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Emigration and the "Safety-Valve" Theory in the Eighteenth Century: Some Mathematical Evidence from the Prince-Bishopric of Würzburg

In the course of the eighteenth century the Holy Roman Empire witnessed an increase of its population of up to then unknown proportions. Within one hundred years, the population in some areas like Franconia more than doubled.¹ Food supply and employment opportunities could not keep pace with this growth. As food prices rose, lack of land, compounded by poor farming techniques, and underemployment impoverished vast numbers of peasants. For the landless proletariat, the underemployed artisans as well as for servants and day laborers, the social and economic situation deteriorated markedly. As their numbers increased, so did emigration. Beginning in the early decades of the eighteenth century, hundreds of thousands of people left in waves of ever shorter intervals,² seeking their fortunes in the New World or in the plains of Eastern Europe. By the time the century had come to an end, almost one million people had settled outside the boundaries of the Holy Roman Empire.³ Contemporary memoranda and minutes of cabinet meetings are filled with worries that this emigration might depopulate the state. At the same time, however, we read of a fear of social tensions and possible unrest as a consequence of unchecked population growth.⁴

The purpose of our study is twofold. First we want to investigate the long-term consequences of emigration from the Prince-Bishopric of Würzburg on the demographic development of this ecclesiastical state. Secondly we want to investigate whether emigration could serve as a "safety-valve" to ease tensions within this agrarian society by opening up land and employment opportunities for those left behind. While the "safety-valve" theory has been discussed for the nineteenth century,⁵ similar analyses for the eighteenth century are rare. For most historians, the "pull-factors," i.e., the availability of land in Eastern Europe or in the British colonies in North America, combined with the activities of recruiters,⁶ outweigh the "push-factors" in the decision to emigrate. The "push-factors," i.e., lack of land and employment opportunities, are often put aside as insignificant: "The situation was bad everywhere."⁷ In order to analyze

our data from the Prince-Bishopric of Würzburg, we will develop a mathematical model for population growth in the context of emigration to investigate whether emigration from Würzburg did indeed lead to a noticeable slowdown of overall population growth and, by increasing the amount of land available for those who stayed behind, also to an easing of social and economic tensions.

The existing population data for the Prince-Bishopric of Würzburg used in this paper are primarily estimates. They are based on contemporary, though incomplete, census counts taken at various time intervals throughout the century. More accurate counts based on the annual population returns in the *Rechnungen* or budgets of the fifty-five administrative districts or *Ämter* of the prince-bishopric do not exist.⁸

The same holds true for the number of emigrants. Since they had to pay an emigration tax called *Nachsteuer* to the state, they are listed in the budgets with the amounts paid. These figures form the basis for our emigrant estimate. One needs to keep in mind, however, that the budgets very often only list the name of the head of the household followed by a note "with wife and children" or similar entries. In such cases we estimated the family size at 4.5 members. Another problem connected with the goal of arriving at more concrete data on the number of emigrants is that an unknown number of people left secretly, either because they were not granted permission to emigrate, or because they wanted to avoid paying the emigration tax. Rather than estimate their number we have excluded them from our model.⁹

A discrete model with a limited number of parameters will be used to interpret this demographic information. As the time period involved is relatively short, seventy-five years, the complexity afforded by the discrete model will be sufficient for our purposes. The particular model chosen is a variation of the Malthusian model, in which population growth rate is inversely proportional to the present population.

The choice of such a model is not only determined by the available data but also by the number of people involved. There are two avenues to assess the impact of emigration on population growth. One is through family reconstruction or an individual-level-over-time approach. Such an approach was used by Ludwig Schmidt-Kehl for two villages in the Rhön, the northernmost, and poorest, part of the Prince-Bishopric of Würzburg.¹⁰ But while it yields valuable data for individual families and communities, it does not easily lend itself to an analysis of a whole state. Würzburg consisted of almost 600 communities, from which a minimum of 22,000 people emigrated during the eighteenth century. The sheer size of this research, even if all necessary data were available, makes an individual or community approach impractical if not prohibitive.

The approach chosen in this study is different. Rather than try and reconstruct events in individual communities or families and extrapolate developments from these samples for the state as a whole, we will use a top-down approach. This invariably leads to generalizations on the local level but has the

advantage that it allows an analysis of the overall impact of emigration on the prince-bishopric as such. Such an approach, which Wolfgang von Hippel has used for his study on emigration from southwestern Germany in the eighteenth century,¹¹ provides the parameters within which a meaningful application of the safety-valve model for a large state or area can take place. At the same time, our approach, which deals with hypothetical populations, makes a certain degree of abstraction necessary and inevitable, which is provided by the mathematical model used.

