

Interregional and Intraregional Inequality in Nineteenth Century Austria

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The paper addresses changes in income and wealth inequality in the first decades of modern economic growth. It relies on wealth data gained from probate inventories established in those provinces of the Habsburg Empire that eventually formed the Republic of Austria. These sources cover the whole population in the period between 1820 and 1913, including unpropertied persons. The analysis is based on a sample that consists of about 7,000 cases. The paper first examines wealth distribution on an aggregate level, using the Gini coefficient as a measure of inequality. As a result, the Austrian economy follows a Kuznets curve but rise and decline are not particularly steep. Further, these results are compared with the development within the regions, which yields quite different results for the regions involved. These results do not show the consistent picture of high inequality in more advanced regions and low inequality in backward regions that might be expected following the basic assumptions underlying the Kuznets curve. The explanation of the specific development within the different regions includes factors like class structure, family structure and patterns of inheritance, which explain why sectoral change, urbanization and other processes did not create a uniform pattern of wealth distribution in those provinces.

In the last decades the discussion on inequality has been an important part of the research on nineteenth century economic and social history of the Habsburg Empire. Important features of well-being that have been addressed in this discussion include housing, working conditions, nutrition and education. These topics were investigated both on the micro- and the macro-level, with qualitative studies predominating. A quite different approach was used in a number of econometric studies that estimated income and some factors connected with it on the macro-economic level; these studies addressed the issue of inequality primarily as regional inequality. In all these research efforts, the question of income and wealth inequality between individuals has found only limited interest.

This paper addresses wealth distribution based on a micro-economic analysis for the major part of what is Austria today, including the provinces of Lower Austria (including the city of Vienna), Upper Austria, Salzburg, Vorarlberg, (North) Tyrol and Vorarlberg, and the two parts of Styria.¹ It relies on wealth data gained from probate inventories established in these provinces between 1820 and 1913 (for a discussion of methodological aspects of the use of these sources, see the Appendix).

In the following the research problems connected with this work are addressed in four sections. Section I gives an outline of how overall inequality observed in the data is disaggregated in order to distinguish between interregional and intraregional inequality. For our analysis we use the Gini coefficient as a measure of inequality. In Section II we ask whether inequality became more pronounced in Austria in that period and whether the end of the nineteenth century is a turning point leading back to a more equal distribution. This section also distinguishes between intraregional and interregional wealth distribution for the whole of Austria and analyses wealth differentials between provinces. Section III describes intraregional inequality for every region and its changes from the middle of the nineteenth century up to World War I and discusses factors that worked in specific ways in different provinces and thus determined different patterns of inequality in those regions. The last section sums up the results.

I

Did inequality rise in Austria during the nineteenth century? The nineteenth century saw sustained economic growth in the Habsburg Monarchy, starting around 1820 and creating a slow though steady rise in income up to World War I. According to our data, real wealth at 1914 prices was around 4,500 florins between 1867 and 1913, and around 2,270 florins between 1820 and 1866, which amounts to an average annual growth rate of 1.5 percent over 47 years; this rate of wealth growth can be taken as an estimate of the rate of income growth as well. As that time was the period when modern economic growth started in the Habsburg Monarchy we hypothetically may assume widening income inequality during that period to be followed by narrowing income inequality in the twentieth century, in other words, a Kuznets curve. If such a development occurred it should appear even more pronounced for wealth inequality since high income groups have usually higher savings rates and accordingly accumulate disproportionately more wealth than low income groups. Thus, countries with rising inequality in income should show rising inequality in wealth as well.²

¹ In this paper, Tyrol is approximately the same region as today's Austrian state of Tyrol, at that time the district of the Innsbruck Chamber of Commerce. Styria is equal to today's Austrian state of Styria (that is, with the exclusion of Lower Styria, which is part of Slovenia today); at that time, Styria was divided into the districts of the Graz and the Leoben Chamber of Commerce.

² The only relevant exception might be the case of a widening income distribution among those who do not

In the following, we measure inequality using the Gini coefficient because this measure can easily be disaggregated according to the relevant characteristics of the persons included in the sample; the Gini coefficient, while yielding rather ambiguous results when employed as an aggregate measure, offers much insight into the origins of inequality when used in its disaggregate form. (This part of the analysis follows Pyatt 1976). The Gini coefficient is the quotient of two terms: The mean absolute wealth difference between any two members of the population, and twice the mean wealth in the population. This has two implications:

1. Since the Gini coefficient is basically the result of a sum of differences, it can originate from a variety of patterns of wealth distribution, and it can be decomposed according to the interesting criteria.
2. By decomposing the coefficient, inequality can be expressed as the expected difference in wealth between two individuals drawn at random.

For an analysis of regional inequality, the interesting criterion for the decomposition of the Gini coefficient is, of course, the region to which an individual belongs. If we subdivide our sample into regional groups, regional inequality is split up and attributed to specific constellations of regional groups to which the individuals belong.

For a better understanding of this analysis, we reflect how individuals would behave in a certain hypothetical game: What would a member of our population do if they had the free choice to keep their wealth status or to switch places with another member randomly selected? We assume that an individual would keep their former wealth status if the new place offered the same or a lower wealth status, but would take the new place if it promised higher wealth. The crucial point is that in such a game the expected differences in wealth are always either zero or positive, and therefore there are no losers. The potential gain can be expressed in absolute values; however, if we calculate the Gini coefficient we must express the potential gain as a proportion of the present wealth status.

