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# ABSTRACT

## Social Networks and Surviving the Holocaust*

Survivor testimonies link survival in deadly POW camps, Gulags, and Nazi concentration camps to the formation of close friendships with other prisoners. We provide statistical evidence consistent with these fundamentally selective testimonies. We study the survival of the 140 thousand Jews who entered the Theresienstadt ghetto, where 33 thousand died and from where over 80 thousand were sent to extermination camps. We ask whether an individual's social status prior to deportation, and the availability of potential friends among fellow prisoners influenced the risk of death in Theresienstadt, the ability to avoid transports to the camps, and the chances of surviving Auschwitz. Pre-deportation social status protected prisoners in the self-administered society of the Theresienstadt ghetto, but it was no longer helpful in the extreme conditions of the Auschwitz-Birkenau concentration camp. Relying on multiple proxies of pre-existing social networks, we uncover a significant survival advantage to entering Auschwitz with a group of potential friends.

**JEL Classification:** Z1

**Keywords:** social status, social networks, Holocaust Survival, Nazi concentration camp, ghetto, Theresienstadt/Terezín, Auschwitz-Birkenau

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*Mutual help of prisoners in concentration camps was the main and most effective way of saving lives.* Testimony of an Auschwitz survivor (Radil, 2016, p.165).

# 1 Introduction

Survival in deadly internment camps, including POW camps, Soviet Gulags, and Nazi concentration camps has been linked to the ability of prisoners to form small mutual-support groups (Davidson, 1984; McElroy, 1957; Schmolling, 1984; Applebaum, 2003), which points to the importance of social networks in extreme circumstances.[1] However, much of the existing literature is based on survivor testimonies, which are fundamentally selective, particularly in Holocaust settings where survival rates were typically low.[2] It is possible that those who did not survive also formed mutual-support groups; therefore, statistical analysis based on all prisoners can provide an important complement of qualitative research.

In this paper, we examine the importance of pre-deportation social status and the availability of social networks (linkages, potential friends) for survival in two Holocaust settings: Theresienstadt and Auschwitz.[3] We study the Jewish prisoners of the Theresienstadt ghetto established in 1941 by the SS in German-occupied Czech lands. Most of the prisoners had been deported from Czech, German, and Austrian cities. Of the 140 thousand Theresienstadt prisoners, 33 thousand died there, almost all elderly, and over 80 thousand were sent to extermination camps.[4] Our analysis is based on the near-complete database of individual histories of Theresienstadt prisoners and thus avoids survival biases by incorporating information on those who did not survive the Holocaust. Theresienstadt prisoners faced high levels of stress and omnipresent hunger even before entering the extreme environment of an extermination camp. Pre-existing friendships, social and family

[1] Social networks affect health in normality and mediate the effects of stress in particular (e.g., House et al., 1988). Social networks also respond to stress. For example, Romero et al. (2016) suggest that in social networks, stress induces higher clustering and an intensification of insider vs. outsider behavior.

[2] For research on Nazi concentration camp and ghetto experiences based on survivor accounts, see, e.g., Eitinger (1964); Luchterhand (1967); Dimsdale (1974); Sofsky (1999); Suderland (2013); Finkel (2017). Papamichos and Antoniou (2019) present a rare attempt to build data on Holocaust social networks, but their effort is again based on testimonies of Holocaust survivors.

[3] While there is little quantitative research on social linkages in the Holocaust, there are several recent studies on the degree to which pre-war social structures are reflected in the internal operation of societies within Nazi camps and ghettos (e.g., Finkel, 2017; Suderland, 2013).

[4] Auschwitz and Treblinka were the most frequent destinations. The Holocaust survival rate of the 44 (17) [26] thousand prisoners in transports from Theresienstadt in 1942 (1943) [1944] was 1% (5%) [10%].

ties may be particularly valuable in such settings, where there are few market substitutes for social resources. For each prisoner in Theresienstadt, we construct a variety of proxies for an individual's social status, and for the availability of potential friends. We do the same for prisoners on transports out of the ghetto, as of their arrival at Auschwitz.[5] We then ask how these two types of social-capital measures affect major risks faced by prisoners: (i) selection into deadly transports out of Theresienstadt, (ii) death in Theresienstadt, and (iii) death after transport to the Auschwitz-Birkenau concentration camp.

In the first step of the analysis, we estimate models focused on selection into transports out of Theresienstadt, which carried over 80 thousand prisoners to extermination camps in the East. We condition on the externally determined (SS-specified) demographic composition of transports and study the relative risk (for prisoners in the at-risk demographic groups) of being on the next transport. This relative risk was affected to a significant extent by decisions taken by the Jewish self-administration of the ghetto, which was in charge of selecting individual prisoners onto transports out of Theresienstadt. Prisoners isolated in the social space of the ghetto and those of low social status may have found it hard to seek patronage or employment in the internal administration. We therefore assess the importance for this selection into transports of an individual's social status, and of membership of Jewish pre-deportation self-administrations (Jüdische Kultusgemeinde in Prague, Israelitische Kultusgemeinde in Vienna, Berlin; henceforth referred to as JKG/IKG), which were strongly involved in the ghetto's self-administration. We study these questions across the varying degrees of group-level selection risk given by SS decisions, and find that social status and JKG/IKG membership protect against selection, particularly so during periods of high group-level selection risk.

Next, we quantify determinants of death risk in Theresienstadt using a death hazard (duration) model, conditioning on prisoners' characteristics, the degree of overcrowding, and the timing of arrival in Theresienstadt. We focus on older prisoners for whom the death risk in Theresienstadt was high, and contrast death risk structures across varying levels of aggregate survival pressure in Theresienstadt. We estimate what appears to be the first

[5]We do not study prisoners deported to Treblinka and Maly Trostinec, the other two chief destinations of out-transports from Theresienstadt, as virtually none of these survived the Holocaust.

multivariate death-hazard duration model from Nazi concentration camps/ghettos. We confirm that isolated elderly prisoners are particularly vulnerable to ghetto overcrowding, hunger, and disease. In addition to family- and social-linkage effects, we again find that social status and membership of pre-deportation self-administrations have protective effects. These effects are again stronger when prisoners face higher ghetto-wide death risks.

Finally, we study Holocaust survival of 17 thousand Theresienstadt prisoners who entered Auschwitz-Birkenau, a large labor and extermination camp.[6] We leverage quasi-random differences in the social-linkage composition of transports to Auschwitz in order to contrast survival chances across prisoners depending on whether they entered the camp alongside a group of socially-linked potential friends, or as socially isolated prisoners who may find it difficult to form friendships (reciprocal relationships) in the camp.[7] In this extreme context, we consider as 'socially linked' prisoners who: had family ties on the transport; shared a place of residence prior to deportation to Theresienstadt;[8] were formerly interned together in a non-deadly agricultural-labor camp;[9] were linked by a distribution chain of an underground satirical weekly while in Theresienstadt; or had JKG/IKG connections.

We find a significant survival advantage conferred by entering Auschwitz with several socially-linked fellow prisoners, based on measures reflecting potential close-friendship links and camaraderie, but not based on social linkage proxies corresponding to pre-deportation administrative ties and social status. In addition, we find that prisoners who were particularly apt at avoiding selection into transports out of Theresienstadt before eventually being deported to Auschwitz were more likely to survive there. This finding connects an indirect realized proxy of social standing within Theresienstadt with survival chances in Auschwitz, and provides further support for the notion of social-capital effects.

[6]The 'failure' in our statistical models corresponds to the 'minority' outcome. In Theresienstadt, most prisoners in a given month did not die and were not selected for transports, so we model the risk of death and of transport selection. In contrast, after entering Auschwitz most prisoners did not survive the Holocaust, so we choose survival as the model's outcome.

[7]We thus avoid not only the selection bias of survival testimonies, but also potential omitted variable bias where prisoners who are more pro-social tend to have more friends and are more likely to survive.

[8]We observe street addresses prior to deportation for the large group of former Prague residents, and also town of residence for several small Czech towns.

[9]Testimonies of prisoners of the agricultural camp (in the Czech town of Lípa) suggest that social ties formed in this previous imprisonment were helpful in extermination camps (Stránský and Ullmann, 1990).

By contrasting the survival value of social linkages across different environments and varying survival pressure, we shed light on the structure of a prisoner society and social resources underpinning survival in extremity. We also provide a novel quantification of the survival effects of prisoners' academic titles, including medical degrees, in addition to that of basic demographic characteristics. We build on the historical literature devoted to Theresienstadt (and discussed in Section 2) as well as on the few existing statistical analyses of deadly internment camps and ghettos (e.g., Finkel, 2017; Suderland, 2013). Our results, based on the most systematic statistical exploration of individual histories available to-date from a Nazi concentration camp setting, confirm the findings of qualitative work based on selective survival testimonies that being socially isolated was particularly costly during the Holocaust. In this regard, our analysis is similar to that of Costa and Kahn (2007), who study a deadly American Civil War POW camp, and fits well into the literature highlighting the importance of social links in high-stakes contexts (e.g., Battiston, 2018; Fisman et al., 2018; Kelly and Grada, 2000; Stuart and Taylor, 2021).

## 2 Theresienstadt and Its Records

Theresienstadt (Terezín) was a concentration and transit camp/ghetto[10] established by the SS[11] in late 1941 in the garrison city of the same name in German-occupied Czechoslovakia. The ghetto initially held only Czech Jews, but from June 1942 Jews from Germany and Austria were deported to the ghetto, forming another two large nationality groups. Theresienstadt was deadly for elderly prisoners, and most of the ghetto's population was eventually deported to extermination camps in occupied Poland.

Our analysis is based on the near-complete database of individual histories of Theresienstadt prisoners compiled by the Terezín Initiative Institute (TII), a non-profit organisation founded by an international association of surviving prisoners of the ghetto. The database was created from records kept by the Nazi administration, primarily transport lists and lists of the deceased in the camp, as well as lists of those who survived in the ghetto. The

[10]Theresienstadt shared some features with other Nazi concentration camps as well as with other Nazi ghettos, such as its 'self-administration'. Theresienstadt was not primarily a labour ghetto, as almost all of the labour conducted in Theresienstadt served to maintain the ghetto's infrastructure (Kárný, 1989).

[11]The SS (Schutzstaffel) under Heinrich Himmler administered all Nazi concentration camps.

TII extended these records by coding a Holocaust survival indicator for almost all prisoners. The database covers information on 139,769 incoming prisoners, for 139,503 (99.8%) of whom we have information available on their Holocaust survival. We also have data on all transports out of Theresienstadt covering 88,059 of prisoners; only 5.6% of these survived until the end of the war. For 32,954 prisoners, the TII records show Theresienstadt as the place of death, and for most of these victims, we know the date of their death. Over 90% of those who died in Theresienstadt were over 60 years old.[12] Of all Theresienstadt prisoners, 16.5% survived the Holocaust. Of those who entered the ghetto before January 1944, only 9% survived, two-thirds in Theresienstadt and the rest in other concentration camps. The Holocaust survival chances of Theresienstadt prisoners was thus based on (i) avoiding or at least postponing deportation out of the ghetto, as survival chances of those on transports out of the ghetto grew towards the end of the Holocaust, (ii) avoiding death through starvation and disease in the ghetto, and, for those on transports to the East, on (iii) attempting to survive incarceration in labour and extermination camps.

The TII data covers prisoners' names, gender, age, academic titles,[13] and an indicator of 'prominent prisoner' status. It also covers information on the arrival in and deportation from Theresienstadt of each prisoner, including their transport numbers and their pre-deportation country of residence, approximated from the city of deportation.[14] Unlike German and Austrian prisoners, Czech prisoners typically arrived in family units, so it is important that the data allow us to approximate family linkages.[15] We compared the monthly transports into Theresienstadt in the TII data to those reported by Lagus and

[12]The chief causes of death were pneumonia and enteritis, followed by tuberculosis and typhus.

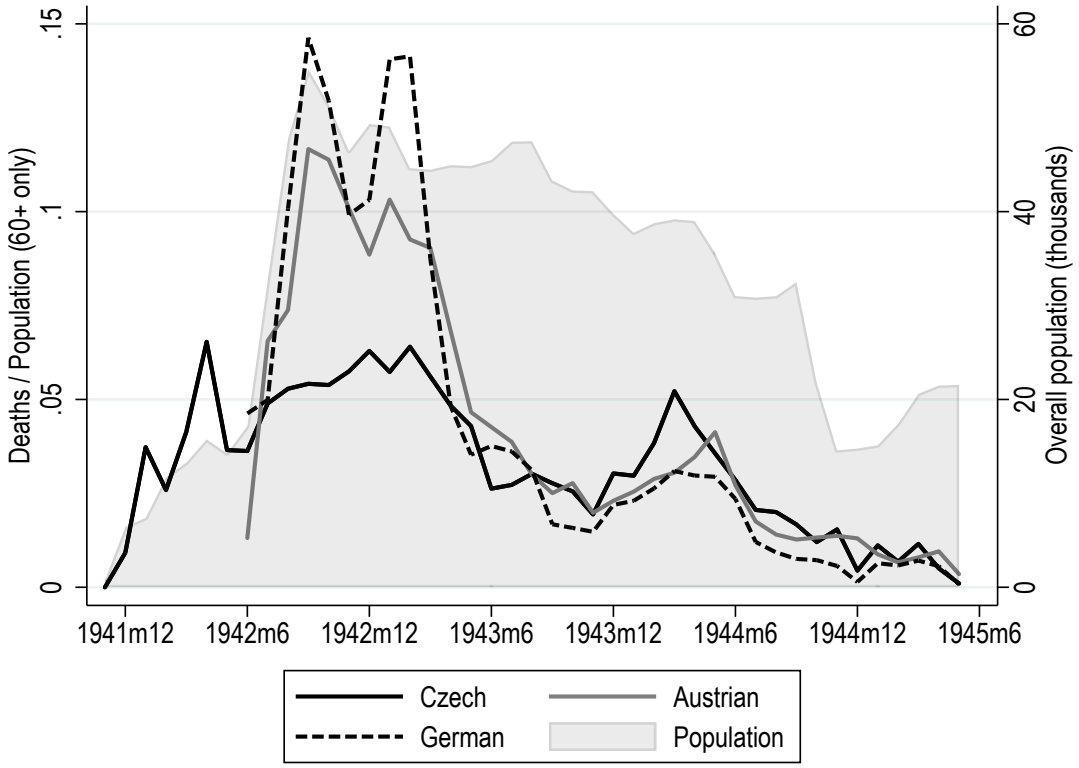
[13]The prisoners were typically middle-class urban Jews. As the ghetto's infrastructure was built and maintained by the prisoners themselves, there was a relative shortage of craft workers and an abundance of white-collar prisoners. In total, three per cent of the prisoners in Theresienstadt held an academic title. There were about 1 thousand engineers, 1 thousand doctors of medicine, 400 lawyers, and 46 professors. The rest of the 5 thousand prisoners with an academic title held the generic "Dr." title in the data.

