All in the Family: A Dynasty Approach to Household Migration Evidence from the 19th Century Austro-Hungarian Empire

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All in the Family:
A Dynasty Approach to Household Migration

Evidence from the 19th Century Austro-Hungarian Empire[1]

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Abstract

This paper deals with the rural-urban migration of families in the last decades of the 19th century in one of the most developed regions of the Austro-Hungarian monarchy – the Pilsen region. The analysis indicates that the household head's expected real rural-urban wage gap was not the main factor behind migration. Instead, the observed behavior is consistent with families maximizing a dynastic utility function such that it was the future prospects of children which triggered migration. The results are not based on tracing of families in time but rely on identifying a control group of stayers. Specifically, I compare the structure of migrant families at the time of arrival to an urban area with that of families who stayed in the hinterlands and to decipher migration motifs.

Abstrakt

Tato studie se zabývá migrací rodin z venkova do města v posledních desetiletích devatenáctého století v plzeňském regionu. Analýza ukazuje, že rozdíl ve mzdách mezi venkovem a městem není hlavní příčinou migrace. Rodina se rozhoduje na základě maximalizace dynastické funkce užitečnosti čímž budoucnost dětí sehrává výraznou roli při rozhodování jestli migrovat nebo ne. Analýza je provedna porovnáváním rodinné struktury migrantů v čase příjezdu do města a rodinné struktury těch, kteří zůstali na venkově.

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1 Introduction

In economic history, rural-urban migration is a long-lasting research subject. Deploying various aggregate statistics economic historians tried to answer questions regarding the economic effects of migration on the growing urban sector, real rural-urban wage gap and integration of the labor markets. Recently, numerous studies utilizing various population censuses have analyzed the rural-urban migration on the individual level and tried to understand the effects of individual socio-demographic characteristics and individual economic conditions on the propensity to migrate.

Literature on migration has recognized that migration is far from a single man business. Family migration played an important role in the voluminous influx of rural population into urban areas. Several studies have analyzed the effect of the household head age and the number of children on the propensity to migrate[4]. Nevertheless, still little is known about the structure of the migrant families and the differences between these families and the families which decided to stay in the hinterlands. Knowing the family structure of both migrants and stayers can be very useful in deciphering migration motifs, especially when the relevant individual economic data are not available. Also, the knowledge of the family structure of both migrants and stayers can uncover the effect of the migration decision on the fertility decision of the households.

In this study I investigate the rural-urban family migration in the Pilsen region, one of the most industrialized areas of the Austro-Hungarian monarchy, in the last two decades of the 19th century[5]. I deploy individual data gathered from the 1900 Austro-Hungarian population census. The purpose of this study is twofold: first, to compare the structure of the migrant families with the structure of the families which stayed in the hinterlands and to explain differences within the framework of the family fertility behavior model with the dynastic utility function as introduced by Barro and Becker (1988); then to analyze the range of possible family migration motifs using the knowledge of both migrants' and stayers' family structure and the general knowledge of the economic situation in the hinterlands and urban areas.

[4] E.g. Long (1972); Sandell (1977); Mincer (1978); Steckel (1989)
[5] This study is a part of a dissertation thesis on migration in the most industrialized part of the Austro-Hungarian monarchy - Bohemia at the turn of the 20th century

My hypothesis for explaining migration motifs is that *a move from villages to towns is a rational act of parents who maximize the expected present discounted value of the dynastic utility function.* Motivation for this hypothesis was anecdotal evidence pointing to the fact that the migration of large families with relatively old household heads was often observed despite the fact that no substantial rural push force was present and that the real rural-urban wage gap was small[6]. This suggests that the migration decision was taken with respect to the whole family and that the future prospect of children was probably important migration motifs.

My methodological approach is different from the one usually used in the existing migration studies[7]. I do not deploy the forward and/or backward tracing of families to create a data set of migrants and stayers which is then analyzed using regression techniques. I collect a cross-section sample of migrant population and a cross-section sample of population which did not migrate – a so-called control group. Then, I use non-parametric tests to compare the distributions of the migrant population and the control group population and to analyze possible migration motifs. Since a unique feature of the data set of migrants is that it is possible to analyze migrant population at the time of their arrival, all analyses are performed such that the migrant population is evaluated *at the time of arrival*.