If we deal with a population that is divided into regional groups, we can sum up these results for those groups. Calculating intraregional inequality, we ask what would be the gains of any member of a certain region if they changed places with another member of the same region, for instance, we ask what could a Styrian expect if they took the place of any other Styrian. (Again, the gains are expressed as a proportion of mean group wealth). Technically, we compare every single Styrian with every single other Styrian and calculate means; consequently, we do not focus on individual cases any more but deal with typical constellations; In this way, we calculate intragroup inequality for every region. Weighted by the size of the regions and summed up, these results yield a measure of intraregional inequality in the whole sample.

Interregional inequality is measured basically in the same way. Now we ask what would be the gains of any member of region A if they changed to region B? For instance, we ask what could a typical Carinthian expect if they took the place of a typical Lower Austrian – we compare every single Carinthian with every single Lower Austrian and calculate means. In this way, we compare every region with every other region. Weighted by group size and summed up, these comparisons yield a measure of interregional inequality. However, inequality between two regions can result from two different constellations:

1. Every member of region A owns more wealth than any member of region B. In this case, interregional inequality is equal to the inequality in regional mean wealth.
2. Some members of region A own more wealth than some members of region B, and *vice versa*. On an average, region A may be richer than region B, but the wealth distributions of

own any wealth at all. Such a process, while raising income inequality, will leave no traces in the wealth distribution.

Table 1: Distribution of assets within and between regions, 1830–1910

	Gini coefficient	Intraregional inequality	Interregional inequality	
			Mean differences	Overlapping distributions
1830	9236	2678	1938	4620
1840	8591	2516	2196	3879
1850	8458	2255	2177	4025
1860	8379	2354	1923	4102
1870	8491	2593	1754	4144
1880	9027	3467	2823	2737
1890	9344	4001	3770	1573
1900	9145	3586	1916	3643
1910	9193	2941	2539	3714

Source: Probate inventories.

Notes: Assets are calculated in 1914 crowns. Regions are Lower Austria, Upper Austria, Salzburg, Styria, Carinthia, Tyrol, Vorarlberg.

the two regions overlap. In this case, interregional inequality consists of inequality due to differences in regional mean wealth and inequality due to overlapping wealth distributions.

To sum up, in this paper, the Gini coefficient denoting wealth inequality in the whole population is disaggregated into three terms: One of these terms denotes wealth inequality within the single regions, another depends on the differences in mean wealth between regions, the third one accounts for the inequality that is not covered by the other two terms and is due to overlapping regional wealth distributions. These three terms constitute the basic framework for the determination of regional patterns of inequality. They do not depend from each other in a strict sense, but are interrelated insofar as a lower degree of intraregional inequality and marked differences in mean wealth between regions will coincide with a minor importance of overlapping regional distributions.

II

In the nineteenth century, the Gini coefficient for overall wealth inequality in Austria lay between 0.8 and 0.9, in other words, close to maximum inequality (which would be 1.0) (Table 1). This is much more than what can be observed for income distributions at any stage of development, but is not uncommon for a wealth distribution prior to or in the first stages of modern economic growth (see, for instance, Soltow 1979, p. 130, and Soltow 1980, pp. 230–231, for Norway and Denmark at the end of the eighteenth century).

The changes over time are more important. Wealth inequality seems especially high before 1840 and around 1900. From 1840 on, the development is more or less in accordance with what Kuznets assumed; the high values at the beginning of the period, however, do not fit to this model. A distinction according to regional criteria gives a better idea of variation and continuity in the distribution of wealth (Table 1). Throughout the period, two thirds of the observed inequality was inequality between regions; the major part of this interregional inequality, however, was due to overlapping distributions: up to the 1870s, about half of overall inequality was inequality by overlapping distributions, and the rest was due to intraregional inequality in the first place and inequality by mean differences between regions in the second. From the 1870s on, the proportion of inequality by overlapping distributions becomes smaller. A large proportion of inequality by overlapping distributions means that regional conditions explain only a minor part

Table 2: Contributions of regions to overall intraregional inequality, 1830–1910

	All regions	Lower Austria	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
1830	2678	1520	196	11	926	23	0	2
1840	2516	1887	353	17	239	14	0	6
1850	2255	1690	305	11	194	19	30	5
1860	2354	1835	213	20	237	30	13	6
1870	2593	2025	253	9	274	14	14	3
1880	3467	3110	93	3	241	15	4	1
1890	4001	3817	73	0	100	4	3	2
1900	3586	3137	159	3	274	6	4	2
1910	2941	2370	338	4	202	7	17	2

Source: Probate inventories.

Notes: Overall intraregional inequality as given in Table 1.

of inequality: Obviously it was not uncommon that quite a number of inhabitants of poor regions managed to accumulate fortunes that were larger than many fortunes in rich regions.

