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Deportation Timing and Jewish Holocaust Survival in Greece: Evidence from 23 Cities

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This study examines variation in Jewish survival across Greek communities during the Holocaust, focusing on the role of deportation timing and city population. Combining quantitative and qualitative evidence, it analyzes community-level data for 23 Greek cities using regression models incorporating city population, the number of days between the beginning of Greece's deportation campaign and deportation in each city, a quadratic temporal term, and their interaction. Deportation timing emerges as the most consistent statistical correlate of survival. The association between deportation timing and survival is positive; evidence of nonlinearity is suggestive but sensitive to the inclusion of the latest-deported community. The qualitative evidence identifies mechanisms through which additional time could create opportunities for survival, including obtaining information, recognizing the threat, securing false documents, hiding, fleeing to rural or mountainous areas, mobilizing resistance networks, and obtaining assistance from local populations and authorities. Drawing on the literature on rescue, the study conceptualizes survival as an interaction between the temporal opportunity created by delayed deportation, the capacity of Jews to recognize and exploit opportunities for survival, and the availability and capacity of potential rescuers and local networks. The findings suggest that time was a necessary but not sufficient condition for survival and highlight the importance of temporal, social, geographical, and institutional conditions in explaining variation across occupied Greece.

Keywords: *Holocaust; Greek Jews; Jewish survival; Greece; deportation; rescue; resistance; city size; urban population; survival rates.*

Introduction

Jewish survival during the Holocaust varied enormously across European countries. By 1945, approximately two-thirds of Europe's Jewish population had been killed, but the scale of destruction differed dramatically across countries. According to estimates compiled by the United States Holocaust Memorial Museum, approximately 99% of Denmark's prewar Jewish population survived, compared with about 75–78% in France, 73% in Belgium, and 86.5% in Italy. Survival was substantially lower in countries such as Germany (30.5%), the Netherlands (27.3%), Hungary (39.3%), and Poland (10.4–17.3%). Greece was also among the countries with the highest levels of Jewish mortality: of an estimated Jewish population of 71,611 in 1941, approximately 58,800–65,000 Jews were killed, implying a survival rate of only about 9–18% (United States Holocaust

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Memorial Museum 2026). These striking differences demonstrate that Jewish survival was far from uniform across Europe and raise important questions about the conditions that allowed some Jewish populations to survive while others were almost completely destroyed.

The substantial variation observed within Greece is equally striking and provides the central empirical motivation for this study. Although Greece as a whole experienced one of the highest Jewish mortality rates in occupied Europe, survival differed dramatically among its Jewish communities. In some cities, survival was extremely limited, particularly where deportations began soon after the German occupation or where opportunities for escape and concealment were constrained. In others, substantial proportions of the Jewish population survived through flight to rural or mountainous areas, concealment, false identities, resistance networks, and assistance from local populations and institutions. The contrast is particularly evident between communities such as Thessaloniki, where the overwhelming majority of Jews were deported and murdered, and communities such as Athens, Volos, Larissa, Trikala, and especially Zakynthos, where much larger proportions survived. This substantial inter-city variation raises a fundamental question: why did Jewish survival differ so markedly among communities exposed to the same broader occupation and persecution regime? The present study addresses this question by examining whether differences in population size and, more importantly, in the time available between the beginning of the deportation campaign in Greece and the onset of deportations in each community help explain these differences in survival.

Previous research on Holocaust survival has emphasized a wide range of factors, including the timing of deportation, demographic characteristics, geographical conditions, the behavior of local authorities, resistance networks, and assistance from the non-Jewish population. The Greek case provides a particularly useful setting for examining these relationships because deportations did not occur simultaneously throughout the country. The deportation campaign began in March 1943, but Jewish communities in different parts of Greece were deported at substantially different dates. This temporal variation provides an opportunity to examine whether communities deported later generally experienced higher survival rates. At the same time, because deportation dates were shaped by broader occupation policies, geographical conditions, and local circumstances, timing cannot be interpreted independently of these factors. The quantitative results are therefore understood as evidence of statistical association rather than as estimates of a causal effect of additional time.

The analysis combines quantitative and qualitative evidence. The quantitative component uses community-level data from 23 Greek city-community observations to estimate several regression specifications examining the associations of Jewish survival with host-city population and deportation timing. The models consider linear and nonlinear relationships between timing and survival and test whether the association between city population and survival varies with deportation timing. The analysis is complemented by qualitative evidence from individual communities, which is used to examine the mechanisms through which opportunities associated with later deportation could be converted into actual survival. These mechanisms included hiding, false identity documents, flight to rural and mountainous areas,

dispersal among non-Jewish populations, assistance from resistance organizations, and intervention by local officials and religious leaders.

The analysis is guided by three hypotheses. First, Jewish survival rates are expected to be positively associated with the population of the host city, reflecting the potential importance of anonymity, social networks, and the greater diversity of urban institutions. Second, survival rates are expected to be positively associated with deportation timing, because communities deported later had greater opportunity to obtain information and organize protective measures. Third, the association between city population and survival is expected to depend on deportation timing, suggesting that demographic and temporal conditions may interact rather than operate independently.

The results indicate that the positive association between deportation timing and survival is the most robust statistical finding in the sample. Evidence for a nonlinear relationship is suggestive but sensitive to the inclusion of the latest-deported community, while host-city population and its interaction with deportation timing do not receive statistically robust support in the preferred specifications. The qualitative evidence provides further insight into the mechanisms underlying the statistical relationship. It suggests that additional time could create opportunities for protective action, but that such opportunities could be converted into survival only where local social networks, geographical conditions, institutional responses, and resistance or assistance networks made escape, concealment, or dispersal feasible.

Physical survival, moreover, did not imply the preservation or restoration of Jewish communal life. As Králová (2018) shows, Greek Jewish survivors faced profound social, economic, and psychological disruption after the war, while the destruction of families, property, and communal networks fundamentally altered the communities to which they returned. The present study focuses narrowly on wartime survival and does not examine these postwar consequences. This distinction is important because individual survival and the survival or reconstruction of Jewish communities represent different dimensions of the Holocaust's consequences.

The paper proceeds as follows. Section 2 develops the theoretical framework and hypotheses. Section 3 presents the data and descriptive statistics, while Section 4 describes the empirical methodology and reports the regression results. Section 5 examines the mechanisms of survival across Greek Jewish communities. Section 6 discusses the limitations of the analysis, and Section 7 presents the conclusions.

The Survival of Greek Jews: Theoretical Framework and Hypotheses

The survival of Jewish communities in occupied Greece during the Holocaust reflected an interaction between structural conditions and local responses. Some characteristics of the communities and their urban environments can be measured quantitatively, whereas other factors—including the behavior of local officials, religious leaders, resistance organizations, and individual members of the non-Jewish population—are more difficult to quantify systematically. Previous research on Holocaust survival has examined both dimensions. Quantitative studies have identified associations between survival and locality-level characteristics such as population size, urbanization, and administrative geography (Tammes 2007, 2017, 2019, Braun 2016,

2019). Historical case studies, meanwhile, emphasize the importance of local institutions, social networks, and the decisions of individuals and organizations in determining whether opportunities for escape, concealment, or assistance could actually be realized (Saltiel 2020, Antoniou & Moses 2018). These perspectives are complementary: structural conditions could create opportunities for survival, but their significance depended on the responses of local actors.

Bowman (2009) provides a comprehensive historical account of the Holocaust of Greek Jewry during 1940–1945 and emphasizes the substantial variation in the experiences of Jewish communities across Greece. His analysis highlights the importance of the timing and organization of deportations, the different occupation regimes, the responses of Jewish communal leaders, opportunities for escape and concealment, participation in resistance, and assistance from non-Jewish Greeks. Particularly important for the present study is the fact that German-, Italian-, and Bulgarian-occupied territories experienced different patterns and intensities of persecution and deportation. The timing of deportations therefore varied substantially across Greek communities, creating different circumstances in which communities could respond to the developing persecution.

An important contemporary source for reconstructing the destruction of Greek Jewry is the work of Michael Molho and Joseph Nehama (1974). Originally published in several volumes shortly after the Holocaust, it documents the persecution and destruction of Jewish communities throughout Greece and provides information on deportations, victims, survivors, and communal institutions. Compiled by representatives of the Jewish community of Thessaloniki in the immediate postwar period, the work also provides an important Jewish communal perspective on the Holocaust. In the present study, such contemporaneous records are particularly valuable for cross-checking population figures and survival estimates reported in later historical studies.

