seat prices by including the names of buyers and sellers, their ethnicities, and the number of votes that were cast in favor and in opposition to each applicant.[12] The new data also comprise annotations that reveal whether a seat was auctioned by the Committee of Admissions, whether a seller had died

[12] For example, Schwert (1977), Jarrell (1984), Golbe (1986), Keim and Madhavan (2000), and Davis, Neal, and White (2007) explore the effects of trading volumes and stock prices on the price of NYSE seats.

or been expelled from the Exchange, and whether a seat was transferred for a nominal price, typically within a family or firm.[13]

Figure 3 illustrates the movement of seat prices over time. Between 1883 and 1936, the average real price of a seat was 1.6 million dollars. Prices rose from 420,000 dollars in 1883 to 5.2 million dollars in 1929 and declined sharply thereafter.[14] Voting data show that rejection rates increased from 3 percent before the war to 4 percent during the war, and returned to 3 percent afterwards (Table 1).

B. Names as a Measure of Ethnicity

I use names as a proxy for the ethnicity of buyers and sellers. Names are matched with ethnicities by an algorithm that uses linguistic rules and location-specific naming practices.[15] For example, surnames ending in "dda" or "ddo" are assigned to Sardinia and therefore Italy. This process creates unique ethnicity matches for 84.2 percent of applicants, yielding a total of 4,290 observations. Ethnicities are combined into four groups, *Anglo-Saxon*, *German*, *Jewish*, and *Other Ethnicities*. *Anglo-Saxon* includes English, Scottish, and Irish names. *Other Ethnicities* combines Dutch, Italian, Russian, along with smaller ethnic groups and other unmatched applicants. I keep Jewish names separate from *Other Ethnicities* because Jewish applicants include German Jews.

Name data suggest that the NYSE was dominated by Anglo-Saxons until well into the 1930s (Figure 4). In 1890, nearly two-thirds of NYSE traders were Anglo-Saxons; by

[13] The share of nominal transfers increased from 11 percent before the war, to 17 percent during, and 21 percent after the war (Table 1). Since nominal transfers typically occurred within firms, they may have been subject to less stringent reviews by the NYSE, which will make it harder to detect discrimination.
[14] In 2005 U.S. dollars. With the close of the market on December 30, 2005, the NYSE stopped selling seats in anticipation of becoming a publicly traded company.
[15] List Service Direct, Inc. (LSDI) at http://listservicedirect.com/ethnic_religious.html

1930, Anglo-Saxons continued to account for half of all traders. The share of German members increased gradually from 6.1 percent in 1890 to 7.7 percent in 1900, 7.8 percent in 1910, 8.0 in 1920, and 8.4 percent in 1930. The share of Jewish traders declined from 8.6 percent in 1890 to 7.5 percent in 1920 and 7.6 percent in 1930 (Figure 4).

C. Potential Weaknesses of the Data

The major weakness of the data is that names may be an imperfect measure of ethnicity. Algorithms that assign names to ethnicities are optimized to match current-day naming practices; this will make it harder to detect discrimination during World War I. Expectations of discrimination may also discourage the use of ethnic-sounding names (Bertrand and Mullainathan 2004; Levitt and Fryer 2004, p.770). Census data have shown that the war reduced the popularity of German first names such as Otto or Wilhelm. Similarly, Germans may have anglicized their last names to avoid discrimination. On June 2, 1918, for example, the *New York Times* reports that "Loyal citizens who possess German forms of the patronymic are striking them out." Applicants with anglicized names are assigned to *Other Ethnicities*, which will make it harder to capture the effect of World War I on the treatment of Germans. For example, Arthur Rittmaster, who applied to the NYSE in 1924 and was rejected, carried an anglicized version of the German name Rittmeister, which falls under *Other Ethnicities*.

Another problem is that Jewish Germans are classified as *Jewish* rather than German applicants, even though they may have been discriminated against as Germans. To address this issue, I use historical shipping records to separate *Jewish Germans* from *Other Jewish* applicants. In response to a surge in immigration after the British-

American War of 1812, Congress passed the Steerage Act of 1819, which required captains to submit lists of all passengers and ports of origins (Page 1911). These documents, including *Passenger Lists of Vessels Arriving at New York, New York 1820-1897,* enable me to count arrivals by country of origin for each last name.[16] Arthur Schiff, for example, applied to the NYSE on December 15, 1932, and is identified as *Jewish* by the matching algorithm. Shipping records show that 111 of 228 Schiff families came from Germany, 55 from Russia, 19 from Hungary, 17 from Poland, 13 from Austria, and 13 from Hessia (which is a German state). Thus, Jewish applicants with the last name Schiff are assigned to the new ethnicity variable *Jewish German*.[17]

D. Three Time Periods

To examine the effect of World War I, the data are divided into three periods: *pre-WWI*, *WWI*, and *post-WWI*. The *pre-WWI* period begins with the first recorded sale of a NYSE seat on January 3, 1883, and extends to June 28, 1914, when Archduke Franz Ferdinand was assassinated in Sarajevo. The NYSE closed for business a few days after the Archduke's death and remained closed until November 28, 1914. By that time, Germany had invaded Belgium and declared war on Russia and France. *WWI* data include the 1920s because measures of ethnic preferences indicate that the war's effect on preferences persisted through this decade. The *post-WWI* period begins with the first Quarter Dividend Sale on February 13, 1929. This final period includes the stock market

[16] Arrival records are available at *ancestry.com*. *Ancestry's* database consists of an index to the passenger lists of ships arriving from foreign ports at the Port of New York from 1851 to 1891 and from 1935 to 1938, along with the lists of passengers entering through Castle Garden between 1855 and 1890.

[17] The *Jewish German* variable may be subject to measurement error if a ship's port of departure differs from a family's country of origin. Specifically, the variable may be biased towards countries that are closer to the United States, and particularly towards Britain. For example, a ship could pick up an immigrant in Hamburg and make another stop in London before setting sail for the United States. This may lead me to classify some German Jews as Anglo-Saxon.

crash on Black Thursday, October 24, 1929 and the Great Depression. The data end on October 1, 1936, when the NYSE stopped recording black balls.

Data on other exchanges suggest that the NYSE faced significant competition during the war. Since the early 19th century, the NYSE had competed with an active curb market, bucket shops, and specialized exchanges, including the *Coal Hole*, the *New York Gold Exchange,* and the *Open Board of Stock Brokers* (Eames 1894, p.43). Its most formidable competitor, however, the *Consolidated Stock Exchange of New York,* was most active in the 1920s. Close to 2,000 seats at the *Consolidated* were "available for a few hundred dollars, no questions asked" (Sobel 1972, p.29). When the *Consolidated* began trading NYSE stocks, bid-ask spreads at the NYSE fell by roughly 10 percent; until 1926, it held nearly a quarter of the market (Brown, Mulherin, and Weidenmier 2006). Thus, competition may have mitigated the effects of ethnic bias during the war.

IV. Effects on the Probability of Rejection

Applications data show that rejection rates for German applicants nearly doubled after the beginning of the war (Table 1). Before the war, 4 percent of German applicants were rejected on grounds of "personal and financial integrity." After 1914, 8 percent of Germans were rejected. In the post-war period, rejection rates dropped back to 1 percent. In contrast, rejection rates for Anglo-Saxons decreased during the war from 2.9 to 2.4 percent and increased slightly after the war to 2.5 percent.

Linear probability and logit regressions with and without annual fixed effects measure the effects of time-ethnicity interactions on rejection rates (Figure 6 for linear

probability, Tables 2 and 3 for logit models).[18] Four ethnicity variables distinguish *Anglo-Saxon, German, Jewish,* and *Other Ethnicities*. Anglo-Saxons are the control ethnicity because they are the largest and socially dominant group. The variables *pre-WWI* and *WWI* account for period effects, while *post-WWI* acts as the control. Time-ethnicity interactions such as *WWI * German Buyer* estimate differences-in-differences over time and across ethnicities.

$$\begin{aligned}\text{Rejected} &= \beta_0 + \beta_1 \cdot \text{German} + \beta_2 \cdot \text{Jewish} + \beta_3 \cdot \text{Other Ethnicity} \\ &+ \beta_4 \cdot \text{Pre-WWI} + \beta_5 \cdot \text{Pre-WWI} \times \text{German} + \cdots + \beta_7 \cdot \text{Pre-WWI} \times \text{Other Ethnicity} \\ &+ \beta_8 \cdot \text{WWI} + \beta_9 \cdot \text{WWI} \times \text{German} + \cdots + \beta_{11} \cdot \text{WWI} \times \text{Other Ethnicity} \\ &+ \beta_{12} \cdot \text{Nominal} + \beta_{13} \cdot \text{Quarter Dividend Sale} + \beta_{14} \cdot \text{Committee of Admissions} \quad (1)\end{aligned}$$

The last line of equation (1) includes controls for *Nominal* transactions, *Quarter Dividend Sale*s, and sales by the *Committee of Admissions*. Rejection rates may be lower for nominal sales because such sales typically occurred within firms and may therefore be subject to less interference by the NYSE. In contrast, rejection rates may be higher during the Quarter Dividend Sale if the sudden increase in the supply of memberships lowered the quality of marginal applicants. Finally, rejection rates may be lower for sales that were administered by the Committee of Admissions if the Committee used discretion in selecting applicants instead of selling to the highest bidder.

A linear regression of rejection rates on *German Buyer,* including these controls, suggests that rejections for Germans increased significantly at the beginning of the war (Figure 6).[19] For most years prior to World War I, German ethnicity had no effect on the probability of rejection. In 1912 and 1914, however, German Americans faced a 40 to 50

[18] Probit regressions yield similar results.
[19] Figure 6 reports coefficients for *German Buyer* in a linear probability regression, run separately by year, and controlling for ethnicities, *nominal* transactions, *Quarter Dividend Sales* and sales by the *Committee*.

percent higher risk of rejection than Anglo-Saxons. This effect persisted at a lower level until 1928, and took off to a second peak in 1934, when Hitler took power in Germany.