Thus, regions showed little homogeneity in the wealth status of their inhabitants, although some regional characteristics and typical differences between regions are obvious. Moreover, a closer examination shows that changes in intraregional inequality as observed in the sample, are mostly changes within Lower Austria – for most of the time, 75 to over 90 percent of intraregional inequality was inequality within Lower Austria, which reflects partly the high proportion of Lower Austria in the population of Austria and partly the specifically high wealth differentials in this province (Table 2). Generally, it should be stressed that results of this kind of disaggregation (though not the Gini coefficient for the whole population) depend heavily on the number and size of groups. Just raising the number of groups by refining the stratification in a sensible way would lower the amount of overall intragroup inequality even more.

Regional differences can be determined more precisely by focusing on single regions and their specific relations to other regions (Tables 3 and 4). Table 3 sums up results from an analysis of pairwise relations between Lower Austria and each other region; the pairwise relations between the other regions are left aside. The values given in the table denote two kinds of inequality:

- ADVANTAGE is one fraction of inequality between Lower Austria and other regions. In the sense of the game described in section I, ADVANTAGE is equal to the gains that a person from outside of Lower Austria could have expected when taking the place of an average Lower Austrian. In other words, it is the advantage Lower Austrians enjoyed compared to other Austrians.
- Correspondingly, DISADVANTAGE is equal to the gains that Lower Austrians could have expected when taking the place of other Austrians, in other words, the advantage of other Austrians over Lower Austrians.

Summed up, these two kinds of inequality yield a Gini coefficient for the specific situation of one province in comparison with other provinces. Since wealth distributions of regions usually overlap, both ADVANTAGE and DISADVANTAGE are positive.³ The high values of ADVANTAGE and low values of DISADVANTAGE given for Lower Austria indicate a favorable position of this province, which means that Lower Austrians generally owned more wealth than inhabitants of other provinces. This difference became more marked in the course of the nineteenth century, when the wealth distributions of Lower Austria and other provinces overlapped less than before.

³ In a constellation where wealth distributions do not overlap, either ADVANTAGE or DISADVANTAGE would be zero, and in a situation of universal equality both would be zero.

Table 3: Regional inequality in Lower Austria, 1830–1910

	Total	ADVANTAGE	DISADVANTAGE
1830	9401	4933	4468
1840	8798	5770	3027
1850	8563	5471	3092
1860	8500	5362	3138
1870	8563	5472	3092
1880	9114	7169	1945
1890	9419	8210	1209
1900	9178	6198	2980
1910	9241	4233	5009

Source: Probate inventories.

Notes: ADVANTAGE, DISADVANTAGE: see text.

Furthermore, overall inequality in this constellation rose from the middle of the nineteenth century up to 1890,⁴ and in the last two decades prior to World War I the distance between Lower Austria and the other regions seems to have narrowed, possibly a sign of a catching-up process of the more backward provinces.

The results for other regions suggest the same notion (Table 4): In all other regions DISADVANTAGE rose in the decades before 1890 and decreased afterwards. The extension of the movements differ from region to region. For instance, Carinthia does shows the largest distance between ADVANTAGE and DISADVANTAGE, and the values for DISADVANTAGE decreased only moderately after 1890. Similarly, Salzburg shows only moderate changes after 1890; however, generally it enjoyed a more favorable position than Carinthia. Upper Austria, Styria, Tyrol and Vorarlberg seem to have improved their standing among the Austrian provinces, at least considering the changes in DISADVANTAGE.

To sum up, changes in the pattern of regional inequality among the Austrian provinces appear primarily in comparison of Lower Austria with the other provinces. Lower Austria was always ahead of the other lands and could even improve its leading position in the second half of the nineteenth century. The other lands managed to reduce their distance to the leading province only in the last two decades prior to World War I, and Carinthia and Salzburg did so only to a minor degree.

III

So far, intraregional inequality has been analysed for all regions together (Table 2). In this section, intraregional inequality will be conducted for every province separately, which yields a clearer picture of the situation within the single regions. Regional Gini coefficients for single provinces are given in Table 5; the overall Gini coefficient of a region is, of course, the measure of intraregional inequality in the same region. Since this measure is calculated on the basis of the regional mean wealth at the given point of time, and is independent of the size of the province, the coefficients of the different regions can be compared directly.⁵

Following Kuznets' basic ideas about the changes in inequality in a growing economy we would expect the most unequal distribution in the most advanced regions in the late nineteenth

⁴ Not a necessary consequence – overall inequality could remain constant although the difference between ADVANTAGE and DISADVANTAGE rises.

⁵ Contrary to the values given in Table 2, which shows the proportion of a region in intraregional inequality in all of Austria.

Table 4: Regional inequality by region, 1830–1910

	Total	ADVANTAGE	DISADVANTAGE	Total	ADVANTAGE	DISADVANTAGE
	E					
	Upper Austria			Salzburg		
1830	9000	3157	5844	8715	4031	4684
1840	8351	4931	3419	8880	5125	3755
1850	8487	4828	3659	8354	4355	3999
1860	8097	4141	3956	8662	5990	2672
1870	8490	4737	3753	8265	4378	3887
1880	8812	2640	6173	8354	2889	5465
1890	9144	2448	6696	8796	1745	7051
1900	9198	4583	4615	8550	2426	6124
1910	9393	7131	2262	9001	2967	6035
	Styria			Carinthia		
1830	9246	5984	3262	9586	2227	7359
1840	8427	2001	6426	8585	1349	7237
1850	8409	1802	6607	8567	2065	6502
1860	8175	2268	5908	8603	3153	5450
1870	8316	2637	5679	8618	1719	6899
1880	8815	2641	6174	9363	2190	7172
1890	9158	1360	7797	9427	728	8699
1900	8964	3295	5669	9080	1578	7501
1910	8877	2958	5918	9049	1610	7440
	Tyrol			Vorarlberg		
1830				8395	2912	5483
1840				8200	4410	3789
1850	8214	5384	2830	7941	4195	3746
1860	8193	3165	5027	8559	4933	3626
1870	7943	3544	4399	7773	3988	3784
1880	8433	2022	6411	8571	2033	6538
1890	9153	1721	7431	8996	3064	5932
1900	8823	2033	6790	8469	3126	5343
1910	8968	5248	3720	8434	4250	4184