But first a look at the facts. Eighteenth-century Franconia consisted of dozens of territories. It was dominated by the prince-bishoprics of Würzburg, Bamberg, and Eichstätt, principalities like Ansbach, Bayreuth, and Hohenlohe, and imperial cities like Nuremberg, Schweinfurt, and Rothenburg. Devastated during the Thirty Years' War, it took the area about sixty years to reach prewar population levels again. Yet the generative behavior developed during the second half of the seventeenth century saw no change once the population losses had been made up. Between 1700 and 1750, the population of the Prince-Bishopric of Würzburg, with an area of some 5,290 square kilometers (2,042 square miles) the largest state in the Franconian district, grew from about 160,000 to some 250,000 people. Around 1790, the prince-bishop had some 280,000 subjects, and by 1803 the population had expanded to around 310,000. With some 127 people per square mile in 1750 and about 152 people in 1810, Würzburg was, after Bamberg and Basel, the most densely populated ecclesiastical state of the empire.¹²

Based on the amount of arable land available in 1812, some 200,000 hectare, this population growth meant a decrease of the average holdings in the prince-bishopric from around 1.44 hectares per capita in 1680 to about 0.84 hectares in 1745 to 0.68 hectares in 1795. At a family average of 4.5 people, the average family farm decreased in size from about 6.48 hectares per family in 1680 to 3.78 hectares in 1745 and 3.06 hectares in 1795.¹³ Modern estimates place the minimum acreage needed to feed a family that size in the eighteenth century at between four and eight hectares, considerably larger than the average holding.¹⁴ Table 1 shows how population growth in the Prince-Bishopric of Würzburg influenced the amount of land available. Within a century, that amount was cut in half, and after the 1720s, population density was starting to strain available resources.

This dangerous development was enhanced by the prevalence of partible inheritance laws. Partitioning of family holdings in order to supply each surviving child with an equal amount of land, practiced all over southwestern Germany, brought ever smaller landholdings.¹⁵ Concurrently it tended to encourage above-average population growth, especially in wine-growing areas such as Franconia. As long as prices remained high, viticulture provided a readily available and labor-intensive cashcrop, which could feed a family on less land than grain farming. In our area almost two-thirds of the population lived off growing grapes. But grape harvests depend heavily on favorable weather

conditions in the spring and are thus notoriously uneven: particularly in the first half of the century, average winter and spring temperatures lay below those of today, reducing yields even further.¹⁶

TABLE 1
Population Growth in the Prince-Bishopric of Würzburg, 1680-1795

POPULATION (absolute growth)		LAND AVAILABLE (per capita) (per family)	
1680	140,000	1.44 ha	6.48 ha
1700	160,000	1.26 ha	5.67 ha
1720	193,000	1.03 ha	4.66 ha
1745	240,000	0.84 ha	3.78 ha
1770	270,000	0.75 ha	3.37 ha
1795	295,000	0.68 ha	3.06 ha

More importantly, the price of wine showed a tendency to decline over the eighteenth century while the price of other foodstuffs increased considerably.¹⁷ As vineyards were turned to other uses, the downturn in the demand for wine, coupled with the need for more land to grow food grains, put additional pressure on the economy as it deprived peasants of a readily marketable cash crop. In the early decades of the century, almslists estimated the minimum annual cost to feed an adult for one year at 8 fl 40 kreuzers, but in the 1790s the *Bürgerspital* in Würzburg estimated 95 fl to keep the poorest *Pfründner* alive.¹⁸

As early as 1717, the *Domkapitel* in Würzburg forbade future partitionings of land holdings in its village of Theilheim in the hope that this would keep population growth down and encourage emigration.¹⁹ In 1730, the government in Bamberg thought the state "filled beyond capacity with peasants, wine-growers and artisans."²⁰ In 1779, Karl Theodor von Dalberg wrote that "in the towns surrounding Würzburg the vineyards have been divided too much, so that there are too many peasants. That is why their children become beggars."²¹ Traveling in Franconia in the 1780s, Christoph Meiners wrote that "in the so-called wine-communities the lots have been divided up so often that many families do not own more than one, one and a half, or two morgens."²² The facts bear out his assessment. In Oberleinach the average holding was less than 0.5 morgen per person in 1790, in Werrnfeld about 1.1 morgen in 1795, in Tauberrettersheim 1.43 morgen in 1798, and in Gerolzhofen 2.5 morgens in 1790.²³

TABLE 2
Average Land-Holdings in Tauberrettersheim, 1705-95

	LAND AVAILABLE	POPULATION	LAND PER CAPITA
1705	956 morgens	423 people	2.26 morgens
1720	956 morgens	531 people	1.80 morgen
1735	956 morgens	537 people	1.78 morgen
1750	956 morgens	645 people	1.48 morgen
1764	956 morgens	655 people	1.45 morgen
1780	956 morgens	684 people	1.39 morgen
1798	956 morgens	665 people	1.43 morgen

But like all statistics, these figures cannot begin to show the extent of rural poverty, which was not confined to wine-growing communities. For example: in Winterhausen, a village of some 852 people in 220 households just south of Würzburg in the *Reichsgrafschaft* Rechteren-Limpurg-Speckfeld, only 35% of the available land was used to grow grapes in 1780. The theoretical average holding came to 5.7 hectares of arable land and 3.2 hectares of vineyards per household. But the richest 13%, i.e., twenty-nine households with around four hectares or more, owned 61% of all arable land and 28% of all vineyards. Between thirty-five and fifty households, i.e., 15% to 20% of the population, received subsidies in the 1780s.²⁴