[14]We do not have citizenship information and denote as 'Czech' those prisoners who arrived on transports from cities located in today's Czech Republic; the same goes for 'German' and 'Austrian' prisoners. Over half of the prisoners came from Czech cities, 28 percent came from Germany, and 12 percent from Austria. Our analysis excludes the small and specific groups of Danish, Polish, and Slovak prisoners.

[15]Family members typically came on the same transport with consecutive transport IDs. Having identified as members of the same family those sharing the same surname and holding consecutive transport numbers, we estimate that 82,000 prisoners arrived with family members, making up about 28,000 (mostly Czech) families. The TII collected direct information on family linkages for over 4,000 prisoners. Our approximation based on transport numbers captures over two thirds of these family linkages, as family members often arrived on separate transports. Among the 4,000 prisoners, only 5% of the family linkages we approximate based on transport numbers are contradicted by the direct measure of family ties.

Polák (2006) and they were nearly identical, confirming that the TII database corresponds to historical records and essentially covers all Theresienstadt prisoners. We amended the database by additional measures on social linkages among prisoners we collected in various archives; these are discussed in detail in the next section.

Figure 1: Total Ghetto Population and Monthly Death Rates for Elderly Prisoners




*Notes:* The graph plots monthly death rates for prisoners aged over 60 in 1941 (left vertical axis), separately by the country of deportation for the three largest nationality groups. The first large spike in death rates coincided with ghetto overcrowding (total ghetto population on right vertical axis); both spikes (in 1942 and 1944) coincided with a rise in infectious diseases recorded as cause of death on death certificates. Monthly populations correspond to month-specific averages of daily populations.

Figure 1 shows the evolution of the total ghetto population and of monthly death rates in Theresienstadt for elderly prisoners. The early rise in death rates among the elderly coincides with ghetto overcrowding in late 1942 when 20,000 prisoners were arriving each month.[16] Rapid declines in the total population, e.g., from September to November 1944, are primarily due to large transports out of the ghetto. While death rates were higher for German and Austrian prisoners during the deadliest period (Adler and Adler, 2017; Jurajda and Jelínek, 2021), deportation risks in 1942-43 were higher for Czechs.

[16] At its peak population, the ghetto provided about 2 square meters of housing capacity per prisoner.

The risks of selection into transports out of Theresienstadt varied dramatically over time and across demographic groups. In most months of the ghetto's existence, out-transport risks were zero, but for several months, they were over 20% for some nationalities. In late 1944, they reached over 40% for all three main nationality groups (Jurajda and Jelínek, 2021, Fig. 2). This variation was dictated by Adolf Eichmann's department in the Reich Security Main Office in Berlin, which chose demographic categories for selection into transports out of Theresienstadt.[17] The ghetto had its Jewish 'self-administration', which ran the ghetto's internal services (e.g., kitchens)[18] and also managed the selection of individual prisoners (within demographic categories pre-set by the SS) for most out-transports from Theresienstadt. See Appendix A for details on the selection process.

# 3 Social Linkages and Estimation Strategy

Our analysis extends the literature on the role of social links in high-stakes contexts (e.g., Stuart and Taylor, 2021) and the large literature on the coping strategies of concentration camp prisoners (e.g., Luchterhand, 1967; Dimsdale, 1974), which includes only a few statistical analyses that investigate what characteristics or strategies helped prisoners to survive (Kranebitter, 2014; Finkel, 2017).[19] It is important that such analysis is multiavariate—in order to compare otherwise comparable prisoners—and that it explores specific mechanisms that underpinned survival. Our focus on a mechanism based on social-linkage resources is motivated by the testimonies of survivors (e.g., Davidson, 1984). Our secondary focus on pre-war social status follows up on earlier testimony-based research linking survival strategies to pre-Holocaust societies (e.g., Finkel, 2017; Suderland, 2013; Braun, 2016). Motivated by the existing Holocaust literature as well as by the description of Theresienstadt provided in the historical literature (Hájková, 2020; Adler and Adler, 2017; Frankl, 2005; Lagus and Polák, 2006), we focus on five dimensions of social linkages and four measures of pre-war social status. Finding similar effects for multiple measures

[17] In the 43 months of the camp's existence, 66 out-transports were dispatched in 19 distinct months. The non-zero selection risk measured across out-transports and demographic groups defined by nationality, gender, and 10-year age brackets has a mean of 0.07 and a standard deviation of 0.06.

[18] The self-administration could carry out its own agenda within the constraints outlined by the SS and, as a result, was able to lower the death rate in the ghetto (Kárný, 2000).

[19] Tammes (2017) asks about the importance of pre-war socio-demographic characteristics of Amsterdam Jews for their Holocaust survival outside of the setting of a concentration camp/ghetto.

would be suggestive of systematic forces. Appendix B provides details, sources of the archival data on social ties and status, and examples of relevant survivor testimonies.

A critical social-resource group is that of one's *family*, of course. For elderly prisoners in particular, having a prime-age family member present in the camp may help secure resources (food, health care) and may motivate an individual to continue in the struggle to live in an environment that constantly undermined such motivation (e.g., Sofsky, 1999).[20] Our indicator for having prime-age family members in Theresienstadt is based on our approximation of family linkages (see note n. 15).

Second, prisoners from the same pre-deportation *place of residence* can form a natural mutual-support group. We define such groups based on pre-deportation street addresses of the forty thousand prisoners deported from Prague (there are 1,917 distinct Prague street addresses available in the TII database) and based on Jewish-registry data from 11 mid-sized Czech towns (2,315 prisoners in total) we merged with the TII data.[21]

Third, a measure of *administrative ties* related to the self-organization of national Jewish communities is based on membership of the official pre-deportation Jewish self-administrations (Jüdische Kultusgemeinde in Prague, Israelitische Kultusgemeinde in Vienna, Berlin). We obtained lists of the members of the three organizations in 1941 and merged them with the TII data. We observe 2,680 members and collaborators of JKG Prague arriving in Theresienstadt, 677 members of IKG Vienna, and 371 members of IKG Berlin. Members of the three organizations were involved in the Theresienstadt self-administration; they were socially connected before the war, and they may have provided mutual help during imprisonment.

Fourth, a key measure of social linkages for our analysis, *camaraderie* is based on the case of young Czech Theresienstadt prisoners, who, according to post-war testimonies, had often formed strong friendships (based, e.g., on sharing food) during their earlier internment in a low-security all-male agricultural labor camp, which was located in Lípa

[20] According to Theresienstadt prisoners' testimonies, although families were separated based on age and gender, adults spent much of their free time with their parents, and members of the family with best access to food provided for others.

[21] For other prisoners, we do not have residency data, only the city from which their in-transport came.

in a rural area of today's Czech Republic.[22] We merged records of the Theresienstadt ghetto with lists of Lípa prisoners. A total of 1,351 Czech Jews were interned in the Lípa camp, of whom 961 entered Theresienstadt.[23]

The four types of social linkages described above were formed prior to entering Theresienstadt. Our final social-linkage measures relate to *imprisonment networks*. First, we observe members of a chain-mail community (104 women and 126 men) formed within Theresienstadt to share a copy of an underground satiric weekly ('Shalom for Friday', henceforth referred to using the Czech abbreviation 'SNAP'). Second, we consider prisoners who came to Theresienstadt on the same in-transport to be potentially socially linked. In-transports often combined residents from a set of neighborhoods; further, within Theresienstadt, prisoners from the same in-transport often shared similar conditions and housing. Hence, it is possible that they formed relevant social ties.[24]

Next, we turn to measures of pre-war social status. The TII database includes an indicator of a *prominent prisoner* status for 223 scientists, politicians, and WWI veterans, and *academic titles* for over 5,000 prisoners. We extend these two status measures based on archival data: We code an indicator corresponding to (692) elite Czech *entrepreneurs*, and form a final, fourth measure of pre-deportation social status based on the (34) prisoners who served as *managers* of the pre-deportation Jüdische Kultusgemeinde Prague (JKG).

We append the TII database with this additional information on social networks and pre-war social status with the goal of studying their importance for avoiding the (death and out-transport) risks faced by Theresienstadt prisoners, and for avoiding death after entering Auschwitz-Birkenau. We condition on social-status indicators in our analysis of all three risks prisoners faced. How can we identify the effect of social-linkage measures on

[22]The Lípa camp is an example of the several thousand small labor camps, in which European Jews were interned before being deported to large ghettos and concentration camps (Megargee, 2009).

[23]We view prior incarceration in the Lípa camp as proxying for pre-existing social ties similar to those captured by membership in a military unit in Costa and Kahn (2007). See Appendix B for details.

[24]We additionally observe three specific groups of prisoners who may be socially linked, but may also have entered the ghetto in poorer health and/or may be treated differently by the rest of the community. We control for membership in these groups, but do not explore them in detail. Specifically, we observe two groups of prisoners who were refugees prior to deportation to the ghetto: 3,880 Jews who had to leave their homes in the Karlsbad region of the *Sudetenland* part of Czechoslovakia annexed by Nazi Germany in 1938, and 335 Jews who fled from their homes in Austria (Vienna) to Prague to avoid the (impending) 1938 Anschluss by Nazi Germany. We also observe 62 members of the Czechoslovak Communist party.

survival? We can effectively use information on the number of potential friends available to prisoners deported on transports out of Theresienstadt, taking the composition of these transports as a laboratory in which the social mix of prisoners varied quasi-randomly due to the immense pressure of the demographic transport orders given by the SS. Consider the 601 Lípa prisoners who ended up on 23 distinct transports to Auschwitz. To identify the effect of social-network resources on survival (presumably through the formation of mutual support groups), we ask whether Lípa prisoners travelling to Auschwitz with a different number of fellow Lípa prisoners display different survival outcomes. We thus use variation in the number of Lípa prisoners across transports and ask whether arriving in Auschwitz with more potential friends improves survival prospects. This analysis conditions on the average survival chances of all prisoners on a given transport to Auschwitz (by transport fixed effects), which is given by external SS decisions. The effects of social linkages thus correspond to the within-transport gaps in survival chances between a typical prisoner and a 'Lípa' prisoner, where this gap is contrasted across transports with a varying number of Lípa prisoners. We similarly condition on the number of potential friends on a transport to Auschwitz based on all of our measures of social linkages.[25] We then ask how large such groups of potential friends need to be to confer a significant survival advantage.

In our preferred specifications, we enrich the baseline models to study the circumstances under which such social resources matter for survival by exploiting varying survival pressure (similar to, e.g., Frey et al., 2010). Specifically, we exploit the dramatically varying survival pressure approximated by the population size of the ghetto, and we interact this proxy with our key regressors. Next, we evaluate average derivatives at pre-specified values of the survival pressure proxy. We perform a similar interaction, using direct measures of group-specific risks, for the specifications that study the risks of out-transports from Theresienstadt and Holocaust survival for those on transports to Auschwitz. In the survival analysis of prisoners entering Auschwitz, we only study the 20 transports with an above-2% transport-wide survival rate, as individual characteristics can have little impact when all members of a transport perish due to the SS decisions in Auschwitz. Appendix C

[25]While the number of Lípa prisoners, JKG/IKG members, and SNAP prisoners travelling together varies only *across* transports to Auschwitz, there is *within*-transport variation in the size of an individual's social network based on family size, pre-deportation place of residence, and on groups of prisoners who came to Theresienstadt on the same in-transport.

outlines the specifications of the econometric models we use, as well as the details of the average-derivative calculations.

In Table 1, we show descriptive statistics for key variables that require an introduction.[26] The first panel of Table 1 covers the model of out-transport selection risks, which is based on data corresponding to person-selection episode combinations. It shows that in a typical selection-exposure episode, over 6% of prisoners (given their demographic group, which was exposed to non-zero selection risks, see Section 2) were selected into a transport to the East. At a given moment of selection, a typical (average) prisoner had already evaded over 10 transport selections; some prisoners were able to avoid all selections they faced, adding up to well over 400% (value over 4 in Table 1) of the accumulated avoided selection probability (again, based on group-level risks).

The second panel shows social-linkage measures (number of potential friends on a transport) for prisoners travelling on transports to Auschwitz (with a non-zero set of potential friends of a given type). We consider social resources by gender given the gender-based organization of the camp. Four family members at most traveled together (by gender). The maximum size of the set of potential friends on a transport varies from 4 (for women from the same street address in Prague) to 183 for men associated with JKG Prague. In the Holocaust survival model for prisoners entering Auschwitz, we additionally control for an indirect proxy for social status and/or linkages corresponding to the prisoner-specific accumulated evaded selection risk in Theresienstadt prior to being deported to Auschwitz. The average value of this measure (defined in the upper panel of Table 1) for prisoners entering Auschwitz is 1.1 (110%) for women and 1.3 (130%) for men.

# 4 Results

## 4.1 Selection on Transports to the East

Our first goal is to estimate models of selection into transports out of Theresienstadt.

[26] Minimum values are not shown in the Table as they are predominantly 0 or 1 depending on the variable definition. See Appendix D for additional descriptive statistics by model type, and for mean censored survival durations by prisoner type corresponding to the death hazard in Theresienstadt.