Source: Probate inventories.

Notes: ADVANTAGE, DISADVANTAGE: see text.

century. From that point of time on, in these regions the distribution might become narrower again. In the backward regions, on the other hand, the distribution of wealth would be relatively equal for most of the time considering the slow changes in the sectoral structure and the low degree of urbanization in those regions; we would not expect much of a change in wealth distribution by the end of the nineteenth century.

A comparison of these provinces does not yield a consistent picture of this kind: Inequality is highest in the most advanced region, Lower Austria, and the most backward region, Carinthia; only in the last decades before World War I, Upper Austria shows a similar degree of inequality. Salzburg, Tyrol and Vorarlberg, on the other hand, seem to have been comparably egalitarian, with Gini coefficients of 0.65 or less.

In which way did the degree of inequality in these regions vary over time? Did inequality grow in the course of the nineteenth century? There was no uniform development in the Austrian provinces: Lower Austria, Upper Austria and Styria experienced growing inequality between the

Table 5: Intraregional inequality in Austrian provinces, 1830–1910

	Lower Austria	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
1830	9616	8084	7287	9043	9646		5758
1840	9161	7542	8999	7076	7500		7422
1850	8684	8459	8115	7219	8216	7185	6959
1860	8793	7392	8662	7152	8601	7800	8666
1870	8873	8452	7935	7637	8179	6994	6529
1880	9340	8094	6292	7830	9388	6270	7118
1890	9549	8384	6192	7213	8344	8062	8135
1900	9370	9247	6544	8371	8162	7169	6780
1910	9484	9454	8568	7462	8056	8530	6763

Source: Probate inventories.

Notes: Values are regional Gini coefficients.

middle of the nineteenth century and 1913, while the situation in Carinthia did not change much. The erratic movements in Salzburg, Tyrol and Vorarlberg may be due to sampling.

An explanation of these developments has to consider that these regions differed from each other greatly in terms of sectoral structure, economic growth, mentalities and various aspects of social structure. Since we do not find a constant relation between sectoral change, migration, urbanization and inequality in the various regions, we will have to employ a specific sets of factors for each province, although this may seem *ad hoc*.

There is one region which largely follows the basic assumptions underlying the Kuznets curve: Lower Austria was on the ascending part of the Kuznets curve, with a peak around 1890 or 1900, which fits nicely to the German development. Lower Austria was the most advanced province and a fast growing one, closer to the German pattern of development than any other region of Austria-Hungary. It had a comparably small and shrinking agricultural sector, an advanced industrial and a large service sector, a fast growing metropolitan area (Vienna) and a high degree of immigration (in 1890, 30 percent of the Lower Austrian population were born outside the province), which favored a more unequal wealth distribution (see *Ergebnisse der Volkszählung vom 31. December 1890*, 3. Heft, Tabelle II).

The development of other regions is harder to explain. At first sight, Upper Austria seems to confirm the idea of a widening distribution in the course of economic growth. But Upper Austria is not exactly a model of dynamic development in the nineteenth century: The region was generally well off but was still a heavily agrarian province and showed only slow changes both in demographics (Upper Austria had just 10 percent of immigrant population) and in its sectoral structure, which would suggest little change in the distribution of wealth as well. Actually inequality in this state was rather marked and became even more so in the last decades before World War I.

Vorarlberg took its own path of development in almost every respect and had also its specific history of wealth distribution. This small province in the West of Austria, which is part of the Alemannic (that is, Swiss–Suevian) culture was a rural industrial region whose success story was founded on its peculiar institutional system. The beginnings of Vorarlberg's remarkable development were marked by the poverty of an agricultural economy in a mountainous region with poor soil and growing population. The inheritance laws of this province were an exception to the Austrian civil law insofar as landed property was divided in kind among the heirs in major parts of the province (by way of contrast, the predominant system in the rest of Austria provided for entailed estates). This led to a fragmentation of estates and, in a growing population, to ever smaller estates. The solution was protoindustrialization, the emergence of a highly successful

Table 6: Rates of illegitimate births in Austrian provinces, 1881–1912

	Lower Austria	Upper Austria	Salzburg	Styria	Carinthia	Tyrol	Vorarlberg
1881	265	184	284	257	463	50	56
1885	262	193	279	257	470	54	67
1890	260	188	269	251	442	56	58
1895	256	182	275	234	431	73	60
1900	239	180	252	235	408	71	57
1905	231	189	256	233	386	71	63
1910	224	191	252	241	370	76	61
1912	217	191	255	233	368	75	67

Source: *Bewegung der Bevölkerung der im Reichsrathe vertretenen Königreiche und Länder, 1881–1912*, Wien 1884–1915.