Logit regressions confirm that the war increased rejection rates for Germans. The coefficient for the time-ethnicity interaction *WWI * German Buyer* is large and positive at 2.0 to 2.2 (Table 2, significant at 5 percent). In comparison, the coefficient for *pre-WWI * German Buyer* stays between 1.1 and 1.3 (Table 2, not statistically significant). These results imply that World War I more than doubled the differences in the probabilities of rejection between Germans and Anglo-Saxons from 6 to more than 13 percent.[20] Results are robust to controlling for stock market conditions with annual fixed effects; coefficients for *WWI * German Buyer* are significantly larger than coefficients for *pre-WWI * German Buyer* (1.8 to 2.0 at 5 percent, Table 3).[21] Time-ethnicity interactions are not significant for any other ethnicity, and *Quarter Dividend Sale* has no effect.[22]

A. Analyzing Individual Votes through Black Balls

Data on black balls make it possible to examine changes in admissions at the level of individual votes. Ordinary least squares regressions of black balls in Tables 4 and 5 re-estimate the logit regressions in Tables 2 and 3 with black balls as the dependent

[20] Marginal probabilities are calculated from the coefficients at the sample means. For example, the effect of being German on the probability of rejection is: $G(\beta o + \beta_{German}X_{German} + \beta_{Jewis}X_{Jewish} + \ldots + \beta_{Nominal}X_{Nominal}) - G(\beta o + \beta_{Jewish}X_{Jewish} \ldots + \beta_{Nominal}X_{Nominal})$, where $G(.)$ is the cumulative probability function of the logistic distribution. Chunrong Ai and Edward C. Norton (2003) show that these effects are approximate. Their correction focuses on interactions between two continuous variables, whereas regressions in the current paper examine interactions between binary variables. I use Ai and Norton's algorithm to measure the size of the bias. It can handle only a single interaction variable, and I estimate a restricted model with *WWI*German* as the only interaction variable to match this constraint. In that model, differences between the approximate calculation and Ai and Norton's corrected method are negligible.

[21] Regressions with annual fixed effects do not include time dummies because time dummies would only capture differences within 1914. For example, the variable *WWI* would measure differences in rejections before and after June 28, 1914. Data for nine years are dropped from regressions with annual fixed effects because no applicant was rejected.

[22] I have performed alternative tests breaking up *Other Ethnicity* into more finely-grained ethnic categories, including Italian, Russian, and Dutch. None of these ethnicities experience a comparable effect of the war.

variable. These regressions show that the share of black balls against Germans more than doubled after 1914. Coefficients on the time-ethnicity interaction for German applicants increase from 0.3 and 0.4 for *pre-WWI * German* (not statistically significant, Table 4) to 0.7 and 0.8 for *WWI * German* (significant at 1 percent, Table 4). Regressions with annual fixed effects confirm these results (Table 5, with an increase from 0.3 and 0.4 for *pre-WWI * German*, not statistically significant, to 0.7 for *WWI * German*, significant at 1 to 5 percent). Thus, the black ball data confirm that World War I significantly lowered the probability that German Americans would be elected to the NYSE.

V. Did the Increase in Rejections Reflect a Change in Productivity?

A potential alternative explanation for the increase in rejections of German traders is that World War I reduced their productivity relative to Anglo-Saxons. The war impeded business with Germany, and German traders are likely to have conducted a larger share of this business. As a result, their productivity may have suffered and thus triggered the increase in rejections. To account for this, I examine changes in the share of Germans among business failures and exits from the Exchange, as well as in the share of applications.

A. No Increase in Defaults or Exits of German Traders

NYSE members who had failed in business or violated trading rules were expelled. Data on expulsions, however, yield little evidence of an effect of World War I on Germans. Between 1915 and 1918, the number of expulsions increased from zero to seven, but only two of these expelled members were German (Figure 7). This share is

particularly low considering the negative *ex ante* assessment of German traders, which should have made them more vulnerable to expulsion. A second spike follows in 1922, with six expulsions, including three Germans. At that time, trading restrictions with Germany had been removed, but ethnic bias may have persisted, as measures of ethnic preferences suggest.

Similarly, data on exits from the Exchange do not indicate that the war lowered the productivity of German traders. The share of German sellers increased sharply in 1898, from less than 9 percent to nearly 16 percent, but there is no effect of World War I. From 1900 to 1923 the share of German sellers fluctuated between 6 and 12 percent; it only jumped again in 1924 (to 15 percent, Figure 8).

B. No Decline in German Applications

An additional check for productivity effects is to compare applications across ethnicities and over time. Specifically, if World War I lowered the productivity of German traders, it may have discouraged Germans relative to other applicants. The data, however, suggest that the share of German applicants *increased* during the war, from 7.6 before 1914 to 9.1 percent during the war, and 9.2 percent after (Figure 9).[23] The share of Jewish applicants declined from 7.5 percent to 6.5 percent after 1914, and recovered to 9.3 percent after the war. Unless World War I lowered the productivity of Jewish applicants, this dip in applications may reflect expectations of discrimination.

[23] Demographic data from the U.S. Census of 1920 suggest that the "quality" of German applicants – measured by age, marital status, and home ownership – stayed roughly constant.

C. World War I has Even Larger Effects on Jewish Germans

Comparing the treatment of Jewish Germans and other Germans creates an additional test of ethnic bias. A potential productivity effect of World War I should have favored Jewish Germans relative to other Germans if Jewish Germans were more likely to have established business relations outside of Germany. For instance, historical records show that Jewish German firms, such as Singer Manasse, figured prominently at the London Stock Exchange prior to World War I. After 1914, many of these firms moved from London to New York. Michael Manasse, for example, came to the NYSE in 1916 (Michie 1999, pp.158-159). These arrivals performed well at the Exchange:

> The New York Stock Exchange, bolstered by the repurchase of dollar securities and the arrival of expertise from London, now became a serious challenger in international markets. (Michie 1999, p.160)

Although Jewish Germans may have been better insulated from the productivity effects of World War I, the NYSE data suggest that they suffered an even stronger increase in rejections than other Germans. Logit regressions in Tables 6 and 7 repeat the analysis of Tables 2 and 3, distinguishing *German Jewish* from *other Jewish* applicants. In these regressions, the interaction variable *WWI * German Jewish* carries a large positive coefficient (2.3 to 2.4, significant at 5 percent, Table 6), which implies a 19 percent increase in rejections. In comparison, the interaction variable *pre-WWI * German Jewish* carries a coefficient of 0.7 to 0.8, which implies a 3 percent increase for the pre-war period. Thus, these data suggest that World War I increased the probability of rejection for German Jews by a factor of six. Logits with annual fixed effects corroborate these results (Table 7).

This large increase in rejections suggests that World War I may have intensified a pre-existing bias against Jewish applicants. The variable *Jewish Buyer* carries a positive

coefficient of 0.7 to 0.8 (significant at 10 percent, Tables 2 and 3), which implies that Jewish applicants faced rejection probabilities 2 to 3 percent above those of Anglo-Saxons.[24]

VI. Changes in the Ethnic Composition of the Committee of Admissions

In addition to influencing admissions, ethnic preferences may also have influenced access to powerful positions within the Exchange. To measure these effects, I examine changes in the ethnic composition of the Committee of Admissions. Rules for selecting the Committee, which were in place from 1869 until the reorganization of the Exchange in 1938, ensured that the ethnic composition of the Committee changed only gradually. Each May, the three longest-serving members of the Committee of Admissions were replaced by three new members (Eames 1894, pp.74-75).

Changes in the ethnic composition of the Committee of Admissions suggest that World War I reduced the chances that Germans would be elected to influential positions within the Exchange.[25] In 1880, the 15-member Committee included 3 German traders (Figure 10). Between 1913 and 1915, the number of Germans declined to 2, and by 1921, only 1 German remained. By 1930, the Committee again included 2 German members.

In conjunction with the black ball data, these data indicate that the increase in rejections reflected a broad-based change in voting patterns at the NYSE rather than a switch in a small number of votes. During the war, only one applicant was rejected by

[24] When *Jewish Buyers* are separated into *Jewish German* and *Other Jewish Buyers*, black balls against *Jewish German Buyers* increase by 0.7 to 0.8 (significant at 1 percent) in regressions with time dummies, and by 0.6 to 0.7 (significant at 1 percent) in regressions with annual fixed effects.
[25] Committee members were identified from the *Minutes* of the Committee of Admissions (1904), Eames (1894), and the *New York Stock Exchange Directory* (1906, 1909, 1913-15, 1920, and 1930).

less than a two-third majority. On March 13, 1919, George Shaskan was rejected with three black balls. Shaskan's rejection, however, may have been due to the NYSE's citizenship requirements: Shaskan's response to the 1920 Census reveals that he had arrived from Russia in 1891, and that his naturalization was still pending in 1920. All other applicants were denied by an overwhelming majority.

In sum, data on admissions decisions, black balls, and internal elections all indicate that World War I worsened the treatment of Germans at the NYSE. These results are a strong indicator of taste-based discrimination. The following section examines whether World War I had a similarly strong effect on the prices that Germans paid to be admitted to the Exchange.

VII. Ethnicity and the Price of Admission

This section examines the prices that Germans offered to enter the Exchange. For the majority of sales, prices were set in direct negotiations between members who planned to leave the Exchange and prospective buyers who wanted to become members. Sellers only interacted with buyers for as long as it took to agree on a price. Thus, in contrast to the remaining members, sellers' incentives to discriminate may have been limited. If they did in fact discriminate, the data should show higher prices for Germans buyers (relative to Anglo-Saxons) during World War I.