The structure of this paper is the following. The second and third part briefly overviews the literature on migration and the rural-urban migration during the Industrial Revolution. The fourth part presents a simple theoretical expose. The fifth part introduces the Pilsen area and the village Lozby. Section six discusses the data set and methodology, section seven presents the analysis. The last section concludes.

2 Migration theories

2.1 Migration of individuals

The first economic model of individual migration decision-making is by Sjaastad (1962). His model presents the decision-making of migrants as a human capital

[6] Jíša (1965); Janáček (1990); Williamson 1994 suggests that "…the greater the influence of rural push, the more likely migration would be a family affair."
[7] see e.g. Steckel (1988).

investment problem. Potential migrants compare the costs and returns of migration and move when the net return is positive. The costs of migration are the money costs of traveling and the "psychic" costs of leaving friends and family and the discomfort coming from uncertainty. The returns of migration are a higher expected earning stream and the "psychic" benefit of the new destination. The future expected earning stream is determined by human capital investments such as job experience and education. Sjaastad's model has a life-cycle feature. He argues that migration diminishes with age since the older the migrant, the fewer years he/she has from human capital investment while the costs of migration remains the same.

Formalization of some of Sjaastad's ideas was done by Todaro (1969). In his model, the potential migrant compares the expected discounted value of earning at home with that at the new destination and moves when the net expected discounted gain is positive. The expectations are taken with respect to the probability of finding a new job. In a formal expression, let Y_U be the fixed real urban income, Y_R the fixed real rural income, p_t the probability of being employed in the urban sector at time t, β the discount factor and $C(0)$ the costs of moving at time 0 (the present). The net present discounted value of real income is

$$V(0)=\sum_{t=0}^{T}\left(p_t Y_U - Y_R\right)\beta^t - C_0 \qquad (1)$$

The potential migrants leave the hinterland if $V(0)$ is positive and stay otherwise. Hence, the decision to migrate is the function of the net present value of rural-urban real wage gap.

A different form of modeling migration was presented by David (1974). He uses job search theory to model migration giving Todaro's model a more realistic form of how migrants find jobs after they move. In addition, utilizing job search theory, the migration decision-making is in the form of general expected utility maximization.

2.2 Migration of households

Literature on migration has recognized that the migration decision is often made inside the family. The family migration decision-making process is viewed as the maximization of a family utility function. In some studies, a family migrates as a

whole and the scholars estimate the effect of various family ties like the presence of a wife and her earnings and school-aged children on the probability of migration. On the other hand, some studies view the family as a decision-making unit which decides whether to let its member migrate for the sake of remittance or to migrate as a whole[8].

Sandell (1977) presents a model and an empirical analysis of family migration in which the family migrates as a whole. In his model, the family wants to maximize its utility which depends on the family's total income, husband's leisure and wife's leisure. The cost of migration is a reduction in the spouse's earnings and the costs of moving incurred by the school-aged children. The present value of family earnings is

$$\sum_{t=1}^{T} Y_{ft}(1+i)^{-t} = \sum_{t=1}^{T} Y_{wf}(1+i)^{-t} + \sum_{t=1}^{T} Y_{ht}(1+i)^{-t} \qquad (2)$$

where i is a discount factor and Y_f, Y_w and Y_h is the present value of family, wife and husband's lifetime earnings respectively.

The family decides to move if the expected net present value from being in a new place is positive. The author estimates a logit equation, where the dependent variable is a dummy indicating whether a family is migratory or not and the explanatory variable is husband's age, husband's education, presence of school-aged children, and the dummies indicating wife's labor market commitment. The sign of the estimated coefficients on husband's age is positive, the signs of the estimated coefficients on the rest of the variables are negative.

Mincer (1978) presents a model in which, similarly to Sandell, the family income is the sum of the husband's and wife's incomes. He shows that family ties are a deterrent to migration and reduce earnings and employment of migrating wives but increase the earnings and employment of migrating husbands. In addition, utilizing a Becker (1974) marriage model he shows that the labor market attachment of women creates an increase in migration ties which both deter migration and contributes to marital instability. He estimates the probability of migration for three different samples of men: those in their twenties, thirties, and over forty-five years of age. The major reasons for the differences in migration behavior between married and other persons are the wife's work status, her earnings, her education, and the presence of school-aged children. The effects of wives' earnings are not significant in the older groups.