Notes: Values of illegitimate births are given in percentage points.

textile industry and some emigration to the New World (Pichler 1993, pp. 46–51). In the end, Vorarlberg was still a rural province with a working-class of industrial laborers and cottagers at the same time, who were rather petit-bourgeois than proletarian. The uncommonly egalitarian distribution of wealth in this province, which may seem strange in the view of Vorarlberg's status as an advanced region (second only to Lower Austria), becomes understandable in the context of this very special social system.

Carinthia represents a very different case, again marked by specific institutions, both formal and informal ones, and the ecological conditions that determined its kind of agriculture. Formally, in terms of inheritance laws, Carinthia was a province of entailed property, which led to a heavy concentration of land in a small part of the population. The Carinthian agriculture focused on cattle-breeding, which demanded a large number of domestics who lived on the farms; these domestics remained mostly unmarried because they did not own the necessary means and, if they wished to marry anyway, did not obtain the consent of the authorities, which was necessary for a marriage at that time. These conditions coincided with an uncommonly high rate of illegitimate births which lay around 40 percent in Carinthia (Table 6) and were not just due to low marriage rates but also to a specific set of mentalities (Pammer 2006). Almost all of these illegitimate births happened in the lower class population, often from parents who had been born illegitimately themselves. This fact determined wealth formation directly because according to civil law, illegitimate offspring inherited only from their mothers not from their fathers (unless an illegitimate father provided for his child by will). Altogether, these Carinthian family structures led to the formation of a rigid lower class and a class status that was handed down from illegitimate parents to their children (Pammer 2001). This became particularly important for wealth formation because the wealth status of the lower classes was largely determined by what people inherited from their parents, not by what people managed to save themselves. In consequence, Carinthian lower class persons, when compared to the lower class population of other mountain provinces like Salzburg, Styria, or Tyrol, owned particularly little wealth.

IV

The patterns of wealth distribution in Austria from the middle of the nineteenth century up to the First World War vary considerably according to region. On the aggregate level, that is including the whole area of today's Austria, we observe a high and slightly rising level of inequality in that period. This development is in accordance with the considerations underlying the Kuznets curve.

The disaggregation of the measure of inequality into several regional components reveals more details of wealth distribution within and between regions. First, we see that all provinces, though differing from each other in mean wealth to a certain degree, had wealth distributions in themselves that were wide enough to overlap with wealth distributions of all other provinces. In the context of overall inequality, this kind of interregional inequality is the dominating component.

A separate analysis of intraregional distribution in the single provinces suggests that the idea of a general relation between rising income or wealth on the one hand and rising inequality on the other hand, does not hold on the regional level. We find rather an unequal distribution both in advanced and backward regions and more egalitarian structures in one of the more dynamic provinces. For an explanation, we address regional specifics in areas like sectoral structure, urbanization, class structure, family structure and patterns of inheritance. Sectoral structure and the degree of urbanization differed greatly between regions; we find low proportions of agriculture in both urbanized and rural-industrial provinces, and a large agricultural sector in other regions. Most regions had specific class structures and family structures, partly in connection with regional specifics in inheritance patterns: In almost all regions entailed property was the rule. The mountain regions had high rates of domestic servants in agriculture and high rates of illegitimate births, which were different in different strata of society; in the law of succession, illegitimacy could decide whether a person had a hereditary title or not. All these factors created a specific situation in every region concerning the accumulation of wealth and handing over wealth from one generation to the next. In some regions this resulted in classes of wealth owners which remained relatively static and represented an unequal distribution of wealth even in a backward society, in other regions quick fluctuation of wealth and a relative openness of social classes resulted in a relatively even distribution.

Altogether, this paper suggests that specific institutions influenced the process of wealth formation and the creation of a certain wealth distribution in ways that differed considerably according to regional conditions. Although distribution in an early industrial economy may resemble the standard pattern of inequality patterns on the aggregate level, this standard image may be the rather accidental sum of individual and divergent processes on the disaggregate level.

APPENDIX: PROBATE SOURCES

Differing from various other countries, the Austrian law provided for a probate process in every case of death. Therefore Austrian probate sources cover the whole population, including even unpropertied persons. For completely impoverished persons, the processes were summarily finished by a short note stating that the deceased had left no wealth; however, this statement was kept in court like any other probate file and thus we need not correct for missing cases at the lower end of the distribution. Although some series of files have been discarded, probate inventories have been preserved well enough to allow a thorough examination of wealth inequality in Austria. This analysis is based on a sample that consists of about 7,100 cases, all of them persons who died in the period between 1820 and 1913. Apart from wealth data, the files usually offer information on a number of relevant issues, among others gender, profession, age and residence. In cases where this information is incomplete, files of medical examination could be used successfully to reconstruct missing data (for a further discussion of the sources used in this analysis, see Pammer, 1998, Appendix).