The quantitative analysis focuses on two structural variables: the total population of the host city (POP) and deportation timing (DAR), measured as the number of calendar days from the beginning of the deportation campaign in Greece to the beginning of deportation in each community. These variables are not intended to capture the full range of circumstances that affected survival. Rather, they represent two measurable dimensions—urban scale and temporal opportunity—that may have shaped the ability of communities and individuals to respond to persecution. Qualitative evidence examined in Section 5 is used to explore the local mechanisms through which these structural conditions may have influenced survival.

City Population and Urban Anonymity

The first theoretical argument concerns the size of the host city. Larger cities may have offered Jews greater opportunities for concealment because of their larger and more heterogeneous populations. In a small town, residents were more likely to know one another personally, making it potentially easier for collaborators or authorities to identify individuals who were attempting to hide or assume a false identity. Larger cities, by contrast, offered greater anonymity and a wider range of social and institutional settings in which individuals could seek assistance or conceal their identity.

Urban size could also be associated with greater institutional capacity. Larger cities generally contained more organizations, religious institutions, administrative offices, and social networks through which assistance could potentially be organized. Such resources could facilitate the production or acquisition of false documents, the identification of safe places, the movement of individuals, and access to sympathetic officials or resistance networks. These possibilities do not imply that large cities necessarily provided greater protection; rather, they suggest that urban scale could create resources that became valuable when local actors were willing and able to use them.

This argument has a broader basis in the sociological literature on urbanism. Simmel (1903/1950) emphasized the impersonal and relatively reserved character of social relations in large cities, contrasting them with the closer interpersonal familiarity associated with smaller communities. Wirth (1938) similarly argued that population size, density, and heterogeneity weaken personal acquaintanceship and alter the mechanisms of informal social control; Guterman (1969) subsequently defended important elements of Wirth's argument. Applied to the circumstances of occupation, these ideas suggest that anonymity in larger urban environments could make identification and denunciation more difficult.

Glaeser and Sacerdote (1999) provide a related argument in the economics of urbanization. They associate higher crime rates in larger cities partly with lower probabilities of recognition and weaker informal social sanctions. Their analysis does not concern Holocaust survival, but the underlying mechanism provides a useful theoretical analogy: where individuals are less likely to be personally known, monitoring and identification may become more difficult. In the context of Jewish survival during the Holocaust, urban anonymity could therefore have reduced the effectiveness of local scrutiny and accusation, particularly when individuals attempted to conceal their identity.

The argument leads to the expectation that Jewish communities located in larger cities may have experienced higher survival rates, other things being equal. The hypothesis is stated as follows:

> *H1: Jewish survival rates are positively associated with the total population of the host city (POP), reflecting the potential importance of anonymity and institutional resources in larger urban environments.*

Deportation Timing and Temporal Opportunity

The second theoretical argument concerns the timing of deportation. DAR measures the number of calendar days between the beginning of the deportation campaign in Greece and the onset of deportation in a particular community. It therefore provides a common temporal reference point for comparing communities that were subjected to deportation at different stages of the campaign.

The theoretical importance of this variable lies in the information and preparation opportunities associated with later deportation. Communities targeted at the beginning of the deportation campaign had little opportunity to observe what had happened elsewhere. Communities targeted later, by contrast, could potentially learn from the experiences of communities that had already been deported.

Information about arrests, deportations, German procedures, escape routes, false documentation, or the availability of assistance could make it possible to prepare a response before deportation occurred.

The relationship should not, however, be interpreted as a simple measure of "time available for rescue." Later deportation did not automatically create effective opportunities for survival. Communities had to receive relevant information, interpret the threat correctly, and possess or develop the social networks and institutional resources necessary to act upon it. Moreover, deportation timing was itself influenced by broader occupation policies, geographical conditions, and the organization of German and allied authorities. DAR is therefore treated as a proxy for temporal opportunity rather than as an exogenous measure of rescue time.

The central expectation is nevertheless that, on average, communities deported later had more opportunity to organize a response to persecution. Such responses could take different forms, including concealment, flight, dispersal, acquisition of false documents, or integration into resistance and assistance networks. The corresponding hypothesis is:

> *H2: Jewish survival rates are positively associated with deportation timing (DAR), reflecting the greater opportunity for information, preparation, and protective action available to communities targeted later in the deportation campaign.*

The Interaction between Urban Scale and Deportation Timing

The potential importance of city population and deportation timing also suggests that the two variables may not operate independently. The resources associated with a large city were unlikely to provide automatic protection. Anonymity, institutional diversity, and extensive social networks could become useful only if individuals had sufficient opportunity to identify these resources and mobilize them. Conversely, additional time may have been less valuable in communities that lacked the social networks or institutional capacity necessary to respond.

This reasoning suggests a possible interaction between urban scale and deportation timing. Later deportation could increase the opportunity to make use of the resources available in larger cities, while the advantages associated with urban scale could make additional time more productive. The interaction hypothesis is therefore:

> *H3: The association between host-city population and Jewish survival varies with deportation timing, such that the relationship between population size and survival may be stronger when communities had more time to obtain information and organize protective measures.*

These hypotheses provide the theoretical basis for the quantitative analysis presented in Section 4. The qualitative evidence examined in Section 5 complements the statistical analysis by identifying the local actors, institutions, and circumstances through which the hypothesized relationships may have operated.

Data and Descriptive Statistics

Table 1 reports the Jewish population, total population of the host city, deportation dates, and survival rates for 24 Greek Jewish communities for which the relevant population data are available. Zakynthos (Zante) is included for historical completeness but is excluded from the regression analysis. Unlike the other communities in the dataset, the Jewish community of Zakynthos was never deported because the German withdrawal from the island preceded the planned deportation. Consequently, deportation timing cannot be defined for Zakynthos. The econometric analysis therefore uses 23 city-community observations.

Before the Holocaust, the Jewish population of the 23 observations in the regression sample totaled 75,202, representing approximately 2.13% of the combined population of the host cities. Of these Jews, 6,823 remained after deportation, corresponding to an overall survival rate of 9.07%. When Zakynthos is included, the number of survivors rises to 7,098 and the overall survival rate to 9.40%. The substantial variation in both Jewish and host-city populations, deportation dates, and survival rates provides the basis for the subsequent statistical analysis.

Total City Population (POP)

The variable POP measures the total population of each host city according to the 1940 Greek census. It is used as an indicator of urban scale and varies considerably across the sample, from 18,898 inhabitants in Veria to 1,124,109 in Athens. Thessaloniki had a population of 375,127 and was considerably smaller than Athens, but contained by far the largest Jewish population in the sample.

The variation in host-city population provides an opportunity to examine whether the demographic scale of the surrounding urban environment was associated with Jewish survival. The raw data do not, however, reveal a simple relationship between city size and survival. Both relatively large and relatively small cities experienced very high as well as very low survival rates. POP should therefore be interpreted as a broad measure of urban scale rather than as a direct measure of anonymity, institutional capacity, or any other specific mechanism.

Jewish Population Before Deportation (NJB)

NJB records the size of the Jewish population in each community before deportation. The variable varies substantially across the sample. Thessaloniki is by far the largest community, with approximately 56,000 Jews, followed by Athens (3,000), Kavala (2,100), Corfu (2,000), and Ioannina (1,850). Most of the remaining communities had fewer than 1,200 Jewish inhabitants.

The large variation in NJB is important for describing the scale of the communities under investigation, although NJB is not included as a principal explanatory variable in the regression models. The raw data do not indicate a simple relationship between the initial size of the Jewish population and survival. Athens, for example, had 3,000 Jewish inhabitants and a survival rate of 66.67%, whereas Thessaloniki, despite having by far the largest Jewish population, had a survival rate of only 3.48%.

Jewish Population After Deportation (NJA)

NJA measures the number of Jews recorded as remaining after the deportation in each community. It ranges from three individuals in Nea Orestias and Soufli and in Serres to 2,000 in Athens and 1,950 in Thessaloniki.

Because the absolute number of survivors is mechanically related to the initial size of the Jewish population, NJA alone is not suitable for comparing survival across communities of very different sizes. The analysis therefore uses the ratio of NJA to NJB to construct the survival-rate variable.

