

Stock Market Performance of Jewish Firms During the Third Reich*

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Abstract

We study the effect of discrimination against Jewish managers and owners on their firms' stock during the Third Reich. The stock of firms with Jewish managers underperformed by around 5% annually, with abnormal performance persisting on average for three years until firm "Aryanization." Firms with Jewish owners perform much like firms without any Jewish involvement. We identify harassment of Jewish-managed firms as the leading cause for the discount. Alternative explanations, such as brain drain and Jewish stigma, seem less relevant. We find that discriminating against a minority can have a negative effect on an entire economy.

JEL classification: G12, G14, N24

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1 Introduction

Discrimination is a blight on many aspects of society. Over the centuries its targets have been minorities, women, and various underprivileged groups. We investigate in detail the most notorious and lethal discrimination in history: the persecution of Jews during the Third Reich in Germany. Here, we let the stock market performance of firms with Jewish managers and owners compared to non-Jewish firms document the extent of the discrimination.

The appointment of Adolf Hitler as chancellor of Germany in January 1933 had severe consequences for Jewish companies. Firms were pressured to oust Jewish managers (*Vorstände*) and Jewish board members (*Aufsichtsratsmitglieder*), and Jewish owners were compelled to forfeit their stock certificates. This enforced exclusion of Jewish people from the German economy is known as “Aryanization.” Although the “Aryanization” of the German economy is a well-studied topic in general, little is known about its effect on Jewish firms’ stock prices in particular and the German stock market in general.

To investigate how “Aryanization” affects Jewish firms’ performance, we hand-collect novel data on weekly stock returns for all 199 Jewish and 1,303 non-Jewish firms listed on the Berlin stock exchange between December 1923 and November 1941. We then can quantify the discrimination that Jewish firms experienced around their “Aryanization.” Jewish-managed firms, those with a Jewish manager or board member, underperformed by 4.75% per year between Hitler’s appointment as chancellor and the firms’ “Aryanization” – a period lasting on average three years. This large and statistically significant abnormal performance suggests that investors repeatedly lowered their expectations about future performance, as they recognized the increasing discrimination against Jewish-managed firms. Abnormal returns of Jewish-owned firms, those with a Jewish blockholder, however, are statistically insignificant.

We investigate channels through which discrimination of Jewish-managed firms can affect abnormal returns. As we control for systematic risk and industry sector, we show that the discount is not due to any concentration of Jewish-managed firms in poorly performing industries or in particularly risky stocks. The difference in average firm size also does not explain the abnormal performance. Our results are robust to methodological changes, and we address endogeneity concerns by controlling for the number of Jewish managers before Hitler’s rise to power.

We develop and test three general hypotheses. The *harassment* hypothesis explains the abnormal performance through lower cash flows attributable to increased harassment of Jewish-

managed firms. Examples are the blocking of store entrances by Nazi brown shirts, the suspension of government contracts with Jewish-managed firms, and the relaxation of customer obligation to pay bills. Investors observing this harassment would expect lower future cash flows, which result in lower stock prices. The harassment hypothesis also predicts the pattern of discounts. There are no discounts before Hitler's appointment or after the firms' "Aryanization," but discounts are statistically significant between those two events, and are concentrated in the years just after Hitler's appointment. As the discounts last over several years, investors gradually lowered their cash flow predictions as the full extent of Nazi harassment became clear over time. Overall, the harassment hypothesis can explain our findings best.

The *brain drain* hypothesis argues that Jewish managers were more skilled than their non-Jewish replacements, and a loss in skilled management translated into reduced stock prices. Huber et al. (2019) suggest this hypothesis and document that Jewish managers were indeed better connected and better educated than their non-Jewish counterparts. The brain drain hypothesis predicts persistent positive abnormal returns for Jewish-managed firms until the Jewish manager was replaced by a non-Jewish manager. Around the "Aryanization," abnormal returns revert to zero and stay at that level as the firm loses human capital. We cannot observe such an abnormal return pattern in the data.

The brain drain hypothesis further suggests that abnormal returns are a function of the Jewish manager's skill. Hence, firms with a presumably higher-skilled Jewish chief executive officer should experience, on average, more positive abnormal returns than firms with a less-skilled Jewish manager. However, we find that firms with Jewish managers in high positions experience the same abnormal returns as other Jewish-managed firms. Along similar lines, firms with multiple Jewish managers should experience more positive abnormal returns than firms with only one Jewish manager. We cannot find that the number of Jewish managers affects the abnormal returns of Jewish-managed firms. We conclude that the brain drain hypothesis does not fit our findings well.

Finally, the *Jewish stigma* hypothesis suggests that investors who did not want to be perceived as supporting Jews sold their stocks of Jewish-managed firms. This selling pressure after Hitler's appointment caused a decline in stock prices, which resulted in negative abnormal returns. After that, if the Jewish-managed firms' cash flows do not suffer, the remaining investors should earn positive abnormal returns until a new equilibrium is reached. After the "Aryanization," the removal of stigma should increase the demand for such firms again, and we should

temporarily observe positive abnormal returns. We cannot observe such a pattern. Moreover, the stigma would predict divestment of Jewish-managed firms' stock and simultaneous investment into non-Jewish stock, yet we cannot find evidence of such reallocation. We conclude that the Jewish stigma hypothesis does not fit our findings well.

We quantify the total loss in value of Jewish firms during the Third Reich to be 157 million *Reichsmark*; this represents some 0.4% of the German gross national product in 1933 (54.8 billion *Reichsmark*) and 3% of the 6 billion *Reichsmark* of taxable assets that Jews owned in 1938. This number is substantially lower than the 1.04 billion *Reichsmark* that Huber et al. (2019) estimate.

Although the Third Reich is a well-studied topic in general, quantitative research remains scarce. A noteworthy exception is the study on brain drain by Huber et al. (2019), who use semiannual stock prices and a large database of managers. We focus on the timing of Jewish managers' dismissals and analyze stock prices at a weekly instead of semiannual frequency. This allows us to adjust stock returns for market movements, which permits more precise estimates of the discrimination effect. Our findings suggest harassment to be the main driver.

Our paper also relates to the literature on discrimination. Card et al. (2016) and Blau and Kahn (2017) use wage differences to analyze discrimination against women. Chatterji and Seamans (2012) discuss race discrimination in connection with credit card issuance. Mayda et al. (2018) observe that for-profit firms are more discriminated against in H1-B visa policy changes than colleges, universities, and non-profit research institutions. Kumar et al. (2015) and Niessen-Ruenzi and Ruenzia (2019) use mutual fund flows to measure discrimination against women and ethnic minorities. We contribute to this literature by showing that firms that are the subject of discrimination experience significant negative abnormal returns. Even if the discrimination ends, the lost value cannot be regained but stock returns can measure the severity of discrimination.

We contribute to the study of asset pricing during the Third Reich. Ferguson and Voth (2008) measure the returns of 115 firms (of 751 firms) that were politically connected to the National Socialist German Workers' Party (NSDAP). An investigation of monthly stock returns of firms listed on the Berlin stock exchange around Hitler's appointment as chancellor indicates that connected firms outperform unconnected firms by 5% to 8% between January and March 1933. The authors also control for "Jewishness" when measuring a firm's performance, but find only a statistically insignificant Jewish underperformance. By significantly expand-

ing the sample period, using weekly returns, and controlling for systematic risk, we show in our sample that discrimination toward Jewish-managed firms leads to a statistically significant underperformance of discriminated firms.

Scherner (2008) uses accounting reports, key performance indicators, and market developments to analyze interactions between big business and the Nazi regime during Hitler's strive for autarky and rearmament. He concludes that firms' investment behavior was based on economic reasoning and only rarely was enforced by the regime. Our findings, however, suggest that the regime intervened in firm employment policy, which resulted in underperformance of the affected firms' stock.

Other studies of "Aryanizations" are mainly descriptive. James (2001), Lorentz (2002), and Herbst and Weihe (2004) investigate large German bank participation in "Aryanizations." Stallbaumer (1999) examines the involvement of the Friedrich Flick holding. Other big German firms such as Krupp and I.G. Farben were also heavily engaged in "Aryanizations." We contribute to this literature by showing that there are no abnormal returns after that period. Value in Jewish-managed firms was destroyed before the "Aryanizations" and did not reappear thereafter.

We also relate our study of individual stock returns to research into the impact of events during the Third Reich on stock indices and bond yields. Choudhry (2010) studies structural breaks in returns of the Dow Jones Industrial Average stock index between January 1939 and December 1945. He finds that important events identified by historians are reflected in the index. This finding contrasts with Hudson and Urquhart (2015), who can find only events that negatively affected the British war effort in the FT 30, a predecessor of the FTSE 100, between January 1939 and December 1945. Events positively affecting the war effort remained insignificant.

We first provide some historical background and describe our data. Section 3 details the methodology and presents our main findings. Section 4 develops and tests explanations for our findings, and Section 5 discusses the robustness of our findings. The last section concludes.

2 Historical Background and Data

Adolf Hitler did not seize power unexpectedly. In November 1923 he had attempted to gain power through a putsch in Munich. The putsch was unsuccessful, and Hitler, among others, was imprisoned. From then on, the National Socialist German Workers' Party (NSDAP) tried

to gain power through elections. In 1930, the party won 18% of the national vote to hold the second-highest number of seats in parliament. This marked the first major success for the Nazi party. The NSDAP reached a record membership of 800,000 by 1931. During that time, Germany was suffering from the aftermath of the Great Depression and was ruled by unstable minority governments.

During the spring of 1932, President Paul von Hindenburg appointed another minority government, headed by Franz von Papen. In the next national elections during the summer of 1932, the NSDAP gained 37% of the votes and the highest number of seats in the *Reichstag*. Only because Hitler insisted on becoming chancellor did the NSDAP not form a government.

In the November 1932 elections, the NSDAP gained only 33% of all votes but remained the largest party by far. Representatives of industry, finance, and agriculture requested that Hindenburg appoint Hitler chancellor, but Hindenburg appointed General Kurt von Schleicher. Only after von Schleicher was forced to resign, and many influential people argued for Hitler's chancellorship, did Hindenburg finally appoint Hitler on January 30, 1933 (Schulz, 1992).

2.1 Jewish Firms During the Third Reich

In 1933, approximately 525,000 Jews lived in Germany, representing less than 1% of the German population. In the years following, 250,000 to 300,000 German Jews fled the country or were imprisoned in concentration camps. The number of German Jews in the population declined to 350,000 (0.5%) in 1938. Although Jews only represented a small part of the population, they were of economic importance. Dippel (1996) estimates that Jews possessed taxable assets worth about 6 billion *Reichsmark* in 1938. Total taxable assets of all Germans were about 53 billion *Reichsmark* in 1935 (Herrmann, 1961). Thus, Jews owned roughly 11% of all taxable assets.

The antisemitic propaganda of the Nazis began as early as 1920, as the National Socialist German Workers' Party (NSDAP) wanted to exclude all Jews from the German economy in their 25-point program (Schuman, 1934). They started implementing this plan by discriminating against Jewish firms immediately after Hitler's appointment. Jewish businesses were boycotted (Hecht, 2003; Adena et al., 2015), government contracts were suspended or not renewed, and firms were pressured to oust their Jewish managers (Stallbaumer, 1999). The unconscionability law was reinterpreted so that doing business with Jews was deemed unconscionable (Rüthers, 2012), and contracts with Jews could thus not be enforced, much the same as for contracts with prostitutes or gamblers. The Nazi regime passed laws that banned Jews from certain professions

such as medicine, law, or education.¹

A decree forced Jews to register their assets by July 31, 1938, if the total value exceeded 5,000 *Reichsmark* (*Verordnung über die Anmeldung des Vermögens von Juden*). The decree excluding Jews from German economic life (*Verordnung zur Ausschaltung der Juden aus dem deutschen Wirtschaftsleben*) and the decree on the use of Jewish assets (*Verordnung über den Einsatz des jüdischen Vermögens*) forced Jews to sell or liquidate their businesses by January 1, 1939. Only a few Jews were spared because they produced important goods. Every sale had to be approved by the government, which ensured that the Reich was the main beneficiary. Stock and bond certificates had to be deposited with a bank and were not accessible thereafter. Real estate and valuables had to be sold, too. Jews were often compensated with German government bonds (which they could not sell). Banks arranging the sale of large businesses took a commission of 2%, earning them millions (Kwiet, 1988; Barkai, 1989; Stallbaumer, 1999). This forced exclusion of Jews from the German economy is characterized as “Aryanization,” it took place between February 1933 and December 1938.²

A prominent example of “Aryanization” of a Jewish firm is Leonard Tietz AG, a chain of department stores selling to the middle class. The Tietz family held the majority of shares. Immediately after January 30, 1933, SA officers (the Nazi party’s paramilitary) stood in front of Tietz department stores, stopping people from entering and buying there. In the spring of 1933, Tietz needed to extend a loan with the Dresdner Bank or go bankrupt. The bank would agree to extend the loan only if Tietz resigned. Soon after, the whole Tietz family was forced to sell their shares in the firm to a consortium formed by Dresdner Bank, Deutsche Bank, and Commerzbank. The formerly Jewish firm was renamed Westdeutsche Kaufhof AG at the next shareholders’ meeting, and the new management started a public relations campaign to communicate that the firm was now “free of Jews.” Today the department store is known as GALERIA Kaufhof (see Busch-Petersen, 2010, for a detailed account). This example demonstrates that some firms were historically recognized as Jewish and that large German banks participated in the “Aryanizations” (James, 2001; Lorentz, 2002; Herbst and Weihe, 2004; Ferguson and Voth, 2008).