Probate inventories usually offer better and more thorough information on wealth than on income. Since information on income usually is poor in early periods it may seem tempting to use wealth data for income estimates, which has been done in fact by several authors. However, wealth data offer a clue to income only to a limited extent, and the distribution of physical wealth differs from the distribution of income. Income estimates that assume a fixed wealth/income ratio seem little convincing because they usually exclude human capital from wealth (see, for example, Jones 1980, pp. 369–374). According to probate data, in the nineteenth century a considerable part of the Austrian adult and working population did not own any physical wealth at all, but these people must have earned some income either in money or in kind or both.

Thus we must distinguish between benefits gained from human capital and benefits gained from other capital (for the purposes of this analysis, income earned from pension funds, life-annuities and similar sources can be treated like income earned from human capital because none of these sources of income is inventorized in probate files). These benefits include income earned in the market as well as private consumption and other welfare effects. Only benefits gained from physical capital can be estimated using probate data; thus, in the following, the term *wealth* denotes physical wealth. The distribution of benefits gained from physical wealth equals the distribution of wealth in the whole population only if the distribution of wealth in probate inventories equals the distribution of wealth in general and if the capital/output ratio is uniform for all kinds of wealth (like real estate, securities, debt claims, businesses, movable property, valuables).

The first of these two conditions is certainly not met. Therefore the sample results used in this study must consider two kinds of biases before being extrapolated to the whole population. The first bias occurs in all studies based on probate files: as these files are established in occasion of death, even a sample of randomly selected cases shows an age structure that differs from the age structure in the whole population. The second bias results from the sample design in this study: the sample is stratified according to region and profession in order to include enough cases from important sectors that comprise only a small percentage of the population (for instance, entrepreneurs or free professionals).

For the estimation of welfare effects of property, the wealth/benefit ratio may be assumed to be in the same order of magnitude for all kinds of wealth. Several kinds of property yielded income that can easily be determined using market data: the most important example is financial securities whose returns in the Austrian stock market are well documented in published as well as archival sources. Similarly, gains from noncommercial loans that are registered as assets of wealth holders are specified in the probate inventories of the time.⁶ The value of real estate was estimated either by assessment of the court or as a multiple of real-estate taxes, which were supposed to be levied not on property but on the income gained from it;⁷ although these incomes from real estate may have been fictitious in many cases, that process seems to have been not entirely without any foundation: in a number of cases in an urban setting, we can duplicate the estimation procedure and arrive at a proportion of taxable annual net returns of the estimated property value⁸ which is in the same order of magnitude as the capital returns in the financial market.

Income from commercial and industrial businesses (except capital companies) and income from agricultural property are harder to assess because in these cases wealth holders' input usually includes human capital; it makes

⁶ Annual returns from noncommercial loans were usually 6 percent throughout the period under consideration.

⁷ § 50, Provisorisches Gesetz über die Gebühren von Rechtsgeschäften, Urkunden, Schriften und Amtshandlungen, RGBl 329/1850; § 208, Kaiserliches Patent vom 9. August 1854, RGBl 208/1854.

⁸ The annual returns are 6.25 percent of estimated property value; see, for instance, Wiener Stadt- und Landesarchiv, Handelsgerichtsarchiv, Verlassenschaften: A 2 66, 1872/26; A 2 140, 1886/36; Bezirksgericht Neubau, 2A 16/36, 1910/363.

sense, however, to assume a return on physical wealth of those wealth holders, similar to capital market returns, and to interpret all residual income as return on human capital.⁹ We hardly need to stress that a major part of agricultural production was used for owners' private consumption; thus benefits in the agricultural sector were in any case higher than incomes gained in the market for agricultural products. It seems doubtful whether the income effects of movable property and valuables should be assessed in the same way because normally there were clearly no marketable profits from these; however, we can assume that in those cases where personal belongings comprised a more than negligible part of one's wealth, their owners estimated the benefits from using these things at least as high as benefits from equivalent wealth of a different kind.

Altogether it seems justified to assume returns either in money or in kind or immaterial benefits to be equal for all kinds of wealth registered in the inventories. Correspondingly, the distribution of wealth in probate files can be assumed to equal the distribution of benefits derived from it.

Since probate sources do not inform about the wealth of the living population but only about persons at the time of their death, we have to consider the effect of age-specific death risks on our results. In the nineteenth century age-specific mortality in the western half of the Habsburg Monarchy showed the usual pattern of mortality in industrializing countries of the time (Table 1): Infant mortality was highest, with annual death rates around ten percent of the population under five years. Mortality was lowest in the age-group between ten and twenty years, rising thereafter and reaching a level for persons over sixty years that was almost as high as for infants. Among infants and the age groups above forty years, mortality was higher for males than for females whereas women between thirty and forty and sometimes even younger women suffered higher mortality rates than men of the same age. Generally mortality was declining in all age-groups in the decades prior to World War I.

Given age-specific mortality, a sample of probates will show a corresponding age-bias. In our sample, infant mortality presents no problem since children are not part of our sample. We excluded persons under twenty years of age from sampling because the probate files of these young persons show almost always zero wealth. For the remaining age-groups, we can assume a monotonous positive relation between age and overrepresentation in the sample. Therefore, if young and old people show different wealth patterns, age will create a certain bias in a probate sample.