Such village averages however represent only part of the situation. In his analysis for the Aischgrund, an area to the southeast of Würzburg, Gerhard Rechter has shown that it was the larger farms, those which would have been best able to survive independently, which suffered most from the practice of partible inheritance. A leveling off of farm holdings took place in the eighteenth century, moving toward a generally lower level. Table 3, based on the findings of Rechter, shows how the formation of new farms came at the expense of the larger units, which showed a marked decline. While large farms sank to the level of medium-sized farms, the percentage of the population without property and of those with holdings smaller than 2.5 hectares rose from 10.2% to 25%. Here we see the devastating results of partitioning small homesteads until they are no longer viable economic units, thus enhancing the trend toward impoverishing the peasantry.²⁵

TABLE 3
Development of Average Land-Holdings (in morgen) in the Area between Rezat
and Aisch, 1600-1800

	w/o property	0-5	5-15	15-30	over 30
1600	0.5%	9.7%	28.7%	23.0%	38.0%
1800	6.0%	19.0%	29.0%	22.0%	24.0%

Before we can assess the impact of emigration on Würzburg, three sets of questions need to be addressed:

1. Did surplus labor in the countryside lead to the growth of rural industry? What was the impact of rural industry on generative behavior and migration?

Most historians agree that in the short run rural industry could slow down the need for emigration as it allowed poor peasants to supplement their inadequate incomes. In his research on preindustrial Germany, Steve Hochstadt found that "in the purely cottage-industrial communities near Düsseldorf mobility was 50% lower."²⁶ But as Charles Tilly has shown, in many areas "the demographic response" to increased employment opportunities often "was even more rapid population growth." Though useful in the short term, such a strategy had disastrous long-term consequences as it eventually led to a worsening of the employment situation and increased the need for migration from home communities.²⁷ Schmidt-Kehl's data on the Rhön affirm Tilly's claim. The mountainous Rhön with its marginal agriculture was the only area in the prince-bishopric where a textile-based cottage industry developed, but the concurrent population growth forced 20% to 22% of those born in the early eighteenth century to look for work outside their home communities. Such a rate of out-migration is about one-third higher than that for the state as a whole, and, if we assume that not all of the out-migrants left the prince-bishopric permanently, affirms our thesis of socially determined emigration.²⁸ But Würzburg as a whole showed a marked lack of protoindustrial development, and any increase in employment opportunities was wiped out by population gains.

The increasing population pressure with its inherent danger of social tensions needed an outlet. The most obvious recourse for the poorer parts of the population was migration. Search for employment opportunities uprooted many peasants and made internal migration a way of life in early modern Franconia. As early as 1675, 93% of all apprentices, 74% of the *Beisassen*, i.e., inhabitants without citizenship, and 57% of all *Bürger* in Würzburg were immigrants to the city. By 1701, 65% of all resident adults 20 years or older and 89% of male nonkin household members had been born outside the city.²⁹

2. Did emigration affect the demographic behavior of the remaining population? And if it did, in which way?

In view of the available statistical data and the strenuous legislative efforts to slow down population growth, the answer has to be in the negative. In a rare insight into the economic situation, government officials concluded in 1766 that "all villages have considerably increased in population during the last thirty or forty years, . . . yet there are neither factories nor manufactories in the prince-bishopric which could provide safe employment and food for our subjects."³⁰ Authorities in Würzburg acknowledged the dangers of the unchecked growth of the lower classes and devised a three-pronged response.

First, they attempted to restrict marriages among paupers by introducing property qualifications, decreed in Würzburg as early as 1732. The impact of this legislation is difficult to assess. In the city of Würzburg itself in 1788, there were only 2,275 married couples in a population of 21,380. But in the *territorium inclausum* of eighteenth-century Franconia, such decrees were easy to circumvent. Ministers in the nearby territories of imperial knights were known to perform marriages for a fee. The Lutheran minister in Niederfüllbach married so many couples that people began to speak of the "Niederfüllbacher Bettlerwallfahrt" in reference to the poor flocking there in search of marriage rites.

Secondly, full citizenship was coupled with high fees and additional property requirements for the admittance of new *Bürger* to the cities and communities of the prince-bishopric to ease potential welfare burdens. By 1764, day laborers in the city of Würzburg had to prove a property of 400 fl, tradesmen 800 fl, before they could purchase full citizenship for some 20 fl. This policy did keep down the number of full citizens—in 1788 there were only 1,789 full citizens—but it did not reduce the absolute number of people living in the cities. Lastly, they refused citizenship to couples who had married without permission, sentencing such culprits to vagrancy or emigration.³¹

Overall, however, these measures showed no noticeable effect, and as the unemployed and underemployed tried their luck in the cities, the number of servants, day laborers, independent artisans and craftsmen grew at a frightening pace. In a small town like Ansbach, the number of people without full citizenship rose by 230% between 1681 and 1741, and the percentage of the lower classes rose from 36.4% to 64.7%.³² In Nuremberg domestic servants comprised 20% of the total population, in Würzburg about 15%, and nowhere but in the poorest communities did it drop below 10%.³³ Hired at wages between ten and twelve Rhenish guilders a year, usually for three months at a time, these servants lived in the utmost poverty. At 14 fl to 18 fl, the average wages for a man servant were not much higher.