Table 1: Summary Statistics of Key Variables

| Variable | Description | Males | | Females | |
|---|---|---|---|---|---|
| | | mean | max | mean | max |
| Transport Selection Model - observations are month-person combinations when a prisoner faces selection risks | | | | | |
| Selection Risk | Demographic-group-level probability of selection | 0.060 | 1.0 | 0.058 | 1.0 |
| Selection Risk Evaded | Sum of group-level selection risks evaded so far | 0.686 | 4.3 | 0.633 | 4.3 |
| Observations | Number of prisoners × selection exposures | | 491,034 | | 694,338 |
| Survival of the Holocaust Model - observations correspond to prisoners on transports to Auschwitz (non-zero values only) | | | | | |
| N family | Number of transportees from the same family on a transport | 1.113 | 4.0 | 1.114 | 4.0 |
| N in-trans | N. of transportees who arrived in Theresienstadt on the same transport | 19.168 | 151.0 | 10.69 | 85.0 |
| N SNAP | Number of transportees sharing the ŠNAP magazine | 11.582 | 25.0 | 3.759 | 8.0 |
| N same street | Number of transportees from the same (Prague) street address | 1.210 | 10.0 | 1.169 | 4.0 |
| N town | Number of transportees from the same (Czech) town | 2.942 | 7.0 | 2.119 | 5.0 |
| N Lípa | Number of transportees who had worked together in the Lípa camp | 44.200 | 75.0 | — | — |
| N JKG Prague | Number of transportees from JKG Prague | 89.658 | 183.0 | 28.765 | 40.0 |
| N IKG Vienna | Number of transportees from IKG Vienna | 37.856 | 60.0 | 13.991 | 18.0 |
| N IKG Berlin | Number of transportees from IKG Berlin | 20.591 | 35.0 | 11.156 | 18.0 |
| Selection Risk Evaded | Sum of group-level selection risk evaded in Theresienstadt prior to deportation | 1.3 | 4.3 | 1.1 | 4.3 |
| Observations | Number of individuals in the sample | | 8,520 | | 8,735 |

We study each prisoner at risk of selection for a given out-transport and condition on the externally determined (SS-specified) demographic composition of out-transports, i.e., on the average out-transport risks faced by a given demographic group in a given moment.[27] We thus investigate the *relative* within-group risk of being on the next transport for prisoners in the at-risk demographic groups. We estimate the importance for this relative selection risk of several social status indicators, including being a member of Jewish pre-deportation self-administrations (JKG/IKG), and of the length of stay in Theresienstadt at a given moment of selection. The analysis also conditions on prisoner nationality, a Prague-deportation indicator, and an indicator for having family members in the ghetto. The sample consists of prisoner-selection exposure combinations corresponding to transports when a given prisoner is facing non-zero risks of selection onto an out-transport, i.e., at the moment when a transport is leaving Theresienstadt that includes members of the prisoner's demographic group defined by nationality, gender, and broad age categories. We consider each moment when a prisoner faces non-zero out-transport risks as one period of a duration model for avoiding out-transports; death in Theresienstadt is taken as an independent censoring event.[28] We exclude those transports where the SS, not the self-administration, selected individual prisoners from the analysis;[29] this leaves us with 52 out-transport-selection episodes to explore. Our analysis also excludes the small group where we do not observe prisoners' age or their complete histories in the ghetto. In the estimation-ready sub-sample of 132,005 prisoners, about 10% spent less than 12 days in Theresienstadt, and 10% spent more than 2 years. The median person who ended up in a transport out of the ghetto spent 3 months in Theresienstadt.

[27] In the case of the few transports where the SS did not specify their nationality composition, the self-administration applied the 'proportional rule' of equal transport risks (burden) across the size of the nationality groups present in the ghetto at the time (see Appendix A). The principle of conditioning on average risks thus also covers these transports without demographic specifications by the SS, since the average selection risk of demographic groups in this case was given by the size of the transport (set by the SS) and by the current demographic composition of the ghetto's population.

[28] Multinomial logit models used (in unreported specifications available upon request) to account for competing risks (Kalbfleisch and Prentice, 2002, pp. 254-257) showed little difference in estimated parameters compared to single-risk models, even after allowing for person-specific unobserved heterogeneity correlated across the two risks. We therefore limit the discussion to single-risk models. We also find no evidence of different age distributions of elderly prisoners on transports vs. those in the at-risk population, which suggests the self-administration was not trying to dispatch relatively weaker/stronger prisoners.

[29] We thus censor transports Bv, Bw, Bx, and By, and all transports after Oct 1944. See Appendix A.

The selection models are estimated by gender and standard errors are two-way clustered by out-transports and in-transports.[30] As discussed above, we estimate specifications that interact the effects of our variables of interest with the level of selection risk faced by a given demographic group at a given moment. We also show simple un-interacted ('Baseline') specifications. In Table 2, columns marked 'Interacted' show average marginal effects (AMEs) of key variables evaluated at high and low out-transport risk, corresponding to 7% and 2% risks (chances) of selection into out-transports, respectively.[31] We compared the baseline-model coefficients across four alternative parametric model specifications; the results were qualitatively as well as quantitatively consistent across the alternative parametric model choices (see Appendix D). The complementary log-log model is our preferred choice for Table 2.[32]

We find in Table 2 that all our social-status proxies (prominent prisoner status, academic titles, etc.) protect against selection. Further, social status lowers the probability of selection into transports more (within one's demographic group) when the selection is risk is high, compared to the low risk level when almost all members of a group are not threatened by selection. For example, having the status of a prominent prisoner in Theresienstadt lowers one's probability of being selected into a transport by about 5 percentage points when the selection risk is high, i.e., lowers it close to 0, relative to otherwise similar prisoners within one's demographic group. Membership in JKG, which may proxy for social status or social linkages, is also helpful in avoiding selection.[33]

A particular control variable we study in the out-transport selection model (and use in the remaining two parts of our analysis) measures the accumulated performance (at a given moment) of each prisoner in terms of avoiding selection into transports that involve his/her demographic group. For each prisoner and each selection exposure, we add up

[30] Asymptotic and wild-bootstrap standard errors based on Cameron and Miller (2015) are similar for the reported specifications. In-transport clusters are formed by city and year of deportation. For instance, all transports from Prague to Theresienstadt in 1942 are considered one cluster.

[31] These values correspond to percentiles p70 and p30 taken across individual-level variation in selection risk. See Appendix C for the definition of AMEs.

[32] We work with the sequence of at-risk transport-selection observations, which we view as constituting a duration 'time' of avoided transports for a given prisoner. The complementary log-log model (see Appendix C) is uniquely appropriate for discrete-time approximations of the continuous-time proportional Cox model (Kalbfleisch and Prentice, 2002, p. 47).

[33] The protective effect of being a JKG Prague manager is much larger than that of being a JKG member (managers are also members in terms of our specification).

Table 2: Transport Selection Model: Average marginal effects (AMEs) for key variables from complementary log-log models of selection into transports for prisoners at risk of selection. The interactive specification evaluates derivatives at p30 and p70 of the demographic-group-level selection risk (at about 2% Low and 7% High risk, respectively).

| Regressor / Risk Level | Females | | Males | |
|---|---|---|---|---|
| | Baseline | Interacted | Baseline | Interacted |
| ***Entrepreneur*** | | | | |
| Low/Overall (for Baseline) | 0.000922 | 0.000421 | -0.0106*** | -0.00586*** |
| | (0.00608) | (0.00337) | (0.00329) | (0.00180) |
| High | | 0.00307 | | -0.0125*** |
| | | (0.0103) | | (0.00376) |
| ***Prominent status*** | | | | |
| Low/Overall | -0.0528*** | -0.0156*** | -0.0547*** | -0.0213*** |
| | (0.00423) | (0.00185) | (0.00373) | (0.00306) |
| High | | -0.0644*** | | -0.0570*** |
| | | (0.00588) | | (0.00582) |
| ***Academic title (excluding medical degrees)*** | | | | |
| Low/Overall | -0.0310*** | -0.0107*** | -0.0205*** | -0.0105*** |
| | (0.00538) | (0.00174) | (0.00308) | (0.00196) |
| High | | -0.0388*** | | -0.0248*** |
| | | (0.00612) | | (0.00409) |
| ***Doctor (medical degree)*** | | | | |
| Low/Overall | -0.0351*** | -0.00872*** | -0.0323*** | -0.0176*** |
| | (0.00468) | (0.00294) | (0.00353) | (0.00221) |
| High | | -0.0439*** | | -0.0413*** |
| | | (0.00541) | | (0.00457) |
| ***JKG Prague manager*** | | | | |
| Low/Overall | 0.000213 | -0.0128*** | -0.0288*** | -0.0191*** |
| | (0.0137) | (0.00288) | (0.00510) | (0.00176) |
| High | | -0.0304** | | -0.0437*** |
| | | (0.0150) | | (0.00473) |

**Table 2 continued from previous page**

| | | | | |
|---|---|---|---|---|
| ***JKG Prague member (including managers)*** | | | | |
| Low/Overall | -0.0128** | -0.00550 | -0.0147*** | -0.00825** |
| | (0.00535) | (0.00365) | (0.00459) | (0.00348) |
| High | | -0.0194*** | | -0.0185*** |
| | | (0.00716) | | (0.00688) |
| ***IKG Vienna member*** | | | | |
| Low/Overall | -0.0266*** | -0.00883*** | -0.0223*** | -0.0131*** |
| | (0.00439) | (0.00209) | (0.00669) | (0.00429) |
| High | | -0.0300*** | | -0.0280*** |
| | | (0.00697) | | (0.00979) |
| ***IKG Berlin member*** | | | | |
| Low/Overall | -0.0411*** | -0.0110*** | -0.0329*** | -0.0233*** |
| | (0.00520) | (0.00261) | (0.00741) | (0.00283) |
| High | | -0.0466*** | | -0.0542*** |
| | | (0.00607) | | (0.00595) |
| ***Demographic-group-level selection risk evaded so far*** | | | | |
| Low/Overall | -0.0865*** | -0.0238*** | -0.0925*** | -0.0504*** |
| | (0.0192) | (0.00800) | (0.0185) | (0.0137) |
| High | | -0.110*** | | -0.121*** |
| | | (0.0304) | | (0.0318) |
| Clusters (out-tr.) | 52 | 52 | 52 | 52 |
| Clusters (in-tr.) | 112 | 112 | 109 | 109 |
| Persons | 68,701 | 68,701 | 45,550 | 45,550 |
| Observations | 694,338 | 694,338 | 491,034 | 491,034 |

*Notes:* Standard errors clustered (two-way) by out-transports and in-transports in parentheses. Appendix C describes the calculation of the AMEs. Significance: * 10% ** 5% *** 1%. All models control for demographic-group-level selection risk, age, duration of imprisonment in Theresienstadt, imprisonment with family members, Sudetenland refugee status, Austrian refugee status, Communist party membership, and country of origin.

this 'evasion performance' thus far in the prisoner's history. Specifically, we add up all the demographic-group-specific average risks avoided, so that the larger the risk evaded, the larger the accumulated value of this variable, which we refer to as 'selection risk evaded'.[34] Anecdotal evidence suggests that selection-evasion performance is linked to prisoners' ability to integrate into the self-administration of the ghetto.[35] We find in Table 2 that the better an individual's performance on this measure thus far, the less likely the prisoner is to be selected for the next transport. As with our social-status indicators, the effect is larger when selection risk (pressure) is stronger. We consider this variable a proxy for unmeasured social status or social linkages. In the next two sections, we ask whether an individual's ability to avoid out-transport risks predicts their ability to avoid the risk of death in Theresienstadt and/or in Auschwitz.

## 4.2 Death Hazard in Theresienstadt

In our second analysis, we study death risks in Theresienstadt for prisoners aged over 60, as this group faced substantial risks of death. The death hazard (duration) models we estimate make the probability of dying in Theresienstadt at a given month of imprisonment a function of proxies of social status, social resources (an indicator of having a prime-aged family member in the ghetto and the count of prisoners who resided at the same street in Prague prior to deportation), and several other controls including year and month-of-year dummies, prisoners' age, and the duration of imprisonment in the ghetto up to a given month. We censor Theresienstadt death-risk histories for those on out-transports from the ghetto. We work with monthly observations and approximate the continuous-time proportional Cox model using the the complementary log-log model (see Kalbfleisch and Prentice (2002, p. 47) and Appendix C).[36] Table 3 shows the estimated average marginal effects (on the monthly death hazard) of key social-status and social-linkage indicators.

[34]The value of this control within Theresienstadt can only be increased over periods when a prisoner is exposed to out-transport risks. For the purposes of the analysis of prisoners who end up being deported out of the ghetto, the value of the variable is set as of the last moment of successfully avoiding out-transports.

[35]For example, all members of the Repper family from Olomouc evaded all transport risks they were exposed to. The Reppers were not 'prominent' prisoners, but two of the family members operated the Theresienstadt crematorium.

[36]Appendix D shows descriptive statistics and censored mean survival times by prisoner type.