We use two classifications for Jewish firms, Jewish-managed and Jewish-owned. Our defi-

¹Different professions were affected at various dates: doctors, lawyers, and editors in 1933; tax consultants, veterinarians, and teachers in 1936.

²Historians use the decree on the use of Jewish assets (*Verordnung über den Einsatz des jüdischen Vermögens*) to mark the end of the “Aryanizations,” but some firms were “Aryanized” after December 1938. For example, in our sample, Anhaltische Kohlewerke Halle was “Aryanized” in 1939. Rosenthal Porzellan was “Aryanized” only in 1941.

nition of Jewish-managed firms coincides with the first two categories in Mosse (1987). A firm is identified as Jewish-managed if a founder is of Jewish extraction and has a leading position in the firm; if a manager (*Vorstand*) is of Jewish extraction; or if a member of the supervisory board (*Aufsichtsrat*) is of Jewish extraction. Here, the terminology “of Jewish extraction” is understood in the sense of the Nazis’ Nuremberg race laws of 1935, not in the sense of religious affiliation. We classify a firm as Jewish-owned if a blockholder is of Jewish extraction.³ With this twofold definition of Jewish firms, a firm can be simultaneously Jewish-managed and Jewish-owned. According to Ferguson and Voth (2008), firms were recognized as Jewish by Jews and non-Jews. We show that Jewish-sounding firms, which use frequent Jewish surnames in their firm names but are in fact non-Jewish, performed as well as other non-Jewish firms. This finding suggests that investors were able to identify Jewish firms much as we define Jewishness (see Section 5.4 for more details).

We obtain owner and manager information from the *Handbuch der deutschen Aktiengesellschaften*, an annual catalog providing information on all German joint stock firms that was publicly available to investors at the time. It lists, among other things, a firm’s managers (*Vorstand*), supervisory board members (*Aufsichtsrat*), blockholders, and firm sector and market capitalization. To find out about the Jewishness of managers, board members, and blockholders, we use the Yad Vashem database, which lists Holocaust victims, and the *Deutsche Biographie*, which gives biographies of important deceased people who lived within the German-speaking area.⁴

We also need to know the “Aryanization” date. A formerly Jewish-managed firm is defined to be “manager Aryanized” as soon as neither founders, nor managers, nor board members are of Jewish extraction. Analogously, we define a formerly Jewish-owned firm to be “owner Aryanized” as soon as no blockholder is of Jewish extraction.⁵ Typically, we can only obtain the “Aryanization” year, but not the exact date. Therefore, we use the end of the “Aryanization” year as the cutoff between a firm being Jewish and having been “Aryanized.” The cutoff is too imprecise for a classic event study, so we instead estimate abnormal performance using a one-factor sector model with time-varying abnormal performances. We classify the remaining

³We obtain blockholders (*Großaktionäre*) from the *Handbuch der deutschen Aktiengesellschaften*. The catalog does not define the term blockholder. However, we have the investment of some Jewish blockholders, which were around 30% or higher. Founding families typically held 51% of the shares.

⁴See: <https://www.deutsche-biographie.de/>

⁵In our sample, only one firm’s “Aryanization” is due to the natural death of the last Jewish manager or Jewish owner. That is, the passing of Dr. Hermann Fischer in August 1940, who was a board member of Kammgarn-Spinnerei Düsseldorf at the time. Our results remain virtually the same when excluding this firm from our sample.

firms as non-Jewish.

2.2 Stock Returns and Descriptive Statistics

For the period from December 1923 through November 1941, we collect weekly stock prices and dividends for firms traded on the Berlin stock exchange.⁶ The start date is determined by introduction of the temporary *Rentenmark* in November 1923, which ended the hyperinflation of the early 1920s. The *Reichsmark* became the new legal currency in August 1924 and its value was pegged to the *Rentenmark*. We stopped collecting data after 1941, as most “Aryanizations” were concluded by then (on average in 1936) and trading restrictions rendered the stock prices uninformative, Ronge (2002).

As the war went on, listings on the Berlin stock exchange dropped, and in 1941 only 489 firms were left of 674 firms in 1933. Berlin was the largest and most important German stock exchange during the first half of the twentieth century (Fohlin, 1999). In 1937, 72% of all German joint stock firms were listed on the Berlin stock exchange. Simultaneously, 64% of the firms listed in Berlin were listed on at least one additional exchange, and there was little difference in stock prices between exchanges (Lehmann-Hasemeyer and Burhop, 2014).

During our sample period, the Berlin stock exchange closed between July 1931 and March 1932 because of a banking and currency crisis resulting from the aftermath of the Great Depression (Schnabel, 2009; Burhop, 2011).⁷ The *Gesetz über den Wertpapierhandel* also reorganized the German stock market. Starting in December 1934, the original 23 stock exchanges were subsequently reduced to 9. Berlin remained the most important stock exchange (Lehmann-Hasemeyer and Burhop, 2014), and we see no obvious changes in the listings on that exchange around that date.

We hand-collect prices from the newspaper *Berliner Börsenzeitung*. The newspaper published daily stock prices, dividends, (reverse) stock splits, and German government bond prices. We collect Wednesday prices, or, whenever they were not available, the latest quoted price within the preceding six days.⁸ We believe this period to be an ideal setting for our investigation, as insider trading was allowed at the time (Standen, 1995; Bhattacharya and Daouk, 2002). Following Leland (1992), informed insider trading should make prices efficient, as even

⁶We thank the numerous student assistants who helped collect the data since 2014.

⁷Our results are robust to excluding six weeks before and after the crisis from the sample.

⁸Collecting stock prices more frequently adds little value because of sporadic trading. Ferguson and Voth (2008) encounter the same problem. While they use only monthly returns, we believe that for this study weekly returns are the best trade-off between losing information through data aggregation and suffering from too many missing observations.

private news is rapidly reflected in the stock price. Further, total costs and taxes on trades were below 1% (Ronge, 2002). We thus expect our prices to accurately reflect the value of firms and the extent of discrimination by the Nazis against Jewish firms.

We calculate net returns for firm i in week t from weekly stock prices ($p_{i,t}$) and dividends ($div_{i,t}$), using $r_{i,t} = (p_{i,t} + div_{i,t})/p_{i,t-1} - 1$. Information on stock splits is available only from July 1934 on. Therefore, we treat net returns prior to July 1934 that exceed 95% as stock splits and those lower than -45% as reverse stock splits. Additionally, we winsorize each firm’s returns at the 0.5% and the 99.5% level. These steps do not have any particular effect on our results.⁹

[Table 1 about here]

Table 1 reports descriptive statistics for the Berlin stock exchange between December 1923 and November 1941. There are 1,502 firms in the raw data set, but for some of these firms we have very few stock prices. Thus, we include only firms with at least ten stock prices. This filtering leaves us with 1,351 firms. Next, we need a firm’s sector to account for potential differences between sectors. We exclude firms for which we have no information on sector. The filter mostly affects firms that were listed in Berlin before 1932. Thus, firms that were listed during the period of interest (the “Aryanizations” of 1933–1938) are hardly affected.¹⁰ We are left with 1,141 firms, including 71 Jewish firms for which we cannot find an “Aryanization” date.¹¹ We drop these 71 firms, and proceed using 1,070 firms, 123 Jewish (with an “Aryanization” date) and 947 non-Jewish. This is conservative econometrically, as any misclassification of Jewish firms as non-Jewish would make it harder for us to find significant discounts.

Jewish and non-Jewish firms have similar return distributions in terms of mean, standard deviation, skewness, kurtosis, and minimal and maximal returns. Differences in means and standard deviations are insignificant. There are 580 return observations for the average Jewish firm and only 410 return observations for the average non-Jewish firm. The difference arises from the fact that Jewish firms were more active in sectors in which firms tend to have more observations. There are similar numbers of missing observations for Jewish and non-Jewish firms, which is reflected in the mean percentage of price quotations while the firm was listed

⁹In our sample, some firms offered subscription rights while issuing new stocks. We cannot adjust stock prices for subscription rights as we do not have the necessary information. Not adjusting may result in an abnormal performance of some -1% to -2% per year (Stehle and Hartmond, 1991), but there is no evidence that subscription rights differed across Jewish and non-Jewish firms. The results in Huber et al. (2019) remain almost identical after adjusting for subscription rights.

¹⁰As a robustness check, we include these firms as a separate sector (“Unclassified”). Results remain virtually the same.

¹¹Our results remain virtually the same when we include the 71 Jewish firms with imputed median “manager Aryanization” and “owner Aryanization” years (1935 and 1937, respectively).

(81.43% and 78.79%, respectively). Both groups have a very low mean AR(1) coefficient, which suggests little autocorrelation in the return time series.

[Figure 1 about here]

We plot simple net returns of Jewish-managed, Jewish-owned, and non-Jewish firms in Figure 1. The plot reveals that stocks of Jewish-managed and Jewish-owned firms underperform after Hitler’s appointment and up until the firms’ “Aryanization,” on average at the end of 1936. The figure shows a one *Reichsmark* investment in equally weighted portfolios of Jewish-managed (light gray, solid line), Jewish-owned (dark gray, dashed line), and non-Jewish (black, dotted line) firm stocks during three different periods. The graphs account for stock splits and assume dividend reinvestment. There is no adjustment for risk.

Between December 1923 and Hitler’s appointment in January 1933 (Panel A), all three firm groups perform rather similarly.¹² The plot also shows the recovery of Germany’s economy in the mid-1920s after the end of the hyperinflation in November 1923 and the Great Depression of the early 1930s. The gap in the graph indicates the banking crisis during which the Berlin stock exchange stopped trading.

After the Nazis took power, Jewish-managed and Jewish-owned firms consistently underperformed non-Jewish firms until the end of 1936, the year in which Jewish firms were “Aryanized” on average (Panel B). Panel C shows that both groups of stocks performed almost identically thereafter.

Our primary objective is to investigate the temporary underperformance of Jewish-managed and Jewish-owned firms shown in Panel B.

[Table 2 about here]

We create a sector-dependent benchmark to account for co-movement of a firm’s stock and its sector. The *Handbuch der deutschen Aktiengesellschaften* lists 24 sectors, some with only five firms. We combine sectors with the highest pairwise correlation of the sector indices to reduce the number to 11. This procedure ensures a sufficient number of firms in every sector (Table 2, Column labeled All). The smallest sector (Insurance) now has 61 firms. There were more Jewish-owned firms than others in Mining (10% for Jewish-managed vs. 33% for Jewish-owned vs. 6% for non-Jewish firms). Jewish-managed and Jewish-owned firms were more prominent

¹²Jewish-owned firms seem to recover from the banking crisis better than Jewish-managed and non-Jewish firms. However, this difference is smaller after accounting for risk and sector performance and is statistically insignificant.

in the Electricity, Rubber, Commerce sector (16% vs. 17% vs. 7%). Jewish-managed and Jewish-owned firms were underrepresented in Insurance (1% vs. 0% vs. 6%), Transportation (5% vs. 0% vs. 9%), and Metal, Machinery, Printing (14% vs. 9% vs. 20%). Other differences were minor, such as in Banking (9% vs. 7% vs. 10%).

We compute sector returns as returns of an equally weighted portfolio of all sector firms. We use the yield of German government bonds with an approximate time to maturity of five years to obtain the risk-free rate, as those bonds have the fewest missing observations in our sample. We use the risk-free rate of the previous week whenever an observation is missing. The risk-free rate has an annualized mean of 6.40%.

[Table 3 about here]

Table 3 shows the distribution of Jewish firm “Aryanization” years (Column 1). Columns 2 and 3 depict the distributions of “manager Aryanizations” and “owner Aryanizations,” respectively. While “manager Aryanizations” cluster at the beginning (1933) and the end (1938) of “Aryanizations,” most Jewish-owned firms were “Aryanized” in 1938 via the decree on the use of Jewish assets (*Verordnung über den Einsatz des jüdischen Vermögens*). The total number of “manager Aryanizations” and “owner Aryanizations” add up to 137 instead of the 123 “Aryanizations” in Column 1. The difference indicates that 14 firms had both Jewish managers and Jewish owners.

3 Methodology and Results

We want to investigate whether discrimination against Jewish firms during the Third Reich affected their stock market performance.

3.1 Model of Stock Returns

We start by comparing the excess returns of Jewish and non-Jewish firms using a one-factor model, where the factor for each firm is the average excess return of its sector portfolio. We model a general intercept α for all firms and an additional Jewish intercept α_J for then-current or former Jewish firms (i.e., the Jewish indicator variable $J_{i,t}$ is one). For more precise estimates, we allow only one intercept for all firms and another one for all Jewish firms. In this setup, the baseline α measures the abnormal return for non-Jewish firms and α_J the additional abnormal

return for the Jewish firms on which we focus the analysis. The total Jewish abnormal return is thus $\alpha + \alpha_J$.