At the same time, however, a pair of men's boots cost about 1 fl 30 kreuzers in 1785, a skirt 30 kreuzers, a pound of veal 6 kreuzers in Ansbach in 1786. A hog cost 8 fl, a calf 12 fl, a cow 15 fl to 20 fl in the 1740s, a spinning wheel 1 fl

and an oaken weaving loom was 18 fl already in the 1690s. A medium sized farm sold at around 2,500 fl in the late eighteenth century in the Aisch area. Around the city of Eichstätt, one "Tagwerk" of land, about 0.85 acres, cost between 500 fl and 700 fl. The city of Bayreuth estimated the cost of keeping a woman alive in the workhouse at 18 fl, for a man at 24 fl per year in 1732.³⁴

Independent craftsmen hardly fared better than the servants, even if most of them had some land for additional resources. Their numbers had increased to a point where their businesses could barely feed their families. In Edelfingen with its 225 families we find eighteen shoemakers and seven tailors, in Römheld in the Rhön, there were twenty-eight butchers, twenty-three bakers, forty-three tailors, forty-seven shoemakers and twenty-two weavers in a population of 1,548. Even larger cities like Würzburg with its 18,000 people could hardly feed the one hundred fifty-four shoemakers, ninety tailors, eighty barrelmakers, forty-seven bakers, etc.—altogether 775 master craftsmen or one for every twenty-three citizens.³⁵

Franconia's poor were caught in a vicious cycle. Without the means to purchase full citizenship, they were frequently in turn denied access to the commons of their home towns, which deprived them of that extra goat or sheep or firewood—that extra income that might have made the difference. Contemporaries estimated between 25% and 33% of the population of the Franconian district in the late eighteenth century to be beggars. Modern historians tend to increase this number to 50% or more.³⁶ Calls for the forced mass transportation of these poor to some faraway country across the oceans or to Siberia, proposed by Ansbach as early as 1747, were rare, but as the century progressed, many administrators recognized the advantages of emigration.³⁷

3. Did emigration create opportunities for those left behind or for immigration from elsewhere?

In the absence of wasteland that could still be taken under the plow, the vigorous attempts by full citizens to reserve use of the commons for themselves, and insufficient attempts at creating employment opportunities, the answer has to be "no." By the early eighteenth century, land resources were exhausted. Between 1682 and 1726, seven villages were founded in the prince-bishopric, but as the largest of them, Neubessingen in 1726, gave a home to only ten families, the overall impact on the state was minimal.³⁸ Efforts to recruit merchants and manufacturers for the state failed as well, and as late as 1812, the largest factory of the state employed a maximum of 56 workers during the summer months.³⁹ At the same time, wages at best stagnated, and for lower income groups even showed a tendency to decline.⁴⁰

Population losses to emigration were not made up by new immigrants. Rather than foster immigration, unless the applicant had sufficient means, the policy of the prince-bishopric was to encourage further emigration of its local poor and to reserve possible employment opportunities for the already present

population.⁴¹ Authorities in Würzburg realized that any emigration would be beneficial for the overall social and economic situation of the state, reasoning that "those subjects remaining behind will be better able to feed themselves."⁴²

The decision to emigrate into faraway lands from the 1720s onward was made easier by the high degree of internal mobility achieved by then. But as long as the plains of Hungary were still ruled by the Ottoman Empire, migration to the New World and into the eastern regions of Prussia still in its infancy, and the Volga region not yet open to settlement, opportunities for emigration were limited. Internal migration even on a large scale could at best redistribute the existing population without long-term beneficial effects for the state as a whole. But it did familiarize people with the concept of geographical mobility and fostered a preparedness to move even over long distances if such an opportunity should present itself.