Changes in wealth patterns over lifetime are due to saving and dissaving in different stages of the life-cycle. However, this process did not happen uniformly in all sectors and differently in high-income and low-income groups. We can distinguish between several patterns:

- Some people earned enough income to save during their active years accumulating some wealth. They dissaved after their retirement using part of their accumulated wealth for their livelihood. For them, wealth is connected positively with age, and negatively with age squared. This pattern can be found, for instance, among middle-class and lower-class persons in the secondary or service sector, like artisans, blue-collar workers, free professionals or servants.
- Some people saved during their active years but did not need to dissave after their retirement because they received pensions. This is true for officials whose wealth is related positively to age but not to age squared provided all officials are treated as a unified group.
- Some people's wealth status did not depend on saving and dissaving but on wealth transfers at a few occasions. They received wealth at a relatively young age from retiring parents. When they retired themselves they transferred the major part of their wealth to one of their own children receiving a life-annuity in compensation. There is no linear relation between wealth and age or age squared in this group. This pattern was almost universal among active and retired farmers.
- Farm laborers were often offspring of farmers who did not succeed in the farm. Instead of receiving a portion of the farm from retiring parents they received a mortgage that was normally never paid. They did not accumulate any further wealth during their lifetime because farm laborers' income was relatively low and was mostly income in kind. When farm laborers became unable to work they received their means of subsistence from the community. Thus, farm laborers received illiquid capital at a young age and did not change their wealth status significantly during the following time. Therefore there is no linear relation between age and wealth for farm laborers either.
- Persons living of private means were in fact a mixed group of rich people of all ages who did not have to work, and elderly persons who may have worked previously but were characterized as private gentlemen or

⁹ This seems justified because the Austrian capital and estate markets were relatively highly integrated, and market segmentations did occur in the labor market rather than in the capital market; capital movements in reaction to significant differences in returns between various kinds of investment would at least have been possible. There is, however, no positive proof of such investment behavior of wealth holders.

ladies (*Privat*) in the files. Due to the heterogenous character of this group, we do not find a systematic relation between wealth and age or age squared in this group.

Average age at death and thus at the time of probating was not equal for all groups. We need to consider average age only for those groups where age is related to wealth. We find that on the average entrepreneurs as well as artisans died at the age of 56 years. Free professionals and officials had four or five years more to live, whereas servants died at an age of 51, and blue-collar workers at an age of 48. Thus, the poor wealth status of servants and blue-collar workers was in part due to lower life expectancy; however, even a higher life expectancy would clearly not have enabled lower class persons to bridge the whole gap between their own wealth status and that of artisans, free professionals or entrepreneurs.

The data used in the present analysis were collected in the course of a project on wealth formation in central Europe in the period between 1820 and 1913. As mentioned in the text, the data used to determine investment behaviour were gained from probate inventories established in those provinces that form now the Republic of Austria.

The following archival sources were used for sampling:

LOWER AUSTRIA: Niederösterreichisches Landesarchiv, A-Akten, BG Amstetten (A 1, 2, 5, 6, 9, 11, 13, 16–20, 22, 26, 28, 32), Aspang (K 1–5, 7, 11, 17, 18, 25–30, 32), Baden (K 4–22, 24–31, 34), BG Dobersberg (K 13–25, 34, 35), Ebreichsdorf (A 1, 2, 4, 6–10), Matzen (K 1). Wiener Stadt- und Landesarchiv, Handelsgericht (A 2 Sch. 1–41, 45–75, 78, 82, 86–95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 159, 160, 165, 170, 175, 180, 185, 190, 195, 200, 205, 210, 215, 230, 233, 235, 244, 245, 258, 260; A 11 Sch. 8, 10, 29, 30, 31, 50, 69, 70, 82, 90, 92, 109, 110, 113, 117–8, 129, 130, 150, 165, 170, 190, 210, 219, 220, 230, 240, 250, 258, 260, 270, 289, 290); BG Innere Stadt I (A 2 Sch. 1, 3–6, 30–2, 52, 80, 100, 120, 140, 145, 150, 155, 160, 190, 198, 200, 209, 210, 220, 228, 230, 240, 250, 260, 270, 280, 300, 315, 330, 340, 360, 370, 390, 400, 420, 430, 440, 460, 480, 500, 520, 540, 560, 580, 587, 600, 607, 620, 636, 640, 660, 680, 695, 700, 707, 720, 740; 5A 31 Sch. 1, 5, 8, 13; 6A 36 Sch. 47, 51, 53), Leopoldstadt I (A 1850, 1851, A 2 Sch. 6; 1A 11 Sch. 25, 46), Landstraße (A 1875–97; 5A 21 Sch. 43, 49, 61, 65), Wieden (A 2 Sch. 18, 36, 60, 95, 100; A 11 Sch. 71), Mariahilf (A 1850), Neubau (A 2 Sch. 9, 52; 2A 16 Sch. 36). Österreichisches Staatsarchiv, Allgemeines Verwaltungsarchiv, Niederösterreichisches Landrecht 5 (Verlassenschaftsabhandlungen) 61, 63, 65, 66, 68, 69, 71, 73, 74.