The ideal test of discrimination would compare prices under identical conditions, for seats that were sold on the same day. Seats were, however, only sold every two weeks and the number of transactions is too small to estimate effects even on a monthly

basis. Thus the data only allow for regressions with annual fixed effects (Table 8),[26] and regressions with time-period dummy variables provide robustness checks (Table 9). The analysis replicates that of rejection rates, except that price regressions add a dummy variable for *Same Ethnicity*, which tests whether sellers favored buyers of their own ethnicity, and a dummy variable for *Rejected*, which tests whether sellers anticipated rejections and charged higher prices to compensate.

$$\begin{aligned} ln(\text{Price}) &= \beta_0 + \beta_1 \cdot \text{German} + \beta_2 \cdot \text{Jewish} + \beta_3 \cdot \text{Other Ethnicity} \\ &+ \beta_4 \cdot \text{Pre-WWI} + \beta_5 \cdot \text{Pre-WWI} \times \text{German} + \cdots + \beta_7 \cdot \text{Pre-WWI} \times \text{Other Ethnicity} \\ &+ \beta_8 \cdot \text{WWI} + \beta_9 \cdot \text{WWI} \times \text{German} + \cdots + \beta_{11} \cdot \text{WWI} \times \text{Other Ethnicity} \\ &+ \beta_{12} \cdot \text{Nominal} + \beta_{13} \cdot \text{Quarter Dividend Sale} + \beta_{14} \cdot \text{Committee of Admissions} \\ &+ \beta_{15} \cdot \text{Same Ethnicity Buyer and Seller} + \beta_{16} \cdot \text{Rejected} \end{aligned} \quad (2)$$

In contrast to rejection data, price data show no effect of ethnic preferences. Coefficients for the variable in Table 9 indicate that WWI raised the price for German applicants by approximately 3 percent (11 to 14 percent for *WWI * German Buyer*, compared with 9 to 11 percent for *pre-WWI * German Buyer*). This effect, however, disappears in regressions with controls for stock market conditions: With annual fixed effects the coefficient for *WWI * German Buyer* is close to zero and not statistically significant (Table 8, *pre-WWI * German Buyer* is also close to zero).[27]

Moreover, there is little proof that German sellers favored buyers of their own ethnicity, and coefficients for same ethnicity interactions are not significant. Without fixed effects, a coefficient of -0.13 on the interaction *German Buyer and Seller * WWI* implies a price reduction of 13 percent (Table 9). This effect, however, is not statistically

[26] Bi-annual fixed effects can compare a larger number of sales, but they do less to control for stock market conditions. Regressions with bi-annual fixed effects yield results that are qualitatively similar to regressions with annual fixed effects, albeit with slightly smaller standard errors.
[27] Separating Jewish Germans from other Jews does not show a price increase for Jewish Germans.

significant and disappears with the inclusion of time fixed effects.[28] Buyers whose applications are *rejected* offer on average 9 percent less for a seat (Table 9), but this effect also disappears with the inclusion of time fixed effects.

There is some evidence, however, that Jewish buyers paid slightly higher prices during World War I. With annual fixed effects, coefficients for *WWI * Jewish Buyer* indicate that Jewish applicants paid a 5 to 7 percent markup during the war, which, compared with a 2 to 4 percent markup before 1914, implies a price increase of 3 percent (Table 8). Regressions with period dummies suggest a markup of 16 to 22 percent after 1914 and 5 to 12 percent before, which implies a price increase of 10 percent (Table 9).

The data also show that seats of deceased or expelled members, which were auctioned by the Committee of Admissions, sold at a discount (nearly 13 percent, Table 9). This discount, however, also disappears with the inclusion of time fixed effects (Table 8).[29]

The most significant price effect occurs for buyers who purchased their seats as part of the Quarter Dividend Sale. In such transactions, buyers negotiated with four sellers instead of one. The NYSE data show that these buyers paid on average 9 percent more than they would have paid in a regular sale at the same time (Table 8). These results suggest that economic considerations were a more powerful determinant of prices than were ethnic preferences.[30]

[28] The corresponding variable *Jewish Buyer and Seller * WWI* shows no significant effect.
[29] There is no evidence that the Committee favored certain ethnicities in its own sales. Interactions between ethnicity variables and the Committee of Admissions yield no statistically significant coefficients.
[30] Another characteristic of transactions during the Quarter Dividend Sale is that sellers remained at the Exchange and may therefore have been more likely to discriminate. Unfortunately, the Quarter Dividend Sale occurs in 1929, when the effect of World War I on ethnic preferences had already lost its force.

VIII. Conclusions

Quantitative measures of ethnic preferences based on German-language operas, naming practices, and food purchases establish that World War I resulted in a strong and persistent shift in ethnic preferences, which effectively converted German Americans to an ethnic minority. This paper has analyzed a new data set on more than 4,000 applicants to the NYSE to test whether this shift in preferences affected the prospects of German Americans' to be admitted to the NYSE. Admissions data reveal that the war more than doubled rejection rates for Germans (relative to Anglo-Saxons).

Despite the strong effect on rejections, the data yield no evidence that Germans paid a premium to enter the Exchange. The reason for this divergence is likely to lie in the institutional characteristics of the admissions process: An applicant to the NYSE negotiates a price with a member who plans to exit the Exchange. It is, however, not the seller, but a committee of remaining members, that evaluates his application. Remaining members do not benefit from higher prices, but they expect to interact with the applicant for a long time. Thus, applicants cannot compensate their future peers, who are most affected by their characteristics, for ethnic bias.

Similar set-ups of separated decision-making on prices and admissions are present in many labor market settings where co-workers may hold discriminatory tastes. For instance, minority applicants may be willing to accept lower wages in their negotiations with the human resource manager of a law firm or investment bank, but their prospective co-workers, and not human resources, decide whom to admit. Similarly, minority buyers can offer higher prices to the owner of a condo, but the condo board, and not the seller,

decides on applications. The results of this paper suggest that taste-based discrimination will persist in such settings, even if regulation ensures equal prices and wages.

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TABLE 1 – APPLICATIONS FOR MEMBERSHIP AT THE NEW YORK STOCK EXCHANGE – SUMMARY STATISTICS

		1883 to WWI (Pre-WWI)	WW1 to Dividend Sale (WWI)	Dividend Sale to December 1936 (Post-WWI)	All years
ANGLO-SAXON					
	Applications	1,207	707	1,085	2,999
	Rejected	2.9%	2.4%	2.50%	2.60%
	Nominal	11.0%	19.2%	23.00%	17.30%
GERMAN					
	Applications	149	117	169	435
	Rejected	4.0%	7.7%	1.20%	3.90%
	Nominal	4.0%	12.0%	19.50%	12.20%
JEWISH					
	Applications	147	105	173	425
	Rejected	3.4%	10.5%	5.20%	5.90%
	Nominal	10.2%	17.1%	12.10%	12.70%
OTHER ETHNICITIES					
	Applications	467	309	462	1,238
	Rejected	3.0%	5.2%	3.50%	3.70%
	Nominal	11.3%	13.9%	18.80%	14.80%
ALL ETHNICITIES					
	Applications	1,970	1,238	1,889	5,097
	Rejected	3.0%	4.3%	2.90%	3.30%
	Nominal	10.5%	17.0%	20.70%	15.90%

Notes: Data on the identities of applicants, seat prices and admissions decisions were collected from the Archives at the New York Stock Exchange. Names were matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. Prices are in year 2000 U.S. dollars.

TABLE 2 – LOGIT REGRESSIONS; 1883-1936, WITH TIME DUMMIES: COEFFICIENTS
DEPENDENT VARIABLE IS 1 FOR REJECTED APPLICANTS, 0 FOR ACCEPTED

	I	*II*	*III*	*IV*	*V*
German Buyer	-0.723	-0.788	-0.785	-0.787	-0.757
	[0.739]	[0.738]	[0.738]	[0.738]	[0.738]
Jewish Buyer	0.721	0.674	0.673	0.679	0.766
	[0.397]+	[0.395]+	[0.395]+	[0.395]+	[0.394]+
Other Ethnicity Buyer	0.353	0.31	0.313	0.307	0.341
	[0.324]	[0.322]	[0.322]	[0.321]	[0.321]
Pre-WWI	0.017	0.112	0.124	0.061	0.157
	[0.333]	[0.330]	[0.330]	[0.260]	[0.260]
Pre-WWI * German Buyer	1.292	1.071	1.073	1.075	1.097
	[0.876]	[0.865]	[0.865]	[0.865]	[0.864]
Pre-WWI * Jewish Buyer	-0.27	-0.519	-0.514	-0.521	-0.601
	[0.643]	[0.627]	[0.627]	[0.627]	[0.626]
Pre-WWI * Other Ethnicity Buyer	-0.14	-0.279	-0.276	-0.27	-0.306
	[0.468]	[0.455]	[0.455]	[0.454]	[0.454]
WWI	-0.127	-0.02	-0.004	-0.067	-0.035
	[0.378]	[0.374]	[0.373]	[0.314]	[0.313]
WWI * German Buyer	2.163	1.958	1.95	1.951	1.975
	[0.861]*	[0.852]*	[0.852]*	[0.852]*	[0.851]*
WWI * Jewish Buyer	1.117	0.881	0.876	0.87	0.792
	[0.581]+	[0.565]	[0.565]	[0.565]	[0.563]
WWI * Other Ethnicity Buyer	0.594	0.445	0.442	0.449	0.455
	[0.493]	[0.480]	[0.480]	[0.479]	[0.478]
Nominal	-1.166	-1.16	-1.179	-1.192	-
	[0.350]**	[0.350]**	[0.349]**	[0.347]**	-
Quarter Dividend Sale	0.12	0.116	0.094	-	-
	[0.300]	[0.299]	[0.297]	-	-
Committee of Admissions	0.504	0.126	-	-	-
	[0.271]+	[0.198]	-	-	-
Constant	-3.605	-3.577	-3.554	-3.49	-3.668
	[0.285]**	[0.287]**	[0.284]**	[0.197]**	[0.195]**
Committee Ethnicity Interactions	Yes	No	No	No	No
Observations (Applications)	5,097	5,097	5,097	5,097	5,097
Pseudo R-squared	0.034	0.032	0.031	0.031	0.02

Notes: Data were collected from the Archives at the New York Stock Exchange. Names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. The category *Jewish* includes German Jewish applicants. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell. These applications are treated as four separate transactions since they involve different sellers and prices. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

TABLE 3 – LOGIT REGRESSIONS; 1883-1936, WITH ANNUAL FIXED EFFECTS: COEFFICIENTS
DEPENDENT VARIABLE IS 1 FOR REJECTED APPLICANTS, 0 FOR ACCEPTED