[8] for the literature on remittance, see e. g. Stark (1991)

The above-mentioned papers are among a few economic studies which consider the presence of children as a migration-decision variable. The influence of the number of children and their age has been more of a focus of demographers. For instance, Long (1972) investigates the importance of household head age, the number of children and the ages of children in determining residential mobility rates. In particular, he is interested in finding out whether, given the age of the household head, the presence of school-aged children serves as a hindrance to migration and what is the effect of the family size on the probability of moving. He finds that, given the age of the household head, families with children under six have higher migration rates than those with children between six and seventeen. The effect of the family size is different for short- and long-distance moving. He finds weak evidence that the probability of moving locally is directly related to family size. On the other hand, he finds a strong support that for family heads younger than thirty five, the probability of migration is inversely related to the number of children.

3 Migration in economic history research

Within the last decades both internal and overseas migration are the core themes in the economic history research[9]. The studies on internal migration focus mostly on migration during the times of significant social and economic changes like the Industrial Revolution in Britain, the settlement of the US farming frontier or the growth of the US economy in the second half of the 19th century, although a fruitful research on the migration in pre-industrial societies has emerged recently as well[10]. The patterns of rural-urban migration, the effects of rural-urban migration on both cities and the country-side, and the reasons why people moved to the cities have been addressed in these studies[11]. There are roughly two strands of the literature on internal migration. One of them describes the general pattern of migration. As such it provides information on the main determinants of migration together with the effect of migration on economic conditions of both the sending and receiving regions and the effects of migration on the labor markets in the sending and receiving regions[12].

[9] Given that the paper focuses on internal migration, literature on overseas migration is not reviewed.
[10] Bribe (2003); Manfredini (2003)
[11] Baines (1985); Willamson (1990)
[12] Boyer (1987); Greenwood (1975); Baines (1985)

The second strand of the literature looks at the micro aspect of migration. These studies analyze the causes of migration and evaluate the impact of migration on the migrants' prospect. Methodologically, the research deploys the tracing of individuals throughout time.[13] For instance, Galenson and Pope (1989), using evidence drawn from the 1850, 1860, and 1870 federal censuses, analyze the characteristics of early settlers on the midwestern farming frontier, the determinants of their wealth, and the correlates of their geographic mobility. They found that the population of settlers was composed mostly from large families, headed by men with an average age of near forty. The migrants continued to be mobile, and high turnover was not random: the young adults were the most likely to leave as were poorer members of the community. In addition, they found that average rates of growth over time were considerably above the national average. Hersovici (1998), using manuscript returns from the 1850 and 1860 federal census, compares people who migrated from Newburyport, Massachusetts with those who persisted. He finds that blue-collar migrants were more successful than were their counterparts who did not move.

As mentioned in the previous section, it has been recognized that migration is often a family decision. There are several studies which analyze the migration patterns of families[14]. A primary focus of Davenport's (1989) study is the migration pattern of families moving to the city between the years 1850-1855 and the change in occupation associated with migration in Albany. He finds that nearly 60% of families came from short distances and heads of families moving from the city's hinterlands usually continued in the same occupation while those who moved to Albany from distant places either maintained already prestigious positions or moved up in their job status. David Dublin (1986) in his study addresses important questions like what kind of families did migrants come from, when in their own life cycles did the migrants move to the city, how did migrants fare in Lynn, Massachusetts, and what factor influenced their success. He finds that the rural migrants to Lynn tended to be single at migration, migration preceded marriage, and that throughout the time, migrants moved up the job ladder. He also states that the most probable reason for migration was not immediate economic need but a lack of future prospect. Steckel (1989) investigates household rural to rural migration patterns in the second half of the 19th

[13] Because of the enormous data collection costs, mostly regional studies are conducted.
[14] Davenport (1989); Dublin (1986); Steckel (1989)

century in the US. He finds that the highest migration rates are among the household heads in their early twenties and that addition numbers of children had no significant impact on migration. He suggests that the reasons behind the second finding are that either the children's attachments to schools, friends, and community are not important or were offset by the unemployment of children.