Table 3: Death Hazard in Theresienstadt: Average marginal effects (AMEs) from complementary log-log duration models of death risks in Theresienstadt. The interactive model evaluates AMEs at a low death risk (at ghetto population of 35 thousand, the 30th percentile across person-months) and a high death risk (population of 45 thousand, $p70$).

| Regressor / Risk | Females | | Males | |
|---|---|---|---|---|
| | Baseline | Interacted | Baseline | Interacted |
| ***Having a prime-age family member in Theresienstadt*** | | | | |
| Low/Overall | -0.00753*** | -0.00467*** | -0.00745*** | -0.00470** |
| | (0.00211) | (0.00174) | (0.00246) | (0.00211) |
| High | | -0.00746*** | | -0.00837*** |
| | | (0.00223) | | (0.00297) |
| ***N Same street*** *(no. of prisoners from same address in Prague)* | | | | |
| Low/Overall | -0.00174*** | -0.000930*** | -0.00135*** | -0.000272 |
| | (0.000262) | (0.000314) | (0.000388) | (0.000558) |
| High | | -0.00161*** | | -0.00197*** |
| | | (0.000238) | | (0.000337) |
| ***Entrepreneurs*** | | | | |
| Low/Overall | -0.0151* | -0.00739 | -0.00207 | -0.00506 |
| | (0.00818) | (0.00904) | (0.00518) | (0.00367) |
| High | | -0.0161*** | | 0.00164 |
| | | (0.00578) | | (0.00550) |
| ***Prominent prisoner*** | | | | |
| Low/Overall | -0.0413*** | -0.0300*** | -0.0535*** | -0.0429*** |
| | (0.00725) | (0.00476) | (0.00317) | (0.00603) |
| High | | -0.0507*** | | -0.0654*** |
| | | (0.00367) | | (0.00485) |
| ***Academic title (excluding medical doctors)*** | | | | |
| Low/Overall | 0.00932 | 0.00410 | 0.0173*** | 0.00906** |
| | (0.00946) | (0.0104) | (0.00399) | (0.00385) |
| High | | 0.00957 | | 0.0195*** |
| | | (0.00858) | | (0.00425) |

**Table 3 continued from previous page**

| | | | | |
|---|---|---|---|---|
| ***Medical doctor*** | | | | |
| Low/Overall | 0.137 | -0.0345*** | -0.0105* | -0.00757 |
| | (0.204) | (0.00432) | (0.00603) | (0.00478) |
| High | | -0.0529*** | | -0.0163*** |
| | | (0.00314) | | (0.00563) |
| ***IKG Vienna*** | | | | |
| Low/Overall | 0.0140*** | 0.0185*** | -0.0161*** | -0.0114*** |
| | (0.00134) | (0.00296) | (0.00318) | (0.00265) |
| High | | 0.00956*** | | -0.0179*** |
| | | (0.00131) | | (0.00374) |
| ***JKG Prague*** | | | | |
| Low/Overall | 0.0392* | 0.0355* | -0.0215** | -0.0148 |
| | (0.0207) | (0.0194) | (0.0103) | (0.0133) |
| High | | 0.0180 | | -0.0335*** |
| | | (0.0203) | | (0.00550) |
| ***IKG Berlin*** | | | | |
| Low/Overall | -0.0303*** | -0.0208*** | -0.0314** | -0.0236** |
| | (0.00442) | (0.00500) | (0.0138) | (0.0113) |
| High | | -0.0283*** | | -0.0309** |
| | | (0.00417) | | (0.0146) |
| ***Transport selection risk evaded thus far*** | | | | |
| Low/Overall | -0.0121 | -0.00323 | -0.0198*** | -0.0122* |
| | (0.00739) | (0.00533) | (0.00758) | (0.00623) |
| High | | -0.0244*** | | -0.0338*** |
| | | (0.00815) | | (0.00769) |
| Clusters | 116 | 116 | 108 | 108 |
| Prisoners | 33,346 | 33,346 | 19,021 | 19,021 |
| Observations | 277,613 | 277,613 | 151,180 | 151,180 |

*Notes:* Standard errors clustered by in-transports in parentheses. Significance codes: * 10% ** 5% *** 1%. All models control for age, duration of imprisonment in Theresienstadt, dummies for calendar years, calendar months, and prisoners' countries of origin and refugee status (there are no elderly Communists).

We find that social linkages protected against death in Theresienstadt. For elderly prisoners, having a prime-age (15-50) family member in the ghetto lowers the monthly death risk by almost a percentage point during the high-risk (overcrowding) period. Having a larger group of prisoners from the same street address in Prague also saves lives, particularly during the high-risk period. Social status was also helpful. Based on most of our measures, social status lowers the risk of dying in Theresienstadt.[37] Having the status of a prominent prisoner has a particularly large protective effect in terms of the death hazard in the high-risk regime.[38] Prisoners who do unusually well in terms of having evaded large out-transport selection risks (up to the current month) also have a lower death hazard in Theresienstadt. Again, we interpret this as suggestive of the notion that the 'transport selection risks evaded' measure is an indirect proxy for social status and/or linkages.[39] Overall, the findings from the two (competing) risks in Theresienstadt suggest that pre-deportation social status (which may be related to social linkages to the self-administration, in particular in the case of JKG membership) lowers the risks of death and selection into transports, especially when overcrowding (and survival pressure) in Theresienstadt is high. We also find that family linkages help protect elderly prisoners of the ghetto.

In the analysis of prisoners on transports to Auschwitz-Birkenau in the next section, we explore variation in social-linkage resources based on the sorting of prisoners into transports. We consider the composition of out-transports in terms of social linkages a laboratory for our study of the effect of social networks on survival. While the evidence

[37]We obtain a mixed signal across gender and risk regimes for IKG Vienna and Berlin. JKG Prague was involved in the self-administration during the deadliest period and membership protects against death risks. We cannot include the effects of being a JKG-Prague manager in the estimated models as none of these prisoners died in Theresienstadt; this supports the notion of strong social-status effects. We also cannot estimate the effect of medical degrees for female prisoners as there are too few observations.

[38]Our findings are robust to additionally conditioning on the prisoners' origins and timing of arrival in Theresienstadt, specifically the interaction of city-of-deportation and year fixed effects.

[39]Table D.7 in Appendix D summarizes the magnitude of the estimated effects based on a traditional discrete-time approximation of the proportional Cox hazard model (see Appendix C) in terms of survival rate differentials at 12 months of Theresienstadt imprisonment. For most social-status groups, the differential is positive, so that prisoners with higher social status are more likely to survive 12 months of imprisonment. Having prominent prisoner status increases the chances of 12-month survival by 24 (31) percentage points. The base survival rate (without any advantage due to social capital) was 62 (55) percent for women (men).

provided above shows prisoners with higher social status and resources were less likely to be selected into transports to the East, most prisoners eventually ended up on transports due to the immense transport pressure, and there is no evidence that the composition of out-transports was optimized in terms of social linkages available on transports.

## 4.3 Survival after Entering Auschwitz

In the third step of our analysis, we model differences in surviving the Holocaust between prisoners on transports to Auschwitz-Birkenau depending on whether they entered the concentration camp alongside a group of potential friends.[40] The variation in social structure across transports allows us to explore several measures of social linkages that were not as clearly defined in the large prisoner society of Theresienstadt. We statistically test whether the improved ability to form close friendships for prisoners with access to pre-existing social linkages (as measured by our proxies) improves chances of survival.

There was a dramatic variation in the survival rates of Theresienstadt prisoners on transports to Auschwitz, with rates improving towards the end of the war.[41] We study the 17,255 Czech, Austrian, and German prisoners[42] on the 20 (16) transports where men (women) had above 2% transport-wide (gender-specific) survival rates. We exclude near-zero-survival transports as social linkages can have little impact when all members of a transport perish as a result of SS decisions. Our estimated models condition on transport indicators (fixed effects) in order to study within-transport comparisons across prisoners.[43] We also condition on fixed effects for groups of socially linked prisoners, a Prague-deportation indicator, length of Theresienstadt imprisonment prior to out-transport, nationality indicators, and the family-present indicator.[44]

[40] We do not observe place of death for the Theresienstadt prisoners who perish after entering Auschwitz. It is possible that some of these prisoners left Auschwitz for other concentration camps or ended up in one of the death marches from Auschwitz. Our estimates thus speak to the extreme experience of a typical prisoner entering Auschwitz, not only to imprisonment in Auschwitz-Birkenau.

[41] Of the 27 transports from Theresienstadt to Auschwitz, seven had survival rates of under two percent. Three transports (Ds in 1943 and Ek and Em in 1944) had survival rates of about twenty percent.

[42] We thus again omit the small groups of Dutch, Slovak, and Polish prisoners.

[43] Note that transport fixed effects also absorb mean differences across transports in social status.

[44] The interacted models also include fixed effects for nationality-age demographic groups, which are perfect predictors in some cases. This leads to smaller sample sizes compared to Baseline specifications. We cluster standard errors by transports out of Theresienstadt. Wild bootstrap (Cameron and Miller, 2015) inference confirms traditional asymptotic inference.

In Table 4, almost all of the types of available social linkages we observe imply that arriving in Auschwitz with a larger group of potential friends supports survival in extreme circumstances. The estimates suggest that having resided together, having been imprisoned together earlier, arriving in Theresienstadt together, and sharing a network in Theresienstadt generates social ties that confer a survival advantage in a deadly concentration camp.[45] The advantage grows with the size of the group of potential friends, as this increases the chances that prisoners with social links stay together. The AMEs are particularly large for prisoners who resided at the same Prague address prior to deportation, a measure of social linkages that is both more precise and available for more prisoners than those based on other approaches.[46] The AMEs represent the effects on survival chances of one additional linked fellow prisoner on a transport. See Appendix Section D.4.2 for an alternative assessment of effect magnitudes across all social-network measures, which suggests that the Lípa social ties helped men about as much as networks based on same-street residence helped women. The differences in the estimated effects across the high/low survival regime are not as large as those we uncovered in Theresienstadt, perhaps because in both regimes survival chances are very low.[47] Further, prisoners who were able to evade many transport selections out of Theresienstadt (before ending up on a transport to Auschwitz) were more likely to survive the Holocaust after arriving in Auschwitz, which is also suggestive of the importance of social linkages and/or social status for survival.

However, administrative social linkages corresponding to the size of JKG/IKG groups are never statistically significant in the baseline survival specifications.[48] Similarly, we find that measures of pre-deportation social status (elite entrepreneur, prominent prisoner status, academic degree other than medical), which conferred a survival advantage in the relatively low-risk, self-administered society of the Theresienstadt ghetto were no longer helpful in the extreme environment of the Auschwitz-Birkenau concentration camp.

[45] Family size does not help predict survival in the complementary log-log models, but is statistically significantly helpful in OLS and non-parametric specifications, see Appendix D.

[46] We find no evidence of linkages based on shared small town residence. Perhaps secular Jews were fully integrated into Czech society and were not socializing based on ethnicity prior to deportation.

[47] If we evaluate the AMEs at very low survival levels, such as 5%, the effects become small. Mechanically, at the limit of 0% survival, no characteristics can have any meaningful effects.

[48] They have puzzling negative effects in the interacted specifications for the smaller IKG groups from Vienna and Berlin. It could be that the SS targeted large (recognizable) groups of Jewish leaders. The unreported JKG/IKG-group fixed effects are also never statistically significant at 5%, see Appendix D.

It could be that the protective effects of social status only operate in self-administered prisoner societies when death risks are low. Finally, we find that medical doctors of both genders were more likely to survive, possibly thanks to their valuable skills.[49]

Table 4: Survival in Auschwitz: Average marginal effects (AMEs) from complementary log-log models of Holocaust survival of Theresienstadt prisoners entering Auschwitz-Birkenau. Interacted models evaluate AMEs at 10% and 20% survival probability (about p30 of the survival probability in the High risk regime and p70 in the Low risk regime).

| Regressor / Risk Regime | Females | | Males | |
|---|---|---|---|---|
| | Baseline | Interacted | Baseline | Interacted |
| ***N Lípa (no. of 'Lípa' prisoners on transport)*** | | | | |
| Low/Overall (for Baseline) | — | — | 0.00137** | 0.00175*** |
| | | | (0.000553) | (0.000391) |
| High | | — | | 0.00109 |
| | | | | (0.00123) |
| ***N Family*** *(no. of family members of same gender on transport)* | | | | |
| Low/Overall | 0.00482 | 0.0138 | -0.00627 | 0.00966 |
| | (0.0160) | (0.0146) | (0.0122) | (0.0148) |
| High | | 0.0000904 | | 0.0149 |
| | | (0.0205) | | (0.0174) |
| ***N Same street*** *(no. of prisoners from same address in Prague on transport)* | | | | |
| Low/Overall | 0.0671*** | 0.0688*** | 0.0189*** | 0.0196*** |
| | (0.00951) | (0.00986) | (0.00657) | (0.00626) |
| High | | 0.0634*** | | 0.0177 |
| | | (0.0111) | | (0.0111) |
| ***N JEK*** *(no. of prisoners on transport from same Czech town)* | | | | |
| Low/Overall | 0.00648 | 0.00376 | -0.00572 | -0.00639 |
| | (0.0273) | (0.0270) | (0.0130) | (0.0130) |
| High | | -0.000582 | | -0.000191 |
| | | (0.0373) | | (0.0167) |

[49]We perform two robustness checks: We include transports bound for camps/ghettos in Riga and Raasika in the analysis (this increases the number of transports/clusters from 20 to 24), and we additionally control for city-of-deportation fixed effects. These additional checks fully confirmed our baseline findings.

**Table 4 continued from previous page**

| | | | | |
|---|---|---|---|---|
| ***N SNAP*** | | | | |
| Low/Overall | 0.0123** | 0.00820 | 0.00106 | 0.00160 |
| | (0.00547) | (0.00658) | (0.00154) | (0.00112) |
| High | | 0.00229 | | -0.00496 |
| | | (0.0112) | | (0.00833) |
| ***N In-trans*** *(no. from the same transport to Theres. on transport to Auschwitz)* | | | | |
| Low/Overall | 0.000302 | 0.000636 | 0.000568** | 0.000626** |
| | (0.000333) | (0.000399) | (0.000262) | (0.000255) |
| High | | 0.000956** | | 0.000508 |
| | | (0.000450) | | (0.000312) |
| ***N JKG Prague*** *(no. of prisoners on transport from JKG Prague)* | | | | |
| Low/Overall | 0.00155 | -0.00136 | 0.0000963 | 0.000114 |
| | (0.00192) | (0.00159) | (0.000223) | (0.000219) |
| High | | -0.00505* | | -0.000198 |
| | | (0.00266) | | (0.000310) |
| ***N IKG Vienna*** | | | | |
| Low/Overall | 0.00171 | -0.0234** | -0.00189 | -0.00394*** |
| | (0.00719) | (0.0112) | (0.00145) | (0.000726) |
| High | | -0.0132* | | 0.00224 |
| | | (0.00729) | | (0.00169) |
| ***N IKG Berlin*** | | | | |
| Low/Overall | -0.0113 | -0.0500** | -0.000844 | -0.0167 |
| | (0.0128) | (0.0225) | (0.00482) | (0.0131) |
| High | | -0.0173 | | -0.00416 |
| | | (0.0116) | | (0.00412) |
| ***Entrepreneur*** | | | | |
| Low/Overall | 0.00489 | 0.00523 | -0.0393 | -0.0291 |
| | (0.0579) | (0.0589) | (0.0349) | (0.0326) |
| High | | 0.0186 | | -0.123*** |

**Table 4 continued from previous page**

| | | | | |
|---|---|---|---|---|
| | | (0.0920) | | (0.0372) |
| ***Prominent*** | | | | |
| Low/Overall | 0.0396 | -0.835*** | 0.00826 | -0.155*** |
| | (0.141) | (0.0954) | (0.137) | (0.00180) |
| High | | -4.678*** | | -0.198*** |
| | | (0.501) | | (0.0372) |
| ***Academic title*** *(excluding medical degrees)* | | | | |
| Low/Overall | 0.0577* | 0.0562 | 0.00490 | 0.00505 |
| | (0.0334) | (0.0400) | (0.0351) | (0.0309) |
| High | | 0.0430 | | -0.0238 |
| | | (0.0549) | | (0.0646) |
| ***Doctor (medical degree)*** | | | | |
| Low/Overall | 0.0822* | 0.0766* | 0.0582** | 0.0568** |
| | (0.0426) | (0.0409) | (0.0250) | (0.0253) |
| High | | 0.112*** | | 0.0586 |
| | | (0.0355) | | (0.0420) |
| ***Transport-selection risk evaded in Theresienstadt*** | | | | |
| Low/Overall | 0.0523*** | 0.0510*** | 0.0373*** | 0.0302*** |
| | (0.00886) | (0.00883) | (0.0126) | (0.0105) |
| High | | 0.0594*** | | 0.0541*** |
| | | (0.0129) | | (0.0131) |
| Clusters | 16 | 16 | 20 | 20 |
| Observations | 8,735 | 8,670 | 8,520 | 8,461 |

*Notes:* Standard errors clustered by out-transports in parentheses. Significance codes: * 10% ** 5% *** 1%. All models control for out-transport fixed effects, prisoners' countries of origin, refugee status, Communist party membership, and fixed effects for Prague residency.