Survival Rate (SURV)

The dependent variable SURV measures the proportion of the pre-deportation Jewish population that remained after deportation:

$$SURV = NJA/NJB$$

Survival rates vary dramatically across the communities. Among the 23 observations included in the regression analysis, the rate ranges from 0.50% in Serres to 73.97% in Volos. Several communities recorded survival rates above 50%, including Volos (73.97%), Trikala (69.23%), Athens (66.67%), Larissa (64.82%), and Patras-Agrinio (57.36%). By contrast, most communities deported at the beginning of the deportation campaign had survival rates below 5%.

When Zakynthos is included, the maximum survival rate is 100%, since all 275 recorded members of the community survived. Because the community was not deported, however, this observation is excluded from the regression analysis. The substantial variation in SURV constitutes the principal outcome to be explained by the empirical analysis.

Deportation Date

The variable "Deportation Began" records the date on which deportation began in each community. The dates reveal a highly uneven temporal progression of the deportation of Greek Jews. The earliest deportations in the dataset began on 4 March 1943, while many communities were not deported until 25 March 1944, approximately one year later. Other communities were deported at intermediate dates, notably Thessaloniki, Florina, and Veria in March 1943.

The variation in deportation dates provides the temporal basis for constructing the DAR variable. It is important to note, however, that deportation timing was not randomly assigned across communities. Differences in timing were related to broader occupation policies, geographical conditions, and the organization of German and allied authorities. Deportation timing should therefore not be interpreted independently of these contextual factors.

Table 1. *Jewish Population, Deportation Dates, and Survival in Greek Cities*

	Community	Total City Population (POP)	Jewish Population before (NJB)	Jewish Population after (NJA)	Survival rate (SURV)	Deportation Began	Days Available for Rescue (DAR)
1	Alexandroupolis	36716	140	4	2.86%	04-Mar-43	1
2	Arta	65175	384	60	15.63%	25-Mar-44	388
3	Athens	1124109	3000	2000	66.67%	25-Mar-44	388
4	Chalkis	79789	325	170	52.31%	25-Mar-44	388
5	Chania/Heraklion	294011	350	7	2.00%	21-May-44	445
6	Corfu	111548	2000	187	9.35%	10-Jun-44	465
7	Didymoteicho	46528	900	33	3.67%	04-Mar-43	1
8	Drama	145089	1200	39	3.25%	04-Mar-43	1
9	Florina	87931	400	64	16.00%	15-Mar-43	12
10	Ioannina	162150	1850	163	8.81%	25-Mar-44	388
11	Kastoria	68237	900	35	3.89%	25-Mar-44	388
12	Kavala	63603	2100	42	2.00%	04-Mar-43	1
13	Komotini	79977	819	28	3.42%	04-Mar-43	1
14	Larissa	76821	1120	726	64.82%	25-Mar-44	388
15	Nea Orestias and Soufli	67536	197	3	1.52%	04-Mar-43	1
16	Patras-Agrinio	159822	265	152	57.36%	25-Mar-44	388
17	Preveza	41486	250	15	6.00%	25-Mar-44	388
18	Serres	92135	600	3	0.50%	04-Mar-43	1
19	Thessaloniki	375127	56000	1950	3.48%	15-Mar-43	12
20	Trikala	83775	520	360	69.23%	25-Mar-44	388
21	Veria	18898	460	131	28.48%	15-Mar-43	12
22	Volos	112012	872	645	73.97%	25-Mar-44	388
23	Xanthi	98575	550	6	1.09%	04-Mar-43	1
	Total 23 cities (regression sample)	**3491050**	**75202**	**6823**	**9.07%**		
24	Zakynthos (Zante)	41165	275	275	100%	No deportation	n.a. (infinite)
	Total 24 cities	**3532215**	**75477**	**7098**	**9.40%**		

Source: Total city population figures are from the 1940 Greek Population Census. The Jewish population figures are from Saltiel (2020).

Deportation Timing (DAR)

DAR measures the number of calendar days from 4 March 1943, the date on which the first deportations in the dataset began, to the date on which deportation began in each community. The variable uses the convention that 4 March 1943 is coded as day 1. Thus, a value of 1 indicates that deportation began at the outset of the deportation campaign, whereas a value of 388 indicates that deportation began 388 calendar days later according to this counting convention.

DAR is used as a proxy for the temporal opportunity available to communities to observe earlier deportations, obtain information, and potentially organize a response. It does not measure the actual amount of time spent on rescue or the effectiveness of protective actions. In particular, communities with later deportation dates may also differ systematically from earlier-deported communities in occupation regime, geography, distance from German administrative centers, accessibility, resistance strength, local government behavior, Jewish communal organization, and pre-existing political networks. DAR should therefore be interpreted as a measure of deportation timing rather than as an exogenous measure of "rescue time."

The variable ranges from 1 to 465 among the 23 communities in the regression sample. The distribution is highly uneven: eight communities have DAR = 1, three have DAR = 12, ten have DAR = 388, one has DAR = 445, and one has DAR = 465. Thus, although DAR is expressed in days, the sample contains only five distinct deportation-timing values. This feature is important for interpreting the regression results, particularly the estimated nonlinear relationship, because the analysis effectively compares a small number of deportation waves rather than a continuously distributed set of independent timing observations.

The concentration of observations at particular dates also reflects the historical organization of the deportations. In particular, the large group of communities with DAR = 388 was deported on 25 March 1944. The late deportation of many communities formerly located in the Italian occupation zone was related to the Italian armistice of 8 September 1943 and the subsequent German assumption of control. The timing of deportation therefore reflects both temporal opportunity and broader changes in the occupation regime.

Summary of the Data

Table 1 summarizes the principal variables used in the analysis. The dataset combines demographic information on Jewish communities and their host cities with the timing of deportation. The resulting sample exhibits substantial variation in survival rates, urban population, Jewish population, and deportation timing. At the same time, the concentration of DAR values in a small number of deportation waves and the historical factors associated with those waves are important qualifications for the econometric analysis.

The next section describes the regression methodology and examines whether the variation in deportation timing and host-city population is statistically associated with differences in Jewish survival rates.

Regression Methodology and Results

Empirical Methodology

Because the dependent variable is a proportion bounded between zero and one, alternative nonlinear specifications could in principle be considered. However, given the reconstructed historical nature of the numerator and denominator, the small sample size, and the absence of a clearly specified individual-level binomial data-generating process, the analysis uses OLS as a transparent reduced-form specification. The results should consequently be interpreted as associations rather than as a structural probability model.

The choice of an appropriate covariance estimator for statistical inference depends critically on the structure of the data and the likely form of departures from the classical OLS assumptions. White (1980) introduced the original heteroskedasticity-consistent (HC0) covariance matrix estimator, which produces asymptotically valid standard errors under heteroskedasticity of unknown form without requiring the researcher to specify its functional form.

However, subsequent research demonstrated that HC0 standard errors tend to be biased downward in finite samples, particularly when the sample size is small and when the regressors exhibit substantial leverage, leading to test statistics that reject the null hypothesis too frequently (MacKinnon & White, 1985).

MacKinnon and White (1985) proposed a family of finite-sample-corrected alternatives, including HC1, HC2, and HC3, which differ in how they adjust each observation's squared residual for its leverage before it enters the covariance calculation. Long and Ervin (2000), in an extensive Monte Carlo evaluation, showed that HC3 consistently outperforms HC0, HC1, and HC2 in samples of fewer than 250 observations, and specifically recommended HC3 as the preferred default for applied work with small cross-sectional samples, a recommendation subsequently reinforced by Cribari-Neto and da Silva (2011), who extended the HC framework further while confirming the superior finite-sample performance of leverage-adjusted estimators such as HC3 relative to the unadjusted White estimator.

Given the well-documented finite-sample limitations of unadjusted or HAC-based inference (MacKinnon & White, 1985; Long & Ervin, 2000), and consistent with general guidance on robust inference in small non-experimental samples), we treat HC3 as the more conservative and appropriate basis for inference here, while emphasizing that the small sample size (N=23) constrains statistical power regardless of estimator.

This literature is directly relevant to the present analysis, which is based on a cross-section of only 23 Greek cities and includes at least one observation, Athens, with substantially higher leverage than the rest of the sample due to its exceptionally large population relative to the other cities. Given both the small sample size and this documented high-leverage observation, HC3 is the standard-error estimator best supported by the applied econometrics literature for this dataset.

A separate consideration concerns the distinction between heteroskedasticity-consistent (HC) and heteroskedasticity-and-autocorrelation-consistent (HAC) covariance estimators, such as the Newey-West estimator (Newey & West 1987), which is

commonly reported in applied regression output, including by default in several econometric software packages.