As mentioned above, several studies on internal migration in the pre-industrial societies have emerged. For instance, Dribe (2003) analyses the migration of rural families in pre-industrial 19th century southern Sweden. He finds that migration occurred over short distances, married couples of younger age were more mobile than married couples of older age, and that a large number of children did not increase the difficulty of migrating. Also, he finds that the families with more younger members were more mobile than families with more older members.

4 Family migration – a theoretical expose

The above reviewed literature on internal migration indicates that, especially in cases of rural-urban migration, little is known about the family structure of migrant families and families who remained behind. If we consider migration to be an investment and migrants to be investors, then the family structure of the migrant families is the outcome of optimal investment decisions. Thus, the knowledge of the structure of the migrant families and the differences between migrant families and families who stayed in the hinterlands can shed more light on the effects of the migration decision on the family structure and on the migration motives.

A useful framework for analyzing the family structure of migrants and stayers is provided by the research on the fertility decision of families as initiated by Becker (1960). This research tries to explain the observed pattern of rural families having a larger number of children than urban families. The main argument is concerned with the relative price of children – the demand for children increases as the relative price of children declines. The relative price of children expresses the costs of raising children. Rural families are larger than urban families because the costs of raising children are lower in the hinterlands than in the urban areas. The lower child-rearing costs in the hinterlands can be due to child labor, which is more productive than a child's labor in the urban areas, lower costs of food in the rural areas, or the fact that women in the rural areas could have been productive even with large numbers of

children than women in the urban areas[15]. Another possible explanation of the size differences in rural and urban families is quality vs. quantity of children. Empirical evidence suggests a difference in the role of education between traditional agricultural and modern industry. In particular, the worker productivity effect of schooling is limited in traditional agriculture; hence, it is not necessary for the rural family to invest in the education of their children, and therefore, the costs of raising children are low.[16]

Deploying the above-described framework to analyze the family structure of migrants and stayers and to draw implications about the migration motifs, we are going to consider a migrant family as a rational forward-looking rural family which faces an opportunity of moving into the urban sector. Before that, however, we will first describe the basic features of a migration decision.

Migration has two intrinsic features: it has a significant life-cycle aspect, and the future benefits are not known with certainty. Thus, people base their migration decision on the comparison of the expected present value of benefits and costs connected with migration. They decide to move when the expected present value of the benefits connected with moving in a new place exceeds the expected present value of the costs connected with migration.

While the migration decision of a single man is a straightforward cost-benefit analysis, the migration decision of a family is more involved. The main principle remains the same – the calculation of the net expected present value of moving to a new place. However, the actual calculation is more involved since it has to be done for every family member. It means that the total costs of moving are the sum of the migration costs bore by the household head, wife and children and the benefits are the sum of the benefits of the household head, wife and children. In the context of rural-urban migration, the benefit from migrating to a town is higher expected income. In particular, parents expect higher future income from working in the growing industrial sector and children are expected to acquire better education which would ultimately increase their future income. Parents' migration costs include transportation costs, psychical costs, costs of human capital transformation (additional education), worse living standards (poor quality of housing, high rent, poor sanitary conditions) and

[15] In the urban areas, women had to have a day care service in order to be productive, which raises the costs of rearing a child.
[16] See e.g. Yang and Zhu (2000)

higher costs of rising children. In addition to these costs, there is a positive probability of a lower real wage in the first years of living in a town or even being unemployed. The migration costs born by children include mainly physical costs and worse living standards.

The costs of migration also include the opportunity costs of leaving the hinterlands. The most profound opportunity costs are born by the wife and children. In the case of the wife, we may speculate that the wife's contribution to the family income when the family resides in the hinterlands is larger than her contribution to the family income while residing in the urban areas. The reason may be that it is not easy to find a job for a woman in the urban areas despite rising job opportunities. Therefore, the migrant family has to take into account a potential drop in income due to the lost of the wife's income when the family moves to the town. As for the children's contribution to the family income, it would not be far from the truth that their contribution to the family income is lower in urban areas than in rural areas. In the rural areas, children can work in a field or do the house chores. In the urban areas, these activities are limited, and even though child factory labor was not completely banned at the time of the Industrial Revolution, we can say that the family could not rely on this source of income.