	I	*II*	*III*	*IV*	*V*
German Buyer	-0.747	-0.795	-0.796	-0.784	-0.752
	[0.741]	[0.740]	[0.740]	[0.740]	[0.739]
Jewish Buyer	0.761	0.722	0.721	0.749	0.831
	[0.399]+	[0.397]+	[0.397]+	[0.396]+	[0.395]*
Other Ethnicity Buyer	0.369	0.336	0.336	0.338	0.387
	[0.324]	[0.323]	[0.323]	[0.323]	[0.322]
Pre-WWI * German Buyer	1.615	1.371	1.37	1.356	1.379
	[0.890]+	[0.872]	[0.872]	[0.871]	[0.871]
Pre-WWI * Jewish Buyer	-0.267	-0.477	-0.477	-0.506	-0.561
	[0.654]	[0.636]	[0.636]	[0.635]	[0.635]
Pre-WWI * Other Ethnicity Buyer	-0.188	-0.326	-0.328	-0.331	-0.377
	[0.478]	[0.461]	[0.461]	[0.461]	[0.460]
WWI * German Buyer	1.98	1.786	1.789	1.763	1.776
	[0.861]*	[0.852]*	[0.852]*	[0.850]*	[0.848]*
WWI * Jewish Buyer	0.968	0.777	0.779	0.727	0.659
	[0.578]+	[0.562]	[0.562]	[0.557]	[0.554]
WWI * Other Ethnicity Buyer	0.489	0.348	0.348	0.333	0.31
	[0.488]	[0.473]	[0.473]	[0.471]	[0.469]
Nominal	-1.09	-1.091	-1.085	-1.125	-
	[0.353]**	[0.353]**	[0.351]**	[0.349]**	-
Quarter Dividend Sale	0.376	0.371	0.376	-	-
	[0.413]	[0.414]	[0.413]	-	-
Committee of Admissions	0.3	-0.041	-	-	-
	[0.281]	[0.207]	-	-	-
Committee Ethnicity Interactions	Yes	No	No	No	No
Groups (Years)	45	45	45	45	45
Observations (Applications)	4,653	4,653	4,653	4,653	4,653
Pseudo R-squared	0.034	0.031	0.031	0.031	0.019

Notes: Data were collected from the Archives at the New York Stock Exchange. Names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. The category *Jewish* includes German Jewish applicants. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell to a new applicant. These applications are treated as four separate transactions because they involve different sellers and prices. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

TABLE 4 – OLS REGRESSIONS; 1883-1973, WITH TIME DUMMIES
DISTINGUISHING GERMAN JEWISH AND OTHER JEWISH BUYERS
DEPENDENT VARIABLE IS NUMBER OF BLACK BALLS (VOTES OPPOSING AN APPLICATION)

	I	***II***	***III***	***IV***	***V***
German Buyer	-0.083	-0.107	-0.106	-0.106	-0.096
	[0.173]	[0.172]	[0.172]	[0.172]	[0.173]
German Jewish Buyer	-0.312	-0.314	-0.314	-0.315	-0.293
	[0.216]	[0.215]	[0.215]	[0.215]	[0.215]
Other Jewish Buyer	0.772	0.734	0.733	0.732	0.772
	[0.253]**	[0.252]**	[0.252]**	[0.252]**	[0.252]**
Other Ethnicity Buyer	0.153	0.136	0.137	0.138	0.15
	[0.116]	[0.116]	[0.116]	[0.115]	[0.115]
Pre-WWI	-0.139	-0.109	-0.101	-0.096	-0.064
	[0.109]	[0.108]	[0.108]	[0.087]	[0.087]
Pre-WWI * German Buyer	0.36	0.272	0.273	0.273	0.284
	[0.257]	[0.249]	[0.249]	[0.249]	[0.249]
Pre-WWI * German Jewish Buyer	0.29	0.289	0.294	0.294	0.283
	[0.331]	[0.316]	[0.316]	[0.316]	[0.317]
Pre-WWI * Other Jewish Buyer	-0.072	-0.333	-0.333	-0.332	-0.381
	[0.382]	[0.368]	[0.368]	[0.368]	[0.368]
Pre-WWI * Other Ethnicity Buyer	-0.095	-0.149	-0.148	-0.149	-0.162
	[0.166]	[0.162]	[0.162]	[0.161]	[0.162]
WWI	-0.121	-0.09	-0.081	-0.077	-0.066
	[0.119]	[0.118]	[0.118]	[0.100]	[0.100]
WWI * German Buyer	0.81	0.739	0.735	0.735	0.745
	[0.273]**	[0.269]**	[0.269]**	[0.269]**	[0.269]**
WWI * German Jewish Buyer	0.814	0.802	0.798	0.799	0.785
	[0.344]*	[0.338]*	[0.338]*	[0.338]*	[0.338]*
WWI * Other Jewish Buyer	0.85	0.604	0.602	0.603	0.569
	[0.446]+	[0.436]	[0.436]	[0.436]	[0.436]
WWI * Other Ethnicity Buyer	0.149	0.099	0.097	0.096	0.097
	[0.187]	[0.184]	[0.184]	[0.183]	[0.184]
Nominal	-0.269	-0.27	-0.279	-0.278	-
	[0.082]**	[0.082]**	[0.082]**	[0.080]**	-
Quarter Dividend Sale	0.002	0.005	-0.007	-	-
	[0.101]	[0.101]	[0.100]	-	-
Committee of Admissions	0.213	0.078	-	-	-
	[0.101]*	[0.077]	-	-	-
Constant	0.433	0.437	0.451	0.447	0.383
	[0.094]**	[0.094]**	[0.093]**	[0.066]**	[0.063]**
Committee Ethnicity Interactions	Yes	No	No	No	No
Observations (Applications)	4,998	4,998	4,998	4,998	4,998

Notes: Data were collected from the Archives at the New York Stock Exchange. Votes are by members of the NYSE's Committee of Admissions; the Committee has 15 members and votes when at least 10 members are present. Black balls were recorded until 1936. As a first step, names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. Then, German Jewish last names are identified based on the most frequent country of origin in the arrival records of ships that entered New York between 1850 and 1950. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell to a new applicant. These applications are treated as four separate transactions because they involve different sellers and prices. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

TABLE 5 – OLS REGRESSIONS; 1883-1936, WITH ANNUAL FIXED EFFECTS
DISTINGUISHING GERMAN JEWISH AND OTHER JEWISH BUYERS
DEPENDENT VARIABLE IS NUMBER OF BLACK BALLS (VOTES OPPOSING AN APPLICATION)

	I	***II***	***III***	***IV***	***V***
German Buyer	-0.089	-0.114	-0.113	-0.106	-0.097
	[0.173]	[0.172]	[0.172]	[0.172]	[0.172]
German Jewish Buyer	-0.278	-0.278	-0.278	-0.274	-0.253
	[0.215]	[0.214]	[0.214]	[0.214]	[0.214]
Other Jewish Buyer	0.769	0.732	0.731	0.756	0.794
	[0.252]**	[0.252]**	[0.252]**	[0.251]**	[0.251]**
Other Ethnicity Buyer	0.169	0.154	0.155	0.156	0.174
	[0.116]	[0.116]	[0.116]	[0.116]	[0.116]
Pre-WWI * German Buyer	0.442	0.352	0.352	0.344	0.357
	[0.257]+	[0.249]	[0.249]	[0.249]	[0.249]
Pre-WWI * German Jewish Buyer	0.285	0.299	0.300	0.295	0.288
	[0.331]	[0.316]	[0.316]	[0.316]	[0.316]
Pre-WWI * Other Jewish Buyer	-0.092	-0.342	-0.342	-0.367	-0.411
	[0.381]	[0.368]	[0.368]	[0.367]	[0.368]
Pre-WWI * Other Ethnicity Buyer	-0.123	-0.171	-0.170	-0.172	-0.189
	[0.166]	[0.162]	[0.162]	[0.162]	[0.162]
WWI * German Buyer	0.738	0.665	0.664	0.650	0.657
	[0.272]**	[0.268]*	[0.268]*	[0.268]*	[0.268]*
WWI * German Jewish Buyer	0.699	0.696	0.695	0.683	0.669
	[0.343]*	[0.337]*	[0.337]*	[0.337]*	[0.337]*
WWI * Other Jewish Buyer	0.902	0.664	0.664	0.620	0.585
	[0.446]*	[0.436]	[0.436]	[0.435]	[0.435]
WWI * Other Ethnicity Buyer	0.105	0.059	0.059	0.052	0.046
	[0.186]	[0.182]	[0.182]	[0.182]	[0.183]
Nominal	-0.247	-0.246	-0.249	-0.267	-
	[0.083]**	[0.083]**	[0.082]**	[0.081]**	-
Quarter Dividend Sale	0.204	0.208	0.206	-	-
	[0.143]	[0.143]	[0.143]	-	-
Committee of Admissions	0.144	0.019	-	-	-
	[0.102]	[0.078]	-	-	-
Constant	0.312	0.334	0.339	0.388	0.341
	[0.057]**	[0.056]**	[0.053]**	[0.040]**	[0.038]**
Committee Ethnicity Interactions	Yes	No	No	No	No
Groups (Years)	54	54	54	54	54
Observations (Applications)	4,998	4,998	4,998	4,998	4,998

Notes: Data were collected from the Archives at the New York Stock Exchange. Votes are by members of the NYSE's Committee of Admissions; the Committee has 15 members and votes when at least ten members are present. Black balls were recorded until 1936. As a first step, names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. Then, German Jewish last names are identified based on the most frequent country of origin in the arrival records of ships that entered New York between 1850 and 1950. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell to a new applicant. These applications are treated as four separate transactions because they involve different sellers and prices. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

TABLE 6 – LOGIT REGRESSIONS; 1883-1936, WITH TIME DUMMIES: COEFFICIENTS
DISTINGUISHING GERMAN JEWISH FROM OTHER JEWISH BUYERS
DEPENDENT VARIABLE IS 1 FOR REJECTED APPLICANTS, 0 FOR ACCEPTED