HAC estimators are designed for settings in which observations possess a meaningful natural ordering, typically time, along which the correlation between residuals can plausibly be expected to decay with increasing distance (Newey & West 1987). The Bartlett-kernel weighting scheme underlying the Newey-West estimator, together with automatic bandwidth-selection procedures such as that of Andrews (1991), explicitly exploits this ordering to determine how much weight to place on the covariance between nearby versus distant observations.

In a cross-sectional sample such as the one employed here, however, the sequence in which observations are listed, whether alphabetically by city name or by an arbitrary identification number, carries no economic meaning, and there is no structural reason to expect the persecution or survival experience of one city to be more correlated with the city immediately preceding or following it in the dataset than with any other city in the sample.

Applying a HAC estimator under these conditions therefore corrects for a form of dependence that is unlikely to reflect any genuine feature of the data-generating process, while incurring the well-documented cost of AC-robust estimators in small samples, namely a further loss of precision beyond what is required to address heteroskedasticity alone.

For these reasons, and following the recommendations of Long and Ervin (2000) and Davidson and MacKinnon (1993), this study reports HC3 heteroskedasticity-consistent standard errors as its primary basis for statistical inference, rather than the HAC estimator conventionally reported for time-series or panel applications.

Empirical Results

Table 2 reports four versions of the survival-rate regression, designed to illustrate both the substantive findings of the paper and the sensitivity of statistical inference to the choice of standard-error estimator discussed in the preceding methodological section. Specifications 1 and 2 estimate an identical equation, SURV regressed on DAR, DAR^2, POP, and the interaction term POP×DAR; they report identical coefficients, R^2, adjusted R^2, and all other goodness-of-fit statistics, differing only in the covariance estimator used to compute standard errors. Specification 1 uses Newey-West HAC standard errors with Andrews (1991) automatic bandwidth selection, while Specification 2 uses the small-sample, leverage-adjusted HC3 estimator recommended for cross-sectional data of this size by Long and Ervin (2000) and Cribari-Neto and da Silva (2011). Variance inflation factor diagnostics (EViews 14, centered VIF) indicate substantial multicollinearity between DAR and DAR^2 (VIF = 217.9 and 222.2, respectively), consistent with the sensitivity of the quadratic specification to the exclusion of Corfu reported in Table 3. POP and the interaction term POP×DAR show no comparable collinearity (VIF = 2.4 and 3.3), indicating that their loss of significance under HC3 reflects estimation uncertainty in a small, high-leverage sample rather than collinearity with the other regressors.

Table 2. *Regression Equations (Dependent variable: survival rates)*

Variables	Specification 1	Specification 2	Specification 3	Specification 4
C	0.0666 (1.99) [0.062]	0.0665548 (1.7356086) [0.0997201]	0.034819 (1.570048) [0.132091]	0.06168882 2.323955747 0.030777571
DAR	0.0062 (2.93) [0.009]	0.0061695 (1.8296369) [0.0839182]	0.006330 (2.364423) [0.028285]	0.000803912 3.011224086 0.006899289
DAR^2	-1.39E-05 (-2.88) [0.01]	-1.39E-05 (-1.6638709) [0.1134501]	-1.38E-05 (-2.133522) [0.045455]	
POP	-3.18E-07 (-1.84) [0.082]	-3.18E-07 (-1.0594056) [0.3034250]		
POP*DAR	1.48E-09 (2.96) [0.008]	1.48E-09 (1.3771680) [0.1853466]		
R-squared	0.5158	0.5158	0.46891	0.344980809
Adjusted R-squared	0.4082	0.4082	0.41580	0.312229849
S.E. of regression	0.2063	0.2063	0.20498	0.226513393
Sum squared resid	0.7661	0.7661	0.84032	1.026166343
Log likelihood	6.4864	6.4864	5.42329	2.500690783
F-statistic	4.7938	4.7938	8.82918	10.53345654
Prob(F-statistic)	0.0083	0.0083	0.00179	0.004051904
Wald F-statistic	37.6	3.8	6.7	8.0
Prob(Wald F-statistic)	1.65e-08	0.0196	0.0059	0.0100
Durbin-Watson stat	1.69	1.69	1.76	1.837195573
Akaike info criterion	-0.1293	-0.12925	-0.2107	-0.045517344
Schwarz criterion	0.1176	0.117596	-0.0626	0.053668334
Number of Cities	23	23	23	23

Notes: In parentheses t-values and in square brackets probabilities. Specification 1 was estimated using HAC standard errors & covariance (Bartlett kernel, Andrews bandwidth = 0.6761). Specifications 2 and 3 were estimated using Davidson-MacKinnon (HC3) heteroskedasticity-consistent standard errors & covariance. Specifications 1 and 2 report identical point estimates and fit statistics, since both estimate the same equation; they differ only in the method used to compute standard errors, illustrating the sensitivity of statistical inference — though not the coefficients themselves — to the choice of covariance estimator.

Specification 3 estimates a simplified equation, dropping POP and the interaction term, and is likewise estimated using HC3 standard errors. The contrast between Specifications 1 and 2 is substantively important. Under HAC standard errors, DAR ($p = 0.009$), DAR^2 ($p = 0.010$), and the interaction term POP×DAR ($p = 0.008$) are all significant well below the 5% level, and POP itself is significant at the 10% level ($p = 0.082$), producing what appears to be strong, broad-based support for all three of the paper's hypotheses. Under HC3 standard errors, applied to the identical coefficients, this picture changes considerably: DAR remains only marginally significant ($p = 0.084$), while DAR^2 ($p = 0.113$), POP ($p = 0.303$), and the interaction term ($p = 0.185$) all lose statistical significance entirely. As discussed above, this divergence is consistent with the finding of MacKinnon and White (1985) that unadjusted or autocorrelation-based standard errors can substantially understate estimation uncertainty in small samples, particularly in the presence of high-leverage observations; Athens, whose population

of 1,124,109 is more than three times that of the next-largest city in the sample, is precisely the kind of high-leverage observation this literature warns against. The fact that HAC standard errors, which were not designed to account for leverage in a cross-section at all, produce the most favorable results for the paper's hypotheses is itself a signal that those results should be treated with caution rather than taken as the primary finding.

Specification 3 addresses this directly by simplifying the model to include only DAR and DAR^2, the two variables that retain at least marginal explanatory relevance once HC3 standard errors are applied, and re-estimating under HC3. The simplified specification provides a more parsimonious model and is modestly preferred by the information criteria and adjusted R^2.

The coefficients in Specification 3 imply a curvilinear relationship between the number of days available for rescue and the probability of survival. The estimates suggest a concave relationship, with an estimated turning point at approximately 230 days. However, the leave-one-out analysis (Table 3) indicates that the evidence for concavity is sensitive to the inclusion of Corfu, the latest-deported community in the sample.

In percentage-point terms, a 100-day increase in DAR is associated with an increase in the survival rate of approximately 6.3 percentage points at low values of DAR, an effect that diminishes and eventually turns negative as DAR approaches and exceeds 230 days. This pattern is consistent with the qualitative case evidence discussed in section five: communities that learned of their impending persecution earlier than the March 1943 baseline, such as those deported in the initial wave, had essentially no opportunity to organize a rescue response, while communities with a moderate delay were able to draw on the precedent of earlier deportations to organize flight to the mountains or into hiding. The eventual downturn beyond 230 days may reflect the fact that the very longest delays, such as that experienced by Corfu, were concentrated in communities where local administrative collaboration with the occupying authorities, rather than lack of time, determined the outcome, as discussed further in section five.

Specification 4 estimates a linear version of the parsimonious model, including only DAR and the constant. It is reported as a robustness benchmark for assessing whether the positive association between deportation timing and survival depends on the quadratic specification.

Taken together, Table 2 supports two conclusions central to the paper's argument. First, the evidence provides suggestive support for a nonlinear association between deportation timing and survival, although the estimates remain sensitive to model specification and the small sample size. Second, the paper's hypotheses regarding population size (H1) and its interaction with time available for rescue (H3) are not supported with statistical confidence once estimation uncertainty is properly accounted for, notwithstanding their apparent significance under HAC standard errors and their consistency with the theoretical framework developed in section two. This does not imply that population size played no role in Jewish survival in Greece; rather, it indicates that a sample of 23 cities lacks the statistical power to confirm this relationship with confidence, given the disproportionate influence of a single large city in the sample. The qualitative case evidence presented in

section five, rather than the regression results, therefore provides the primary support for the role of city size and its interaction with time available for rescue advanced in this paper.