The regression is:

$$r_{i,t} - r_{f,t} = (\alpha + \alpha_J J_{i,t}) + \beta_i (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (1)$$

where, during week t , $r_{i,t}$ is the return of firm i , $r_{f,t}$ is the risk-free rate, $r_{s,t}$ is the equally weighted return of the firm’s sector, and $u_{i,t}$ is the error term. We estimate the coefficients α , α_J , and β_i using ordinary least squares. We use clustered standard errors at the weekly level to account for potential firm heterogeneity. Note that all returns are annualized throughout the study.

To further address probable variation in the intensity of Jewish firm discrimination over time, we split intercepts, slope parameters, and indicator variables into three subperiods. Our first subperiod starts with the beginning of our sample in December 1923 and ends with Hitler’s appointment as chancellor of Germany on January 30, 1933. We refer to these years of the Weimar Republic as *Weimar*.

Our second subperiod extends from Hitler’s appointment to the end of each firm’s “Aryanization” year and is firm-specific.¹³ Such firm-specific cutoffs permit a more precise analysis of Jewish firm performance before and after their “Aryanization.” For non-Jewish firms, we employ a placebo test and randomly assign “Aryanization” years by drawing from the distribution of Jewish firms’ “Aryanization” years, which is on average 1936. We refer to this subperiod as *Pre-Aryanization*. We address endogeneity concerns (was poor performance leading to the dismissal of Jewish managers or was the pending dismissal anticipated in poor performance?) in Section 3.4.

Our third subperiod is again firm-specific and includes the weeks after the firm’s (placebo) “Aryanization” year until the end of our sample in December 1940. We refer to the third subperiod as *Post-Aryanization* throughout. The complete regression is:

$$r_{i,t} - r_{f,t} = \sum_{p \in \{ \textit{Weimar}, \textit{Pre-Aryanization}, \textit{Post-Aryanization} \}} \left(\alpha^p + \alpha_J^p J_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (2)$$

¹³We classify a firm with Jewish managers and Jewish owners as “Aryanized” when the firm is “manager Aryanized” and “owner Aryanized.”

where $J_{i,t}^p$ is an indicator variable taking a value of one if firm i is (formerly) Jewish. The superscript p indicates the subperiod and corresponds to *Weimar*, *Pre-Aryanization*, or *Post-Aryanization*. The intercepts α^p and α_J^p and the slope parameters β_i^p depend now on the subperiods, too.

3.2 Stock Returns for Jewish and Non-Jewish Firms

For non-Jewish firms, the average abnormal return α in Table 4 during *Weimar* is -0.55% and statistically significant at the 5% level. During *Pre-Aryanization* and *Post-Aryanization*, the abnormal return is close to zero and insignificant. We note that the weighted abnormal return across all firms and all subperiods needs to be zero as the sector portfolios include all firms.¹⁴

[Table 4 about here]

For Jewish firms, during *Weimar*, we expect little discrimination, and the Jewish abnormal return α_J^{Weimar} should be zero. Indeed, the coefficient of 1.05% is statistically insignificant. With the increasing discrimination against Jewish firms after Hitler’s rise to power and up until their “Aryanization,” we expect a negative Jewish abnormal return $\alpha_J^{Pre-Aryanization}$. As expected, we can strongly reject a zero coefficient and find a discount of 4.07% (significant at the 5% level). Finally, we expect the discount $\alpha_J^{Post-Aryanization}$ to revert to zero after the “Aryanization” of formerly Jewish firms. The abnormal return is 0.04% and insignificant. We conclude that Jewish firms suffered significant discounts after Hitler’s appointment as chancellor and before their “Aryanization.”

Next, we analyze the firm-specific betas, and find that they change over our three subperiods. Between *Weimar* and *Pre-Aryanization*, the difference in betas is significant at the 5% level for 23% of betas and between *Pre-* and *Post-Aryanization* for 10% of betas. Thus, we allow betas to change between subperiods in all subsequent regressions.

To see whether investors were able to identify Jewish firms, we analyze the abnormal returns of non-Jewish firms that could be incorrectly perceived as Jewish because of their “Jewish sounding” names. These are firms with frequently used Jewish surnames in their firm name. These firms did not experience any specifically mandated discriminating actions. Thus, their abnormal returns should be zero. Indeed, Jewish sounding firms performed just like other non-Jewish firms in all three subperiods. This finding suggests that investors were able to distinguish

¹⁴This does not hold for log returns, as the log of average returns is not equal to the average of log returns. We thus use net returns.

between actual Jewish firms and Jewish sounding firms.

3.3 Results for Jewish-Managed and Jewish-Owned Firms

Jewish-managed and Jewish-owned firms experienced different types of discrimination. Jewish-managed firms mostly suffered actions aimed directly at the firm, such as boycotts and the suspension of contracts. Jewish-owned firms, however, typically encountered indirect discrimination, as most of the actions targeted the Jewish owners themselves, such as the decree on the use of Jewish assets. Moreover, the public might have found Jewish ownership hard to detect. Thus, we analyze if Jewish-managed firms performed differently from Jewish-owned firms.

In our regressions, we replace the single indicator variable for Jewish firms with two indicator variables, one for Jewish-managed and another for Jewish-owned firms. The new equation is:

$$r_{i,t} - r_{f,t} = \sum_{p \in \{Weimar, Pre-Aryanization, Post-Aryanization\}} \left(\alpha^p + \alpha_{JM}^p JM_{i,t}^p + \alpha_{JO}^p JO_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (3)$$

where $JM_{i,t}^p$ is an indicator variable taking a value of one if firm i is (formerly) Jewish-managed and $JO_{i,t}^p$ is an indicator variable taking a value of one if firm i is (formerly) Jewish-owned.¹⁵ We estimate the coefficients β_i^p , α^p , α_{JM}^p , and α_{JO}^p using ordinary least squares. The remaining variables are defined in a manner analogous to those in Equation (2), and we cluster standard errors at the weekly level.

[Table 5 about here]

The average ‘‘Aryanization’’ years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. The results in Table 5, Regression (3), reveal discrimination as Jewish-managed firms suffered a negative abnormal return of 4.75% during *Pre-Aryanization*, statistically significant at the 5% level. Abnormal returns are low and insignificant during *Weimar* and after firm ‘‘Aryanization.’’ The results suggest that Jewish-managed firms underperformed after Hitler’s appointment but only until the firms’ Jewish managers were forcibly removed.

For Jewish-owned firms, abnormal returns during *Pre-* and *Post-Aryanization* are -1.92% and 1.70%, respectively, but insignificant. The abnormal return is low and insignificant during

¹⁵For firms with Jewish managers and Jewish owners, both indicator variables take a value of one. The cutoff between *Pre-* and *Post-Aryanization* for the Jewish-managed indicator variable corresponds to the ‘‘manager Aryanization,’’ and the cutoff for the Jewish-owned indicator variable corresponds to the ‘‘owner Aryanization.’’ Hence, the two cutoffs may differ for these firms.

Weimar. Hence, in all three subperiods, we cannot reject the null hypothesis that the stock of Jewish-owned firms performed similarly to the stock of non-Jewish firms. This finding suggests that the effect of discrimination focused more on Jewish-managed firms and less on Jewish-owned firms. Further, if the seizure of Jewish investors’ stock happened over the counter and possibly at a discount, market prices might not reflect the transaction.

The average abnormal return of non-Jewish firms is almost identical to that in Table 4, Regression (2). The small difference in the coefficients arises from the fact that some Jewish firms are both Jewish-managed and Jewish-owned; these firms are weighted slightly differently in Regressions (2) and (3).¹⁶

3.4 The Timing of Manager Dismissals

Firm-specific cutoffs between *Pre-* and *Post-Aryanization* are based on the dismissals of Jewish managers. They could be correlated with firm performance, and we are concerned about endogeneity (Bhagat and Bolton, 2008). Did poorly performing firms dismiss Jewish managers or did firms perform poorly anticipating the dismissal of Jewish managers?

Huber et al. (2019) mitigate such potential endogeneity by using the fraction of Jewish managers within a firm before Hitler’s appointment. We follow their strategy and split estimates and variables into only two subperiods. For all firms, the cutoff is Hitler’s appointment as chancellor of Germany in January 1933. We call the subperiods *Weimar* and *Aryanization*. We only investigate stock returns until the end of the “Aryanizations,” which historians date to December 4, 1938. The analysis is now independent of the timing of Jewish managers’ dismissals.

We use the number of Jewish managers and owners as a proxy for a fraction as we do not have the number of all managers and all investors, respectively. The new regression equation is:

$$r_{i,t} - r_{f,t} = \sum_{p \in \{Weimar, Aryanization\}} \left(\alpha^p + \alpha_{JM}^p |JM|_{i,t}^p + \alpha_{JO}^p |JO|_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (4)$$

where $|JM|_{i,t}^p$ is the number of Jewish managers in firm i and $|JO|_{i,t}^p$ is the number of Jewish blockholders in firm i . Other variables are defined in a manner analogous to those in Equation (3). We estimate the coefficients β_i^p , α^p , α_{JM}^p , and α_{JO}^p using ordinary least squares. While the interpretations of β_i^p and α^p remain as in Equation (3), α_{JM}^p shows the additional abnormal

¹⁶In untabulated results, we separately group together firms that are simultaneously Jewish-managed and Jewish-owned. These results provide no further insights.

return for a firm with one Jewish manager, and α_{JO}^p shows the additional abnormal return for a firm with one Jewish blockholder. We cluster standard errors at the weekly level.

[Table 6 about here]

We report the results in Table 6. As expected, the coefficient for Jewish-managed firms is close to zero and insignificant during *Weimar*. After Hitler’s appointment, the abnormal return is -0.97% and statistically significant at the 10% level. Thus, an average Jewish-managed firm, which had 1.89 Jewish managers, experienced abnormal returns of -1.83%. Compared to our main results in Table 5, the abnormal return is, as expected, closer to zero. The *Aryanization* subperiod includes stock returns of “Aryanized” firms, which are similar to those of non-Jewish firms, reducing the underperformance.

The abnormal return of Jewish-owned firms is 0.76% and insignificant during *Weimar*. During *Aryanization*, the coefficient is -0.98% but insignificant. An average Jewish-owned firm had 1.33 Jewish blockholders, thus, experiencing an abnormal return of -1.30%. The estimates for non-Jewish firms are very similar to our base model.

Our main finding of Jewish-managed firms underperforming their non-Jewish counterparts still holds, which suggests that endogeneity is not the main driver.

4 Explanations for the Underperformance of Jewish Firms’ Stock

We can easily rule out two possible explanations for the underperformance of Jewish-managed firms’ stock. First, discounts were not driven by any concentration of Jewish-managed firms in poorly performing sectors, as we control for sector in the regressions. Similarly, discounts did not occur because Jewish-managed firms were riskier than non-Jewish firms, as we control for systematic risk through firm-specific betas. Additionally, the comparative statistics on Jewish and non-Jewish firm stock returns are similar, and differences are statistically insignificant.

Huber et al. (2019) observe that large firms were more likely to have had Jewish managers. To test if the discounts could be explained by large firms underperforming smaller ones, we add to our model a second factor which accounts for firm size. We use market capitalization to measure firm size, which we could collect for 399 firms (about half of the firms during *Pre-Aryanization*).

We construct the size factor as the difference between the returns of an equally weighted portfolio of firms with below-median size and the returns of an equally weighted portfolio of firms with above-median size. As for the first factor, we allow the loadings on the size factor to change between subperiods. The new equation is:

$$r_{i,t} - r_{f,t} = \sum_{p \in \{Weimar, Pre-Aryanization, Post-Aryanization\}} \left(\alpha^p + \alpha_{JM}^p JM_{i,t}^p + \alpha_{JO}^p JO_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + \beta_{size,i}^p (r_{small,t} - r_{big,t}) + u_{i,t}, \quad (5)$$

where $r_{small,t}$ is the equally weighted return of below-median firms, $r_{big,t}$ is the equally weighted return of above-median firms. We estimate the coefficients β_i^p , $\beta_{size,i}^p$, α^p , α_{JM}^p , and α_{JO}^p using ordinary least squares. The remaining variables' definitions are analogous to those in Equation (3), and we cluster standard errors at the weekly level.

[Table 7 about here]

The abnormal return of Jewish-managed firms during *Pre-Aryanization* remains almost unchanged at -4.36% and is significant at the 5% level. The coefficient for *Weimar* becomes more negative but is insignificant. The coefficient for *Post-Aryanization* remains unchanged. This finding suggests that discounts cannot be explained by firm size.

The abnormal returns of non-Jewish firms and Jewish-owned firms are very similar to that in Table 5, Regression (3). The coefficients of non-Jewish firms are now all insignificant.

4.1 Main Hypotheses

We next test three hypotheses that could explain the discounts, namely, harassment, brain drain, and Jewish stigma by comparing their predicted abnormal return patterns with the empirical patterns. We collect the predictions in Figure 2.

[Figure 2 about here]

The *harassment* hypothesis would explain the discounts through lower cash flows due to harassment of Jewish-managed firms. Before Hitler's appointment, there was much less harassment than during the Third Reich, so we do not expect any differences in abnormal returns between Jewish and non-Jewish firms during *Weimar*; see Figure 2, Panel A.