Overall, we interpret these estimates as suggesting that close friendships (unlike administrative ties and pre-deportation social status) support survival in the extreme conditions

of a Nazi concentration camp and that larger groups of socially-linked prisoners generate valuable opportunities to form mutually-supportive small 'communes'. Our estimates are lower bounds to the extent that our measures of social linkages contain measurement error, and because we do not measure all social ties between prisoners, so the base-group prisoner is not fully isolated in the social space of the ghetto/camp.

# 5 Conclusions

Deportation and killing of civilians was prevalent in Europe throughout the 20th century (Naimark, 2001), and continues throughout the world today. Investigating the social structure of internment camps is thus important not only as a study of history. We provide what appears to be the first multivariate exploration of competing risks faced by prisoners of Nazi ghettos and concentration camps. We contrast factors that underpin survival outcomes under varying survival pressure, with and without the ability to self-administer prisoner societies. Guided by the existing literature, we focus on social-status and social-network effects. In absence of direct information on prisoner friendships, we employ social-linkage proxies (potential friends) based on various pre-existing networks. Our analysis generates complementary evidence to, and a statistical check on the large part of the Holocaust literature based on fundamentally selective survival testimonies. It supports this literature in its emphasis on the importance of mutual-support groups as a key survival strategy of prisoners facing extreme survival pressure. Within the self-administered society of the Theresienstadt ghetto, pre-deportation social status and administrative linkages helped protect prisoners against selection into out-transports and supported survival of the elderly. Social status and administrative linkages were no longer helpful in the extreme conditions of the Auschwitz-Birkenau concentration camp, where friendships corresponding to shared previous residence, earlier shared imprisonment, and prisoner networks all generated a significant survival advantage.

Our evidence is relevant to the literature studying parochial altruism—the notion that experience of violent conflict supports within-group cooperation among survivors (Trivers, 1971; Choi and Bowles, 2007). An alternative mechanism highlighted here is that those

more prone to cooperation (thanks to, e.g., having available larger social networks) are more likely to survive violent conflicts. Finally, our analysis extends the literature on the importance of social links in high-stakes contexts (e.g., Costa and Kahn, 2007; Stuart and Taylor, 2021) by studying an extreme setting, and we similarly extend the large literature on the importance of social networks for health outcomes (e.g., House et al., 1988) by providing evidence on the transferability of social linkages generated in normal social environments to the extreme conditions of Nazi concentration camps.

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# A Appendix: Out-Transport Selection Process

The ghetto's self-administration, its Council of the Elders, was selected by the SS. Ethnicity was important to loyalties and group formation within the self-administration (Hájková, 2020). The first self-administration, lasting from November 1941 to October 1942 and fully under control of Czech Jews, built most of the ghetto's internal structures. Subsequent administrations became gradually dominated by German and Austrian Jews. A key function of the self-administration was to assemble transports based on the SS demographic-group-level orders corresponding to age and/or nationality groups; it collected suggestions for transports from departments within the self-administration, heard complaints against transport assignment,[50] and in some cases combined large out-transport groups across specific in-transport groups. The SS initially protected the elderly from transports, but in September and October 1942 it ordered large out-transports of prisoners aged over 65 in order to reduce overcrowding. For many transports, the SS decided that they be composed of only one nationality group, for instance, elderly Czech prisoners.[51] In the remaining transports, the self-administration followed a fairness objective of spreading the burden of transports evenly across the nationality groups: it allocated the nationality shares on a given transport in accordance with the nationality shares on the ghetto's population at the time (Hájková, 2020, p. 203; we confirm this empirically).[52] The influence of the self-administration over the individual-level composition of transports was terminated in the fall of 1944 (with transport 'En'), when the SS started selecting all individuals for transports.[53]

[50]The Large Commission of the self-administration, which decided on the composition of transports, consisted in large part of veterans of the self-administration (Hájková, 2020).

[51]We know those SS directives that were repeated in the Daily Orders of the Council of the Elders. Transports Bo, Bp, Bq, Br, and Bs were to be composed of German and Austrian prisoners. Transports Bv, Bw, Bx (By, Cq, Cs) were to be composed of mainly elderly (in some cases young) Czech prisoners.

[52] We first exclude transports where we know from Daily Orders that the SS decided on the demographic composition (transports Bv, Bw, Bx, By, Bo, Bp, Bq, Br, Bs, Cq, Cs). In addition, five transports were almost exclusively composed of Czech prisoners (Cu, Dr, Dm, Dl-N, and Dl) and so were likely also a direct SS order. Finally, two transports went to Bergen Belsen (Eg and Ej), another concentration camp, and were also under direct SS control. This leaves ten sizeable transports, all to Auschwitz, where the self-administration could affect the nationality composition. The nationality composition of all of these transports was indeed very close (within five percentage points) to the prevailing nationality shares of the ghetto's population in the month of each transport.

[53]According to the Daily Orders, the SS also took direct control of the composition of four October 1942 transports, namely transports Bv, Bw, Bx, and By.

# B Appendix: Social Linkages and Social Status

## B.1 Archival Sources

*Social Linkages - Lípa camp*

The male Czech Jews interned at the Lípa camp were engaged in agricultural labor. The camp was guarded by only one or two members of the SS (Jindrová, 2009). It was a labor camp, but it was not deadly and the atmosphere was conducive to friendship formation. After the daily agricultural work, prisoners (whose average age was 26) organized their own free time, played games (chess tournaments) and shared books through a camp library. In their survivor testimony, Stránský and Ullmann (1990, p.15) report that Lípa prisoners formed small 'communes' where they shared food (sent by mail from home), helped each other with their labor tasks, etc., and that these 'communes' later on helped their members survive the Holocaust. The data we employ merges (based on name, age, and place of residence) the complete list of Lípa camp prisoners compiled by Jindrová (2009) with the TII near-complete database of Theresienstadt prisoners. Out of the total of 1,351 participants in the Lípa camp, 961 (71%) entered Theresienstadt. Of these, the median length of time they spent in the Lípa camp was 166 days, i.e., about half a year, which allows for strong social links to be built.[54] Ultimately, 842 (88%) of the 961 Lípa prisoners in Theresienstadt ended up in transports to the east (601 were sent to Auschwitz in 23 separate transports), and 100 (11%) survived in Theresienstadt.[55]

*Social Linkages and Status - IKG/JKG*

Self-governing bodies of the Jewish communities in Prague, Vienna, and Berlin, were misused during the Holocaust by Nazi Germany as administrative bodies supporting the extermination of Jewish populations. The officials of these organizations set up deportation lists based on Nazi instructions, and also organized social help for those in need, as well

[54]While many Lípa prisoners were transferred directly to Theresienstadt, for example those on transports AE5 and Dn coming directly from Lípa, most Lípa prisoners were first released and only later imprisoned in Theresienstadt.

[55]This group includes 65 Lípa prisoners arriving in Theresienstadt in 1945, who were from mixed marriages, unlike the prisoners arriving earlier. These 65 prisoners faced no out-transport risks and are thus not the object of our analysis. The entire group survived the war in Theresienstadt. The probability that Lípa prisoners who arrived in Theresienstadt before 1945 survived the war there is 3%.

as educational and sport activities of pre-deportation local Jewish societies. The list of JKG Prague members and managers was digitized from Krejčová et al. (1997) and merged with the TII data. The Berlin and Vienna lists were obtained from archives (by T. Fedorovič). We then digitized these and merged them with the TII database based on TII data assistance. Sources:

- IKG Wien: Personalkartei der MitarbeiterInnen der IKG Wien (1925-1945), Archiv der Israelitischen Kultusgemeinde Wien, http://www.archiv-ikg-wien.at/
- JKG Berlin + Reichvereinigung der Juden in Deutschland: CJA, 2 B 1, Nr. 6, Mitarbeiterverzeichnis der Reichsvereinigung der Juden in Deutschland, 1. 9. 1941. Das Museum der Neuen Synagoge Berlin – Centrum Judaicum, https://centrumjudaicum.de/

*Social Linkages - SNAP*

An underground satiric weekly (Shalom for Friday, *Šalom na pátek* in Czech, ŠNAP) was shared by Theresienstadt prisoners forming a chain-mail community. Source: Yad Vashem Archives O.64/64.

*Social Linkages - Small Towns*

We approximate social ties formed based on place of residence for 11 Czech towns[56] where we observe local Jewish registry cards (JEK in Czech). Source: Fedorovič (2008).

*Social Status - Entrepreneurs*

Other than the TII-database indicator identifying prominent prisoners (Hyndráková et al., 1996), we have two external sources to identify pre-war social status corresponding to being a well-off, socially connected elite business owner. We coded a list of 221 Czech Jewish elite entrepreneurs from Pick (1968, p. 359–438) and merged it with the database of the 1934 members of the Jewish B'nai B'rith association (obtained form the Jewish Museum Prague, sign. 11069), which covered the Jewish intellectual and business/financial elite of pre-war Czech lands (Čapková, 2000). The combined list of entrepreneurs was then merged with the TII database using names and age (if available) yielding 692 matches.

[56]Benešov, Beroun, Brandýs n.L., Kladno, Kralupy, Louny, Mělník, Písek, Roudnice, Sedlčany, Tábor.

*Refugees*

We were able to obtain information on two refugee groups: the Jews who were forced to leave the Karlsbad region of *Sudetenland* after its annexation by Nazi Germany in 1938, and those fleeing from Austria, which was also annexed in 1938. The *Sudetenland* data on Jewish respondents to the 1930 census was merged with TII data based on ITI prisoner IDs assigned by the Prague Jewish Museum (M. Frankl). The information on Austrian refugees was manually collected from TII archives based on histories of residency, it was then digitized and coded into the extended TII database. We consider those eventual Theresienstadt prisoners who moved from Austria to the Protectorate (Czech lands) in 1938 or thereafter to be Austrian refugees.

*Communists*

We digitized the likely incomplete list of Communist party members in Theresienstadt from Kárný (1983) [Komunistická organizace v terezínském koncentračním táboře 1941–1945], National Archive of the Czech Republic.

## B.2 Survivor Testimonies on Social Linkages

*Family ties*

Jiří Franěk (born 1922) recalls help from his aunt in Auschwitz. "When my beautiful little cousin left for the gas chamber, her mother, my aunt, started taking care of me, and every day she brought me an extra portion of soup scraped from the bottom of the barrel." Jiří Franěk. 1994. Like sheep to the slaughter. [Jako ovce na porážku], in *The Theresienstadt family camp in Auschwitz-Birkenau* [Terezínský rodinný tábor v Osvětimi-Birkenau], The Foundation of the Theresienstadt Initiative: Prague, p. 83.

*Mutual-support groups*

"In the extreme conditions of the camps, inter-personal relationships were critical ... linkages from the past: family or local ties." "Mutual solidarity of prisoners in Auschwitz was not unusual, including sharing food..." Peter Salner. 1997. *They Survived the Holocaust.* [Prežili Holokaust], Slovak Academy of Sciences: Bratislava, p. 146 and p. 150.

"Boys aged 14-16 in the family camp in Auschwitz who survived recalled the importance of mutual help, including risking one's life to save that of a friend, which helped them survive the harsh months until liberation." Ruth Bondyová. 1994. The children's block in the family camp in Auschwitz. [Dětský blok v rodinném táboře v Osvětimi], in *The Theresienstadt family camp in Auschwitz-Birkenau* [Terezínský rodinný tábor v Osvětimi-Birkenau], The Foundation of the Theresienstadt Initiative: Prague, p. 60.

"40 boys (14 to 16 years old) from Room 7 in Building L417 in Theresienstadt proudly called themselves the Nešarim (eagles). Living together under the tutelage of their youth leader Franta had an unusual impact on everyone's lives: the creation of an extended family of brothers." Jan Strebinger testimony: "One of the many things that Franta taught us was to depend on each other, and that contributed to Robin's and my survival in the various camps we went through." Thelma Gruenbaum, 2004. *Nešarim: Child Survivors of Terezín,* London – Portland, p. 1-2 and p. 194.

*Lípa-camp ties*

"...their camaraderie led to the formation of small 'communes' where they shared everything, from food received by mail to labor in the field. There were also those who kept to themselves, never helped anybody, never shared. Their fate was not good later on, when conditions got worse." O. Stránský and O. Ullmann. 1990. *Lípa 1940-1945*, Prague, p. 15.

*Administrative JKG/IKG ties*

Lea Rachman recalls arriving in the Łódź ghetto with her father, who was formerly the chief editor of the newspaper of the JKG in Prague: "When we came to Lodž, we were contacted by local JKG/IKG people, and we soon got assigned a large flat in the ghetto." Richard Seemann. 2000. *Ghetto Litzmannstadt 1941-1944,* Institute of International Relations: Prague, p.27 and p.74.