	I	***II***	***III***	***IV***	***V***
German Buyer	-0.723	-0.788	-0.786	-0.787	-0.757
	[0.739]	[0.738]	[0.738]	[0.738]	[0.738]
German Jewish Buyer	-0.994	-0.996	-0.996	-0.994	-0.927
	[1.026]	[1.024]	[1.024]	[1.024]	[1.024]
Other Jewish Buyer	1.515	1.454	1.452	1.459	1.573
	[0.427]**	[0.425]**	[0.425]**	[0.424]**	[0.422]**
Other Ethnicity Buyer	0.352	0.309	0.312	0.307	0.341
	[0.324]	[0.322]	[0.322]	[0.321]	[0.321]
Pre-WWI	0	0.096	0.109	0.061	0.157
	[0.333]	[0.330]	[0.329]	[0.260]	[0.260]
Pre-WWI * German Buyer	1.291	1.072	1.074	1.075	1.097
	[0.876]	[0.865]	[0.865]	[0.865]	[0.864]
Pre-WWI * German Jewish Buyer	0.706	0.743	0.752	0.749	0.712
	[1.295]	[1.261]	[1.261]	[1.261]	[1.261]
Pre-WWI * Other Jewish Buyer	-0.499	-0.891	-0.891	-0.899	-1.041
	[0.759]	[0.749]	[0.749]	[0.749]	[0.747]
Pre-WWI * Other Ethnicity Buyer	-0.139	-0.277	-0.275	-0.27	-0.306
	[0.468]	[0.455]	[0.455]	[0.454]	[0.454]
WWI	-0.145	-0.036	-0.019	-0.067	-0.035
	[0.377]	[0.373]	[0.372]	[0.314]	[0.313]
WWI * German Buyer	2.162	1.959	1.95	1.951	1.975
	[0.861]*	[0.852]*	[0.852]*	[0.852]*	[0.851]*
WWI * German Jewish Buyer	2.35	2.334	2.328	2.325	2.279
	[1.157]*	[1.137]*	[1.137]*	[1.137]*	[1.136]*
WWI * Other Jewish Buyer	0.906	0.445	0.441	0.434	0.306
	[0.707]	[0.691]	[0.690]	[0.690]	[0.686]
WWI * Other Ethnicity Buyer	0.595	0.447	0.444	0.449	0.455
	[0.493]	[0.480]	[0.480]	[0.479]	[0.478]
Nominal	-1.168	-1.158	-1.177	-1.186	-
	[0.351]**	[0.351]**	[0.349]**	[0.347]**	-
Quarter Dividend Sale	0.093	0.094	0.071	-	-
	[0.301]	[0.301]	[0.299]	-	-
Committee of Admissions	0.501	0.13	-	-	-
	[0.271]+	[0.199]	-	-	-
Constant	-3.587	-3.563	-3.539	-3.491	-3.668
	[0.285]**	[0.286]**	[0.283]**	[0.198]**	[0.195]**
Committee Ethnicity Interactions	Yes	No	No	No	No
Observations (Applications)	5,072	5,097	5,097	5,097	5,097
Pseudo R-squared	0.044	0.038	0.038	0.038	0.027

Notes: Data were collected from the Archives at the New York Stock Exchange. As a first step, names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. Then, German Jewish last names are identified based on the most frequent country of origin in the arrival records of ships that entered New York between 1850 and 1950. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell to a new applicant. These applications are treated as four separate transactions because they involve different sellers and prices. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

TABLE 7 – LOGIT REGRESSIONS; 1883-1936, WITH ANNUAL FIXED EFFECTS: COEFFICIENTS DISTINGUISHING GERMAN JEWISH AND OTHER JEWISH BUYERS
DEPENDENT VARIABLE IS 1 FOR REJECTED APPLICANTS, 0 FOR ACCEPTED

	I	***II***	***III***	***IV***	***V***
German Buyer	-0.742	-0.789	-0.79	-0.78	-0.747
	[0.741]	[0.740]	[0.740]	[0.740]	[0.739]
German Jewish Buyer	-0.947	-0.934	-0.934	-0.928	-0.86
	[1.027]	[1.025]	[1.025]	[1.025]	[1.024]
Other Jewish Buyer	1.575	1.502	1.502	1.546	1.651
	[0.433]**	[0.430]**	[0.430]**	[0.426]**	[0.425]**
Other Ethnicity Buyer	0.37	0.34	0.34	0.342	0.392
	[0.324]	[0.323]	[0.323]	[0.323]	[0.323]
Pre-WWI * German Buyer	1.608	1.363	1.361	1.35	1.372
	[0.890]+	[0.872]	[0.872]	[0.871]	[0.871]
Pre-WWI * German Jewish Buyer	0.785	0.878	0.876	0.869	0.85
	[1.305]	[1.268]	[1.268]	[1.268]	[1.268]
Pre-WWI * Other Jewish Buyer	-0.627	-0.989	-0.988	-1.032	-1.135
	[0.778]	[0.765]	[0.765]	[0.763]	[0.761]
Pre-WWI * Other Ethnicity Buyer	-0.188	-0.33	-0.332	-0.334	-0.381
	[0.478]	[0.461]	[0.461]	[0.461]	[0.460]
WWI * German Buyer	1.968	1.775	1.778	1.757	1.767
	[0.861]*	[0.852]*	[0.851]*	[0.850]*	[0.848]*
WWI * German Jewish Buyer	2.073	2.095	2.096	2.075	2.033
	[1.157]+	[1.137]+	[1.137]+	[1.136]+	[1.134]+
WWI * Other Jewish Buyer	0.913	0.58	0.582	0.508	0.389
	[0.720]	[0.698]	[0.698]	[0.688]	[0.683]
WWI * Other Ethnicity Buyer	0.484	0.342	0.341	0.328	0.302
	[0.488]	[0.472]	[0.472]	[0.470]	[0.468]
Nominal	-1.098	-1.095	-1.089	-1.121	-
	[0.353]**	[0.353]**	[0.352]**	[0.349]**	-
Quarter Dividend Sale	0.274	0.294	0.3	-	-
	[0.413]	[0.413]	[0.411]	-	-
Committee of Admissions	-0.742	-0.789	-0.79	-0.78	-0.747
	[0.741]	[0.740]	[0.740]	[0.740]	[0.739]
Committee Ethnicity Interactions	Yes	No	No	No	No
Groups (Years)	45	45	45	45	45
Observations (Applications)	4,653	4,653	4,653	4,653	4,653
Pseudo R-squared	0.046	0.04	0.04	0.04	0.028

Notes: Data were collected from the Archives at the New York Stock Exchange. As a first step, names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. Then, German Jewish last names are identified based on the most frequent country of origin in the arrival records of ships that entered New York between 1850 and 1950. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell to a new applicant. These applications are treated as four separate transactions because they involve different sellers and prices. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

TABLE 8 – OLS REGRESSIONS; 1883-1936, WITH ANNUAL FIXED EFFECTS
DEPENDENT VARIABLE IS LOG PRICE OF A SEAT IN YEAR 2000 US DOLLARS

	I	*II*	*III*	*IV*	*V*	*VI*
German Buyer	0.003	0.003	0.002	0.001	0.001	0.003
	[0.014]	[0.014]	[0.013]	[0.013]	[0.013]	[0.013]
Jewish Buyer	-0.022	-0.022	-0.023	-0.025	-0.025	-0.018
	[0.013]+	[0.013]+	[0.012]+	[0.012]*	[0.012]*	[0.012]
Other Ethnicity Buyer	0.027	0.027	0.025	0.025	0.025	0.025
	[0.010]**	[0.010]**	[0.009]**	[0.009]**	[0.009]**	[0.009]**
Pre-WWI * German Buyer	0.009	0.009	0.008	0.003	0.003	0.001
	[0.019]	[0.019]	[0.019]	[0.018]	[0.018]	[0.018]
Pre-WWI * Jewish Buyer	0.036	0.035	0.035	0.026	0.026	0.02
	[0.019]+	[0.019]+	[0.019]+	[0.018]	[0.018]	[0.018]
Pre-WWI * Other Ethnicity	-0.017	-0.017	-0.017	-0.017	-0.017	-0.017
	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]
WWI * German Buyer	0.009	0.009	0.011	0.007	0.007	0.003
	[0.021]	[0.021]	[0.020]	[0.020]	[0.020]	[0.020]
WWI * Jewish Buyer	0.066	0.066	0.066	0.058	0.058	0.047
	[0.021]**	[0.021]**	[0.021]**	[0.020]**	[0.020]**	[0.020]*
WWI * Other Ethnicity	-0.016	-0.015	-0.016	-0.016	-0.016	-0.018
	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]	[0.014]
Quarter Dividend Sale	0.093	0.093	0.093	0.093	0.093	-
	[0.011]**	[0.011]**	[0.011]**	[0.011]**	[0.011]**	-
Committee of Admissions	0.005	0.006	0.005	0.001	-	-
	[0.007]	[0.007]	[0.007]	[0.006]	-	-
German Buyer and Seller * WWI	0.017	0.017	-	-	-	-
	[0.053]	[0.053]	-	-	-	-
Rejected	0.008	-	-	-	-	-
	[0.013]	-	-	-	-	-
Constant	13.939	13.939	13.941	13.942	13.943	13.964
	[0.006]**	[0.006]**	[0.004]**	[0.004]**	[0.004]**	[0.003]**
Committee Ethnicity Interactions	Yes	Yes	Yes	No	No	No
Same Ethnicity Interactions	Yes	Yes	No	No	No	No
Groups (Years)	54	54	54	54	54	54
Observations (Applications)	4,210	4,210	4,210	4,210	4,210	4,210

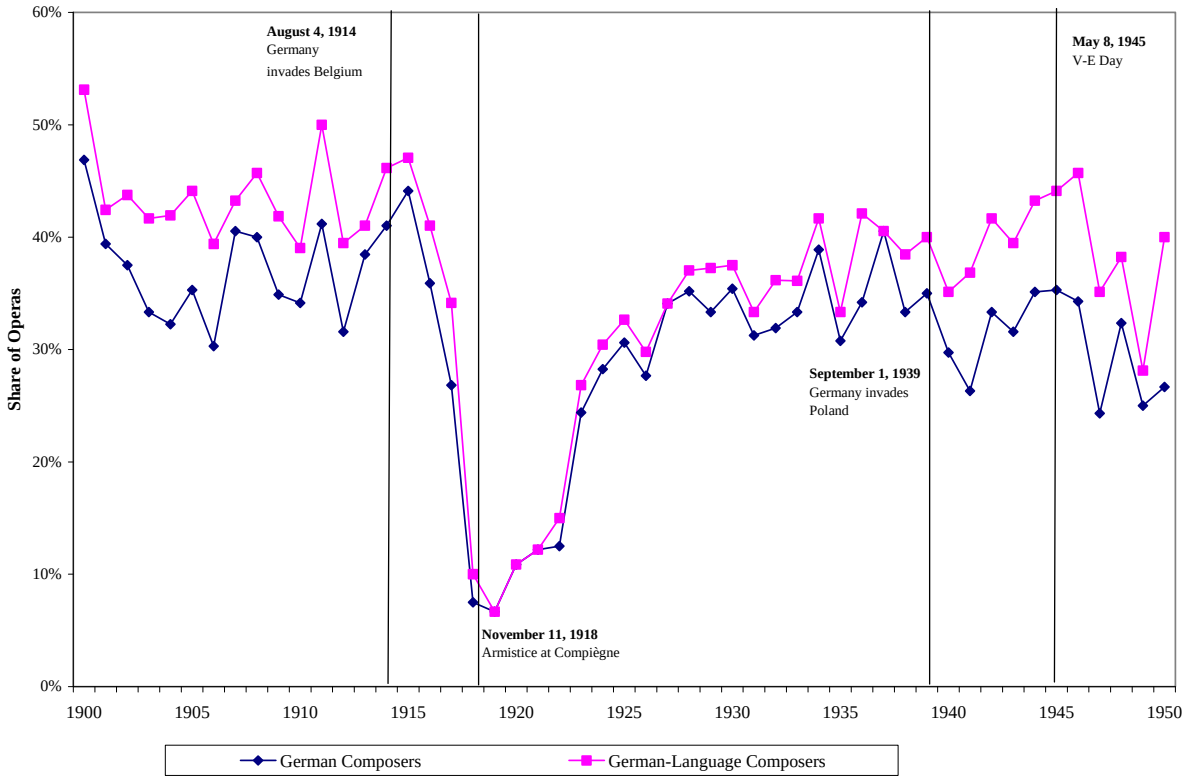
Notes: Data were collected from the Archives at the New York Stock Exchange. Names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. "Jewish" includes German Jewish as well as other Jewish applicants, following the original classification. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell to a new applicant. These applications are treated as four separate transactions because they involved different sellers and prices. Prices for these transactions are multiplied by a factor of four. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