After Hitler's appointment, harassment intensified radically. Nazi brown shirts blocked some department store entrances of Jewish-managed and Jewish-owned firms, stopping customers. The widespread harassment forced investors to reduce their expectations of future cash flows, resulting in lower stock prices and negative abnormal returns; see *Pre-Aryanization* in Panel A. Note that persistent discounts during the earlier part of *Pre-Aryanization* require a pattern of investors repeatedly lowering cash flow expectations. They do so if they are repeatedly surprised by how much worse the harassment could become. As the change in harassment intensity becomes more predictable, the negative abnormal returns should slowly disappear; see the later part of *Pre-Aryanization* in Panel A.

After "Aryanization," harassment should stop as there would no longer be any Jewish firms. If the loss in cash flow has been permanent (customers never returned), then there will be no reversal of the discounts during *Post-Aryanization*. If the loss in cash flows reverts (customers return after the brown shirts are gone), we would see temporary positive abnormal returns. We depict the former case in Panel A.

The *brain drain* hypothesis argues that Jewish managers were more skillful than their non-Jewish counterparts. Huber et al. (2019) make this point and document that Jewish managers were better connected and more educated than non-Jewish managers. Then, Jewish-managed firms should outperform non-Jewish firms, have higher cash flows, and exhibit higher stock prices. Thus, we expect positive abnormal returns while the Jewish manager is with the firm, that is, during *Weimar* and the earlier part of *Pre-Aryanization* (Figure 2, Panel B).

Around the replacement of the probably more highly skilled Jewish manager by a potentially less-skilled non-Jewish manager, we expect the positive abnormal returns to revert to zero as the firm loses its advantage over competitors. If investors anticipate the replacement, the decline in positive abnormal returns should start during the later part of *Pre-Aryanization*.

During *Post-Aryanization*, abnormal returns should be zero as the new non-Jewish manager only has an average skill level and cannot consistently create positive abnormal returns; see *Post-Aryanization* in Panel B.

According to the *Jewish stigma* hypothesis, investors sell stocks of Jewish-managed firms as they do not want (or do not want to be seen) to own such ostracized firms. Before Hitler's appointment, Jewish stigma should be low, and we should not observe any abnormal returns during *Weimar* (Figure 2, Panel C).

After Hitler's appointment, Jewish stigma builds up. Declining demand for shares of Jewish-

managed firms depresses prices, and we should observe negative abnormal returns. See the beginning of *Pre-Aryanization* in Panel C. After that, the situation is similar to the case of so-called vice stocks, where firms are stigmatized because of what they produce, for example, tobacco or weapons. As long as the cash flows of such companies do not suffer, the remaining investors should experience positive abnormal returns. See the middle part of *Pre-Aryanization* in Panel C. The positive abnormal returns persist until a new equilibrium is reached, and abnormal returns return to zero, as shown in the later part of *Pre-Aryanization* in Panel C. The speed of attaining the equilibrium depends on the demand of the remaining investors willing to buy Jewish-managed firms' stock.

Once the stigma is eliminated, which would be after "Aryanization," stock prices should increase due to increased demand for the stock. The price increase creates positive abnormal returns for the then-current investors and persists until a new equilibrium is reached (see the earlier part of *Post-Aryanization*). In the new equilibrium, abnormal returns should be zero again, as depicted in the later part of *Post-Aryanization* in Panel C.

4.2 Weimar

Our finding of no abnormal return during *Weimar* matches the harassment and the Jewish stigma hypotheses but not the brain drain hypothesis. The brain drain hypothesis predicts positive abnormal returns, as shown in Figure 2, Panel B, although such abnormal performance may be hard to detect in the data if the skill differential were only small.

4.3 Pre-Aryanization

Figure 2 reveals distinct abnormal return patterns for each of our hypotheses during the early and late parts of *Pre-Aryanization*. Thus, we define *Early-Pre-Aryanization* to start in February 1933 after Hitler's appointment and through end in December 1934. *Late-Pre-Aryanization* is the remainder of *Pre-Aryanization*, that is, January 1935 through the end of each firm's "Aryanization" year.¹⁷ The new regression is:

¹⁷Note that firms with "Aryanization" years before 1935 appear only in *Early-Pre-Aryanization* and not in *Late-Pre-Aryanization*, as the weeks after the "Aryanization" year are associated with *Post-Aryanization*. Thus, *Late-Pre-Aryanization* only contains the later part of Jewish-managed firms that are "Aryanized" after 1934.

$$r_{i,t} - r_{f,t} = \sum_{p \in \{ \textit{Weimar}, \textit{Early-Pre-Aryanization}, \textit{Late-Pre-Aryanization}, \textit{Post-Aryanization} \}} \left(\alpha^p + \alpha_{JM}^p JM_{i,t}^p + \alpha_{JO}^p JO_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (6)$$

where the subperiods *Early-* and *Late-Pre-Aryanization* are defined as above. We estimate the coefficients β_i^p , α^p , α_{JM}^p , and α_{JO}^p using ordinary least squares. The remaining variables' definitions are analogous to those in Equation (3), and we cluster standard errors at the weekly level.

[Table 8 about here]

For Jewish-managed firms, the abnormal return of *Early-Pre-Aryanization* is strongly negative at 7.68% and statistically significant at the 10% level, as seen in Table 8. The abnormal return during *Late-Pre-Aryanization* is only -0.91% and statistically insignificant. The abnormal returns during *Weimar* and *Post-Aryanization* are close to zero and insignificant, much like the main results in Table 5. This finding suggests that discounts are concentrated during the first two years after Hitler's appointment – also for firms that are “Aryanized” after 1934.

For Jewish-owned and non-Jewish firms, the more detailed analysis does not provide any new insights. The abnormal return of Jewish-owned firms during *Early-Pre-Aryanization* is negative (-6.57%) but statistically insignificant. During *Post-Aryanization*, the abnormal return is 1.69% and remains insignificant. The abnormal returns in the other subperiods are all close to zero and insignificant. As expected, the abnormal returns of non-Jewish firms in all subperiods are close to zero. Only the coefficients for *Weimar* and *Post-Aryanization* are significant at the 10% level, just as in the base results.

The observed abnormal performance of Jewish-managed firms is consistent with the harassment hypothesis (see Figure 2, Panel A). The predicted negative abnormal return during *Early-Pre-Aryanization* shows up in a negative and significant coefficient. The insignificant estimate for *Late-Pre-Aryanization* is consistent with a reversion of abnormal returns to zero.

The pattern is inconsistent with the brain drain hypothesis, as the predicted estimate for *Early-Pre-Aryanization* is positive, not negative (see Figure 2, Panel B). Nor is the pattern fully consistent with the Jewish stigma hypothesis. Negative and positive abnormal returns should broadly average to some value close to zero during *Early-Pre-Aryanization* (see Figure 2, Panel C). If the positive abnormal returns during the second half of *Early-Pre-Aryanization*, however,

are small (with little demand from investors willing to buy Jewish-managed firms’ stock), initial negative abnormal returns could dominate estimation of the coefficient.

4.4 Post-Aryanization

Figure 2, Panel C, reveals distinctively different abnormal return patterns for the stigma hypothesis during the early and late parts of *Post-Aryanization*. Thus, we define *Early-Post-Aryanization* as the first two years after firms’ “Aryanization.” *Late-Post-Aryanization* is the next stage of *Post-Aryanization*, that is, the third year after “Aryanization” through December 1940. The regression is:

$$r_{i,t} - r_{f,t} = \sum_{p \in \{ \textit{Weimar}, \textit{Pre-Aryanization}, \textit{Early-Post-Aryanization}, \textit{Late-Post-Aryanization} \}} \left(\alpha^p + \alpha_{JM}^p JM_{i,t}^p + \alpha_{JO}^p JO_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (7)$$

where subperiods *Early-* and *Late-Post-Aryanization* are defined as above. We estimate the coefficients β_i^p , α^p , α_{JM}^p , and α_{JO}^p using ordinary least squares. Other variables are defined analogously to those in Equation (3), and we cluster standard errors at the weekly level.

[Table 9 about here]

Abnormal returns of Jewish-managed firms during *Early-Post-Aryanization* are negative and insignificant; see Table 9. During *Late-Post-Aryanization*, the coefficient is close to zero and again insignificant. These findings do not suggest a reversal of negative abnormal returns. Jewish-owned firms have a small positive abnormal return of 0.63%, which is insignificant, in the two years after “Aryanizations.” During *Late-Post-Aryanization*, the intercept is 2.07% and also insignificant. Abnormal returns of non-Jewish firms during *Early-* and *Late-Pre-Aryanization* are close to zero and insignificant.

The findings of no abnormal returns for Jewish-managed firms during all of *Post-Aryanization* are in line with the harassment and brain drain hypotheses (see Figure 2, Panels A and B). The Jewish stigma hypothesis contradicts our finding, as it predicts a positive and significant estimate during *Early-Post-Aryanization* (see Figure 2, Panel C). We should note that the positive abnormal returns might not show up in the data if prices increased only by a little or slowly.

4.5 Degrees of Jewishness

The brain drain hypothesis suggests that a Jewish manager who occupies a very important position (VIP) adds more abnormal return to a Jewish-managed firm than an ordinary manager. Similarly, multiple Jewish managers within one firm should add more abnormal return than only a single Jewish manager. For each measure of Jewishness, we investigate if the abnormal return of Jewish-managed firms changes.

We define a VIP manager as a member of the executive board or as chairperson of the supervisory board. Jewish VIP-managed firms are defined as “Aryanized” as soon as the VIP manager leaves the firm or moves to a non-VIP position, such as an ordinary seat on the supervisory board. The remaining Jewish-managed firms are defined as “Aryanized” as soon as no non-chair member of the supervisory board is Jewish.

Firms are defined to have multiple Jewish managers as soon as more than one manager is Jewish. The definition of “Aryanized” remains unchanged, that is, firms with multiple Jewish managers are defined as “Aryanized” as soon as the last Jewish manager leaves the firm.

Firms with a higher degree of Jewishness – measured by importance or the number of Jewish managers – should experience the same pattern as depicted in Figure 2, Panel B. The VIP manager and the multiple Jewish managers should create even higher cash flows for the firm resulting in more positive abnormal returns. Abnormal returns of such firms should revert to zero in the same way as they did for other Jewish-managed firms during *Late-Pre-Aryanization* (see Figure 2, Panel B). The harassment and stigma hypotheses’ predictions, by contrast, are not affected by a manager’s VIP status or the number of Jewish managers.

For each measure of Jewishness, we add an indicator variable to regression (3). The regression equation becomes:

$$r_{i,t} - r_{f,t} = \sum_{p \in \{Weimar, Pre-Aryanization, Post-Aryanization\}} \left(\alpha^p + \alpha_{JM}^p JM_{i,t}^p + \alpha_{Highly}^p Highly_{i,t}^p + \alpha_{JO}^p JO_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (8)$$

where $Measure_{i,t}^p$ is an indicator variable taking a value of one if firm i is a (formerly) Jewish-managed firm that satisfies the definition of the measure. We estimate the coefficients β_i , α^p , α_{JM}^p , $\alpha_{Measure}^p$, and α_{JO}^p using ordinary least squares.

For the VIP measure, the coefficient α_{Highly}^p estimates the additional abnormal return that

Jewish VIP-managed firms experience over non-VIP Jewish-managed firms. For the multiple manager measure, α_{Highly}^p estimates the additional abnormal return that firms with multiple Jewish managers experience over firms with only one Jewish manager. Other variables are defined as in Equation (3), and we cluster standard errors at the weekly level.

[Table 10 about here]

We report the results for Jewish VIP-managed firms in Table 10, Regression (8a). Compared to the base results of Table 5, Regression (3), the abnormal return of all Jewish-managed firms during *Weimar* becomes negative (-1.25%) but remains statistically insignificant. The average abnormal return during *Pre-Aryanization* also becomes more negative (-5.95%) and is statistically significant at the 10% level. The coefficient for *Post-Aryanization* becomes more negative (-1.38%) but remains statistically insignificant.

For Jewish VIP-managed firms, coefficients are positive at 3.38%, 2.69%, and 1.35% during *Weimar*, *Pre-Aryanization*, and *Post-Aryanization*, respectively, but statistically insignificant. The coefficients of non-Jewish and Jewish-owned firms remain virtually the same, as expected.

We turn to the results for firms with multiple Jewish managers, which we report in 10, Regression (8b). The abnormal return of all Jewish-managed firms during *Pre-Aryanization* is -5.83% and significant at the 5% level. The coefficients for *Weimar* and *Post-Aryanization* are similar to the base result (0.77% and -1.10%, respectively) and remain insignificant.

The estimate of firms with multiple Jewish managers is negative at -1.72% during *Weimar*. Estimates during *Pre-* and *Post-Aryanization* are positive at 2.10% and 0.62%, respectively. All three estimates are statistically insignificant. As expected, the coefficients of non-Jewish and Jewish-owned firms remain virtually the same.

The findings for VIP-managed firms and firms with multiple Jewish managers further invalidate the brain drain hypothesis.