Now, consider a family which has to decide whether to migrate or not and the parents who are altruistic toward their descendants. In particular, consider a rational forward-looking rural family whose preferences are described by a dynastic utility function $U_t(c, n, u_{t+1})$ where n is the number of children in the current generation, c is the total consumption and t and $t+1$ refers to the current and the next generation respectively. The family maximizes the dynastic utility function with respect to consumption and the number of children, given the budget constraint where c is the total consumption, p stands for the costs of raising children, n is the number of children, $E(I_f)$ is the expected total family income, $E(I_{hh})$ is the household head's expected income, $E(I_w)$ is the wife's expected income and $E(I_{ch})$ is the children's expected income.

$$Max_{c,n} \sum_{t=1}^{\infty} U(c, n, u_{t+1})$$

$$subject\ to: \qquad c + p^i * n = E(I^i{}_f)$$
$$E(I^i{}_f) = E(I^i{}_{hh}) + E(I_w) + E(I_{ch}) \qquad (3)$$
$$where\ \ i = rural, urban$$

The family decision-making process can be viewed as a search process – a comparison of the net expected benefits from different places. The family has a choice of either moving into a town or staying in the hinterland. In the former case, the family members face the costs of raising children p^{urban} and job opportunities which would give them the total expected family income $I^{urban}{}_f$. In the latter case, the costs of raising children is p^{rural} and the total expected family income is $I^{rural}{}_f$. The expected income is negatively related to the age of a family member and positively related to the acquired education. The total expected family income consists of the expected income of the household head, his wife, and children. Since the wife's income was small in comparison with the household's head income, I neglect the wife's income from the further analysis. Given that the parents care about the future prospect of their children, I consider children's expected income separately.

The family computes two value functions of its dynastic utility function: one when it lives in the town and the other one when it lives in the hinterland. The family moves if the difference between the value function from living in the urban area and the value function from living in the hinterlands exceeds the migration costs:

$$delta \equiv v(p^u, I^u_f) - v(p^r, I^r_f) > migration\ costs \qquad (4)$$

The higher the difference between the value functions, the higher is the probability of migration. To make the analysis verbally tractable, I will consider only the immediate descendants. The model has the following implications for the family size, age distribution of household heads and, the timing of migration.

4.1 Family size

From the above-mentioned family maximization problem, the fertility decision depends on the relative price of children and the expected total family income. Under the *ceteris paribus* assumption, higher relative price of children or lower expected total family income in the urban areas decreases fertility. As was previously discussed, the costs of raising children were higher in the hinterlands than in the urban areas. Hence, *ceteris paribus* we should expect migrant families to have a lower number of children than the families which remained in the hinterlands. The lower number of children in migrant families can also be driven by the migration costs connected with children.

The implication of this reasoning is that if we draw the distribution of the size of the migrant families and the families of stayers, we should expect the migrant families to have a lower number of children than the hinterland families. The null hypothesis would be that the migrant families have a larger number of children than the stayer families.

4.2 Age distribution of household head

Since the household head's expected income is negatively related to his age, the delta in (4) declines with age and hence, *ceteris paribus*, we should expect the families with younger household heads to migrate more than families with an older household head. However, in the case of dynastic utility function, we may observe the families with the relatively older household head to migrate as well. The reason for that is because migration to a town is beneficial not only for the household head but also for his children. The household head benefits from the opportunity of higher income created by industrialization and his children benefit from better education which, increases their human capital and hence their expected future incomes. Therefore, even though the older household head would not be able to benefit fully from higher expected future income[17], a move to town raises the expected future income of children which increases the delta in (4) and hence, the incentive for the whole family to migrate.

[17] If the household head is old enough, the net expected rural-urban income differential can be even zero.

The implications are the following. We should expect the age of the household heads who stayed in the hinterlands to be higher than the age of the household heads who migrated. The age distributions of the migrant household heads and the stayer household heads are expected to be skewed to the left in the former and to the right in the latter case. Furthermore, the distribution of the migrant household head is expected to have a heavy tail. The null hypothesis would be that there are less young migrant household heads than young stayer household heads.