TABLE 9 – OLS REGRESSIONS; 1883-1936, WITH TIME DUMMIES
DEPENDENT VARIABLE IS LOG PRICE OF A SEAT IN YEAR 2000 US DOLLARS

	I	*II*	*III*	*IV*	*V*	*VI*
German Buyer	0.012	0.013	0.013	0.009	0.007	-0.012
	[0.048]	[0.048]	[0.045]	[0.044]	[0.045]	[0.048]
Jewish Buyer	-0.064	-0.067	-0.061	-0.062	-0.061	-0.012
	[0.046]	[0.046]	[0.043]	[0.042]	[0.043]	[0.046]
Other Ethnicity Buyer	0.026	0.025	0.02	0.023	0.02	-0.029
	[0.033]	[0.033]	[0.030]	[0.030]	[0.030]	[0.033]
Pre-WWI	-0.978	-0.977	-0.977	-0.978	-0.989	-1.479
	[0.029]**	[0.029]**	[0.029]**	[0.029]**	[0.029]**	[0.024]**
Pre-WWI * German Buyer	0.108	0.106	0.102	0.091	0.087	0.106
	[0.064]+	[0.064]	[0.064]	[0.062]	[0.062]	[0.067]
Pre-WWI * Jewish Buyer	0.118	0.121	0.112	0.105	0.1	0.051
	[0.065]+	[0.065]+	[0.065]+	[0.062]+	[0.062]	[0.067]
Pre-WWI * Other Ethnicity	0.014	0.014	0.014	0.021	0.019	0.068
	[0.042]	[0.042]	[0.042]	[0.041]	[0.041]	[0.045]
WWI	-0.613	-0.612	-0.612	-0.613	-0.629	-1.119
	[0.032]**	[0.032]**	[0.032]**	[0.032]**	[0.032]**	[0.029]**
WWI * German Buyer	0.143	0.138	0.121	0.113	0.12	0.138
	[0.073]+	[0.073]+	[0.070]+	[0.069]	[0.069]+	[0.075]+
WWI * Jewish Buyer	0.218	0.212	0.209	0.203	0.207	0.158
	[0.072]**	[0.072]**	[0.072]**	[0.070]**	[0.070]**	[0.076]*
WWI * Other Ethnicity	0.015	0.012	0.012	0.019	0.022	0.071
	[0.048]	[0.048]	[0.048]	[0.047]	[0.047]	[0.051]
Quarter Dividend Sale	0.699	0.698	0.698	0.697	0.72	-
	[0.027]**	[0.027]**	[0.027]**	[0.027]**	[0.027]**	-
Committee of Admissions	-0.127	-0.129	-0.129	-0.127	-	-
	[0.025]**	[0.025]**	[0.025]**	[0.019]**	-	-
German Buyer and Seller * WWI	-0.127	-0.132	-	-	-	-
	[0.183]	[0.183]	-	-	-	-
Rejected	-0.09	-	-	-	-	-
	[0.045]*	-	-	-	-	-
Constant	14.357	14.355	14.36	14.361	14.338	14.828
	[0.028]**	[0.028]**	[0.025]**	[0.025]**	[0.025]**	[0.018]**
Committee Ethnic. Interact.	Yes	Yes	Yes	No	No	No
Same Ethnicity Interactions	Yes	Yes	No	No	No	No
Observations (Applications)	4,210	4,210	4,210	4,210	4,210	4,210
R-squared	0.67	0.67	0.67	0.67	0.66	0.6

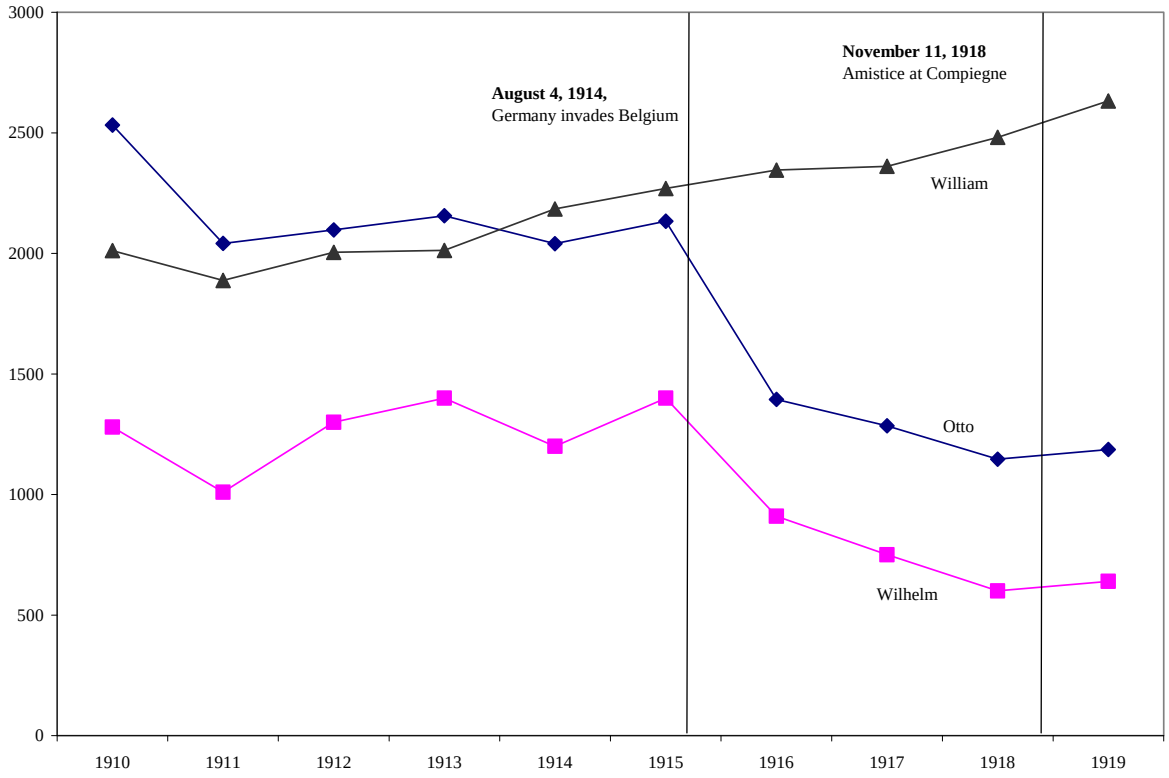
Notes: Data were collected from the Archives at the New York Stock Exchange. Names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices. The category *Jewish* includes German Jewish last names, following the original classification. During the Quarter Dividend Sale, each existing member received one additional quarter of a membership which he could sell to a new applicant. These applications are treated as four separate transactions because they involve different sellers and prices. Prices for these transactions are multiplied by four. + denotes significance at 10 percent, * at 5 percent, and ** at 1 percent.

FIGURE 1 – THE SHARE OF GERMAN-LANGUAGE OPERAS FROM 1900 TO 1950



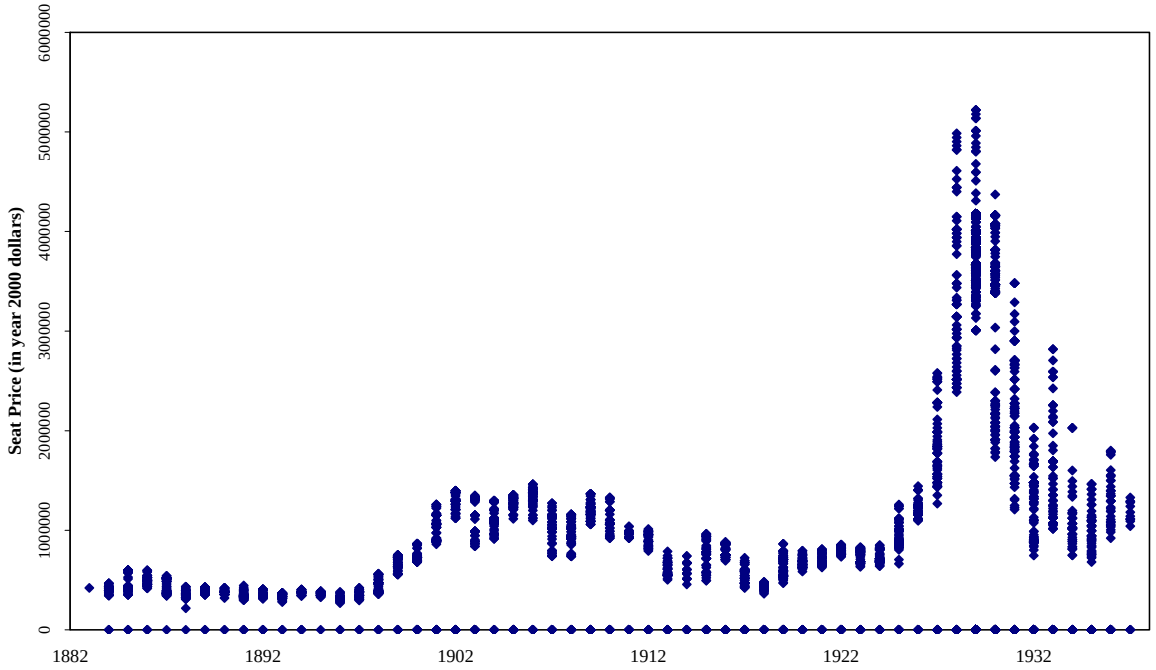
Notes: Data on operas are collected from historical schedules of performances in the online archives of the Metropolitan Opera in New York. German-language composers include Austrian and Bohemian composers.