4.6 Divesting Jewish Firms' Stock

If the Jewish stigma hypothesis holds, investors should sell their shares of Jewish-managed firms as a stigma develops during *Early-Pre-Aryanization*. Investors would replace shares of Jewish-managed firms with shares of non-Jewish firms. Such replacement would simultaneously cause negative shocks in Jewish-managed firm stock and positive shocks in non-Jewish firm stock. The firm-specific shocks are captured by the residuals in our one-factor model (Equation 6).

Thus, residuals of Jewish-managed and non-Jewish firms should be negatively correlated during *Early-Pre-Aryanization*.

To capture the average correlation between the residuals of Jewish-managed and non-Jewish firms, we form an equally weighted portfolio of Jewish-managed firm residuals and an equally weighted portfolio of non-Jewish firm residuals. We measure both portfolios' correlation during *Weimar*, *Early-Pre-Aryanization*, *Late-Pre-Aryanization*, and *Post-Aryanization*. Note that any firm's residuals are negatively correlated with the residuals of the remaining firms of the same sector by construction because our model computes sector returns from all sector firms. To determine if divestitures affect correlations of residuals beyond their default negative correlation, we bootstrap the distribution of correlation coefficients.

We do so by randomly sorting firms into three groups whose sizes correspond to the sizes of the original Jewish-managed, Jewish-owned, and non-Jewish groups, respectively. For each sort, we rerun Regression (6) from Section 4.3, obtain for the three groups their average residuals, and compute the correlation between them. We repeat these steps a thousand times, generating a bootstrapped distribution of correlation coefficients.

[Table 11 about here]

Table 11 reports the correlation between Jewish-managed and non-Jewish firms' average residuals during *Weimar*, *Early-Pre-Aryanization*, *Late-Pre-Aryanization*, *Post-Aryanization*, and the whole sample (*Total*) in Column Correlation. As expected, all correlations are negative and range from -0.78 to -0.52. For each period, correlation coefficients lie between the 5th and the 95th percentiles. In a two-sided test, we cannot reject the null hypothesis that the residuals of Jewish-managed and non-Jewish firms are correlated only to the extent mechanically induced by the sector averages. Untabulated correlations between Jewish-owned and non-Jewish firms range from -0.55 to -0.39 and also lie between the 5th and the 95th percentiles.

This finding contradicts the portfolio replacement story and does not support the Jewish stigma hypothesis. The harassment and the brain drain hypotheses do not predict a significantly more negative correlation of residuals compared with the baseline negative correlation.

A related suggestion is that non-Jewish close competitors ought to gain from the travails of Jewish firms. We identify such close competitors as non-Jewish firms that share the first two digits of the U.S. Standard Industrial Classification categories. Untabulated results turn out to be insignificant throughout. Non-Jewish close competitors do not seem to have gained from the discrimination against Jewish firms.

4.7 Collecting the Evidence

Which hypothesis fares best? We provide a quick overview in Table 12, where we mark test results consistent with a hypothesis' prediction with a check mark and inconsistent results with a cross-out.

[Table 12 about here]

The harassment hypothesis passes all five of our tests. The predicted abnormal return pattern in Figure 2, Panel A, matches the observed pattern in all three subperiods (Rows T1–T3). Further, Jewish VIP-managed firms and firms with multiple Jewish managers are predicted to perform like other Jewish-managed firms (Row T4), and the correlation of residuals should not be affected by stock replacements (Row T5).

The brain drain hypothesis matches the abnormal return pattern only during *Post-Aryanization* (Row T3) and the divestment test (Row T5). The predicted pattern of abnormal returns depicted in Figure 2, Panel B, does not match the observed pattern during *Weimar* and *Pre-Aryanization* (Rows T2 and T3, respectively). Further, the brain drain hypothesis predicts that VIP-managed firms and firms with multiple Jewish managers will experience stronger abnormal returns than other Jewish-managed firms, which we cannot find in the data (Row T4). Overall, the brain drain hypothesis passes only two of five tests.

The Jewish stigma hypothesis does not fare any better, as it also passes only two of five tests. During *Weimar*, the result of no abnormal returns matches the hypothesis' prediction in Figure 2, Panel C (Row T1), but the pattern does not match during *Pre-* and *Post-Aryanization* (Rows T2 and T3, respectively). The stigma hypothesis predicts no differences between firms with important or multiple Jewish managers and other Jewish-managed firms, which is in line with our finding (Row T4). Yet simultaneous selling of Jewish firms' shares and reinvestment into non-Jewish shares should lead to a correlation of residuals that is more negative than the correlation mechanically induced by the sector averages. We cannot find such a significantly more negative correlation (Row T5).

To sum this up, the harassment hypothesis predicts all our findings and seems to be the most suitable explanation. The brain drain and stigma hypotheses seem to be less relevant.

5 Robustness

Next we analyze the sensitivity of our results to our choice of factor model, subperiods, winsorizing, filtering, and consideration of Jewish-sounding firms. To save space, we report estimates for only Regression (3), that is, Jewish-managed and Jewish-owned firms are investigated separately during the three subperiods *Weimar*, *Pre-Aryanization*, and *Post-Aryanization*. Changes in the other regressions are very similar.

5.1 Factor Model Choice

When investigating our finding's dependence on the choice of the factor in our model, we find that our main result of negative abnormal returns for Jewish-managed firms during *Pre-Aryanization* holds.

[Table 13 about here]

First, we replace the sector-specific factor by one equal-weighted market index, see Table 13, Regression (3a). Then, we exclude a firm from its sector portfolio (Regression 3b), and finally, we use the value-weighted market index of Rongé (2002) (Regression 3b). In all three cases, Jewish-managed firm discounts become stronger during *Pre-Aryanization* while the significance level remains at 5%. For non-Jewish firms, we find high positive and statistically significant abnormal returns during *Pre-* and *Post-Aryanization*, when excluding firm i from the sector and using the value-weighted index.

For the value-weighted index, the abnormal return of Jewish-owned firms during *Pre-Aryanization* intensifies (-6.63%) and becomes significant at the 5% level. Such a significant underperformance of Jewish-owned firms would further support the harassment hypothesis, as the discount could be explained by investors updating their expectations for Jewish-owned firms. The brain drain hypothesis cannot explain this finding, as Jewish-owned firms were not forced to dismiss their (non-Jewish) managers. The stigma hypothesis would again predict sharp initial discounts followed by positive abnormal returns in *Pre-Aryanization* and positive abnormal returns in *Post-Aryanization*, which we do not see.

Other changes are relatively small, and coefficients remain insignificant. Overall, our main findings hold.

5.2 Firm-Specific Subperiods

Firm-specific cutoffs between *Pre-* and *Post-Aryanization* periods are econometrically fraught, as test statistics might be biased. Instead, we use for all firms the median “Aryanization” year – 1936. Thus, subperiods are of identical lengths for all firms, and test statistics are well-specified.

[Table 14 about here]

We report the results in Table 14, Regressions (3d). The abnormal return of non-Jewish firms during *Pre-Aryanization* increases to 0.86% and becomes significant at the 5% level. During *Post-Aryanization*, the abnormal return becomes virtually zero and is statistically insignificant. The negative abnormal performance of Jewish-managed firms remains almost unchanged and remains significant at the 5% level. The remaining estimates are close to zero and insignificant. Overall, our main result still holds for the alternative cutoffs.

5.3 Winsorizing and Filtering

Our hand-collected data are susceptible to erroneous stock prices. These errors may originate from copying or from the *Berliner Börsenzeitung* itself. To improve data quality in our main runs, we winsorize each firm’s stock return distribution at the 0.5% and the 99.5% level.

[Table 15 about here]

Stronger winsorizing, for example, at 1.0% and 99.0% or even 2.5% and 97.5%, barely affects our results (see Table 15, Regressions 3e and 3f, respectively). As expected, the abnormal performance of Jewish-managed firms during *Pre-Aryanization* becomes less negative, yet the estimate stays significant at the 5% level.

We report results from returns without winsorizing in Regression (3g). The discount of Jewish-managed firms during *Pre-Aryanization* is slightly lower and significant only at the 10% level. The abnormal return of Jewish-managed firms during *Weimar* increases to 3.71% but remains insignificant. The other estimates remain close to zero. Overall, our main finding still holds.

[Table 16 about here]

To reduce data noise in our main results, we exclude all firms with fewer than ten observations. To analyze the sensitivity of our results to this filter, we first increase the threshold to

200 observations (Table 16, Regression 3h). The abnormal return of non-Jewish firms during *Weimar* is only still -0.18% and statistically insignificant. Our results stay virtually the same.

Next, we include firms for which we could not identify the sector. We collect these firms in a twelfth sector called “Unclassified” (Table 16, Regression 3i). The abnormal return of non-Jewish firms during *Weimar* stays almost unchanged at -0.49% but becomes significant at the 5% level. The abnormal performance of Jewish-managed firms during *Pre-Aryanization* stays the same. Other estimates remain similar and insignificant. Our main finding holds.

As we require Jewish firm “Aryanization” years for firm-specific cutoffs between *Pre-* and *Post-Aryanization*, we are forced to drop 71 Jewish firms for which we could not find “Aryanization” dates. We include these firms and use the median “Aryanization” years of Jewish-managed and Jewish-owned firms (Table 16, Regression 3j). The abnormal return of non-Jewish firms during *Weimar* becomes more negative (-0.73%) and is significant at the 5% level. The coefficient during *Post-Aryanization* hardly changes but becomes insignificant. Other estimates remain very similar and significance levels do not change. We find that our main result still holds.

In another run, we include only firms with stock prices available for more than 80% of all the weeks they are listed on the Berlin stock exchange (Table 16, Regression 3k). The abnormal return of Jewish-owned firms during *Post-Aryanization* increases to 3.48% and becomes significant at the 10% level. Other estimates are similar to the base model results. Overall, our main result holds.

Next, government bond yields might not reflect the appropriate risk-free rate. We increase the risk-free rate in all periods by two percentage points and observe only negligible differences in the estimates (Table 16, Regression 3l). Similarly, for a two percentage point decline (Table 16, Regression 3m) estimates barely change.

[Table 17 about here]

As we have stock split information only from July 1934 on, we assume that very large negative (positive) returns before this date are caused by (reverse) stock splits. We repeat our analysis without this assumption (Table 17, Regression 3n). The abnormal return of Jewish-managed firms during *Pre-Aryanization* becomes slightly less negative (-4.03%) and is significant at the 10% level. Other estimates are close to the base result. Again, the results remain virtually the same.

Stocks with very low prices are more strongly affected by discretization, that is, steps of 0.25

Reichsmark, than stocks with high stock prices. Thus, stocks with low prices are characterized by relatively high variance. We exclude all observations for which the stock price is below 5 *Reichsmark*. This threshold corresponds to the 0.5th percentile of the distribution of all stock prices. The estimates of non-Jewish firms during *Weimar* and *Post-Aryanization* become insignificant, other estimates barely change (Table 17, Regression 3o). We find that our results stay virtually the same.

We exclude six weeks preceding and following the banking crisis of 1931, when return variances were relatively high. We find that results stay virtually the same (Table 17, Regression 3p).

In 1934, firms were forced to cap their dividends at 6% of their nominal capital. Any additional earnings a firm wanted to pay out to investors had to be invested into German government bonds (Ronge, 2002). To see whether Jewish firm underperformance might be driven by the dividend cap, we repeat our analysis on the subsample of firms that paid dividends of 6% or less in 1933 and thus were probably not affected by the cap. The subsample consists of 968 non-Jewish firms and 106 Jewish firms of which 79 were Jewish-managed and 40 Jewish-owned. Comparing these numbers to the total sample, we find that roughly 14% of Jewish firms were affected by the dividend cap compared with some 10% of non-Jewish firms. The average “Aryanization” years of Jewish-managed and Jewish-owned firms remain at 1935 and 1937, respectively. The abnormal return of Jewish-managed firms during *Pre-Aryanization* hardly changes and remains significant at the 5% level (see Table 17, Regression 3q). Other estimates barely change, and our finding stays virtually the same.

5.4 Results for Non-Jewish Firms with Jewish-Sounding Names

We conjecture that investors were able to differentiate between Jewish firms, that is, firms with Jewish managers or Jewish owners, and Jewish-sounding firms. The latter group of non-Jewish firms includes frequently used Jewish surnames in their firm name. These firms should not have experienced any discrimination. Examples are Byk-Guldenwerke Chemische Fabrik AG, whose Jewish founder, Heinrich Byk, had left the firm in 1914, and Gritzner-Kayser Aktiengesellschaft, which had no Jewish affiliation. In our data, we identify 33 of the non-Jewish firms with Jewish-sounding names.¹⁸ We analyze these firms as a new group of firms in Equation (2), and call

¹⁸The list of typical Jewish surnames is available at <https://www.familyeducation.com/baby-names/browse-origin/surname/jewish>. We excluded surnames that coincide with other generic firm names like *Deutsche* or *Berliner*.

them “Jewish-sounding.” The complete regression is now:

$$r_{i,t} - r_{f,t} = \sum_{p \in \{Weimar, Pre-Aryanization, Post-Aryanization\}} \left(\alpha^p + \alpha_J^p J_{i,t}^p + \alpha_{JS}^p JS_{i,t}^p \right) + \beta_i^p (r_{s,t} - r_{f,t}) + u_{i,t}, \quad (9)$$

where $JS_{i,t}^p$ is an indicator variable taking a value of one if the non-Jewish firm i has a Jewish-sounding name. We estimate the coefficients α^p , α_J^p , α_{JS}^p , and β_i^p using ordinary least squares. Other variables are defined analogously as for Equation (2), and we cluster standard errors at the weekly level.