4.3 The timing of migration

The timing of migration is analyzed with respect to household head age and the age of children. As it was reasoned in the case of the age distribution of household head, we should expect younger household heads to migrate more than older household heads. Hence, we should observe migration to occur predominantly at the early stage of a household head life-cycle since at that stage it is possible to get as much of the net expected benefits from migration as possible. However, the family maximizes dynastic utility function; therefore, the age of children becomes a decision variable too. It was argued above that the education of children is positively related to their expected income and that the town provides better education than the hinterlands. The consequence of this is that migration to the town increases, in expectations, children's income. This ultimately triggers migration since the delta in (4) increases as well. In other words, in the dynastic utility framework, the quality of the children's education may trigger family migration. However, the parents face the higher costs of raising children in town than in the hinterlands. Hence, in their decision to migrate, they have to compare the costs of raising children in the town with their current/expected rural-urban income gap in the town. If this income gap is high enough to cover higher costs of raising children, the timing of migration with respect to children is undetermined. However, if the current/expected rural-urban income gap is not high enough, parents will wait till the eldest child starts his/her compulsory primary education and then move to town.

The implication is that we can expect the age distribution of the oldest child to be around the age when the child starts his/her compulsory primary education.

5 Industrialization in Pilsen

During the second half of the 19th century, Pilsen became an industrialized city with an increasing share of the population working in various industries and a decreasing share of the population working in its agricultural sector. Between the years 1869 and 1900 employment in transportation increased by 960%, the number of workers in the steel industry rose by 468%, and the manufacturing industry exhibited an increase in employment by 344%. In 1900, there were 601 white-collar workers, 10784 skilled workers, and 11980 unskilled workers working in Pilsen industrial firms; in the transportation sector and trade, 1005 white-collar workers, 2793 skilled workers and 366 unskilled workers were employed. Distribution of the increase in employment by sectors between the years 1869 and 1900 was 30% in agricultural, 188% in various industries, 440% in trade and 646% in public service and various small and medium enterprises[18].

The development of the industries in the Pilsen area was halted by the crisis in the 1870s. Since the 1880s, however, the number of small and medium enterprises was rapidly increasing[19]. Traditional beer production also flourished. In 1893, a new Pilsen beer production factory Prior was founded and together with Pilsner Urquell and Mestansky Pivovar produced more than one million hectoliters of beer at the turn of the 20th century. The most rapid development occurred in the machine making industry. In 1886 Skoda began to produce steel and in 1890 a new plant for armory production was built near the suburb village of Skvrnany. Soon Skoda became the largest enterprise in the Pilsen region[20]. In addition, the Austria-Hungarian monarchy nationalized the Czech western railways and in 1898 began to build its workshops near the suburb village Lobzy. Together with Skoda, the railways became the largest firm in the area.

Rapid industrialization was intimately connected with the spread of railways. The railway network had begun to expand since the 1860s and enabled firms not only more easily to import necessary raw materials but also to distribute their products beyond the boundaries of the Pilsen area. In addition, railways made the movement of

[18] Jíša (1965)
[19] Chylík (1917)
[20] Škoda works were well known for its production of weapons to warrant its mentioning in "To whom the bell tolls" by E. Hemingway

labor force from rural to urban areas easier and hence it helped rural migrants to seize the opportunities of obtaining new urban jobs

The industrialization of Pilsen was accompanied by a substantial increase in its population, which was driven predominantly by a huge migration from the near by villages[21]. Between 1714-1820, Pilsen's population increased by 173%, while in the next 50 years, the population increase was 230%. In absolute numbers, in 1869 Pilsen had 23691 inhabitants; in 1880 38883; in 1890 50221; and in 1900 68079 inhabitants. It was the fourth largest city in Bohemia by the 1910.

One of the features of Pilsen industrialization is a great deal of nominal wage differences across occupations, especially with respect to workers' qualifications. There was a big difference between the nominal wage of a foreman, a qualified worker and a worker[22]. In order to move up the job ladder, one had to be either an experienced craftsman or had to follow evening courses organized either by the employer or the Pilsen's Chamber of Commerce. This meant that education played a crucial role in achieving better living standards.