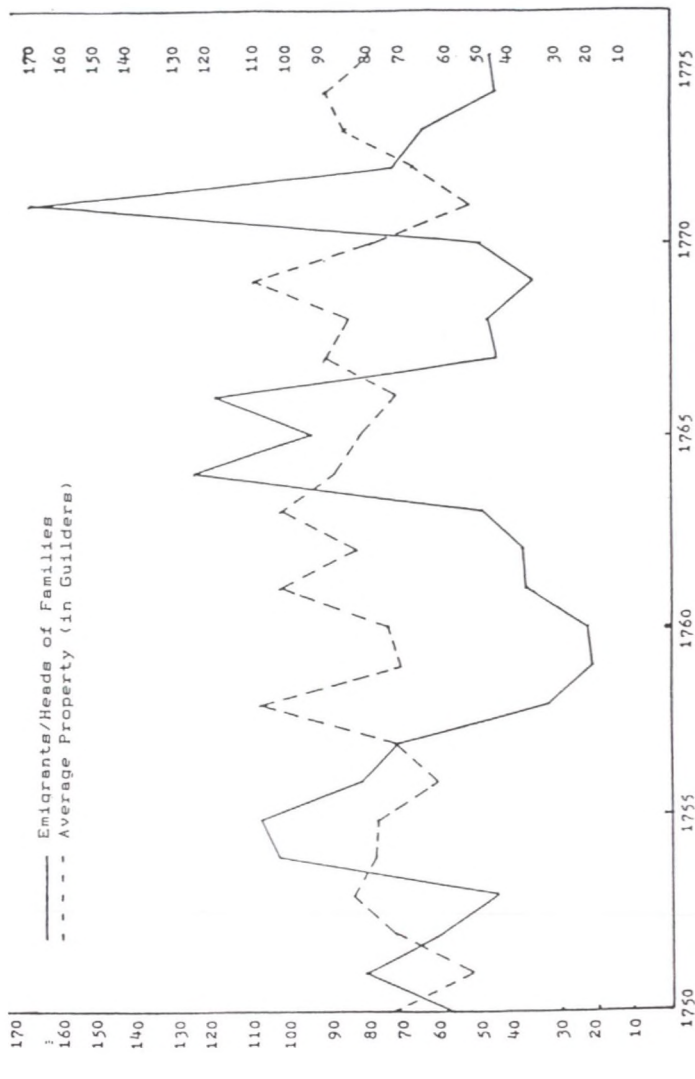
The acquisition of vast territories by the Habsburgs from the Ottoman Empire in 1718 gave the heretofore aimless internal migration in Franconia a new direction and goal. In 1722, the settlement of the Hungarian plains with German colonists became the official policy of the government in Vienna.⁴³ This opened up a vast territory for the surplus population of Catholic southwestern Germany, who were less than welcome in the British colonies in North America. As soon as news of this policy reached the Prince-Bishopric of Würzburg, a wave of emigrants left for Hungary in the five years from 1720 to 1725, followed by another large contingent in the mid-1740s.⁴⁴ After the end of the Seven Years' War, emigration resumed with renewed vigor, and, as shown in Graph 1, reached its peak for the eighteenth century during the famine of 1771.⁴⁵ Between 1720 and 1795, a minimum of at least 22,000 people decided to seek their fortunes elsewhere and left the Prince-Bishopric of Würzburg.⁴⁶

The actual number of emigrants was undoubtedly higher. A comparison of lists of transmigrants through Vienna and of applications for readmission in 1764 with the names of emigrants to French Guyana entered in the budgets of Würzburg, shows that at least 73 families, 25% of all emigrants, left secretly and without permission. If these figures were representative for the century as a whole, our total emigration figures would have to be raised considerably and result in a considerable decrease in the theoretical population for 1795.

In formulating a model for growth of a population with emigration, we consider two effects of emigration. First, there is the immediate decline caused by the emigrants leaving the population. Next there is the long decrease which results since the progeny of the emigrants do not contribute to the population. Two populations will be considered: the actual population, measured by using census figures and a hypothetical population (if emigration had not occurred), estimated by our model. We assume that both populations grow at the same exponential rate.

Amount Of Guilders Exported
per Emigrant/Head of Family

Number of Emigrants/
Heads of Families



GRAPH 1
Emigration from Mainfranken to Hungary 1750-75

Mathematical Model for Population Growth

Let t_0, t_1, t_2, \dots be a sequence of times. P_i be the actual population at time t_i , m_i be the number of emigrants from Würzburg in the time period from t_{i-1} to t_i , r_i be the growth rate of the actual population in the time period from t_{i-1} to t_i . We assume the population growth is exponential so that

$$r_i = \ln(P_i/P_{i-1})/(t_i - t_{i-1}),$$

or equivalently,

$$P_i = P_{i-1} e^{r_i(t_i - t_{i-1})}$$

The hypothetical population at time t_i will be denoted by H_i . The initial populations, P_0 and H_0 are equal. A subsequent hypothetical population is computed by adding the number of emigrants in the time period to the size of the population at the beginning of the period and applying the population growth rate computed from the actual populations in the same time period, that is

$$H_i = (H_{i-1} + m_i) e^{r_i(t_i - t_{i-1})}$$

These relationships yield the following table when applied to the data for the Prince-Bishopric of Würzburg from the years 1720, 1745, 1770, 1795.

TABLE 4
Actual and Hypothetical population for the Prince-Bishopric of Würzburg
in the Eighteenth Century

i	t_i	P_i	m_i	r_i	H_i
0	1720	193,300			193,300
1	1745	240,000	7,000	0.008655	248,700
2	1770	270,000	8,000	0.004711	288,800
3	1795	295,000	7,000	0.003542	323,200

On the basis of this model we arrive at a theoretical decrease of the population for 1795 of more than 28,000 people. At a de facto population of some 295,000, they constitute almost 10% of the total. This had a measurable influence upon the availability of land. Table 5 shows that on the average there was at least 0.26 hectare more land available per family due to emigration even at the very lowest numbers used by us.