[Table 18 about here]

If investors were able to differentiate between Jewish firms and Jewish-sounding firms, the stock of Jewish-sounding firms should perform just like the stock of other non-Jewish firms. We find that Jewish-sounding firms have negative abnormal returns during all three subperiods, but all estimates are statistically insignificant (see Table 18). Thus, we cannot reject the null hypothesis that firms with Jewish-sounding names perform like other non-Jewish firms.

6 Total Economic Loss

To quantify the economic impact of “Aryanizing” the German economy, we estimate the total loss of firm value incurred by Jewish firms due to discrimination. We compute the estimated loss as the part of the change in a firm’s market value that can be attributed to the abnormal return of Jewish firms as follows:

$$\text{Total market value change for Jewish-managed firms}^p = \sum_{\substack{t \in p \\ i \in JM}} \alpha_{JM}^p JM_{i,t}^p MV_{i,t}, \quad (10)$$

where p indicates the subperiods (*Weimar*, *Pre-Aryanization*, and *Post-Aryanization*); α_{JM}^p is the estimated average weekly discount of Jewish-managed firms obtained from Table 5; $JM_{i,t}^p$ is an indicator variable taking a value of one if firm i was then or formerly Jewish-managed during subperiod p ; and $MV_{i,t}$ is the market value of firm i during week t . The formula for computing the total loss for Jewish-owned firms is similar to Equation (10).

We have information on market capitalization for only 58 Jewish-managed and 27 Jewish-owned firms. Thus, we assume that Jewish-managed firms, for which we do not have any market

capitalization, have a market capitalization equal to the average observed market capitalization of Jewish-managed firms. For the Jewish-managed firms that we had to exclude from our sample because of missing “Aryanization” dates, we additionally assume that they experience the same abnormal returns as other Jewish-managed firms and that they were “Aryanized” in the average “Aryanization” year. We treat Jewish-owned firms similarly.

[Table 19 about here]

Jewish-managed firms’ market capitalizations drop in the subperiods *Pre-* and *Post-Aryanization* (Table 19). The decline is strongest during *Pre-Aryanization* (RM 141.07 million), which accounts for the lion’s share of the total RM 179.14 million decline between February 1933 and November 1941, that is, after Hitler’s appointment. Jewish-owned firms experience a loss only during *Pre-Aryanization* of RM 49.86 million. During *Weimar* and *Post-Aryanization*, the change in market value of Jewish-owned firms is positive but small (RM 36.47 million and RM 35.89 million, respectively).

The total loss for Jewish firms between February 1933 and November 1941 amounts to RM 193.11 million or roughly Euro 3.86 billion today. This figure corresponds to 0.4% of the German gross national product, which was RM 54.8 billion in 1933 (Räth, 2009), or 3.2% of the approximately RM 6 billion taxable assets that Jews owned in 1938 (Dippel, 1996). Our number is substantially lower than the 1.04 billion *Reichsmark* estimated by Huber et al. (2019).

7 Conclusion

We investigate the most notorious and lethal example of discrimination in history – the persecution of Jews during the Third Reich. We measure the economic effect of discrimination against firms with Jewish managers and firms with Jewish owners using weekly hand-collected stock prices between December 1923 and November 1941. Using a one-factor sector model to estimate firms’ abnormal returns, we find that firms with Jewish managers significantly underperformed non-Jewish firms by around 5% annually after Hitler’s appointment as Chancellor of Germany in January 1933. The abnormal performance persisted until all Jewish managers were ousted, a firm’s so-called Aryanization. Discrimination against Jewish owners by contrast is not reflected in stock performance.

The most likely explanation for the negative abnormal returns is harassment. This harassment induced investors to update their expectations about a firm’s future performance. Our

results do not support alternative explanations for the underperformance, such as brain drain and Jewish stigma.

We can quantify the loss of value for Jewish firms between February 1933 and November 1941. The total loss amounts to 0.4% of the German gross national product in 1933 and some 3% of taxable assets that Jewish people owned in 1938.

Our findings show that the adverse effects of discrimination extend beyond the objects of discrimination. Unrelated bystanders, including investors, employees, and other stakeholders, can suffer too, even if they do not belong to the discriminated-against minority. Ultimately, discrimination can affect an economy as a whole.

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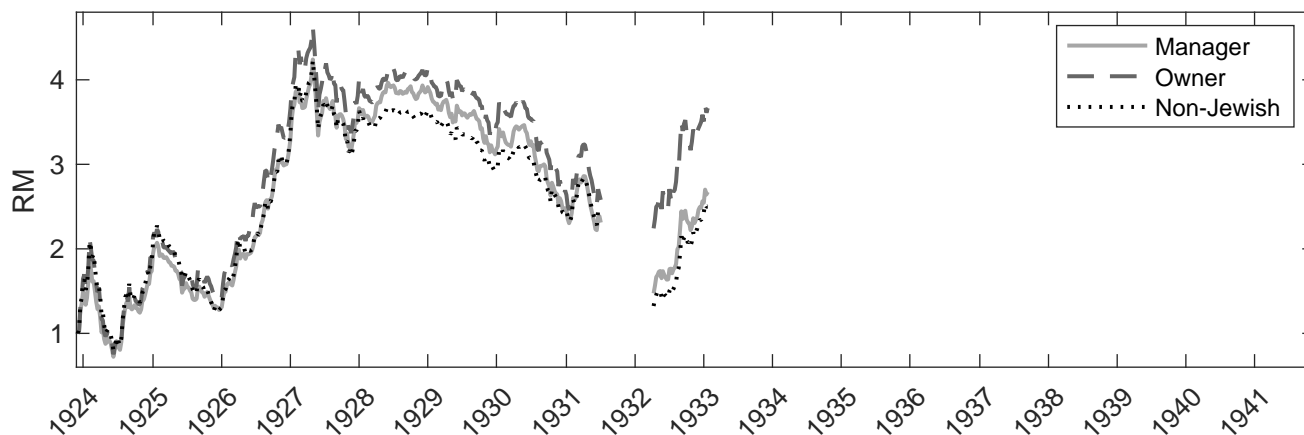
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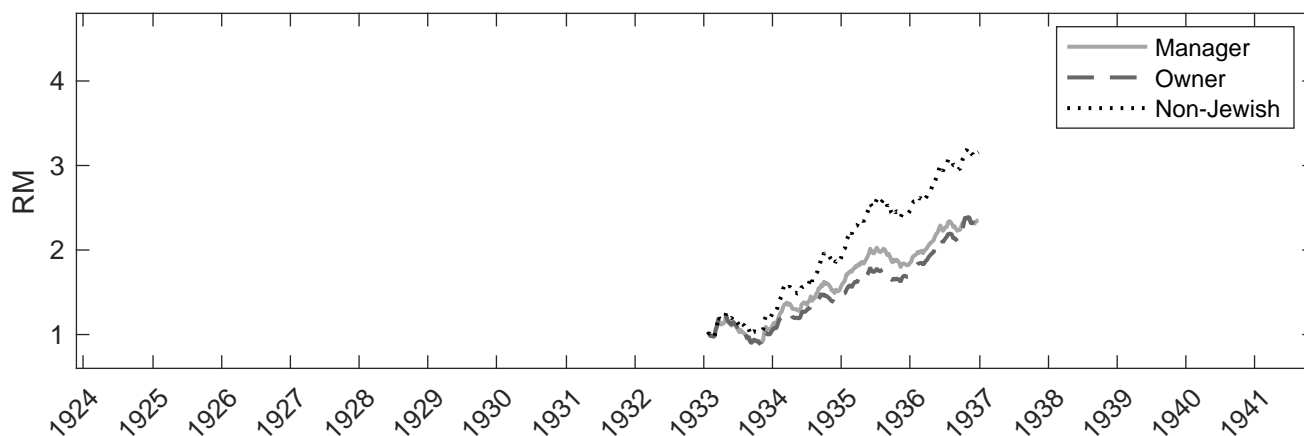
Figure 1: Jewish-Managed and Jewish-Owned Firms' Stock Performance

The figure shows a one *Reichsmark* buy and hold investment into equally weighted portfolios of Jewish-managed (light gray, solid line) and Jewish-owned (dark gray, dashed line), and non-Jewish (black, dotted line) firms' stocks. Portfolios are corrected for stock splits, and dividend payments are reinvested into the issuing stock. The Berlin stock exchange was closed for business between July 1931 and March 1932, indicated by a gap in the lines.

Panel A: Weimar: December 1923 to January 1933



Panel B: Pre-Aryanization: February 1933 to the year of the “Aryanization” 1936



Panel C: Post-Aryanization: The year after the “Aryanization” 1937 to November 1941

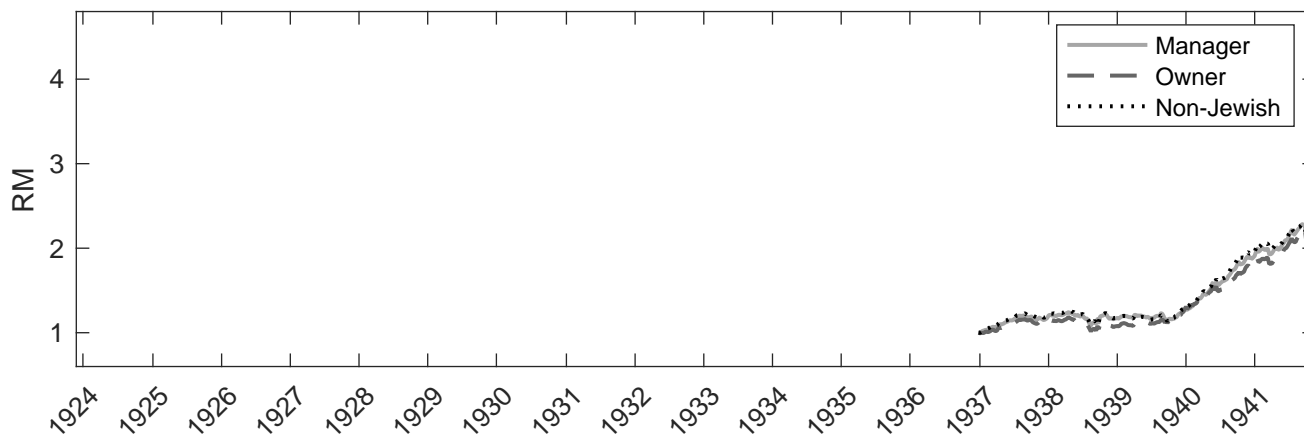
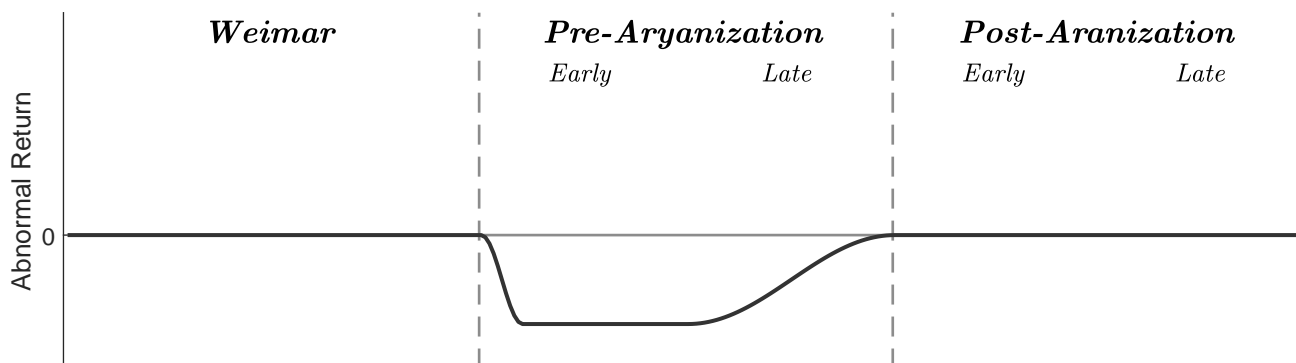


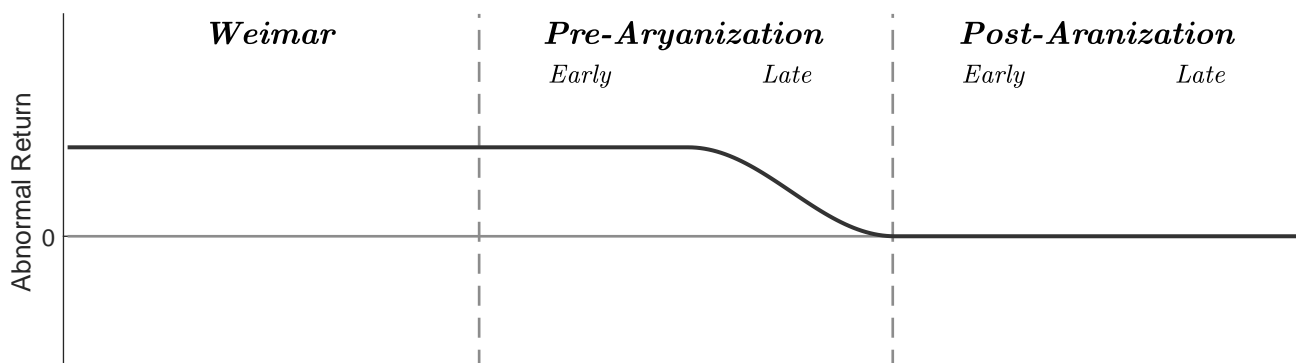
Figure 2: Abnormal Return Pattern Predictions

The figure shows the predicted abnormal return patterns of the harassment, the brain drain, and the Jewish stigma hypotheses. We split the time line into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the “Aryanization” (*Pre-Aryanization*), and the year after the “Aryanization” through November 1941 (*Post-Aryanization*). In all panels, the first light gray, dashed vertical line corresponds to Hitler’s appointment, the second to “Aryanizations.”