5.1 Migration pattern in the Pilsen region

The main sources of migration to Pilsen and its suburbs were the nearby villages and adjacent counties. At the end of the 19th century, 8419 people came from the various villages of Pilsen county, 3910 from Přestice, 2003 from Stříbro, 3560 from Rokycany and 1272 from Kralovice counties. Further from Pilsen, its migrants were from Klatovy (2143); Strakonice (927); Domažlice (735); Blatná (696); Sušice (686); Hořovice (735); Horšúv Týn (612); Pisek (633); Prague (1057)[23].

The city of Pilsen was not prepared to cope with such intensive migration. The housing market responded and the price of apartments in Pilsen increased[24]. As a consequence, the migrants settled not only in the city of Pilsen but also, and in the last decade of the 19th century even more intensively, in the suburban villages of Lobzy, Skvrňany, Doubravka, Božkov and Doudlevce as is presented in Table 1 below.

[21] Within the years 1890-1900, population increased by 35% out of which 15% was a natural increase and 20% was due to migration, see Danes (1917).
[22] Janáček (1990), chapters 4 and 6
[23] Dějiny Plzně II (1967)
[24] Jíša (1965)

Table 1 Population development of Pilsen and its suburbs

	1857	1859	1880	1890	1900
Pilsen	14269	23681	38883	50221	68079
Lobzy	**136**	**183**	**242**	**790**	**3035**
Božkov	448	475	583	810	1311
Doubravka	344	377	545	942	2402
Bolevec	440	504	681	1002	2255
Skvrňany	466	660	976	1807	3735
Doudlevce	305	305	444	774	1812

Source: Retrospektivní lexicon obcí ČSSR 1850-1970

5.2 Lobzy

Lobzy was originally a tiny village with a little bit more than a hundred inhabitants who were employed predominantly in agriculture. In the last decade of the 19th century Lobzy experienced a massive inflow of migrants. The reasons for that were job opportunities created by the state railways, which began to build their workshops and the expansion of nearby beer production factories. Based on the 1900 monarchy population census, almost half of the rural migrants worked in the state railway workshops and more than one third in the beer production factories Měšťanský pivovar and První akciový pivovar. The rest of the village population was employed in various small enterprises and agriculture.

6 The Data and Methodology

The evidence used was drawn from the manuscript returns of the decennial monarchy census of population of 1900 for the suburb village of Lobzy and for the hinterland villages of Bezděkov, Habartice and Strážov. Two samples were created. The first sample was collected from the manuscript returns of Lobzy, the second – the control group sample - was collected from the manuscript returns of Bezděkov, Habartice and Strážov.

As for the first sample, of 3035 inhabitants who resided in Lobzy in 1900, we have a sample of 2473 inhabitants. The reason for that is twofold. First, some of the

manuscript returns are lost and some of the manuscript returns were incomplete. In particular, a couple of the manuscript returns lacked information on the household head's birth year and the year of the household head's arrival in the village. The lack of this information prevents us from further analyses; hence, I did not take these manuscript returns into consideration.

The manuscript returns include information on the name, date of birth, place of birth, occupation, and literacy of each person residing in the village on the date when the population census took place. Moreover, for each person in the village the census also provides information on the year of permanent residency in the village and the family relationship. The last two pieces of information make this data set of great value and importance since they enable us to distinguish very easily the migrants from the original village inhabitants and to determine the family status of every person in the village.

Examining the sample, I found that there are only twenty-one original village families[25]. The rest of the sample consists of people who came to Lobzy between 1870 and 1900. The rest of the village population is a migrant population, and I divided them into three groups: those who came before 1890, so-called early migrants; migrants who came between 1890 and 1895; and migrants who came between 1896-1900. The division of the sample is not arbitrary. Since the largest migration wave in the second half of the 19th century happened in the last decade of that century, it seems natural to distinguish migrants from the last decade of the 19th century and the migrants from the years before 1890. The reason is that there might be differences in the migration motives and hence the migration patterns before 1890 and after 1890. The decision to divide the migrants who arrived in the last decade of the 19th century into two groups is based on the fact that in the last years of the 1890s, an unprecedented industrial expansion occurred (Škoda expanded its armory production and the state railways began to build workshops) which could have caused a different migration behavior. Not taking into account the above-mentioned historical facts could bias the analysis and thus invalidate the conclusions.