TABLE 5
Hypothetical Population Growth and Development of
Average Land-Holdings without Emigration, 1680-1795

POPULATION (growth without emigration)		LAND AVAILABLE (per capita) (per family)	
1680	140,000	1.44 ha	6.48 ha
1700	160,000	1.26 ha	5.67 ha
1720	193,300	1.03 ha	4.65 ha
1745	248,700	0.80 ha	3.61 ha
1770	288,800	0.69ha	3.11 ha
1795	323,200	0.61 ha	2.78 ha

Was this emigration large enough to have had a safety-valve effect? Comparative data to validate our results are provided by Wolfgang von Hippel's study on southwestern Germany, another area with consistently high emigration. Between 1707 and 1794, the population of the Duchy of Württemberg increased from 342,000 to 614,000 or 80% vs. 84% for Würzburg between 1700 and 1795. Hippel estimates that emigration absorbed a maximum of 20% of the birth surplus vs a minimum of 10% for Würzburg during the eighteenth century, with an average emigration of 0.15% of the population per year.⁴⁷

Since the safety-valve theory has been used primarily for the nineteenth century, let us also look at some of the facts there. Between 1816 and 1910, the population of Germany (in the boundaries of 1871) grew from 23.5 million to 65 million. During the same time about 4.35 million people emigrated, mostly to the United States. On the basis of these data, Peter Marschalck estimates that emigration during the nineteenth century slowed down population growth by about 5.5 million people or 8.5% of the total for 1910.⁴⁸ Yet after about 1870 German society changed rapidly from an agrarian into an industrial state. Thereafter emigration is mainly dependent on the changes in the business cycles

of an industrial society. Thus the *ceteris-paribus* clause for our hypothetical population cannot be invoked for all of the nineteenth century, and Marschalck backs away from this number.

Yet he and others concede the usefulness of such a model for either short time periods or relatively stable societies. On the basis of this assumption he concedes that emigration was an important hindrance for population growth in Germany, especially during the first half of the nineteenth century. Population growth was slowed down by some 1.5 million people in emigrants alone between 1816 and 1856, at a population of about 37 million people in 1856. This would constitute a loss of about 4% for Germany as a whole, not counting second and third generation losses. If we look at Württemberg as one of the major areas of emigration from 1816 to 1855, we find 265,000 emigrants and a population of 1.7 million people, the percentage of emigrants is 16%. In Baden we have 1.3 million people and 150,000 emigrants or 11.4% during the same time period.⁴⁹

Despite the parameters set by incomplete records and statistical materials, our findings suggest that emigration from the Prince-Bishopric of Würzburg during the eighteenth century did serve as a "safety valve." The slowdown in population growth was measurable and large enough to have brought some relief to this area in the eighteenth century. It compares favorably with findings from other areas of Germany in both the eighteenth and nineteenth centuries. Emigration could not solve the economic problems of southwestern Germany. Yet it could help ease some of the strains placed upon the social, demographic and economic structures of society as a consequence of population growth.

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Notes

¹ For statistical material connected with this population growth see Keyser (1938), Armengaud (1976, 22-73) and Flinn (1981, 13-25). For the Prince-Bishopric of Würzburg in particular see Jäger (1967, 130-45).

² An excellent introduction into the problems connected with overpopulation, pauperization and emigration is Grigg (1980, 11-39). For analyses of conditions in Germany see Vowinckel (1939), Tetzlaff (1953), Vanja (1978), and Selig (1988). On the wavelike character of emigration see in particular Schmidt (1965, 323-61) and Bennion (1971).

³ Between 1685 and 1812, some 350,000 Germans settled in the eastern regions of Prussia, another 350,000 in Hungary, some 125,000 in North America, about 50,000 in Poland, some 40,000 in Russia, some 10,000-15,000 each in Spain and Denmark. See Fenske (1980, 340ff.). For figures on migration to the United States in the eighteenth century see in particular Gemery (1984, 283-320), and Fogleman (1992, 691-709) with about 84,500 German emigrants between 1700 and 1775 (700-4).

⁴ On 22 April 1766, the Prince-Bishop of Würzburg, Adam Friedrich von Seinsheim, ordered an end to all emigration, "so that the country might not get depopulated." Bayerisches Staatsarchiv

Würzburg, Gebrechenamtsprotokoll of 22 April 1766, hereafter quoted as BSW, Gebr.Prot. and date. While mercantilist policies demanded the continuous increase of population as a measure of the wealth, power and reputation of a state, these policies were challenged by observers warning of the dangers of unlimited population growth: "as certainly as there has to be a group of people working as servants or day laborers for the large farmers and propertied classes, it is just as certain that this class becomes dangerous when there are too many of them. . . . Begging, vagrancy, thievery and all other consequences of deprivation or misery are the obvious results" of their unchecked increase. Pfeufer (1791, 249). All translations are by the authors.