# C Appendix: Model Specifications

The main econometric models used in this paper are specified as generalized linear models (GLMs, cf. Nelder and Wedderburn, 1972) of the following form:

$$\mathbb{E}[Y|\boldsymbol{\Theta}] = f(\mathbf{X}\boldsymbol{\beta}), \tag{1}$$

where $Y$ is the dependent variable (death in Theresienstadt, selection into out-transports, death after transport to Auschwitz); $\boldsymbol{\Theta}$ is the conditioning set consisting chiefly of the matrix of observed regressors $\mathbf{X}$; $f(\cdot)$ is a parametric inverse link function (see Table 5); and $\boldsymbol{\beta}$ is a vector of parameters to be estimated.[57]

Table 5: Definitions of inverse link functions

| Model | $f(\mathbf{X}\boldsymbol{\beta})$ |
|---|---|
| OLS | $\mathbf{X}\boldsymbol{\beta}$ |
| Logit | $\frac{\exp(\mathbf{X}\boldsymbol{\beta})}{1+\exp(\mathbf{X}\boldsymbol{\beta})}$ |
| Probit | $\Phi(\mathbf{X}\boldsymbol{\beta})$ |
| Complementary log-log | $1-\exp(-\exp(\mathbf{X}\boldsymbol{\beta}))$ |

*Note:* $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution.

For survival analysis, we also alternatively use the Cox proportional hazard model in discrete time, specifically Cox (1972) with the traditional Breslow (1974) approximation for tied survival times. In GLM duration models used to study death risks in the ghetto

[57] A non-parametric local-linear kernel model (e.g. Fan and Gijbels, 2003, sec. 7.8) of survival in Auschwitz has been fitted as well, such that $\mathbb{E}[Y|\boldsymbol{\Theta}] = \mathcal{F}(\mathbf{X})$, where $\mathcal{F}$ is an unknown function to be estimated from the data. Inference in this model was conducted by constructing percentile confidence intervals and symmetric bootstrap p-values (MacKinnon, 2009) using 200 bootstrap replications clustered by out-transports. The results, reported in Table D.9, are similar to those based on the parametric models in terms of the magnitude of the estimated effects as well as in terms of their statistical significance.

and selection into out-transports, Equation (1), which is the basis for building individual likelihood contributions corresponding to observed individual histories,[58] is specified as

$$\mathbb{P}[\text{failure time}_i = t | \text{failure time}_i \geq t, \mathbf{X}_{it}] = f(\mathbf{X}_{it}\boldsymbol{\beta}), \tag{2}$$

where failure time designates the period in which person $i$ dies in the ghetto or is selected into an out-transport (out of all periods with relevant out-transports). The (simple binary) survival model for prisoners entering extermination camps takes the form

$$\mathbb{P}[\text{survival}_i | \mathbf{X}_i] = f(\mathbf{X}_i\boldsymbol{\beta}). \tag{3}$$

Since the parameters $\boldsymbol{\beta}$ are difficult to interpret in terms of their magnitude (other than for OLS and Logit specifications), we compute *average marginal effects* (AMEs). The AME for a continuous variable $x$ evaluated at a given level of other regressor $z$ is:

$$\widehat{\text{AME}}(x|z = \tilde{z}) = \frac{1}{N}\sum_{j=1}^{N} \frac{\partial f(\mathbf{x}_j\widehat{\boldsymbol{\beta}})}{\partial x_j}\bigg|_{z_j=\tilde{z}}, \tag{4a}$$

where $j$ indexes observations in the sample from 1 to $N$, and where $\mathbf{x}_j$ is the $j$-th row of the regressor matrix $\mathbf{X}$. For discrete $x$, AME measures the difference between the function $f$ evaluated at two values of $x$, say $x^{(1)}$ and the baseline value $x^{(0)}$:

$$\widehat{\text{AME}}(x|z = \tilde{z}) = \frac{1}{N}\sum_{j=1}^{N} f(\mathbf{x}_j\widehat{\boldsymbol{\beta}})\Big|_{z_j=\tilde{z},x_j=x^{(1)}} - f(\mathbf{x}_j\widehat{\boldsymbol{\beta}})\Big|_{z_j=\tilde{z},x_j=x^{(0)}}. \tag{4b}$$

In other words, $\widehat{\text{AME}}(x|z = \tilde{z})$ is calculated in three steps: (i) the value of $z$ is set in the entire sample to $\tilde{z}$, leaving other elements of $\mathbf{X}$ unchanged; (ii) the partial derivative or the discrete difference of $f(\mathbf{x}_j\widehat{\boldsymbol{\beta}})$ with respect to $x$ is calculated at each observation of the modified sample; and (iii) partial derivatives or discrete differences computed in step (ii) are averaged across the sample.

[58] The individual histories of Theresienstadt prisoners we study involve competing risks between death in the ghetto and out-transports. We estimated models taking explicit account of the competing risks including correlated unobservables. The results, available upon request, were not appreciably different from those based on the simpler, single-risk models with independent censoring.

# D Appendix: Supplementary Tables

## D.1 Additional summary statistics

Table D.1: Additional summary statistics for key variables in the Transport Selection model. Standard deviations (SD) for binary variables omitted.

| Variable | Females | | Males | |
|---|---|---|---|---|
| | Mean | SD | Mean | SD |
| Age in 1940 | 48.915 | 20.304 | 43.152 | 20.775 |
| Selection risk | 0.058 | 0.058 | 0.060 | 0.061 |
| Transports evaded | 10.617 | 9.773 | 12.596 | 11.343 |
| Selection risk evaded | 0.633 | 0.716 | 0.686 | 0.692 |
| Duration of imprisonment (months) | 6.756 | 7.168 | 7.765 | 7.629 |
| Entrepreneur | 0.002 | — | 0.013 | — |
| Prominent status | 0.002 | — | 0.002 | — |
| Ac. title (non-medical) | 0.005 | — | 0.071 | — |
| Doctor (medical degrees) | 0.003 | — | 0.027 | — |
| JKG Prague Manager | 0.000 | — | 0.001 | — |
| JKG Prague | 0.010 | — | 0.033 | — |
| IKG Vienna | 0.003 | — | 0.007 | — |
| IKG Berlin | 0.002 | — | 0.004 | — |
| Arr. with family | 0.621 | — | 0.645 | — |
| Sudetenland refugee | 0.034 | — | 0.043 | — |
| Austrian refugee | 0.003 | — | 0.004 | — |
| Communist | 0.001 | — | 0.003 | — |
| Austrian origin | 0.105 | — | 0.066 | — |
| Czech origin | 0.663 | — | 0.797 | — |
| German origin | 0.233 | — | 0.137 | — |
| Observations | | 694,338 | | 455,741 |

Table D.2: Additional summary statistics for variables in the Duration Model in Theresienstadt. Standard deviations (SD) for binary variables omitted.

| Variable | Females | | Males | |
|---|---|---|---|---|
| | mean | sd | mean | sd |
| Age in 1940 | 68.330 | 5.711 | 68.155 | 5.497 |
| Population in ghetto (thousands) | 39.537 | 10.918 | 39.491 | 11.086 |
| Transports evaded | 8.077 | 7.077 | 6.991 | 7.389 |
| Selection risk evaded | 0.477 | 0.500 | 0.446 | 0.522 |
| Duration of imprisonment (months) | 9.910 | 8.466 | 9.355 | 8.207 |
| N family | 0.136 | 0.655 | 0.193 | 0.727 |
| N street | 0.168 | 0.952 | 0.244 | 1.140 |
| Entrepreneur | 0.002 | — | 0.012 | — |
| Prominent status | 0.002 | — | 0.007 | — |
| Ac. title (non-medical) | 0.001 | — | 0.068 | — |
| Doctor (medical degrees) | 0.000 | — | 0.021 | — |
| JKG Prague Manager | 0.000 | — | 0.000 | — |
| JKG Prague | 0.000 | — | 0.007 | — |
| IKG Vienna | 0.001 | — | 0.007 | — |
| IKG Berlin | 0.001 | — | 0.004 | — |
| Arr. with family | 0.472 | — | 0.666 | — |
| Sudetenland refugee | 0.018 | — | 0.030 | — |
| Austrian refugee | 0.002 | — | 0.004 | — |
| Austrian origin | 0.218 | — | 0.209 | — |
| Czech origin | 0.293 | — | 0.364 | — |
| German origin | 0.490 | — | 0.427 | — |
| Observations | | 277,613 | | 151,180 |

Table D.3: Censored mean survival times (months since arriving in Theresienstadt) for select groups of prisoners aged 60 years or more in 1940.

| Group | Females | | | Males | | |
|---|---|---|---|---|---|---|
| | Persons | Mean | SE | Persons | Mean | SE |
| All | 34,064 | 18.63 | 0.12 | 19,441 | 16.37 | 0.15 |
| Arr. with a prime-age fam. member | 3,800 | 22.56 | 0.36 | 3,019 | 20.87 | 0.39 |
| Prominent | 28 | 35.74 | 1.95 | 38 | 35.70 | 1.48 |
| Entrepreneur | 66 | 23.89 | 2.25 | 230 | 20.04 | 1.39 |
| Sudetenland refugee | 640 | 24.92 | 1.03 | 563 | 22.04 | 1.04 |
| Austrian refugee | 30 | 25.86 | 2.88 | 52 | 25.44 | 3.17 |
| Ac. title (excl. medical degrees) | 32 | 14.73 | 2.66 | 1,065 | 16.04 | 0.56 |
| Doctor (medical degree) | 4 | 22.75 | 6.28 | 248 | 23.70 | 1.25 |
| IKG Vienna | 44 | 14.20 | 2.42 | 82 | 19.83 | 1.72 |
| JKG Prague | 17 | 24.27 | 2.87 | 81 | 30.67 | 1.78 |
| IKG Berlin | 15 | 26.76 | 2.76 | 34 | 26.21 | 1.84 |
| Selection risk evaded $\geq 1$ | 3,239 | 25.05 | 1.33 | 1,500 | 27.46 | 0.52 |

Table D.4: Additional summary statistics for variables in the Survival Model in Auschwitz. Standard deviations (SD) for binary variables omitted.

| Variable | Females | | Males | |
|---|---|---|---|---|
| | Mean | SD | Mean | SD |
| N Family | 1.114 | 0.339 | 1.113 | 0.375 |
| N in-trans | 10.69 | 12.56 | 19.17 | 32.01 |
| N SNAP | 3.759 | 2.214 | 11.58 | 9.032 |
| N Same street | 1.169 | 0.427 | 1.210 | 0.755 |
| N Lipa | — | — | 44.20 | 21.96 |
| N JEK | 2.119 | 1.185 | 2.942 | 1.765 |
| N JKG Prague | 28.77 | 9.083 | 89.66 | 59.25 |
| N IKG Vienna | 13.99 | 5.195 | 37.86 | 23.93 |
| N IKG Berlin | 11.16 | 5.921 | 20.59 | 13.77 |
| Age in 1940 | 29.76 | 14.30 | 31.35 | 14.72 |
| Selection risk evaded | 1.292 | 0.966 | 1.102 | 0.912 |
| Entrepreneur | 0.001 | — | 0.011 | — |
| Prominent status | 0.001 | — | 0.001 | — |
| Ac. title (non-medical) | 0.011 | — | 0.065 | — |
| Doctor (medical degrees) | 0.006 | — | 0.035 | — |
| JKG Prague | 0.041 | — | 0.099 | — |
| IKG Vienna | 0.012 | — | 0.023 | — |
| IKG Berlin | 0.010 | — | 0.010 | — |
| Communist | 0.001 | — | 0.002 | — |
| Arr. with family | 0.738 | — | 0.673 | — |
| SNAP reader | 0.006 | — | 0.006 | — |
| Sudetenland refugee | 0.026 | — | 0.036 | — |
| Austrian refugee | 0.004 | — | 0.003 | — |
| Austrian origin | 0.133 | — | 0.084 | — |
| Czech origin | 0.206 | — | 0.140 | — |
| German origin | 0.661 | — | 0.776 | — |
| Observations | | 8,735 | | 8,520 |

## D.2 Selection on Transports to the East

Table D.5: Coefficients from alternative parametric models of selection into transports out of Theresienstadt.

| | Females | | | | Males | | | |
|---|---|---|---|---|---|---|---|---|
| | OLS | Logit | Cloglog | Probit | OLS | Logit | Cloglog | Probit |
| Age (std.) | -0.00355 | -0.308** | -0.292** | -0.140** | -0.00444 | -0.145 | -0.108 | -0.0695 |
| | (0.00530) | (0.120) | (0.117) | (0.0560) | (0.00400) | (0.118) | (0.108) | (0.0534) |
| Age (std.) × Age (std.) | -0.00910*** | -0.252 | -0.239* | -0.107 | -0.00978** | -0.211 | -0.207 | -0.0933 |
| | (0.00339) | (0.164) | (0.145) | (0.0708) | (0.00483) | (0.160) | (0.143) | (0.0703) |
| Age (std.) × Age (std.) × Age (std.) | -0.00110 | -0.0203 | -0.0176 | -0.00496 | -0.000661 | -0.0189 | -0.0230 | -0.00605 |
| | (0.00121) | (0.0529) | (0.0451) | (0.0229) | (0.00162) | (0.0569) | (0.0520) | (0.0238) |
| Selection risk evaded so far | -0.0644*** | -1.682*** | -1.662*** | -0.671*** | -0.0711*** | -1.766*** | -1.723*** | -0.743*** |
| | (0.00917) | (0.396) | (0.390) | (0.134) | (0.0116) | (0.365) | (0.357) | (0.135) |
| Current selection risk | 1.052*** | 13.03*** | 11.23*** | 7.016*** | 1.047*** | 11.75*** | 9.975*** | 6.401*** |
| | (0.0391) | (1.215) | (1.066) | (0.572) | (0.0375) | (1.268) | (0.967) | (0.609) |
| Duration of imprisonment | 0.00262*** | 0.0396** | 0.0398** | 0.0179** | 0.00291*** | 0.0556*** | 0.0558*** | 0.0238*** |
| | (0.000686) | (0.0200) | (0.0192) | (0.00813) | (0.000685) | (0.0190) | (0.0174) | (0.00822) |
| Entrepreneur | 0.00437 | 0.0480 | 0.0176 | 0.0242 | -0.0100*** | -0.237*** | -0.215*** | -0.107*** |
| | (0.00738) | (0.120) | (0.115) | (0.0617) | (0.00304) | (0.0755) | (0.0695) | (0.0333) |
| Prominent status | -0.0526*** | -2.706*** | -2.587*** | -1.175*** | -0.0529*** | -2.727*** | -2.568*** | -1.211*** |