Panel A: Harassment Hypothesis



Panel B: Brain Drain Hypothesis



Panel C: Jewish Stigma Hypothesis

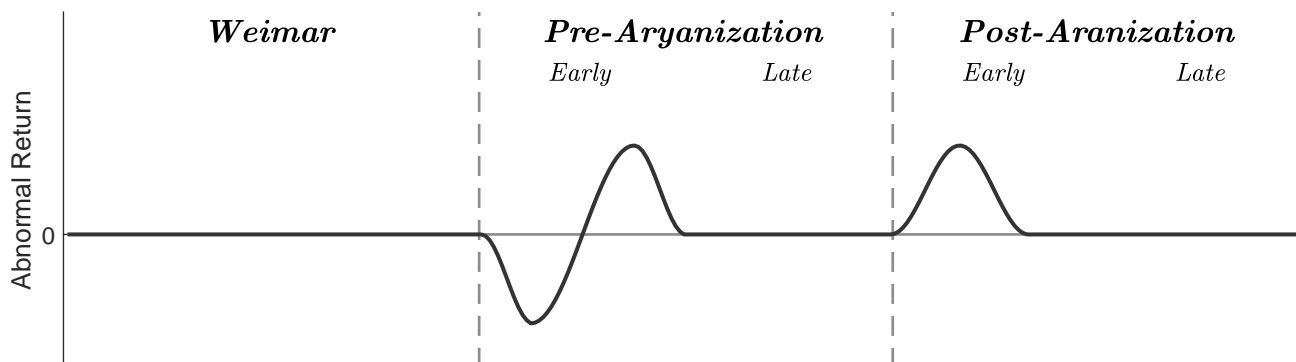


Table 1: Descriptive Statistics

We report numbers for Jewish and non-Jewish firms. We report for all groups of firms equally weighted cross-sectional averages of: number of firms, number of observed returns, mean percentage of quotations while listed, mean weekly net return, annualized mean weekly net return, standard deviation, annualized standard deviation, and skewness, kurtosis, minimum, maximum, and AR(1) coefficient for weekly net returns. The sample period is December 1923 through November 1941.

	Jewish Firms	Non-Jewish Firms
Number of Firms	123	947
Mean Number of Returns	580.38	410.11
Mean Percentage of Quotations While Listed	81.43%	78.79%
Mean Net Return	0.40%	0.38%
Mean Net Return – annualized	23.07%	21.80%
Mean Standard Deviation	5.43%	7.08%
Mean Standard Deviation – annualized	39.16%	51.05%
Mean Skewness	1.13	1.16
Mean Kurtosis	9.50	9.58
Mean Minimum	-16.85%	-19.90%
Mean Maximum	26.76%	32.83%
Mean AR(1) Coefficient	-0.01	-0.01

Table 2: Sector Distribution

The table presents the relative distribution of all, Jewish-managed, Jewish-owned, and non-Jewish firms within 11 sectors. Fourteen firms had Jewish managers and Jewish owners. These firms appear in Columns 2 and 3 but are counted only once in Column 1. The sample period is December 1923 through November 1941.

Sector	All	Jewish-Managed	Jewish-Owned	Non-Jewish
Banks	9.91%	8.79%	6.52%	10.35%
Construction, Stones, Gas, Water, Ice	10.19%	8.79%	8.70%	10.35%
Mining	7.66%	9.89%	32.61%	6.12%
Metal, Machinery, Printing	18.97%	14.29%	8.70%	19.85%
Electricity, Rubber, Commerce	7.57%	16.48%	17.39%	6.55%
Textile, Movies, Theater, Plantations	9.53%	8.79%	6.52%	9.71%
Chemistry, Leather, Timber	5.98%	8.79%	6.52%	5.81%
Paper, Others	7.29%	6.59%	8.70%	7.18%
Insurances	5.70%	1.10%	0.00%	6.34%
Transportation	8.22%	5.49%	0.00%	8.76%
Breweries, Nutrition	8.97%	10.99%	4.35%	8.98%
Total	1,070	91	46	947

Table 3: Distribution of “Aryanization” Years

The table shows the distribution of 123 Jewish firms’ “Aryanization” years, consisting of 91 “manager Aryanizations” and 46 “owner Aryanizations.” Fourteen firms had Jewish managers and Jewish owners. These firms appear in Columns 2 and 3 but are counted only once in Column 1. The sample period is December 1923 through November 1941.

Year	“Aryanizations”	“Manager Aryanizations”	“Owner Aryanizations”
1933	29	27	4
1934	7	6	2
1935	16	11	6
1936	12	14	3
1937	14	11	4
1938	41	21	24
1939	1	0	1
1940	1	1	0
1941	1	0	1
1942	1	0	1
Total	123	91	46

Table 4: Abnormal Performance: Jewish and Non-Jewish Firms

The table shows the annualized abnormal return of non-Jewish and Jewish firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish firms is estimated as the additional abnormal return to non-Jewish firms. We split the time-varying abnormal return into three periods: December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" year is 1936. We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (2)
Non-Jewish (α)	Weimar	-0.55%** (-2.07)
	Pre-Aryanization	0.04% (0.08)
	Post-Aryanization	0.49% (1.44)
Jewish (α_J)	Weimar	1.05% (0.58)
	Pre-Aryanization	-4.07%** (-2.42)
	Post-Aryanization	0.04% (0.04)

Table 5: Abnormal Performance: Jewish-Managed and Jewish-Owned Separated

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the additional abnormal return to non-Jewish firms. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (3)
Non-Jewish (α)	Weimar	-0.46%* (-1.80)
	Pre-Aryanization	0.03% (0.07)
	Post-Aryanization	0.56%* (1.66)
Jewish- managed (α_{JM})	Weimar	0.04% (0.02)
	Pre-Aryanization	-4.75%** (-2.25)
	Post-Aryanization	-0.81% (-0.64)
Jewish- owned (α_{JO})	Weimar	0.81% (0.30)
	Pre-Aryanization	-1.92% (-0.85)
	Post-Aryanization	1.70% (0.89)

Table 6: Abnormal Performance: Under the Nazi Government

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated with respect to the number of Jewish managers and Jewish blockholders, measured in 1932. The coefficients show the additional abnormal return to non-Jewish firms for a firm with one Jewish manager and one Jewish blockholder, respectively. On average, a Jewish-managed firm had 1.89 Jewish managers and a Jewish-owned firm had 1.33 Jewish blockholders. We split the time-varying abnormal return into two periods, namely, December 1923 through January 1933 (*Weimar*) and February 1933 through November 1938 (*Aryanization*). The cutoff between subperiods is the same for all firms. We use clustered standard errors at the weekly level and report t -statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (4)
Non-Jewish (α)	Weimar	-0.40%* (-1.94)
	Aryanization	0.30% (1.36)
Jewish- managed (α_{JM})	Weimar	-0.31% (-0.38)
	Aryanization	-0.97%* (-1.66)
Jewish- owned (α_{JO})	Weimar	0.76% (0.47)
	Aryanization	-0.98% (-0.88)

Table 7: Abnormal Performance: Including a Size Factor

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a two-factor model that also accounts for firm size. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the additional abnormal return to non-Jewish firms. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (5)
Non-Jewish (α)	Weimar	0.18% (0.59)
	Pre-Aryanization	-0.17% (-0.32)
	Post-Aryanization	0.40% (1.21)
Jewish- managed (α_{JM})	Weimar	-2.18% (-1.20)
	Pre-Aryanization	-4.36%** (-2.05)
	Post-Aryanization	-0.74% (-0.59)
Jewish- owned (α_{JO})	Weimar	0.74% (0.27)
	Pre-Aryanization	-1.32% (-0.58)
	Post-Aryanization	0.91% (0.48)

Table 8: Abnormal Performance: Pattern during Pre-Aryanization

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the additional abnormal return to non-Jewish firms. We split the time-varying abnormal return into four periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the end of 1935 (*Early-Pre-Aryanization*), the beginning of 1936 through the year of the "Aryanization" (*Late-Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). Firms "Aryanized" before 1936 do not appear in *Late-Pre-Aryanization*. The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (6)
Non-Jewish (α)	Weimar	-0.46%* (-1.80)
	Early-Pre-Aryanization	0.78% (0.89)
	Late-Pre-Aryanization	-0.69% (-1.17)
	Post-Aryanization	0.59%* (1.75)
Jewish- managed (α_{JM})	Weimar	0.04% (0.02)
	Early-Pre-Aryanization	-7.68%* (-1.93)
	Late-Pre-Aryanization	-0.91% (-0.44)
	Post-Aryanization	-0.97% (-0.78)
Jewish- owned (α_{JO})	Weimar	0.81% (0.30)
	Early-Pre-Aryanization	-6.57% (-1.35)
	Late-Pre-Aryanization	0.22% (0.11)
	Post-Aryanization	1.69% (0.89)

Table 9: Abnormal Performance: Pattern during Post-Aryanization

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the additional abnormal return to non-Jewish firms. We split the time-varying abnormal return into four periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), the first two years after "Aryanization" (*Early-Post-Aryanization*), and the third year after the "Aryanization" through November 1941 (*Late-Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (7)
Non-Jewish (α)	Weimar	-0.46%* (-1.80)
	Pre-Aryanization	0.03% (0.07)
	Early-Post-Aryanization	1.05% (1.41)
	Late-Post-Aryanization	0.18% (0.38)
Jewish- managed (α_{JM})	Weimar	0.04% (0.02)
	Pre-Aryanization	-4.74%** (-2.24)
	Early-Post-Aryanization	-2.46% (-1.15)
	Late-Post-Aryanization	0.85% (0.58)
Jewish- owned (α_{JO})	Weimar	0.81% (0.30)
	Pre-Aryanization	-1.92% (-0.85)
	Early-Post-Aryanization	0.63% (0.22)
	Late-Post-Aryanization	2.07% (0.76)

Table 10: Abnormal Performance: Degrees of Jewishness

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, highly Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the additional abnormal return to non-Jewish firms. The abnormal return of highly Jewish-managed firms is estimated as the additional abnormal return to Jewish-managed and non-Jewish firms. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We subsequently measure the degree of Jewishness by a Jewish manager's VIP status (8a) and by a firm having multiple Jewish managers (8b). We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (8a)	Regression (8b)
		Jewish VIP Manager	Multiple Jewish Managers
Non-Jewish (α)	Weimar	-0.44%* (-1.75)	-0.46%* (-1.80)
	Pre-Aryanization	0.05% (0.11)	0.03% (0.07)
	Post-Aryanization	0.57%* (1.72)	0.56%* (1.66)
Jewish- managed (α_{JM})	Weimar	-1.25% (-0.62)	0.77% (0.32)
	Pre-Aryanization	-5.95%** (-2.02)	-5.83%** (-2.07)
	Post-Aryanization	-1.38% (-0.87)	-1.10% (-0.62)
Highly Jewish- managed (α_{Highly})	Weimar	3.38% (0.99)	-1.72% (-0.54)
	Pre-Aryanization	2.69% (0.74)	2.10% (0.62)
	Post-Aryanization	1.35% (0.63)	0.62% (0.29)
Jewish- owned (α_{JO})	Weimar	0.37% (0.14)	0.87% (0.32)
	Pre-Aryanization	-2.25% (-0.97)	-1.90% (-0.84)
	Post-Aryanization	1.32% (0.69)	1.68% (0.89)

Table 11: Correlations

The table presents the correlation between portfolios formed as the equally weighted average Jewish-managed firms' and non-Jewish firms' residuals. We split the sample into four periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the end of 1935 (*Early-Pre-Aryanization*), the beginning of 1936 through the year of the "Aryanization" (*Late-Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). *Total* uses the whole sample. The average "Aryanization" years of Jewish-managed firms is 1935. Column "Percentile" reports the percentage of bootstrapped correlations that are lower than the value in Column "Correlation."