FIGURE 2 – BOYS NAMED OTTO, WILHELM, AND WILLIAM FROM 1911 TO 1919



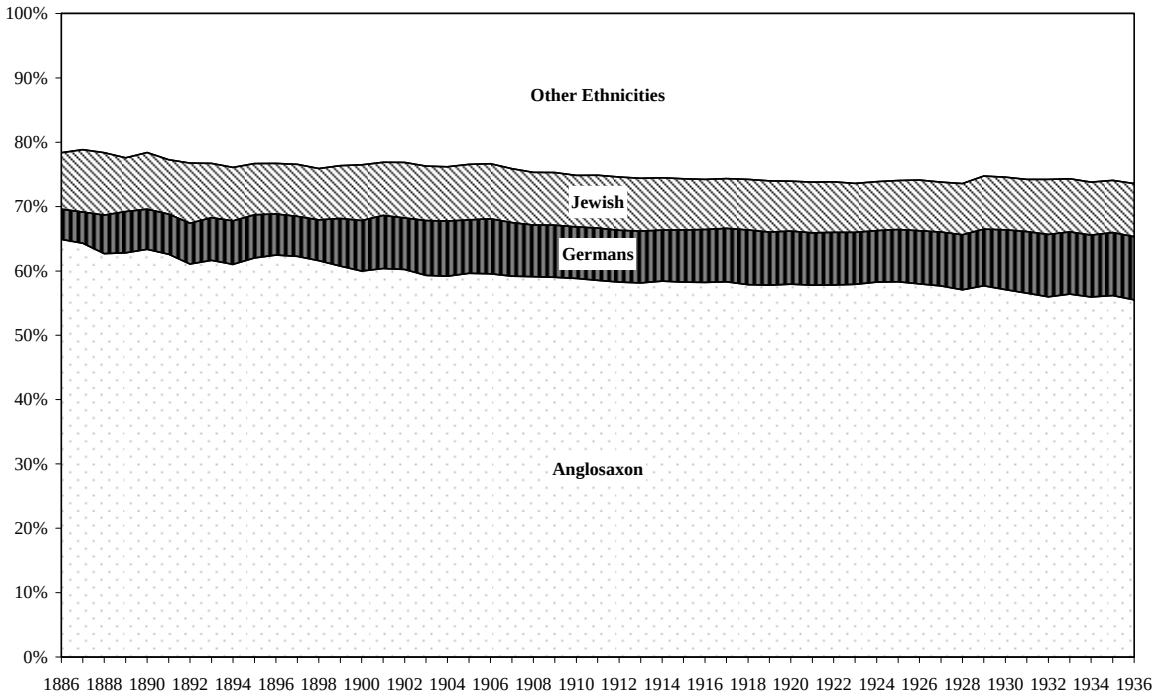
Notes: Data are constructed by counting the number of children with the name Otto or Wilhelm born between 1911 and 1919 and recorded in the United States Census of 1920. To scale the series in one graph, the number of Ottos is multiplied by 10 and the number of Williams is divided by 20.

FIGURE 3 - NYSE SEAT PRICES, 1883-1936



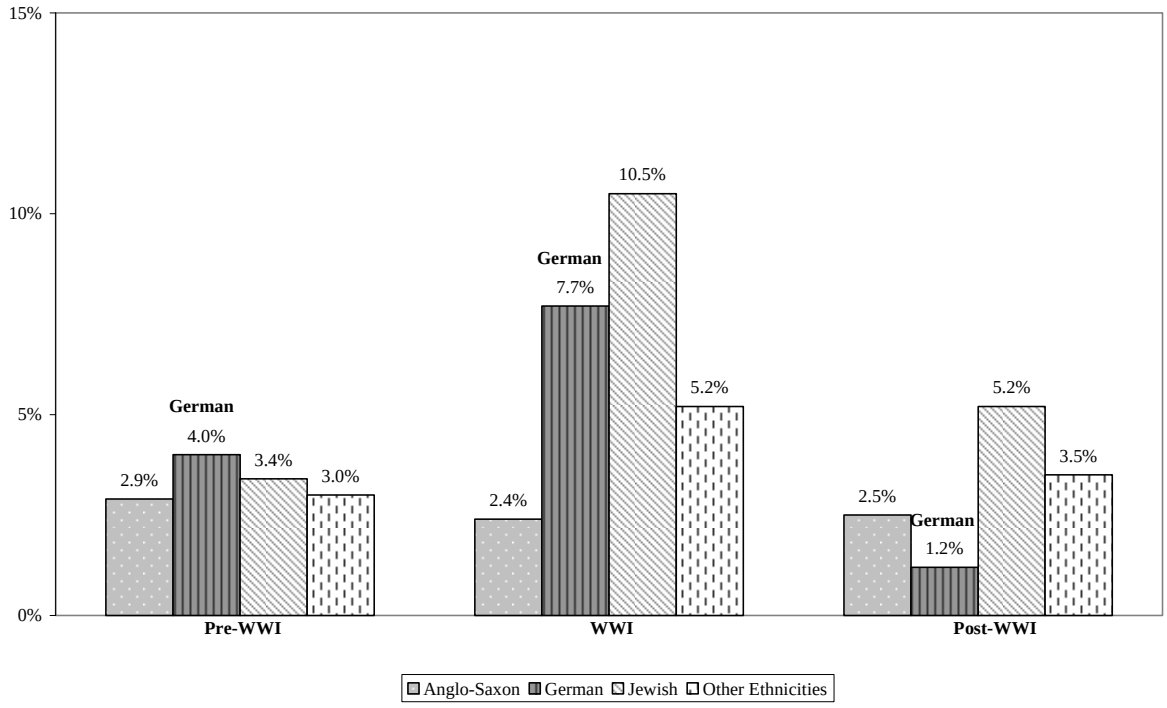
Notes: Price data are collected from the ledgers of transactions at the Archives of the NYSE.

FIGURE 4 –ETHNIC COMPOSITION OF THE NYSE FROM 1886 TO 1936



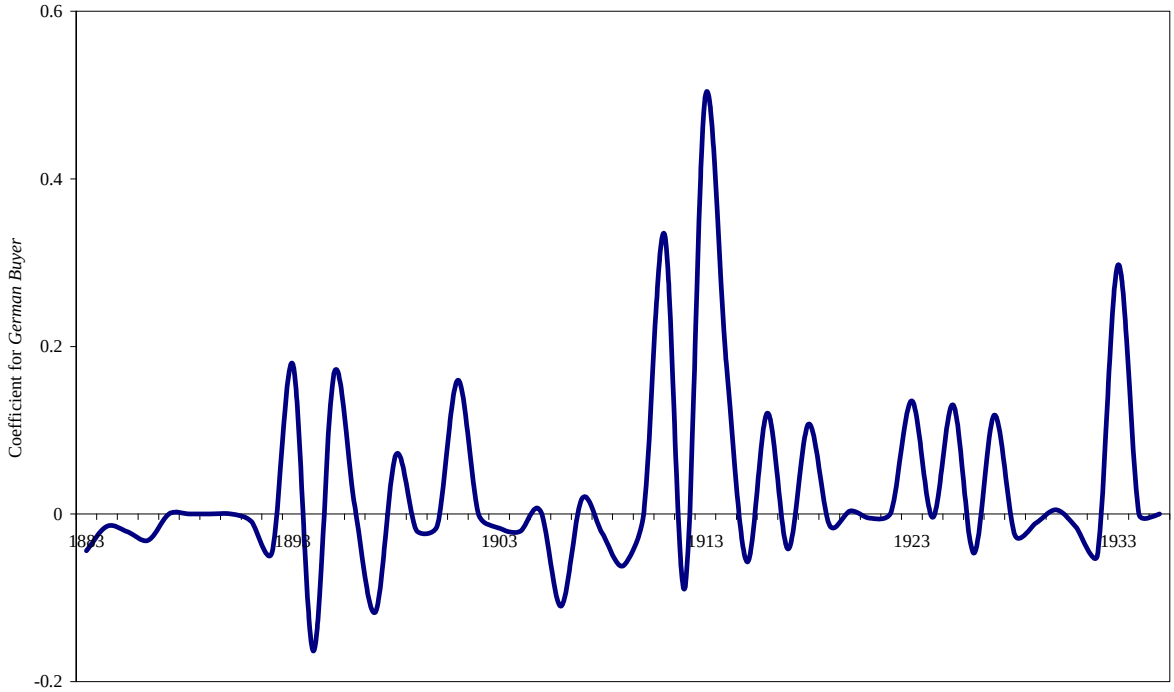
Notes: The ethnic composition is computed by adding buyers to the stock of existing members and subtracting sellers. Buyers' and sellers' names are collected from the ledgers of transactions in the archives of the NYSE. Names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices.