A further question is whether the estimated DAR relationship is driven by a single influential observation. Table 3 reports a leave-one-out sensitivity analysis for the quadratic specification SURV regressed on C, DAR and DAR², estimated with Davidson-MacKinnon HC3 heteroskedasticity-consistent standard errors (Long & Ervin 2000).

Table 3. *Robustness - Leave-One-Out Sensitivity for Quadratic Specification*

Excluding Variable	**None Baseline**	**Chalkis POP 79,789**	**Corfu POP 111,548**	**Athens POP 1,124,109**	**Thessaloniki POP 375,127**	**Corfu Linear C DAR**
C	0.03482 (1.570) [0.1320]	0.0356 (1.582) [0.1300]	0.02727 (1.063) [0.3008]	0.03658 (1.623) [0.1209]	0.04180 (1.896) [0.0732]	0.06168 (2.323) [0.0307]
DAR	0.006329 (2.364) [0.0282]	0.006133 (2.209) [0.0396]	0.008300 (1.683) [0.1086]	0.005865 (2.173) [0.0425]	0.006364 (2.294) [0.0333]	0.000803 (3.011) [0.0068]
DAR^2	-1.38E-05 (-2.133) [0.0454]	-1.33E-05 (-2.012) [0.0585]	-1.88E-05 (-1.517) [0.1456]	-1.28E-05 (-1.977) [0.0626]	-1.39E-05 (-2.067) [0.0525]	-
R-squared	0.4689	0.441808054	0.479319796	0.436544808	0.461051423	0.344980809
Adjusted R-squared	0.41580	0.383051008	0.424511353	0.377233735	0.404319993	0.312229849
N	23	22	22	22	22	22

Notes: Dependent variable: SURV. Specification: C DAR DAR^2. Estimator: OLS with Davidson-MacKinnon HC3 heteroskedasticity-consistent SEs. N=22 when one city excluded, N=23 baseline. Chalkis SURV 52.31% DAR 388 high survival; Corfu DAR 465 latest deportation; Athens POP 1.12M high leverage; Thessaloniki POP 375k largest pre-war Jewish population NJB. Excluding Athens, Chalkis, Thessaloniki DAR remains significant at 5% HC3. Excluding Corfu quadratic loses significance (DAR p=0.108, DAR2 p=0.145) but linear DAR remains significant at 1% (p=0.0068, last column), confirming linear time effect is robust while curvature identification depends on late-deportation tail.

Each column excludes one potentially influential city identified on substantive and statistical grounds. Athens is excluded as a high-leverage outlier in terms of total city population [1,124,109 versus a mean of 107,588 for the remaining 22 cities], Thessaloniki as the second-largest city and the largest pre-war Jewish community in Greece [375,127 total population], Chalkis as a high-survival outlier at intermediate DAR [SURV 52.31% at DAR 388], and Corfu as the latest deportation in the sample [DAR 465].

Excluding Athens, Chalkis, or Thessaloniki leaves the results qualitatively unchanged: DAR remains significant at 5% with HC3 [p=0.0425, 0.0396 and 0.0333 respectively] and DAR² significant at 10% [p=0.0626, 0.0585 and 0.0525]. Excluding Corfu weakens the quadratic specification to DAR p=0.1086 and DAR² p=0.1456, indicating that identification of concavity depends on retaining the late-deportation tail. The linear effect itself is robust: when Corfu is excluded and the model is estimated as SURV on C and DAR only, DAR remains positive and highly significant at 1% with HC3 [coefficient 0.000803, t=3.01, p=0.0068, N=22, R²=0.345].

To assess the robustness of the results, a range of alternative specifications and measures of urban characteristics were examined. In addition to the baseline population measure (POP), the analysis considered the squared population term (POP^2), the logarithm of population [ln(POP)], city altitude, and the share of the Jewish population in the total population of the host city. These variables were introduced separately and in alternative combinations to examine whether the estimated relationship between deportation timing and Jewish survival was sensitive to the way urban characteristics were measured. The inclusion of these alternative measures did not materially change the main econometric results. In particular, the positive association between deportation timing and survival remained, while the coefficients associated with city population and its alternative transformations were not consistently statistically significant. Given the small number of observations, these additional specifications are treated as robustness checks rather than as a basis for selecting a more complex model.

The most robust empirical finding is the positive association between deportation timing and Jewish survival. Evidence for a nonlinear relationship is suggestive but sensitive to the extreme late-deportation observations. By contrast, city population and its interaction with deportation timing do not receive statistically robust support in the 23-city sample.

Mechanisms of Survival across Greek Jewish Communities

The regression results identify systematic relationships between Jewish survival and the structural characteristics of the communities, particularly the time that elapsed before deportation reached each city. The aggregate statistical results, however, cannot capture the specific mechanisms through which individual Jews and their communities were able to avoid deportation. In this section we examine first selected literature on the theory and historiography of rescuing Jews in the Holocaust period and second apply this to the Greek Jewish Communities.

The Historical Evidence on Jewish Rescuing

Historical evidence indicates that survival depended on a variety of strategies, including the use of false identity documents, hiding, flight to mountainous or rural areas, dispersal among local populations, and assistance from resistance organizations and individual rescuers.

For example, Baron (1986) in a review survey examines non-Jewish who rescued Jews during the Holocaust, identifying two main approaches: historical studies of national/local conditions enabling rescue (e.g., Denmark, Bulgaria, France), and psycho-social studies profiling individual rescuers through interviews. Historical works link rescue rates to the nature of German occupation and native compliance or resistance. Psycho-social research examines rescuers' demographics, upbringing, social marginality, role models, religious/political values, and—most decisively—prior relationships with those saved. Baron notes some rescuers acted from mixed or

self-interested motives. He concludes that no study has yet successfully synthesized macro-historical and psychological explanations of rescue behavior.

Moore (2003) examines Jewish rescue in Nazi-occupied Western Europe, focusing on the Netherlands and comparing it with Belgium and France—countries with strikingly different Jewish survival rates (25% in the Netherlands vs. ~60% in Belgium and ~75% in France). He argues existing scholarship, dominated by sociological/psychological studies of individual rescuer motivation, neglects the broader social and administrative context shaping rescue possibilities. Moore highlights factors like differing occupation structures, population registration systems, Jewish self-help organizations, and community leadership (especially clergy) in mobilizing rescue networks. He also complicates the "righteous gentile" narrative, noting rescuers' mixed motives—including profit, religious conversion, and even sexual exploitation—alongside genuine altruism, and calls for more integrated historical-sociological analysis.

Oliner & Oliner (1988) drawing on interviews with over 700 European rescuers and non-rescuers ("bystanders"), the Oliners investigate why some ordinary people risked their lives to save Jews during the Holocaust while others remained passive. They find that rescuers were distinguished less by heroic impulse than by empathy, a sense of connection to others, and moral values instilled through upbringing—particularly by parental modeling of caring behavior. The book compares rescuers and bystanders systematically, offering both historical analysis (including a chapter by Lawrence Baron on national contexts) and psychological explanation, and became widely regarded as a landmark study of altruism under extreme conditions.

Guttstadt et al. (2016) central argument is that the neutral countries' responses to the Holocaust cannot be classified simply as either rescue or indifference. Their policies toward Jewish refugees and their own Jewish citizens were shaped by pragmatism, domestic politics, diplomatic pressure, and changing expectations about the war's outcome. The editors emphasize considerable ambivalence and inconsistency, challenging postwar "rescue myths" and simplistic national narratives. A comparative approach therefore reveals a spectrum ranging from humanitarian assistance to restrictive policies and inaction, requiring a more nuanced assessment of neutrality during the Holocaust.

Jones (1998) uses Oskar Schindler as a case study to examine Holocaust rescue through the economic concept of "amenity potential," derived from Harold Demsetz (1983). The concept refers to the opportunities created by controlling a firm's resources: an owner can deploy those resources for purposes beyond profit maximization, within legal and market constraints. Jones argues that Schindler's control over factories, labor, money, and business relationships gave him unusual opportunities to protect Jewish workers. His rescue efforts therefore cannot be understood solely as altruism or moral transformation; they were made possible by his economic position and control of organizational resources. Schindler initially operated within the Nazi economic system and benefited from it, but subsequently used the resources accumulated through his businesses to circumvent or manipulate that system, including through bribes, employment arrangements, and the relocation of his workers. Jones thus presents rescue as partly a problem of rational choice under institutional constraints, showing how economic resources could create opportunities for resistance even within a highly coercive system.