UPPER AUSTRIA: Oberösterreichisches Landesarchiv, BG/LG Linz (Präs 1854 ff, Abh. Sch. 1000–7, 1009, 1011–2, 1015–6, 1019, 1025, 1027, 1028, 1032–5, 1037, 1040, 1042, 1045, 1047–1051, 1053, 1055–6), BG Braunau (A 54, 64, 91–2, 108), Eferding (A 7, 44), Frankenmarkt (A 4, 12, 71), Freistadt (A 17, 44, 70, 108), Grein (A 16, 53), Grieskirchen (A 16, 46), Grünburg (A 8, 15, 16, 23, 28, 44), Ischl (A 13, 42, 44, 52, 54, 58, 70, 78), Kirchdorf (A 1, 19), Kremsmünster (A 3, 22, 28, 31, 58, 81, 87, 89, 91, 115–6), Lambach (A 8, 17–8, 34, 42–3, 48), Leonfelden (A 34, 46, 64, 106), Mauthausen (A 2), Mondsee (A 19), Ottensheim (A 10, 17), Pregarten (A 30), Ried (A 3, 55, 65, 78, 96, 119, 137, 140), Schärding (A 73, 106, 110, 115, 134, 185, 194, 200), Urfahr (A 10, 36), Wildshut (A 2, 10, 14, 24), Wels (A 10, 30, 35, 47, 50, 70, 126).

SALZBURG: Salzburger Landesarchiv, BG Salzburg (A Sch. 430, 432, 436, 438, 442, 445, 447, 450, 455, 464, 466, 474, 477, 536, 559, 570, 597, 598, 610; A I Sch. 160, 185, 249), Golling (A I Sch. 6–8), Hallein (A Sch. 98, 107, 109, 111, 117, 121, 122, 129, 130, 145, 146), Lofer (IV A Sch. 7, 9, 16), Mattsee (Sch. 17, 19), Mittersill (A Sch. 226–9, 231–6, 240, 243–5, 248–59, 269, 270, 274, 277, 285, 288, 289, 291), Neumarkt (1 A 1898–9, 1909–11), Oberndorf (IV 1861; IV A 1869 57; IV 1870; IV A 1874 63), Saalfelden (A Sch. 67, 142, 148–9), St. Gilgen (A Sch. 21, 29), Tamsweg (P 89), Thalgau (A 8, 29, 30), Werfen (A Sch. 60, 75, 76, 122–5, 132–3), Zell am See (A 7a, 13, 29).

STYRIA: Steiermärkisches Landesarchiv, Landesgericht (A 1903, 1–13), BG Aflenz (A 1884, 1904), Birkfeld (A 1850), Bruck (A 1865, 1871, 1872–3, 1879, 1893, 1912), Eisenerz (A 1858–61), Fürstenfeld (A 1871–2, 1906–7), Gleisdorf (A Sch. 22), Graz (D 1853, 1856, 1860, 1862, 1867, 1869, 1871, 1873, 1882, 1886, 1891, 1892, 1895; A 8 1899, 1901, 1905, 1910, 1912), Graz-Umgebung (A 1868), Gröbming (A 1899–1903), Hartberg (A Sch. 48, 228), Irdning (A Sch. 10, 88), Judenburg (A Sch. 57, 73, 74, 77, 80, 84, 89), Knittelfeld (A 1850, 1898, 1900, 1901, 1903), Leibnitz (A Sch. 66, 74), Liezen (A 1863, 1907), Murau (A Sch. 8), Mureck (A 1855, 1909), Neumarkt (A 1870, 1873, 1875, 1879, 1911), Obdach (A Sch. 7–8), Oberwölz (A Sch. 9, 11), Pöllau (A Sch. 193, 200, 202), Radkersburg (A Sch. 108, 137), Schladming (A 1899), Stainz (A Sch. 38, 47, 198), Voitsberg (A 1859, 1865, 1872, 1876, 1880, 1883, 1889, 1894, 1896, 1897, 1899–1909), Vorau (A 1856–63), Weiz (A 1877, 1885).

CARINTHIA: Kärntner Landesarchiv, BG Althofen (Abhandlungen Fasz. 27, 35, 42, 49), Ferlach (Akten 30, 31, 42, 45, 50, 72, 86), Gurk (Verlässe Sch. 43, 54), Millstatt (Verlassenschafts-, Vormundschafts- und Kuratelsakten 27, 28, 34, 35, 39, 60, 75, 84), Paternion (1, 3), Wolfsberg (27, 31, 75, 83).

TYROL: Tiroler Landesarchiv, BG Imst (A 1, 2, 6), Innsbruck (A 1, 10, 17, 23, 34, 41, 45, 49, 52, 55, 60, 76, 82, 110, 124, 127, 136, 140, 145, 148), Reutte-Ehrenberg (A 1, 4, 10), Schwaz (A 2, 7, 9), Nauders (A 1, 3–4, 6–7, 9).

VORARLBERG: Vorarlberger Landesarchiv, BG Bludenz (A Sch. 61, 65, 70, 75, 78, 81, 84, 92, 94, 96), Bregenz (A Sch. 104, 114, 121, 127, 130, 131, 132, 133, 144, 152, 156, 164, 169, 172, 180, 184, 186, 188, 189, 190, 192, 193, 196), Feldkirch (A Sch. 38, 49, 57, 67, 69, 77, 88, 93, 98, 106, 111, 112, 117, 124, 128, 133, 148, 146, 147, 154, 168, 170, 171, 186, 191, 195, 197, 204, 207, 212, 214, 221, 229, 234, 238, 240, 241, 242, 243, 244, 248, 252, 253, 254).

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