**Table D.5 continued from previous page**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (0.00741) | (0.574) | (0.561) | (0.216) | (0.00674) | (0.693) | (0.668) | (0.291) |
| Ac. title (excl. medical degrees) | -0.0295*** | -0.863*** | -0.831*** | -0.395*** | -0.0220*** | -0.502*** | -0.448*** | -0.249*** |
| | (0.00522) | (0.183) | (0.173) | (0.0843) | (0.00334) | (0.0725) | (0.0701) | (0.0318) |
| Doctor (medical degree) | -0.0381*** | -1.042*** | -1.009*** | -0.483*** | -0.0400*** | -0.916*** | -0.822*** | -0.455*** |
| | (0.00592) | (0.174) | (0.171) | (0.0794) | (0.00407) | (0.126) | (0.125) | (0.0573) |
| JKG Prague Manager | -0.00109 | -0.0186 | 0.00409 | -0.0374 | -0.0553*** | -0.859*** | -0.713*** | -0.469*** |
| | (0.0120) | (0.276) | (0.263) | (0.132) | (0.0105) | (0.197) | (0.167) | (0.0931) |
| IKG Vienna | -0.0232*** | -0.693*** | -0.672*** | -0.318*** | -0.0207*** | -0.614*** | -0.510*** | -0.275*** |
| | (0.00630) | (0.162) | (0.146) | (0.0777) | (0.00547) | (0.213) | (0.188) | (0.0888) |
| JKG Prague | -0.0169** | -0.298** | -0.274** | -0.141** | -0.0164** | -0.335*** | -0.305*** | -0.152** |
| | (0.00652) | (0.134) | (0.128) | (0.0630) | (0.00666) | (0.128) | (0.112) | (0.0627) |
| IKG Berlin | -0.0352*** | -1.367*** | -1.334*** | -0.583*** | -0.0324*** | -1.122*** | -0.861*** | -0.566*** |
| | (0.00629) | (0.279) | (0.280) | (0.113) | (0.00866) | (0.307) | (0.276) | (0.115) |
| Arr. with family | -0.00174 | -0.0406 | -0.0346 | -0.0187 | 0.00201 | 0.0666 | 0.0644 | 0.0300 |
| | (0.00324) | (0.0644) | (0.0584) | (0.0303) | (0.00300) | (0.0588) | (0.0575) | (0.0267) |
| Sudetenland refugee | 0.000115 | -0.0140 | -0.0173 | -0.00779 | -0.00202 | -0.0480 | -0.0473 | -0.0227 |
| | (0.00389) | (0.0800) | (0.0771) | (0.0387) | (0.00179) | (0.0435) | (0.0395) | (0.0205) |
| Austrian refugee | -0.0214*** | -0.501*** | -0.454*** | -0.237*** | -0.00897 | -0.208*** | -0.202*** | -0.0849** |
| | (0.00564) | (0.158) | (0.147) | (0.0750) | (0.00598) | (0.0749) | (0.0673) | (0.0433) |
| Austrian origin | -0.0346*** | -0.573*** | -0.543*** | -0.264*** | -0.0412*** | -0.878*** | -0.936*** | -0.370*** |

**Table D.5 continued from previous page**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (0.00449) | (0.175) | (0.183) | (0.0673) | (0.00557) | (0.198) | (0.203) | (0.0718) |
| German origin | -0.0355*** | -0.636*** | -0.637*** | -0.272*** | -0.0465*** | -0.993*** | -1.023*** | -0.408*** |
| | (0.00468) | (0.221) | (0.218) | (0.0849) | (0.00652) | (0.262) | (0.251) | (0.0967) |
| Communist | -0.0499*** | -1.852*** | -1.821*** | -0.768*** | -0.0198* | -0.706** | -0.608** | -0.348*** |
| | (0.00583) | (0.242) | (0.239) | (0.108) | (0.0110) | (0.289) | (0.267) | (0.126) |
| Clusters (out) | 52 | 52 | 52 | 52 | 52 | 52 | 52 | 52 |
| Clusters (in) | 112 | 112 | 112 | 112 | 109 | 109 | 109 | 109 |
| Observations | 640,773 | 640,773 | 640,773 | 640,773 | 491,034 | 491,034 | 491,034 | 491,034 |

Standard errors clustered by out-transports and in-transports in parentheses

Significance codes: * p<0.1, ** p<0.05, *** p<0.01

## D.3 Death in Theresienstadt

Table D.6: Coefficients from the death hazard (survival) models in Theresienstadt fitted on the sample of prisoners aged 60 or more in 1940.

| | Females | | | | Males | | | |
|---|---|---|---|---|---|---|---|---|
| | Logit | Probit | OLS | Cloglog | Logit | Probit | OLS | Cloglog |
| Arr. with prime-age fam. member | -0.159*** | -0.0705*** | -0.00550*** | -0.155*** | -0.136*** | -0.0622*** | -0.00596*** | -0.130*** |
| | (0.0497) | (0.0223) | (0.00200) | (0.0481) | (0.0475) | (0.0216) | (0.00224) | (0.0455) |
| N Street | -0.0349*** | -0.0159*** | -0.000932*** | -0.0339*** | -0.0231*** | -0.00934*** | -0.000477** | -0.0226*** |
| | (0.00529) | (0.00243) | (0.000155) | (0.00509) | (0.00665) | (0.00299) | (0.000218) | (0.00650) |
| Population in ghetto (thousands) | 0.0307*** | 0.0132*** | 0.000989*** | 0.0301*** | 0.0280*** | 0.0124*** | 0.000944*** | 0.0273*** |
| | (0.00496) | (0.00205) | (0.000180) | (0.00501) | (0.00293) | (0.00129) | (0.000134) | (0.00289) |
| Entrepreneur | -0.370* | -0.180 | -0.0142** | -0.340 | -0.0432 | -0.0343 | -0.00261 | -0.0353 |
| | (0.224) | (0.116) | (0.00587) | (0.213) | (0.0944) | (0.0451) | (0.00431) | (0.0898) |
| Prominent prisoner | -1.460*** | -0.534** | -0.0207*** | -1.442*** | -1.922*** | -0.772*** | -0.0435*** | -1.877*** |
| | (0.546) | (0.213) | (0.00583) | (0.538) | (0.314) | (0.123) | (0.00445) | (0.313) |
| Ac. title (excl. med. doctor) | 0.177 | 0.0999 | 0.0110 | 0.169 | 0.273*** | 0.127*** | 0.0144*** | 0.263*** |
| | (0.165) | (0.0767) | (0.00928) | (0.159) | (0.0565) | (0.0275) | (0.00396) | (0.0530) |
| Doctor (medical degree) | 1.455 | 0.604 | 0.0562 | 1.430 | -0.193 | -0.0922* | -0.00540 | -0.190 |
| | (1.356) | (0.617) | (0.0524) | (1.348) | (0.122) | (0.0489) | (0.00350) | (0.119) |
| Sudetenland refugee | -0.0468 | -0.0175 | -0.000257 | -0.0474 | -0.0270 | -0.0127 | -0.000270 | -0.0269 |
| | (0.140) | (0.0684) | (0.00528) | (0.131) | (0.0561) | (0.0254) | (0.00249) | (0.0544) |

**Table D.6 continued from previous page**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Austrian refuge | -0.221*** | -0.0944*** | -0.000633 | -0.220*** | -0.0706 | -0.0401 | -0.00143 | -0.0659 |
| | (0.0674) | (0.0295) | (0.00134) | (0.0659) | (0.133) | (0.0661) | (0.00533) | (0.126) |
| IKG Vienna | 0.246*** | 0.120*** | 0.0145*** | 0.246*** | -0.324*** | -0.151*** | -0.00773 | -0.308*** |
| | (0.0228) | (0.0103) | (0.000794) | (0.0220) | (0.0710) | (0.0312) | (0.00484) | (0.0707) |
| JKG Prague | 0.634** | 0.359*** | 0.0278*** | 0.589** | -0.430* | -0.163* | 0.00938** | -0.435* |
| | (0.250) | (0.0977) | (0.00459) | (0.246) | (0.253) | (0.0865) | (0.00471) | (0.255) |
| IKG Berlin | -0.853*** | -0.354*** | -0.0151*** | -0.840*** | -0.742* | -0.340** | -0.0184*** | -0.713 |
| | (0.172) | (0.0716) | (0.00421) | (0.170) | (0.445) | (0.155) | (0.00387) | (0.453) |
| Selection risk evaded | -0.210 | -0.0326 | 0.0124** | -0.235* | -0.320** | -0.101* | 0.00764 | -0.333*** |
| | (0.147) | (0.0664) | (0.00593) | (0.141) | (0.134) | (0.0612) | (0.00661) | (0.128) |
| Age (std.) | 1.627** | 0.104 | -0.194** | 1.822** | -0.881 | -1.131*** | -0.508*** | -0.436 |
| | (0.720) | (0.280) | (0.0834) | (0.741) | (0.794) | (0.400) | (0.105) | (0.771) |
| Age (std.) $^2$ | 1.041* | 1.001*** | 0.209** | 0.851 | 3.445*** | 2.254*** | 0.571*** | 2.971*** |
| | (0.571) | (0.256) | (0.101) | (0.570) | (0.803) | (0.442) | (0.127) | (0.750) |
| Age (std.) $^3$ | -0.410*** | -0.293*** | -0.0184 | -0.390*** | -1.165*** | -0.701*** | -0.143*** | -1.048*** |
| | (0.151) | (0.0823) | (0.0356) | (0.138) | (0.265) | (0.154) | (0.0457) | (0.240) |
| German origin | 0.560*** | 0.275*** | 0.0328*** | 0.524*** | 0.579*** | 0.285*** | 0.0408*** | 0.543*** |
| | (0.0789) | (0.0387) | (0.00468) | (0.0733) | (0.0758) | (0.0389) | (0.00643) | (0.0703) |
| Austrian origin | 0.285*** | 0.142*** | 0.0164*** | 0.265*** | 0.318*** | 0.160*** | 0.0233*** | 0.298*** |
| | (0.0543) | (0.0270) | (0.00311) | (0.0511) | (0.0375) | (0.0200) | (0.00308) | (0.0352) |

**Table D.6 continued from previous page**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Clusters | 116 | 116 | 116 | 116 | 108 | 108 | 108 | 108 |
| Observations | 277,613 | 277,613 | 277,613 | 277,613 | 151,180 | 151,180 | 151,180 | 151,180 |

Standard errors clustered by in-transports in parentheses

Significance codes: * p<0.1, ** p<0.05, *** p<0.01

Fixed effects for duration dependence, calendar years and calendar months omitted.

Table D.7: Survival differentials (difference in survival rates when $x = 1$ and $x = 0$) after 12 months in Theresienstadt based on the Cox proportional hazard model. Base survival indicates survival rate without any advantage due to social capital.

| Regressor | Females | | Males | |
|---|---|---|---|---|
| | Surv. diff. | p-val | Surv. diff. | p-val |
| Prominent prisoner | 0.243 | 0.008 | 0.314 | 0.000 |
| IKG Berlin | 0.171 | 0.000 | 0.170 | 0.117 |
| JKG Prague | -0.181 | 0.018 | 0.115 | 0.088 |
| IKG Vienna | -0.060 | 0.000 | 0.084 | 0.000 |
| Selection risk evaded | 0.069 | 0.062 | 0.105 | 0.005 |
| Ac. title (excl. doctors) | -0.044 | 0.290 | -0.076 | 0.000 |
| Entrepreneur | 0.084 | 0.105 | 0.012 | 0.627 |
| Doctor | -0.459 | 0.288 | 0.052 | 0.106 |
| Prime-aged family present | 0.039 | 0.001 | 0.036 | 0.004 |
| Austrian refugees | 0.056 | 0.001 | 0.021 | 0.557 |
| Sudetenland refugees | 0.012 | 0.734 | 0.008 | 0.607 |
| Base survival | 0.623 | — | 0.554 | — |
| Persons | 33,346 | | 19,021 | |
| Clusters | 116 | | 108 | |
| Observations | 277,613 | | 151,180 | |

## D.4 Survival in Auschwitz

### D.4.1 Alternative specifications

Table D.8: Coefficients from the models of survival in Auschwitz.

| | Females | | | | Males | | | |
|---|---|---|---|---|---|---|---|---|
| | OLS | Logit | Cloglog | Probit | OLS | Logit | Cloglog | Probit |
| N Lipa | — | — | — | — | 0.00283*** | 0.0113** | 0.0102** | 0.00656** |
| | | | | | (0.000794) | (0.00514) | (0.00409) | (0.00309) |
| N Family | 0.0442** | 0.0681 | 0.0358 | 0.0520 | 0.00297 | -0.0530 | -0.0466 | -0.0191 |
| | (0.0180) | (0.155) | (0.119) | (0.0858) | (0.0121) | (0.101) | (0.0906) | (0.0545) |
| N Same street | 0.0870*** | 0.721*** | 0.499*** | 0.411*** | 0.0424*** | 0.258** | 0.140*** | 0.149*** |
| | (0.0136) | (0.0943) | (0.0675) | (0.0533) | (0.0116) | (0.109) | (0.0489) | (0.0530) |
| N SNAP | 0.0242* | 0.0992** | 0.0916** | 0.0605** | 0.000973 | 0.0115 | 0.00790 | 0.00724 |
| | (0.0117) | (0.0477) | (0.0395) | (0.0293) | (0.00174) | (0.0128) | (0.0114) | (0.00699) |
| N in-trans | 0.000595 | 0.00362 | 0.00225 | 0.00227 | 0.000308 | 0.00464** | 0.00422** | 0.00254** |
| | (0.000356) | (0.00314) | (0.00246) | (0.00176) | (0.000190) | (0.00212) | (0.00194) | (0.00109) |
| Selection risk evaded | 0.0229* | 0.479*** | 0.389*** | 0.236*** | 0.0232** | 0.329*** | 0.277*** | 0.183*** |
| | (0.0121) | (0.0806) | (0.0655) | (0.0457) | (0.0104) | (0.0989) | (0.0940) | (0.0501) |
| N JKG Prague | 0.00552 | 0.0228 | 0.0115 | 0.0122 | 0.0000139 | 0.000699 | 0.000716 | 0.000306 |
| | (0.00321) | (0.0203) | (0.0143) | (0.0119) | (0.000231) | (0.00193) | (0.00165) | (0.00109) |
| N IKG Vienna | -0.000969 | 0.0188 | 0.0127 | 0.00504 | -0.00189 | -0.0156 | -0.0140 | -0.00824 |