Varese and Yaish (2000) examine Holocaust rescue as a problem of matching the supply of potential rescuers with the demand of people needing help. Rather than treating rescue primarily as a consequence of altruistic personality or moral motivation, they emphasize opportunities, information, trust, and situational circumstances. Using secondary analysis of data on rescuers and non-rescuers, they find that a direct request for help substantially increased the probability of rescue. Potential rescuers also tended to help people they already knew or people referred through trusted intermediaries, reducing the risk of helping the "wrong" person. The authors therefore argue that many people may possess a greater capacity for altruistic behavior than observed rescue rates suggest. In economic terms, the problem is partly one of market failure in the provision of altruism: willing helpers and people in need may fail to find one another because of information and trust problems. Improving the mechanisms through which requests for assistance reach potential rescuers could therefore increase the amount of rescue.

Hoffman (2011) examines whether economic resources and income affected the probability that individuals would rescue Jews during the Holocaust. Using both cross-country data and individual-level data on rescuers and non-rescuers, he finds a strong positive relationship between wealth and rescue: richer countries had more rescuers, and within countries, wealthier individuals were more likely to rescue Jews. Importantly, the individual-level relationship remains after controlling for practical measures of the ease of rescue, such as the number of rooms in a household. Hoffman therefore argues that the result cannot be explained simply by wealthier people having more physical capacity to hide Jews. Since wealthier individuals arguably also had more to lose from being caught, the findings are consistent with the broader proposition that altruism increases with income. The paper thus introduces an important economic dimension to Holocaust rescue, suggesting that the capacity and willingness to bear the costs and risks of helping others were partly associated with economic status.

A Theoretical Framework for Rescue and Survival

The historical literature reviewed above suggests that Jewish rescue can be understood as the outcome of an interaction between the availability of potential rescuers and the ability of Jews to identify and exploit opportunities for survival. This perspective integrates the psychological, historical, sociological, and economic explanations of rescue without assuming that either the characteristics of rescuers or those of Jewish victims alone determined survival.

On the rescuer side, the probability of assistance was influenced by moral values, empathy, prior relationships, social networks, economic resources, and the institutional environment. Oliner and Oliner (1988) emphasize empathy and moral socialization; Baron (1986) and Moore (2003) stress the importance of local political and institutional conditions; Varese and Yaish (2000) highlight the importance of information, trust, and direct requests for assistance; while Jones (1998) and Hoffman (2011) demonstrate that economic resources could increase the capacity or willingness to undertake rescue. Rescue therefore depended not simply on whether individuals were altruistic, but also on whether they possessed the resources, social connections, and opportunities necessary to act.

At the same time, survival depended on characteristics and decisions on the Jewish side. Jews differed in their access to information, mobility, financial resources, social networks, and ability to reach locations where hiding or escape was possible. Particularly important was the recognition of the threat. Individuals or communities that underestimated the severity or imminence of persecution could delay flight or concealment, thereby reducing the opportunities available to them once deportation operations began. Conversely, early recognition of the danger could allow individuals to obtain false documents, leave urban areas, establish hiding places, contact resistance organizations, or seek assistance from local populations.

The resulting process can therefore be understood as one of opportunity and matching. Potential rescuers needed both the willingness and the capacity to provide assistance, while Jews needed to recognize the danger and establish access to people or networks capable of providing it. Social relationships and intermediary organizations could connect the two sides. The effectiveness of this process was further conditioned by geography, local institutions, the degree of German control, and the availability of safe locations.

This framework gives particular importance to time. Additional time did not automatically produce rescue or survival. Rather, it increased the number of opportunities available for the different components of the survival process to operate. More time could permit the recognition of the threat, the organization of escape, the acquisition of false documents, the establishment of hiding places, the mobilization of resistance networks, and the development of relationships between Jews and potential rescuers. Time could therefore be converted into survival when the necessary social, economic, geographical, and institutional conditions were present.

The framework also helps explain why communities exposed to similar temporal conditions could nevertheless experience very different survival outcomes. A longer period before deportation increased the potential opportunity set, but the extent to which that opportunity was realized depended on the availability of rescuers, the organization of assistance, the willingness of local populations to help, the accessibility of rural or mountainous refuge, and the ability of Jews to respond to the emerging threat. Conversely, a short period before deportation could sharply restrict these possibilities, particularly when German authorities exercised effective control or when the population was too large to disperse rapidly.

The qualitative evidence presented below is consistent with this framework. The cases do not permit direct estimation of the individual mechanisms identified in the theoretical literature. Instead, they illustrate how additional time could create opportunities for organized assistance, flight, hiding, and dispersal, and why those opportunities were converted into survival in some communities but not in others. The purpose of the case evidence is therefore to identify plausible mechanisms underlying the statistical relationship between deportation timing and Jewish survival, rather than to provide an independent causal test of the regression results.

Rescuing Greek Jews

Table 4 summarizes the principal mechanisms of survival identified for the communities in the sample and the main actors involved. The cases provide qualitative

evidence of the mechanisms described in the theoretical framework above. In particular, they illustrate how additional time before deportation could create opportunities for flight, hiding, dispersal, the acquisition of false documents, and the organization of assistance. They also demonstrate that the availability of time was not sufficient by itself: its value depended on the existence of social networks, willing rescuers, resistance organizations, accessible rural or mountainous refuge, and the ability of Jews to recognize and respond to the threat.

The case evidence is not intended to provide an independent causal test of the regression coefficients. Rather, it is used to identify plausible mechanisms consistent with the statistical association between deportation timing and survival and to illustrate why communities exposed to similar temporal conditions nevertheless experienced different outcomes. The cases therefore provide a bridge between the aggregate statistical relationship and the historical processes through which time could be converted into survival.

Organized Assistance and Resistance

The most striking cases are Athens, Volos, Larissa, Trikala, Zakynthos, Chalkis, Patras and Agrinio, where survival involved organized assistance rather than isolated individual escapes. Bowman (2003) discusses the case of Chalkis, on the island of Evia. Athens is particularly important because survival involved several mechanisms simultaneously—false identity papers, hiding, escape to the Middle East, and participation in resistance networks—with Archbishop Damaskinos and Police Chief Angelos Evert among the prominent figures associated with efforts to protect Jews.

Volos similarly illustrates the importance of cooperation among religious leaders, resistance organizations, and the local population. These cases suggest that the availability of time was potentially valuable not merely because individuals could flee spontaneously, but because additional time allowed networks of assistance to organize more effective collective responses.

Flight and Dispersal into Rural Areas

A second mechanism was the physical dispersal of Jewish communities into mountainous and rural areas. Volos, Larissa, Trikala, Arta, and Agrinio provide examples in which Jews escaped from the urban environment and sought refuge in villages or mountainous areas. The case of Agrinio is particularly notable because the community was dispersed among surrounding villages, while in Veria Jews were hidden in the nearby village of Sykia.

These cases highlight the importance of the relationship between urban Jewish communities and their surrounding rural populations. Survival could therefore depend not only on the resources available within a city but also on whether Jews could reach locations where German authorities had less effective control and where local inhabitants were willing to provide assistance.

Table 4. *Mechanisms of Survival across Greek Jewish Communities*

Community	**Documented/Reported Means of Survival**	**Principal Actors Reported in the Historical Literature**
Athens	False identity papers, hiding, escape to Middle East, resistance	Archbishop Damaskinos, Police Chief Angelos Evert, resistance networks
Volos	Flight to mountain villages, resistance protection	Rabbi Moses Pesach, Archbishop Ioakeim, EAM/ELAS
Larissa	Flight to mountains, hiding by villagers, resistance	EAM/ELAS and local population
Trikala	Flight to mountains and hiding	Resistance and local population
Zakynthos	Entire community hidden	Mayor Loukas Karrer, Bishop Chrysostomos and islanders
Chalkis	Hiding and evacuation before arrests	Local population and resistance
Patras	Hiding and flight	Resistance networks
Agrinio	Entire community dispersed to villages	Local population and resistance
Veria	Hidden in nearby village of Sykia	Local villagers
Thessaloniki	Small number escaped before deportations or survived camps	Individual rescue efforts and resistance
Ioannina	Limited escapes before deportation	Individual rescuers
Corfu	Some hid in villages or escaped	Local assistance
Kavala	Very few escaped before deportation	Individual efforts
Drama	Very few escaped	Individual efforts
Serres	Very few escaped	Individual efforts
Komotini	Very few escaped	Individual efforts
Xanthi	Very few escaped	Individual efforts
Kastoria	Few escaped before deportations	Individual efforts
Arta	Hiding and flight to mountains	Resistance and villagers
Preveza	Hiding	Local population
Chania/Heraklion	A few survivors were absent from the island or escaped	Individual circumstances

Source: Author's compilation based on the historical literature: Antoniou (2018), Apostolou (2018), Bantiou (2026), Blümel (2021), Bowman (2003, 2009), Chandrinos & Droumpouki (2018), Droumpouki (2016), Fleming (2008), Kerem (2012), Naar (2016), Schminck-Gustavus (2023), Spyros (2019), and Tzafleris (2019).