FIGURE 5 - REJECTED APPLICANTS BY ETHNICITY, 1883-1936



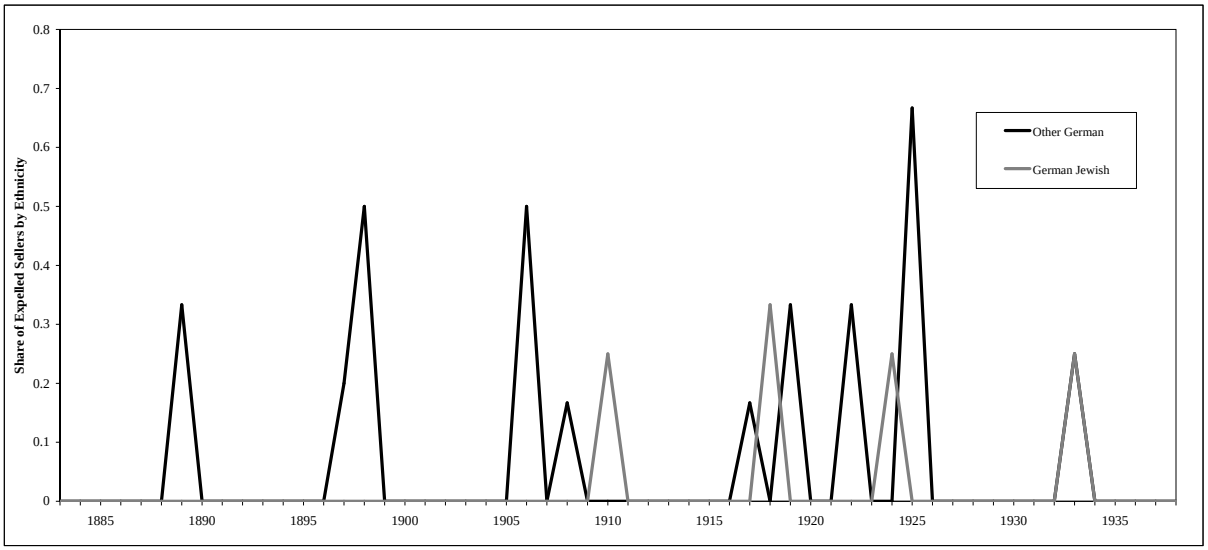
Notes: Data on names and election outcomes are collected at the archives of the NYSE. Names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices.

FIGURE 6 – EFFECT OF GERMAN ETHNICITY ON PROBABILITY OF REJECTION



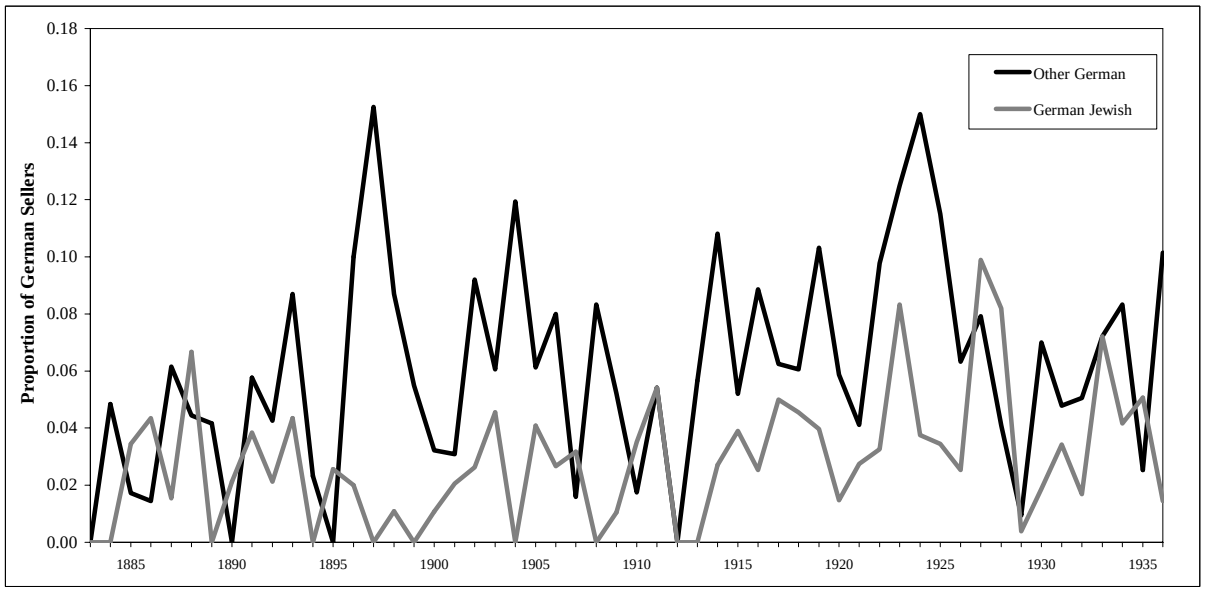
Notes: Coefficients per year for the variable *German Buyer* in a linear probability regression that controls for ethnicities, *Nominal* transactions, *Quarter Dividend Sales* and sales carried out by the *Committee of Admissions*.

FIGURE 7 – EXPULSIONS FROM THE NYSE, 1883 TO 1936



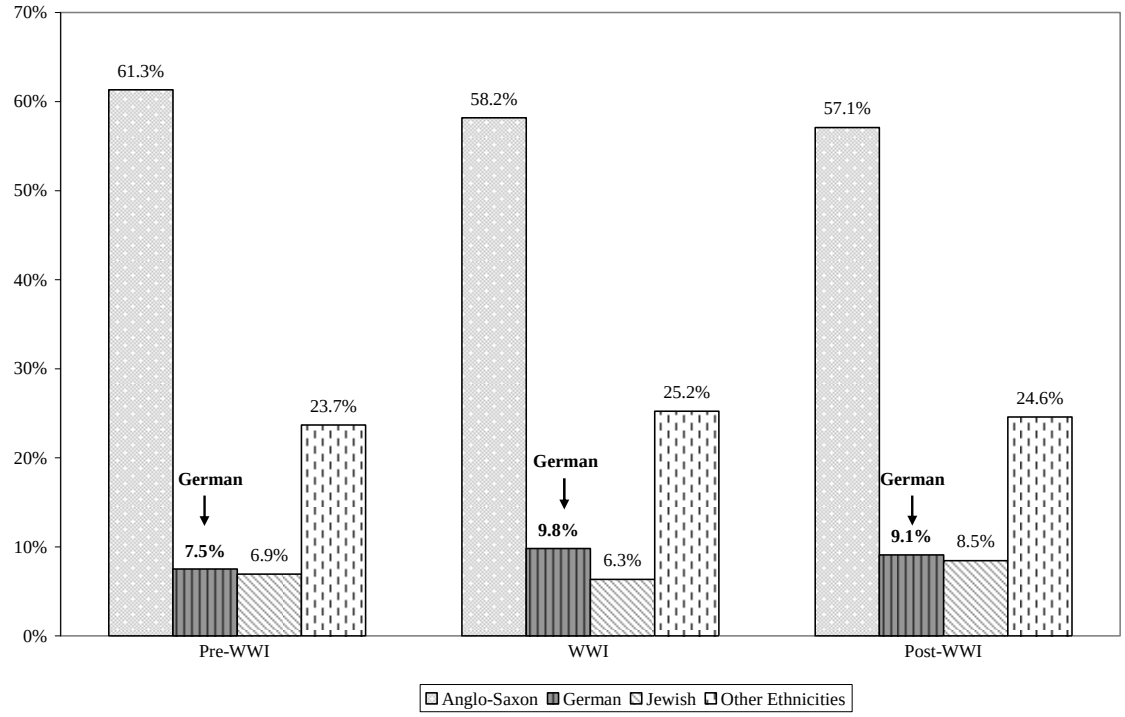
Notes: Names of expelled members are collected from annotations in the ledgers of transactions at the NYSE archives. German and Jewish members are identified by a commercial algorithm that uses linguistic rules and location-specific naming practices. German Jews are distinguished from other Jews using passenger lists of immigrant ships that arrived at the port of New York between 1850 and 1950 (available at ancestry.com).

FIGURE 8 – SELLERS OF NYSE SEATS, 1883 TO 1936



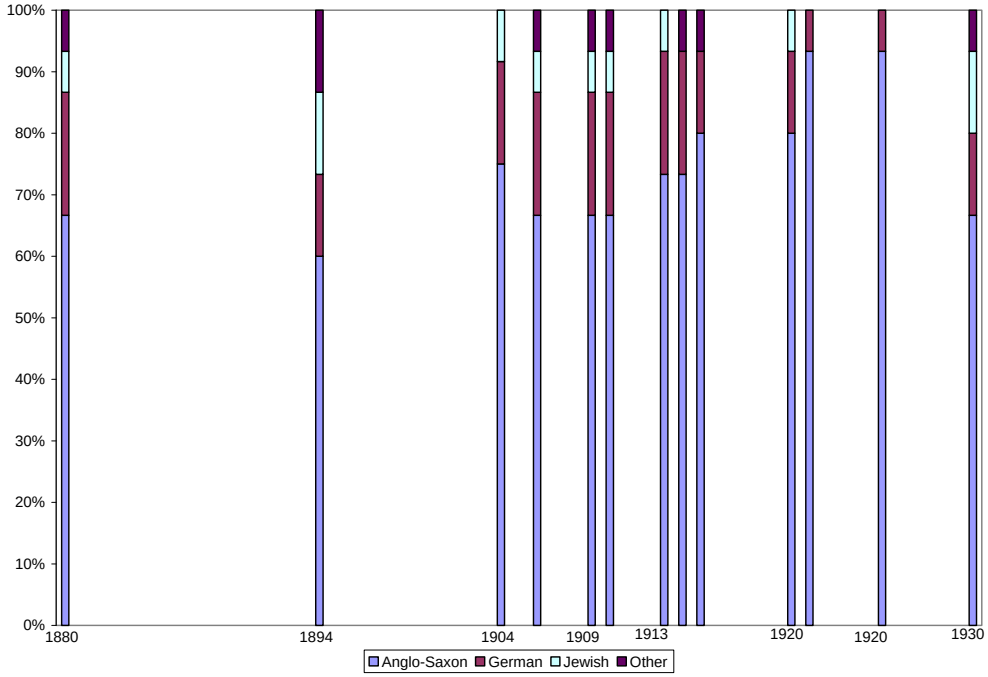
Notes: Sellers' names are collected from the ledgers of transactions at the NYSE archives. German and Jewish members are identified by a commercial algorithm that uses linguistic rules and location-specific naming practices. German Jews are distinguished from other Jews using passenger lists of immigrant ships that arrived at the port of New York between 1850 and 1950 (available at ancestry.com).

FIGURE 9 – SHARES OF APPLICANTS BY ETHNICITY BEFORE, DURING, AND AFTER WORLD WAR I



Notes: Applicants' names are collected from the ledgers of transactions in the archives of the NYSE. Names are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices.

FIGURE 10– ETHNIC COMPOSITION OF THE COMMITTEE OF ADMISSIONS



Notes: The Committee of Admissions had 15 members, whose names are drawn from the *Minutes* of the Committee of Admissions (1904), Francis Eames (1894), and the *New York Stock Exchange Directory*. Members are matched to ethnicities by a commercial algorithm that uses linguistic rules and location-specific naming practices; this information was supplemented with information from obituaries in the *New York Times* and census records.