**Table D.8 continued from previous page**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (0.00672) | (0.0672) | (0.0535) | (0.0347) | (0.00151) | (0.0131) | (0.0107) | (0.00761) |
| N IKG Berlin | -0.00285 | -0.0850 | -0.0844 | -0.0469 | 0.0000700 | -0.00394 | -0.00627 | -0.00293 |
| | (0.00576) | (0.100) | (0.0943) | (0.0512) | (0.00246) | (0.0371) | (0.0358) | (0.0185) |
| N JEK | 0.00224 | 0.00192 | 0.0482 | -0.0187 | -0.00328 | -0.0434 | -0.0425 | -0.0212 |
| | (0.0310) | (0.268) | (0.203) | (0.150) | (0.0132) | (0.113) | (0.0967) | (0.0611) |
| Lipa prisoner | — | — | — | — | -0.120** | -0.708** | -0.630** | -0.395** |
| | | | | | (0.0459) | (0.303) | (0.246) | (0.181) |
| Entrepreneur | -0.00230 | -0.111 | 0.0364 | -0.127 | -0.0384 | -0.371 | -0.326 | -0.205 |
| | (0.0642) | (0.486) | (0.431) | (0.311) | (0.0284) | (0.365) | (0.327) | (0.198) |
| Prominent status | 0.00684 | 0.366 | 0.295 | 0.328 | 0.00485 | -0.0467 | 0.0601 | -0.0775 |
| | (0.188) | (1.354) | (1.047) | (0.743) | (0.106) | (1.034) | (0.977) | (0.583) |
| Ac. title (excl. medical degrees) | 0.0863 | 0.597* | 0.429* | 0.324* | 0.00222 | 0.0194 | 0.0360 | 0.0123 |
| | (0.0527) | (0.336) | (0.248) | (0.188) | (0.0334) | (0.284) | (0.255) | (0.151) |
| Doctor (medical degree) | 0.0608 | 0.725** | 0.612* | 0.370* | 0.0488** | 0.461*** | 0.385** | 0.265*** |
| | (0.0567) | (0.365) | (0.318) | (0.205) | (0.0203) | (0.167) | (0.150) | (0.0890) |
| JKG Prague | -0.0173 | 0.0532 | 0.210 | 0.0522 | 0.0201 | 0.0711 | 0.0625 | 0.0436 |
| | (0.0790) | (0.534) | (0.368) | (0.317) | (0.0320) | (0.292) | (0.249) | (0.163) |
| IKG Vienna | 0.0324 | 0.0593 | 0.118 | 0.0691 | 0.0910 | 0.730 | 0.639* | 0.413 |
| | (0.107) | (1.071) | (0.840) | (0.564) | (0.0618) | (0.459) | (0.353) | (0.270) |
| IKG Berlin | 0.0280 | 0.602 | 0.662 | 0.344 | 0.0140 | 0.308 | 0.330 | 0.187 |

**Table D.8 continued from previous page**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (0.0691) | (0.732) | (0.608) | (0.424) | (0.0718) | (1.089) | (1.053) | (0.547) |
| Communist | 0.184 | 1.116* | 0.894* | 0.641* | 0.162 | 0.441 | 0.298 | 0.279 |
| | (0.125) | (0.608) | (0.467) | (0.361) | (0.121) | (0.534) | (0.387) | (0.322) |
| Months spent in Terezin | -0.00109 | -0.0464*** | -0.0361*** | -0.0229*** | -0.00176 | -0.0287*** | -0.0241*** | -0.0165*** |
| | (0.00140) | (0.0112) | (0.00941) | (0.00596) | (0.00112) | (0.00953) | (0.00908) | (0.00492) |
| Arr. with family | -0.112*** | -0.501** | -0.367** | -0.287** | -0.0153 | 0.00131 | 0.0101 | -0.0165 |
| | (0.0274) | (0.204) | (0.156) | (0.115) | (0.0147) | (0.123) | (0.109) | (0.0695) |
| Non-missing JEK ID | -0.00817 | -0.0682 | -0.187 | 0.0159 | -0.0240 | -0.163 | -0.114 | -0.107 |
| | (0.0717) | (0.617) | (0.455) | (0.341) | (0.0388) | (0.363) | (0.310) | (0.203) |
| Sudetenland refugee | 0.0346 | 0.269 | 0.235 | 0.154 | 0.00193 | -0.00640 | -0.0469 | 0.00495 |
| | (0.0334) | (0.220) | (0.174) | (0.124) | (0.0207) | (0.169) | (0.136) | (0.0961) |
| Austrian refugee | 0.377*** | 2.306*** | 1.537*** | 1.310*** | 0.151** | 1.124*** | 0.872*** | 0.656*** |
| | (0.0577) | (0.322) | (0.257) | (0.190) | (0.0620) | (0.378) | (0.275) | (0.224) |
| Age (std.) | 0.0945 | 0.728 | 0.374 | 0.507 | -0.158*** | -2.627*** | -2.511*** | -1.300*** |
| | (0.0706) | (0.968) | (0.767) | (0.541) | (0.0124) | (0.251) | (0.267) | (0.0995) |
| Age (std.) × Age (std.) | 0.531*** | 5.391*** | 4.287*** | 3.068*** | 0.181*** | 0.891*** | 0.600* | 0.625*** |
| | (0.0678) | (1.033) | (0.855) | (0.565) | (0.0324) | (0.319) | (0.324) | (0.149) |
| Age (std.) × Age (std.) × Age (std.) | 0.209*** | 2.265*** | 1.837*** | 1.276*** | 0.106*** | 0.878*** | 0.723*** | 0.521*** |
| | (0.0206) | (0.310) | (0.262) | (0.168) | (0.0134) | (0.130) | (0.124) | (0.0664) |
| German origin | -0.0780*** | -0.954*** | -0.826*** | -0.527*** | -0.0778*** | -0.803*** | -0.727*** | -0.419*** |

**Table D.8 continued from previous page**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (0.0230) | (0.217) | (0.174) | (0.119) | (0.0270) | (0.232) | (0.205) | (0.132) |
| Austrian origin | -0.0210 | 0.142 | 0.140 | 0.0435 | -0.0282 | -0.131 | -0.117 | -0.0735 |
| | (0.0206) | (0.148) | (0.110) | (0.0814) | (0.0177) | (0.159) | (0.140) | (0.0859) |
| Observations | 8,735 | 8,735 | 8,735 | 8,735 | 8,520 | 8,520 | 8,520 | 8,520 |
| Clusters | 16 | 16 | 16 | 16 | 20 | 20 | 20 | 20 |

Standard errors clustered by out-transports in parentheses

Significance codes: * p<0.1, ** p<0.05, *** p<0.01

Transport fixed effects and Prague residency fixed effects omitted.

Table D.9: Results from a non-parametric kernel model of survival in Auschwitz. Percentile-based confidence intervals (CI) and p-values based on bootstrap clustered by out-transports.

| Variable | Females | | | | Males | | | |
|---|---|---|---|---|---|---|---|---|
| | AME | 95% CI | | p-val | AME | 95% CI | | p-val |
| N Lipa | — | — | — | — | 0.004 | 0.001 | 0.006 | 0.005 |
| N Family | 0.081 | 0.025 | 0.131 | 0.000 | 0.046 | 0.017 | 0.087 | 0.020 |
| N SNAP | 0.063 | 0.013 | 0.112 | 0.010 | 0.013 | -0.027 | 0.054 | 0.480 |
| N Same street | 0.107 | 0.078 | 0.139 | 0.000 | 0.074 | 0.049 | 0.097 | 0.000 |
| N In-trans | 0.001 | -0.001 | 0.003 | 0.526 | 0.000 | 0.000 | 0.001 | 0.747 |
| Selection risk evaded | 0.038 | -0.027 | 0.077 | 0.133 | -0.004 | -0.029 | 0.033 | 0.813 |
| Been to Lipa camp | — | — | — | — | -0.102 | -0.198 | 0.025 | 0.056 |
| Lived in Prague | -0.086 | -0.119 | -0.049 | 0.000 | -0.087 | -0.120 | -0.053 | 0.000 |
| Entrepreneur | -0.030 | -0.257 | 0.238 | 0.755 | -0.069 | -0.135 | -0.013 | 0.020 |
| Prominent status | -0.053 | -0.270 | 0.431 | 0.673 | -0.145 | -0.340 | 0.271 | 0.167 |
| Ac. title (excl. medical) | 0.060 | -0.028 | 0.188 | 0.250 | 0.027 | -0.020 | 0.105 | 0.313 |
| Doctor (medical deg.) | 0.031 | -0.077 | 0.223 | 0.709 | 0.040 | -0.016 | 0.117 | 0.217 |
| JKG Prague | 0.158 | 0.065 | 0.254 | 0.005 | 0.042 | -0.004 | 0.078 | 0.040 |
| IKG Vienna | 0.026 | -0.033 | 0.097 | 0.413 | 0.072 | 0.015 | 0.207 | 0.096 |
| IKG Berlin | -0.030 | -0.084 | 0.049 | 0.357 | -0.017 | -0.105 | 0.066 | 0.641 |
| Communist | 0.226 | -0.069 | 0.443 | 0.102 | 0.177 | -0.120 | 0.555 | 0.232 |
| Duration of imprisonment | -0.001 | -0.006 | 0.007 | 0.857 | 0.003 | -0.001 | 0.005 | 0.106 |
| Non-missing JEK ID | 0.041 | -0.018 | 0.098 | 0.204 | 0.014 | -0.029 | 0.064 | 0.540 |
| Non-missing family ID | -0.127 | -0.195 | -0.050 | 0.000 | -0.061 | -0.115 | -0.022 | 0.005 |
| Sudetenland refugee | 0.059 | -0.004 | 0.135 | 0.097 | 0.019 | -0.028 | 0.074 | 0.414 |
| Austrian refugee | 0.432 | 0.279 | 0.545 | 0.000 | 0.148 | -0.043 | 0.297 | 0.086 |
| Age (std.) | -0.132 | -0.155 | -0.107 | 0.000 | -0.105 | -0.159 | -0.059 | 0.000 |
| German origin | -0.007 | -0.038 | 0.014 | 0.648 | -0.039 | -0.078 | -0.014 | 0.020 |
| Austrian origin | -0.069 | -0.164 | -0.018 | 0.061 | -0.129 | -0.209 | -0.052 | 0.000 |

*Note:* Transport fixed effects omitted.

### D.4.2 Effect Magnitudes in the Auschwitz Survival Model

AMEs for the number of prisoners with social linkages on transports to Auschwitz indicate the marginal effect *of a single additional fellow prisoner* on transport. Since the sizes of the groups of potentially linked prisoners differ notably (Table 1 in the main text), the expected survival advantage is difficult to compare between different social groups. For this reason, we alternatively evaluate the expected survival advantage of a measure of social linkages $x$ as follows:

$$\text{Survival advantage due to } x = \frac{1}{N}\sum_{j=1}^{N} f(\mathbf{x}_j\widehat{\boldsymbol{\beta}})\Big|_{x_j=\overline{x}+\frac{\text{sd}(x)}{2}} - f(\mathbf{x}_j\widehat{\boldsymbol{\beta}})\Big|_{x_j=\overline{x}-\frac{\text{sd}(x)}{2}}, \quad (5)$$

where $\overline{x}$ and $\text{sd}(x)$ are the sample mean and standard deviation of $x$, respectively, for observations where $x > 0$. Thus, Equation (5) measures the change in the expected survival probability when the number of socially-linked prisoners rises by one standard deviation around its sample mean (taken at the level of individual prisoners). We also evaluate (5) when the accumulated 'selection risk evaded' rises by one standard deviation on the assumption that this variable is also indicative of an individual's social capital.

Table D.10 reports the results computed from the baseline complementary log-log model (see Tables 4 and D.8). The survival advantages are notably closer to each other than the AMEs. For example, the AME of travelling to Auschwitz with a fellow male prisoner from the same in-transport is smaller than that of travelling with a prisoner from the same street address by a factor of 30, while the survival advantage of 1 standard deviation of prisoners from the same street address is about as large as the advantage of prisoners from the same transport to Theresienstadt. However, due to the obvious presence of measurement error in the number of linked prisoners (for example, it is unlikely that all prisoners arriving in Theresienstadt on the same transport formed social networks), survival advantages reported in Table D.10 provide only a suggestion that the various measures of social linkages we study are not fundamentally different in terms of the magnitudes of their effects on survival chances.

Table D.10: Survival advantages of a 1 standard deviation change around the sample mean of different measures of social linkages computed from the complementary log-log model.

| Variable | Females | | | Males | | |
|---|---|---|---|---|---|---|
| | Surv. adv. | SE | p-val | Surv. adv. | SE | p-val |
| N Lipa | — | — | — | 0.039 | 0.016 | 0.013 |
| N Family | 0.002 | 0.005 | 0.764 | -0.002 | 0.005 | 0.607 |
| N Same street | 0.034 | 0.005 | 0.000 | 0.016 | 0.005 | 0.004 |
| N SNAP | 0.032 | 0.014 | 0.020 | 0.010 | 0.015 | 0.490 |
| N in-transp. | 0.004 | 0.004 | 0.362 | 0.018 | 0.008 | 0.030 |
| N JKG Prague | 0.016 | 0.020 | 0.419 | 0.006 | 0.014 | 0.665 |
| N IKG Vienna | 0.010 | 0.040 | 0.812 | -0.031 | 0.024 | 0.190 |
| N IKG Berlin | -0.038 | 0.042 | 0.371 | -0.011 | 0.061 | 0.861 |
| N JEK | 0.008 | 0.034 | 0.812 | -0.009 | 0.021 | 0.660 |
| Selection risk evaded | 0.050 | 0.008 | 0.000 | 0.034 | 0.011 | 0.003 |