⁵ See in particular Hansen (1976, 9-61), Marschalck (1973, 69-71) and Moltmann (1978, 279-96), with additional literature there. For a sociological analysis of the problem see Lee (1966, 47-57), Wolpert (1965, 159-69) and Ellemers (1964, 41-58). For a discussion of recent German historiography concerning emigration and the peculiar German problems connected with this see Roeber (1987, 750-74).

⁶ A prime supporter of this interpretation is Fenske (1978, 183-220). See also Lotz (1966, 153), who writes that the activities of the recruiters were vital. "Without their recruiting the whole colonization of the southeast would have been simply impossible."

⁷ Fenske (1980, 339). He estimates that 25% of all emigrants went to Hungary "as a result of the efforts of the government." Many more left because of private recruitment.

⁸ For one, our figures do not include the twenty-four mediatised institutions, which rarely list population figures. Thus the available estimates will be used in this study, though with due caution and allowing for a certain margin of error. For a discussion of this issue and a list of surviving budgets of the Prince-Bishopric see Selig (1988, 339-40).

⁹ The number of illegal and thus unrecorded emigrants may have been as high as 25% of the total. Selig (1988, 46-75).

¹⁰ Schmidt-Kehl (1937, 176-99). The communities analyzed are Langenleiten, founded in the late seventeenth century, and Geroda-Platz.

¹¹ von Hippel (1984, 25-46).

¹² Sartori (1788, 130). These figures are compiled from Bundschuh (1790, 6:363; 5,180 square kilometers, 283,912 inhabitants), Ssymank (1945, 8; 5,290 square kilometers, 250,000 inhabitants around 1750), Schwägermann (1951, 15; 5,290 square kilometers, 160,758 inhabitants in 1700). The best estimates are in Schubert (1983, 37).

¹³ The figures concerning the amount of land available are taken from Chroust (1914, 44, 49, 56).

¹⁴ 1 acre = 4.025 square meters, 1 hectare = 2.5 acres. Schubert (1981, 40) calls for a minimum of 8 hectares, Heller (1971, 190) thinks 5 hectares to 8 hectares as the minimum amount of land needed to feed a family of 4 to 5 people. Henning (1970, 165-83) estimates that the majority of farmers had less than 5 hectares. Bog (1954, 1-16) shows that in the area around Nuremberg the average land holdings were about 3.6 hectares per family in the middle of the eighteenth century. Heller (1971, 191) in his analysis of 30 communities in the border area between Bamberg and Würzburg comes to the conclusion that everywhere a minimum of 70%, in some cases 94% to 98% of the villagers did not have enough land to live on.

¹⁵ The connection between population growth and the practice of partible inheritance has been researched by Berkner (1977, 53-69). Between 1689 and 1766, the population of Calenberg, an area of impartible inheritance around Göttingen, rose by 31%, the total number of families by 15%. In the area of partible inheritance around Göttingen, total population growth during the same time period exceeded 62%, that of the number of families 39%. If we include servants, relatives and subtenants living in the homes of the families counted here, we arrive at an overall growth rate of 65% for the area of impartible inheritance vs. 186% for the area of partible inheritance. Berkner concludes that "impartible inheritance acted to slow population growth . . . whereas . . . the effect of partibility was to create population pressures" (64). Contemporary observers like Sartori (1788, 151) stated that "compared to other ecclesiastical states Maynz and Würzburg have a larger population; however, population in wine-growing areas does not mean wealth, for at least one third are utterly destitute people, who, despite the hardest labor, can barely save themselves from starvation." Modern researchers like Wopfner (1938, 208) and Strobel (1972, 187) also emphasize the fact that partitioning of land holdings was worst in wine-growing areas like Würzburg.

¹⁶ Glaser et al. (1988, 43-69, 50). For annual yields between 1741 and 1841 see Hohmann (1952, 62-65). The percentage of grape growers is from Flurschütz (1965, 132).

¹⁷ Glaser et al. (1988, 54).

¹⁸ Schubert (1983, 421, n. 166), and Franz (1951, 10).

¹⁹ Pfrezinger (1939, no. 37).

²⁰ Quoted in Schubert (1983, 38).

²¹ Quoted in Abert (1912, 198). His contemporaries would have agreed with him. Cella (1786, 15) wrote that "the dividing up of the holdings has to have its limits," since it is "the source of poverty for the majority of the population."

²² Meiners (1794, 2:168). The size of a "morgen" varied greatly, from 1.847 to 2.391 square meters. A size of 2.000 square meters is used here.

²³ All communities mentioned lie within the boundaries of the Prince-Bishopric of Würzburg. The figures for Oberleinach according to BSW HV Msf 469 and BSW Rechnungen no. 12103, 1790. For Werrnfeld see BSW HV Msf 747 and BSW Rechnungen no. 8191, 1795. For Gerolzshofen see BSW HV Msq 11, 1790, and for Tauberrettersheim, including table 2, the *Fränkischer Merkur* (1798), no. 5.