Note: Table 4 includes Zakynthos for qualitative comparison despite its exclusion from the regression sample (see Limitations); Patras and Agrinio are presented separately here to reflect distinct local rescue histories, though combined as a single observation in the regression. Alexandroupolis, Didymoteicho, Florina, and Nea Orestias-Soufli are omitted from Table 4 due to limited documented case-level detail in the sources consulted.

Limited Opportunities for Escape

At the other end of the spectrum are communities such as Kavala, Drama, Serres, Komotini, Xanthi, Kastoria, and Didymoteicho, where only a very small number of Jews escaped before deportation. These communities generally experienced extremely low survival rates. The contrast with communities such as Volos, Larissa, Trikala, and Zakynthos suggests that survival was not simply a function of the size of the Jewish population. Rather, opportunities for escape and hiding depended on the time available, the possibility of reaching safe locations, the willingness of the local population to provide assistance, and the existence of organized resistance or rescue networks.

The Exceptional Case of Zakynthos

Zakynthos represents the most exceptional case in the sample. The entire Jewish community was hidden rather than deported, resulting in a survival rate of 100 percent. This remarkable outcome involved cooperation among Mayor Loukas Karrer, Bishop Chrysostomos, and the island's population. Unlike communities in which only a fraction of the Jewish population managed to escape or remain in hiding, Zakynthos demonstrates the potential importance of collective local action in protecting Jewish residents. The case is therefore both historically exceptional and statistically influential, and its experience should be considered separately when interpreting the regression results. For this reason, Zakynthos was excluded from the regression analysis.

Thessaloniki as a Distinctive Case

Thessaloniki constitutes a particularly important case because of the exceptional size of its Jewish population and the extremely low survival rate despite the existence of a period of 12 days between the beginning of deportations on 4 March 1943 and the beginning of deportation in Thessaloniki. The literature on the history of the Jews of Thessaloniki is extensive; see, among others, Mazower (2005), Naar (2016), Papamichos Chronakis (2018), Rozen (2005), and Saltiel (2014, 2020).

Mazower (2005) provides important historical context for understanding the distinctive position of Thessaloniki's Jewish community before the Holocaust. For centuries under Ottoman rule, Thessaloniki was one of the principal centers of Sephardic Jewish life in the Mediterranean, and its Jewish population played a major role in the city's commercial, social, and cultural life. The incorporation of Thessaloniki into Greece in 1912, the arrival of large numbers of Christian Orthodox refugees after 1922, the Great Fire of 1917, and subsequent processes of urban reconstruction and Hellenization profoundly altered the city's demographic and social structure.

Nevertheless, on the eve of the Holocaust, Thessaloniki remained home to one of the largest and most institutionally developed Jewish communities in southeastern Europe. Mazower's account is therefore relevant to interpreting Jewish population size not merely as a demographic variable but also as an indicator of the scale of communal institutions, social networks, and economic resources available to the Jewish population. The destruction of Salonica's Jewish community under German occupation consequently represented not only a high level of individual mortality but also the near-complete destruction of a long-established communal and urban social world (Mazower, 2005).

Papamichos Chronakis (2018) further highlights the complex social and national identity of Thessalonian Jews before and during the Holocaust. Focusing on Jews from Thessaloniki deported to Auschwitz, he shows that Jewish identity coexisted with a strong sense of Greek national belonging, challenging interpretations that portray the community as socially or nationally isolated from Greek society. This evidence is relevant to understanding the characteristics of the large Thessalonikian Jewish community, whose size was accompanied by extensive communal and social networks and a complex relationship with the broader Greek population. Thus, Jewish population size may capture not only demographic scale but also the institutional and social resources embedded in large and established Jewish communities.

The relationship between Jewish population size and survival was also mediated by the institutional and political characteristics of individual communities. Rozen (2005), in his study of Tzevi Koretz, Chief Rabbi of Thessaloniki from 1933 to 1943, illustrates the complex relationship between the city's Jewish community, its leadership, and the wider Greek political and social environment. His analysis highlights both the extensive institutional organization of Thessalonian Jewry and the controversies surrounding communal leadership on the eve of and during the Holocaust. This suggests that the size of a Jewish community should not be interpreted simply as a measure of the number of individuals at risk. Larger communities could also possess more developed communal institutions, leadership structures, and social networks, although these resources did not necessarily translate automatically into greater protection under conditions of systematic persecution (Rozen 2005).

The destruction of Jewish communal institutions provides further evidence of the broader social consequences of the Holocaust in Greece. Saltiel (2014) documents the destruction of Thessaloniki's historic Jewish cemetery in 1942, demonstrating how the persecution of Greek Jews extended beyond the physical targeting of individuals to the systematic destruction of the institutions and material structures associated with Jewish communal life. The cemetery represented centuries of Jewish presence in Thessaloniki and its destruction constituted an important step in the removal of the community's historical and cultural foundations. This case illustrates that the resources associated with a large Jewish population—including communal institutions, collective memory, and established social structures—could themselves become targets of persecution. Consequently, population size may capture both the demographic scale of a community and the institutional depth that characterized its prewar social organization, although these resources could be progressively dismantled as persecution intensified (Saltiel 2014).

Only a small number of Jews escaped before the deportation, while many of those who were deported subsequently died in the camps. The Thessaloniki case illustrates the limitations of a short period of warning when the Jewish community was exceptionally large and the deportation operation could be implemented on a massive scale. It also provides an important contrast with smaller communities that had more time to organize flight or hiding.

Overall Interpretation

Taken together, the historical evidence and the theoretical literature suggest that Jewish survival was the outcome of an interaction between opportunities created by

time, the availability and capacity of potential rescuers, and the ability of Jews to recognize and exploit those opportunities. The literature on rescue demonstrates that assistance cannot be attributed to a single motivation. Empathy, moral values, prior relationships, religious and political beliefs, economic resources, and situational incentives could all influence the willingness and capacity of non-Jews to provide assistance (Baron 1986, Oliner & Oliner 1988, Jones 1998, Hoffman 2011).

At the same time, rescue depended on information, trust, and social connections that allowed potential rescuers and those seeking assistance to find one another (Varese & Yaish 2000). Historical studies further demonstrate that these individual characteristics operated within broader institutional and political environments that could either facilitate or constrain rescue (Baron 1986, Moore 2003, Guttstadt et al. 2016).

The Greek cases are consistent with this multidimensional interpretation. Communities such as Athens, Volos, Larissa, Trikala, Zakynthos, Chalkis, Patras, and Agrinio illustrate situations in which survival opportunities were converted into organized assistance, hiding, flight, or dispersal. The importance of resistance organizations, religious leaders, local authorities, villagers, and individual rescuers suggests that survival often depended on the existence of networks capable of mobilizing assistance rather than on isolated acts of individual altruism. The cases of Volos, Larissa, Trikala, and Agrinio, in particular, demonstrate how Jews could use additional time to move from urban communities to villages and mountainous areas where German control was weaker and assistance was available. Zakynthos provides the most striking example of collective local action, in which the entire Jewish community was protected.

The evidence also suggests that time operated as an enabling condition rather than as an independent mechanism of rescue. Additional time increased the opportunity to recognize the threat, establish contacts, obtain false documents, organize hiding places, mobilize resistance networks, and escape to safer locations. However, time could be converted into survival only when other conditions permitted action. A community might have additional time but limited survival opportunities if effective networks of assistance were absent, if local authorities cooperated with the occupiers, if safe locations were inaccessible, or if the population failed to respond sufficiently early to the threat. Conversely, where organized networks and willing local populations existed, even relatively small communities could use the available time effectively.