Period	Correlation	Percentile
Weimar	-0.52	31.0%
Early-Pre-Aryanization	-0.70	59.3%
Late-Pre-Aryanization	-0.78	78.5%
Post-Aryanization	-0.75	87.8%
Total	-0.57	36.3%

Table 12: Overview of Hypotheses and Tests

The table shows the results of various tests for the *harassment*, *brain drain*, and *Jewish stigma* hypotheses. Test results supporting the hypothesis are indicated by a check mark (✓). Contradicting results are indicated by a cross-out (✗). Tests T1–T3 analyze the observed discount pattern. T4 investigates if firms with Jewish managers in very important positions or firms with multiple managers experience greater discounts than other Jewish-managed firms. T5 measures the correlation of Jewish-managed and non-Jewish firms' abnormal returns.

Hypothesis		Harassment: permanent damage due to harassment ⇒ lower cash flows; long term	Brain drain: Jewish manager leaves firm and is replaced by non-Jewish manager with less experience, fewer university degrees, and fewer connections; long term	Jewish stigma: investors exit stocks to not be perceived as supporting Jewish firms; short term
Test				
T1	No discount in Weimar	✓	✗	✓
T2	Discount in Pre-Ary	✓	✗	✗
T3	No discount in Post-Ary	✓	✓	✗
T4	Degree of Jewishness	✓	✗	✓
T5	Divestment	✓	✓	✗

Table 13: Robustness: Factor Model Choice

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the difference to non-Jewish firms' abnormal return. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We subsequently replace the equally weighted sector-specific returns by one equally weighted market return (3a); exclude a firm from its sector portfolio (3b); and use the value-weighted blue-chip index of Ronge (2002) (3c). We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (3)	Regression (3a)	Regression (3b)	Regression (3c)
		Base Model	One Market Factor	Sector Excludes Firm <i>i</i>	Value-Weighted Index
Non-Jewish (α)	Weimar	-0.46%* (-1.80)	-0.55%* (-1.75)	0.07% (0.15)	13.86% (1.30)
	Pre-Aryanization	0.03% (0.07)	0.26% (0.49)	2.43%*** (2.96)	19.01%*** (3.04)
	Post-Aryanization	0.56%* (1.66)	0.75%* (1.95)	2.34%*** (4.46)	14.07%*** (3.97)
Jewish-managed (α_{JM})	Weimar	0.04% (0.02)	0.17% (0.08)	-0.10% (-0.05)	-0.70% (-0.22)
	Pre-Aryanization	-4.75%** (-2.25)	-5.77%** (-2.55)	-5.70%** (-2.58)	-6.83%** (-2.38)
	Post-Aryanization	-0.81% (-0.64)	-1.34% (-1.04)	-0.88% (-0.67)	-0.40% (-0.29)
Jewish-owned (α_{JO})	Weimar	0.81% (0.30)	0.18% (0.06)	0.66% (0.24)	0.61% (0.20)
	Pre-Aryanization	-1.92% (-0.85)	-3.77% (-1.51)	-2.75% (-1.16)	-6.63%** (-2.23)
	Post-Aryanization	1.70% (0.89)	0.95% (0.43)	1.39% (0.71)	-0.54% (-0.23)

Table 14: Robustness: Calendar Time Cutoffs

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the difference to non-Jewish firms' abnormal return. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through December 1936, the year of the median "Aryanization" (*Pre-Aryanization*), and January 1937 through November 1941 (*Post-Aryanization*). We use the median of all "Aryanization" years as the cutoff between *Pre-* and *Post-Aryanization* (3d). We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (3)	Regression (3d)
		Base Model	Median Aryanization Year
Non-Jewish (α)	Weimar	-0.46%* (-1.80)	-0.46%* (-1.80)
	Pre-Aryanization	0.03% (0.07)	0.86%** (2.10)
	Post-Aryanization	0.56%* (1.66)	-0.07% (-0.32)
Jewish-managed (α_{JM})	Weimar	0.04% (0.02)	0.04% (0.02)
	Pre-Aryanization	-4.75%** (-2.25)	-4.61%** (-2.20)
	Post-Aryanization	-0.81% (-0.64)	-0.04% (-0.03)
Jewish-owned (α_{JO})	Weimar	0.81% (0.30)	0.81% (0.30)
	Pre-Aryanization	-1.92% (-0.85)	-2.35% (-0.87)
	Post-Aryanization	1.70% (0.89)	0.31% (0.21)

Table 15: Robustness: Winsorizing

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the difference to non-Jewish firms' abnormal return. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We winsorize firms' returns at different levels, namely, winsorizing at 1% and 99% (3e), and winsorizing at 2.5% and 97.5% (3f), and no winsorizing (3g). We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (3) Base Model	Regression (3e) Winsorizing at 1% and 99%	Regression (3f) Winsorizing at 2.5% and 97.5%	Regression (3g) No Winsorizing
Non-Jewish (α)	Weimar	-0.46%* (-1.80)	-0.49%* (-1.96)	-0.58%** (-2.37)	-0.77%** (-1.99)
	Pre-Aryanization	0.03% (0.07)	0.06% (0.11)	-0.04% (-0.09)	-0.09% (-0.17)
	Post-Aryanization	0.56%* (1.66)	0.56%* (1.72)	0.58%* (1.86)	0.64%* (1.84)
Jewish- managed (α_{JM})	Weimar	0.04% (0.02)	0.44% (0.23)	1.43% (0.87)	3.71% (0.98)
	Pre-Aryanization	-4.75%** (-2.25)	-4.60%** (-2.22)	-4.10%** (-2.14)	-4.23%* (-1.95)
	Post-Aryanization	-0.81% (-0.64)	-0.68% (-0.56)	-0.80% (-0.69)	-1.35% (-1.01)
Jewish- owned (α_{JO})	Weimar	0.81% (0.30)	0.57% (0.23)	-0.08% (-0.04)	0.28% (0.09)
	Pre-Aryanization	-1.92% (-0.85)	-2.05% (-0.93)	-1.90% (-0.93)	-1.06% (-0.46)
	Post-Aryanization	1.70% (0.89)	1.58% (0.87)	1.66% (0.96)	1.94% (0.98)

Table 16: Robustness: Data Filtering

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the difference to non-Jewish firms' abnormal return. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We subsequently exclude firms with fewer than 200 observations (3h); include firms that we could not associate with a sector (3i); include Jewish firms without an "Aryanization" date and use the median "Aryanization" year (3j); exclude firms with fewer than 80% price quotations while listed (3k); and increase and reduce the risk-free interest rate by 2 percentage points (3l and 3m, respectively). We use clustered standard errors at the weekly level and report t -statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (3)	Regression (3h)	Regression (3i)	Regression (3j)	Regression (3k)	Regression (3l)	Regression (3m)
		Base Model	Minimum 200 Observations	Include Firms without Sector	Include all Jewish Firms	Minimum 80% Price Quotation	$r_f + 0.02$	$r_f - 0.02$
Non-Jewish (α)	Weimar	-0.46%* (-1.80)	-0.18% (-0.72)	-0.49%** (-2.00)	-0.73%** (-2.22)	-0.51% (-1.60)	-0.49%* (-1.92)	-0.42%* (-1.68)
	Pre-Aryanization	0.03% (0.07)	0.10% (0.21)	0.03% (0.06)	0.57% (1.22)	0.71% (1.32)	0.04% (0.08)	0.03% (0.06)
	Post-Aryanization	0.56%* (1.66)	0.52% (1.51)	0.59%* (1.75)	0.50% (1.59)	0.00% (0.01)	0.53% (1.58)	0.59%* (1.74)
Jewish-managed (α_{JM})	Weimar	0.04% (0.02)	-1.40% (-0.70)	-0.08% (-0.04)	0.98% (0.54)	2.21% (0.94)	-0.01% (0.00)	0.08% (0.04)
	Pre-Aryanization	-4.75%** (-2.25)	-4.57%** (-2.20)	-4.74%** (-2.24)	-4.74%** (-2.58)	-4.54%** (-2.13)	-4.85%** (-2.30)	-4.65%** (-2.20)
	Post-Aryanization	-0.81% (-0.64)	-0.71% (-0.56)	-0.89% (-0.70)	-1.01% (-0.98)	-1.02% (-0.77)	-0.69% (-0.55)	-0.93% (-0.74)
Jewish-owned (α_{JO})	Weimar	0.81% (0.30)	0.21% (0.08)	1.39% (0.50)	2.94% (1.29)	-0.25% (-0.09)	0.89% (0.33)	0.72% (0.27)
	Pre-Aryanization	-1.92% (-0.85)	-2.09% (-0.98)	-1.91% (-0.85)	-1.83% (-1.03)	-1.05% (-0.42)	-1.99% (-0.88)	-1.85% (-0.82)
	Post-Aryanization	1.70% (0.89)	1.15% (0.57)	1.38% (0.71)	1.61% (0.97)	3.48%* (1.71)	1.79% (0.95)	1.60% (0.83)

Table 17: Robustness: Data Filtering – Continued

The table shows the annualized abnormal return of non-Jewish, Jewish-managed, and Jewish-owned firms, estimated as each group’s mean abnormal return according to a one-factor sector model. The abnormal return of Jewish-managed and Jewish-owned firms is estimated as the difference to non-Jewish firms’ abnormal return. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the “Aryanization” (*Pre-Aryanization*), and the year after the “Aryanization” through November 1941 (*Post-Aryanization*). The average “Aryanization” years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. We subsequently keep large returns before July 1934 in the data (3n); exclude stock prices below 5RM (3o); exclude six weeks before and after the banking crisis of 1931 (3p); and exclude firms affected by the dividend caps of December 1934 (3q). We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (3) Base Model	Regression (3n) No Assumption Large Jumps Are Splits Pre 1934	Regression (3o) Filter Out Stocks Below 5 RM	Regression (3p) Filter Out Six Weeks Around Banking Crisis	Regression (3q) Not Affected by Dividend Cap
Non-Jewish (α)	Weimar	-0.46%* (-1.80)	-0.44%* (-1.69)	-0.28% (-1.19)	-0.43%* (-1.71)	-0.52%** (-2.04)
	Pre-Aryanization	0.03% (0.07)	0.05% (0.09)	0.04% (0.09)	0.04% (0.08)	-0.16% (-0.29)
	Post-Aryanization	0.56%* (1.66)	0.58%* (1.71)	0.53% (1.59)	0.56%* (1.66)	0.57% (1.59)
Jewish- managed (α_{JM})	Weimar	0.04% (0.02)	0.12% (0.06)	-1.02% (-0.56)	-0.13% (-0.07)	0.34% (0.17)
	Pre-Aryanization	-4.75%** (-2.25)	-4.03%* (-1.85)	-4.65%** (-2.27)	-4.72%** (-2.23)	-4.83%** (-1.88)
	Post-Aryanization	-0.81% (-0.64)	-0.88% (-0.70)	-0.79% (-0.64)	-0.81% (-0.65)	0.13% (0.09)
Jewish- owned (α_{JO})	Weimar	0.81% (0.30)	0.67% (0.24)	1.14% (0.46)	1.26% (0.46)	0.88% (0.30)
	Pre-Aryanization	-1.92% (-0.85)	-2.30% (-1.02)	-2.13% (-1.00)	-1.97% (-0.87)	-1.45% (-0.54)
	Post-Aryanization	1.70% (0.89)	1.68% (0.88)	1.85% (0.99)	1.70% (0.89)	0.99% (0.51)

Table 18: Abnormal Performance: Jewish vs. Jewish-Sounding

The table shows the annualized abnormal return of non-Jewish, Jewish, and Jewish-sounding firms, estimated as each group's mean abnormal return according to a one-factor sector model. The abnormal return of Jewish and Jewish-sounding firms is estimated as the additional abnormal return to non-Jewish firms. We split the time-varying abnormal return into three periods, namely, December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish and Jewish-sounding firms are both 1936. We use clustered standard errors at the weekly level and report *t*-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Group	Sub-Period	Regression (9)
Non-Jewish (α)	Weimar	-0.48% (-1.51)
	Pre-Aryanization	0.07% (0.12)
	Post-Aryanization	0.59% (1.62)
Jewish (α_J)	Weimar	0.97% (0.53)
	Pre-Aryanization	-4.10%** (-2.38)
	Post-Aryanization	-0.06% (-0.05)
Jewish-sounding (α_{JS})	Weimar	-1.73% (-0.53)
	Pre-Aryanization	-0.56% (-0.13)
	Post-Aryanization	-1.62% (-0.96)

Table 19: Total Loss in Jewish Firm Value

The table shows the estimated change in Jewish firms' market values due to the "Aryanization" of the German economy. Estimates are computed as Jewish-managed and Jewish-owned firm market values multiplied by the respective average weekly discount obtained from Table 5. The subperiods are December 1923 through January 1933 (*Weimar*), February 1933 through the year of the "Aryanization" (*Pre-Aryanization*), and the year after the "Aryanization" through November 1941 (*Post-Aryanization*). The average "Aryanization" years of Jewish-managed and Jewish-owned firms are 1935 and 1937, respectively. Figures are in million *Reichsmark*.

Subperiod	Weimar	Pre-Aryanization	Post-Aryanization	Sum of Pre- and Post-Aryanization
Jewish-managed	2.66	-141.07	-38.07	-179.14
Jewish-owned	36.47	-49.86	35.89	-13.97
Total	39.13	-190.93	-2.18	-193.11