²⁴ "Selen-[sic] und Güter-Tabelle von . . . Winterhausen Anno 1786." Stadtarchiv Burgfarnbach, Pücklerarchiv L 200.

²⁵ Table 3 is based on Rechter (1981, 340). One morgen is here 0.56 hectare.

²⁶ Hochstadt (1983, 195-224).

²⁷ Tilly (1979), quoted in Hochstadt (1983, 224). Mendels (1976, 193-216, 202-3) considers "strong forces favoring downward social mobility" a precondition for protoindustrialization. But like Tilly he also points out the frequent increase in fertility for such areas, similar to developments in the Rhön area of the Prince-Bishopric of Würzburg.

²⁸ Schmidt-Kehl (1937, 180-81). Developments in Würzburg confirm Mendels (1976, 216), that "social mobility patterns are not unilaterally determined by what happens in industry or in the economy." For a different view however see Diefendorf (1985, 88-112, 106-7), who argues that in the Rhineland this kind of generative behaviour, protoindustrialization and social mobility were much more pronounced in the cities rather than in the countryside.

²⁹ Hochstadt (1983, 204). This high rate of immigration was partly caused by higher mortality rates in the city.

³⁰ BSW Gebr.Prot. 17 March 1766.

³¹ The decree setting minimum property requirements of 200 fl as a prerequisite for a marriage permit in Würzburg was announced on 21 January 1732. Heffner (1776, 2:35). The purchase price for full citizenship in the prince-bishopric varied. It averaged about 20 fl per person, but could go as high as 100 fl. Selig (1988, 102-4).

³² Bahl (1974, 177, 280).

³³ Schubert (1983, 114).

³⁴ One Rhenish guilder (fl.) = 12 batzens = 60 kreuzers. Rechter (1981, 495) and Schubert (1983, 364, n. 564, and 88). Selig (1987), who analyzed the emigration movement of 1764 in the Prince-Bishopric of Würzburg, found that in his group of 306 names/heads of families applying for emigration, most were wine-growers. Of 123 applicants whose professions were recorded, 34 were male and female servants and day laborers. 95% of all applicants owned less than the 200 fl necessary to qualify for a marriage permit, 40% owned no property at all.

³⁵ On the deplorable situation of the independent craftsmen see Adelman (1803, 76, Würzburg), Flurschütz (1965, 128) and Schubert (1983, 102, Römhild and Edelfingen).

³⁶ Contemporary estimates in Riesbeck (1783, 1:260, 25% beggars) and Sartori (1788, 132, 33% beggars), modern figures in Rechter (1981, 340, 52%), Saalfeld (1980, 478, almost 40%), and Schubert (1983, 99).

³⁷ On the attitude of Ansbach, which repeated its requests in 1750 and which finally contacted the emperor himself in 1771, see Schubert (1983, 323).

³⁸ Selig (1988, 98-100).

³⁹ Schubert (1983, 73). Schöpf (1802, 151) even claimed that "Würzburg is no state of factories and cannot very well be one, since the encouragement of manufactories and factories means drawing workers away from farming and viniculture." On early factories in Franconia see Reuter (1961).

⁴⁰ Glaser et al. (1988, 53-54). See also Eßer, (1986, 101-36, esp. 106-8). He found, that unlike prices, wages remained relatively stable during the eighteenth century, thus eroding the purchasing power of monetary wages. For comparative data from northern Germany see Achilles (1975, 55-69).

⁴¹ Selig (1988, 29-44).

⁴² BSW Gebr.Prot. 17 March 1766.

⁴³ On the Peace of Passarowitz and governmental policies regarding the Batschka and the Banat in the 1720s see Weidlein (1937, 487-92), Rössler (1964, 110-28) and Schünemann (1930, 115-20).

⁴⁴ For emigration from Würzburg see in particular Metz (1935, 23-39) and Pfenzinger (1934, nos. 20-24). An imperial request of 1722 concerning the recruitment of colonists in Würzburg and Bamberg in BSW Reichssachen no. 3. Pfenzinger (1934, no. 20) insists however that the first emigrants left Würzburg before any recruiting activities had taken place.

⁴⁵ Graph 1 is based on the number of names recorded in Pfenzinger (1941). Pfenzinger only lists emigrants to Hungary; thus the total number of emigrants was higher.

⁴⁶ In the mid-1790s, the population started to grow at an accelerated pace of about 1.5% to 2.0% per year, while emigration came to an end until after the Napoleonic Wars, so that a later date would distort our findings. On subsequent developments in the Grand Duchy of Würzburg see Bilz (1968).

⁴⁷ von Hippel (1984, 28-30).

⁴⁸ All figures taken from Marschalck (1973, 35-51 and 93). A similar discussion of this problem can be found in Marschalck (1973, 88). See also Hansen (1976, 54).

⁴⁹ Marschalck (1973, 104).

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