The historical evidence also points to an important victim-side dimension of the rescue process. Jews were not passive recipients of rescue. Their survival could depend on recognizing the seriousness of persecution, deciding when to flee or hide, mobilizing personal and communal networks, and reaching locations where assistance was available. Underestimating the threat could delay these actions and reduce the effective value of the time available. Thus, the same number of days before deportation did not necessarily represent the same effective opportunity for survival across communities.

This perspective helps reconcile the apparent importance of both time and population size in the quantitative analysis. Population size may represent not only the number of individuals exposed to persecution but also differences in the scale and organization of communal institutions and social networks. Large communities

could possess substantial social and economic resources, but they could also be more difficult to disperse and more visible to the authorities. Thessaloniki illustrates this ambiguity particularly clearly. Its extensive communal organization and social networks did not translate into large-scale escape when the deportation process was implemented rapidly and on a massive scale. The case therefore demonstrates that resources available to a community could not necessarily be mobilized when the time available for action was severely constrained.

The qualitative evidence consequently provides a plausible mechanism for interpreting the statistical relationship between deportation timing and survival. The regression does not identify which particular individuals acted as rescuers, why they acted, or why particular Jews successfully obtained assistance. Nor can the available data establish the relative importance of altruism, economic resources, social networks, threat perception, or geography. What the case evidence demonstrates is that additional time created an opportunity structure within which these mechanisms could operate. Where networks of assistance, favorable geography, willing local populations, and responsive Jewish communities were present, that opportunity could be transformed into actual survival. Where such mechanisms were absent or where deportation occurred rapidly, the opportunity to act was greatly reduced.

The central implication is therefore that time should be understood as a necessary but not sufficient condition for rescue and survival. Its effect was conditional on the social, economic, institutional, and behavioral resources available to both those offering assistance and those seeking it. The Greek cases thus complement rather than replace the econometric evidence: the statistical analysis identifies the importance of the temporal opportunity, while the historical evidence and the rescue literature indicate the mechanisms through which that opportunity could—or could not—be converted into survival.

Limitations

Several limitations should be acknowledged. First, the empirical analysis is based on a relatively small cross-sectional sample of 23 Greek cities. The limited number of observations necessarily reduces statistical power and constrains the number of explanatory variables that can be included simultaneously. The results should therefore be regarded as evidence of patterns within the observed communities rather than as precise estimates that can be readily generalized beyond the sample.

Second, the two principal explanatory variables, city population (POP) and days available for rescue (DAR), capture only a limited part of the processes that may have shaped survival. The theoretical and historical literature suggests that survival depended on a combination of rescuer characteristics and motivations, economic and social resources, information, social networks, local institutions, geographical opportunities, Jewish responses to persecution, and the behavior of local and occupation authorities. These factors could not be measured consistently across all communities and are therefore not incorporated directly into the regression analysis. The qualitative evidence in section five is used instead to illustrate how such mechanisms may have operated.

Third, DAR is not a direct measure of the amount of time actually devoted to rescue. It measures the interval between the beginning of the deportation campaign in Greece and the beginning of deportation in a particular city. Its theoretical interpretation is therefore as a measure of the temporal opportunity structure available to a community. Additional time could allow Jews to receive information about deportations elsewhere, recognize the seriousness of the threat, establish contacts, obtain false documents, hide, flee, disperse, or seek assistance from resistance organizations and local populations. Whether these opportunities were actually utilized depended on conditions that are not directly observed in the quantitative data.

Fourth, DAR may also capture factors other than time itself. The timing of deportation could be related to differences in the organization of German occupation, local administration, geography, transportation, or the strategic importance of particular cities. Consequently, the estimated association between DAR and survival should not be interpreted as establishing that the passage of time alone produced higher survival.

Fifth, the linear and quadratic DAR terms are highly collinear. This reduces the precision with which their separate coefficients can be estimated and contributes to the sensitivity of the quadratic specification to the exclusion of individual observations, particularly Corfu. The evidence for curvature should therefore be interpreted as suggestive rather than as establishing a precise functional form for the relationship between time and survival.

Sixth, the historical data are subject to measurement and comparability problems. Jewish population figures, deportation dates, and numbers surviving or remaining after deportation have sometimes been reconstructed from different historical sources. Population movements before and during the occupation may also make it difficult to assign individuals unambiguously to particular communities. These issues introduce the possibility of measurement error in both the dependent and explanatory variables.

Finally, the qualitative evidence cannot resolve the causal mechanisms identified in the theoretical literature. The historical cases demonstrate that organized assistance, flight, hiding, dispersal, resistance networks, and local protection were important pathways to survival, but they do not allow the relative contribution of rescuer motivation, Jewish behavior, economic resources, social networks, geography, or other factors to be estimated. The case evidence should therefore be understood as mechanism-oriented historical evidence, rather than as an independent causal test of the regression results.

These limitations notwithstanding, the combination of econometric analysis and community-level historical evidence provides a useful framework for examining variation in Jewish survival across occupied Greece. The quantitative analysis identifies a systematic temporal pattern, while the historical evidence helps clarify the types of opportunities and mechanisms through which differences in deportation timing could have been translated into differences in survival.

Conclusions

This study examined the substantial variation in Jewish Holocaust survival rates across Greek cities by combining quantitative evidence from 23 city-community observations with historical case-study evidence. The analysis focused on two characteristics that may have shaped the capacity of Jewish communities to respond to persecution: the population of the host city and the timing of deportation. The results indicate that deportation timing is the most consistent statistical correlate of survival in the Greek sample. Communities deported later generally experienced higher survival rates, whereas the relationship between host-city population and survival is considerably weaker and does not remain statistically robust across the preferred specifications.

The importance of deportation timing should not, however, be interpreted as evidence that additional days mechanically or causally produced higher survival. Deportation timing was itself shaped by geographical, administrative, and occupation-related circumstances that may also have affected the possibilities for escape and concealment. Moreover, the small sample and the limited number of distinct deportation dates require caution in interpreting the regression coefficients. The evidence is therefore best understood as an association: communities whose deportation occurred later generally had a larger temporal opportunity to respond to the escalating persecution.

The historical evidence helps explain why this temporal opportunity could matter. Later deportation provided additional time for information about Nazi intentions to circulate, for individuals and families to assess the danger, and for communal and personal networks to organize responses. In different communities, this time was converted into concrete strategies including hiding, flight to rural and mountainous areas, dispersal among non-Jewish populations, acquisition of false identity documents, and assistance from resistance organizations, local officials, religious leaders, and individual rescuers. The contrast between communities with substantial survival and those deported rapidly illustrates that time was not itself a protective mechanism. Its value depended on whether individuals and communities possessed the social networks, information, geographical opportunities, and institutional support necessary to transform time into effective action.

The findings also qualify a simple population-size explanation of survival. A large urban population could provide anonymity, diverse social networks, economic resources, and institutional opportunities. At the same time, a large Jewish population could be more difficult to conceal or disperse and could attract greater administrative attention. Thessaloniki illustrates this tension particularly clearly: despite its extensive communal organization and social networks, the rapid implementation of deportation left very little opportunity to convert these resources into large-scale escape. Conversely, smaller communities could sometimes achieve substantial survival when geographical conditions, local assistance, resistance networks, and individual initiatives facilitated concealment or flight. Zakynthos, which was not deported and is therefore excluded from the regression analysis, represents the clearest historical boundary case of this interaction between local protection and survival.

More broadly, the Greek evidence suggests that Holocaust survival should not be understood through a single demographic characteristic or a simple distinction between

rescuers and victims. Survival emerged from the interaction of temporal opportunity, local circumstances, social networks, institutional responses, geography, and individual agency. Jewish people were not passive recipients of rescue: they actively sought information, organized escape, obtained false identities, dispersed into safer areas, and mobilized relationships with non-Jewish individuals and organizations. At the same time, the effectiveness of these actions depended heavily on the willingness and capacity of surrounding populations and institutions to provide protection.

The principal contribution of this study is therefore to place the temporal organization of persecution alongside the demographic and social conditions that have traditionally received greater attention in studies of Holocaust survival. The Greek case demonstrates that the timing of deportation can be an important dimension of survival, but that time mattered because it created an opportunity for action rather than because it independently determined outcomes. Future research could extend this analysis by incorporating more detailed measures of Jewish population characteristics, occupation regimes, geographical accessibility, resistance networks, local administrative behavior, and non-Jewish assistance. Such evidence would make it possible to assess more precisely how temporal opportunity was transformed into survival across different communities.

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