The control group would ideally be a stratified sample gathered from the sending villages. Most of the migrants came from the villages and the county capitals of eight counties – Přestice, Rokycany, Stříbro, Blatná, Kralovice, Klatovy, Rakovník

[25] By original I mean families with the household heads who were either born in Lobzy or came to Lobzy when they were younger than eighteen.

and Strakonice. There are 70 sending villages in these counties, most of them are located in Přestice, Rokycany, and Klatovy counties. I decided to rule out the county capitals and take into account only villages far enough from them so that they are not considered as their suburbs[26]. Unfortunately, there are only three villages with the manuscript returns for 1900 – Bezděkov, Strážov and Habartice and they are located in Klatovy county. It is possible that our control group does not represent the entire population of sending villages. Fortunately, this is not the case. The villages are located in the county which sent among the highest number of migrants to Lobzy. Hence, we can say that the population of these villages represents the population from which most of Lobzy migrants were drawn. Moreover, the size of the control group villages is similar to the size of most of the Klatovy county villages; thus, the control group population was not drawn from unrepresentative outliers. The control group sample was created as follows. Since Habartice is a relatively small village, I gathered data from all the manuscript returns. There were three migrant families, which I excluded from my analysis. As for the remaining two villages, I gathered data from every fifth manuscript return. There were nine migrant families in Bezděkov and one in Strážov. These families are also excluded from the analysis.

Since the migrant population is divided into three migration waves, three relevant control groups were created. I evaluated the families in the control group sample at three points of time –1889, 1895, and 1900. These are the years in which the majority of early migrants, 1890-1895 migrants and 1896-1900 migrants respectively, arrived in Lobzy. Doing this, we create control groups with a population as it was at the time when most of the migrants moved to Lobzy.

In the data set, a typical family consists of the household head, his wife, and their children. A widow or widower with children is also considered to be a family. A single person is considered to be an individual who lives alone, works as a servant and lives together with a family, or is a family member such as an aunt, uncle, cousin, etc and lives with his/her family. As for the number of children in the family, we have to be aware of what we really observe in the data as data. We observe the number and the age of children in the year of arrival. This number, however, does not have to be the same as the number of children who were actually born to the family. The reason

[26] Family behavior of the suburb's population could have been influenced by the family behavior of the population in the town; hence, including suburb villages into the sample could bias the analysis.

is very high infant mortality at that time. The implication is that what we observe in the data as the oldest child is actually the oldest surviving child.

Unlike the usual studies on migration, I did not deploy the tracing of families throughout time to create the data set[27]. Instead of this, I collected a cross section of the families which migrated from various villages to Lobzy and a cross section of families which stayed in the sending villages as they were present at the end of 1900. Since I can extract from the manuscript returns the year of permanent residency, a good proxy for the time of arrival in the village, I can analyze the families *at the time of their arrival*. Moreover, I can impose a pseudo-dynamic on the data and conduct the analysis at different points of time. However, we must realize what kind of families we are dealing with. For instance, the migrant families which came to Lobzy between 1896-1900 are those which came to Lobzy within that time period and *remained* in Lobzy till the end of 1900. Also, families which did not migrate are those which were created in a particular control group village and stayed there till the end of the year 1900. The data set does not include families or individuals who came to/were born in Lobzy or left/died Lobzy before the end of the year 1900. The same applies for the families which stayed in the hinterlands. The data set includes only those which came to Lobzy minus the families which left Lobzy before the end of 1900. A natural question arises whether such a data set is representative enough to conduct an analysis without the fear of various biases. It might happen that the migration motives as well as the family structure of those who remained in Lobzy and those who left are different. This, however, does not seem to be the case. Those who came to Lobzy and left along with those who stayed had most probably the same reasons to migrate. It seems highly unlikely that those who left the village might have had different migration motives[28].

The data do not allow us to control for the occupation of migrants at the time of their arrival to Lobzy since the manuscript returns only include information on the occupation of the household heads in 1900.

[27] The reason is enormous data gathering and matching costs since the Bohemian manuscript returns have not been put into electronic form yet.
[28] One possible explanation for the departure of some of the migrants is that they found better dwelling either in the other suburb villages or in Pilsen, see Jíša (1965)

6.1 Descriptive statistics

The description of the first sample is provided in Table 2. Out of 2473 inhabitants, 2423 are part of the family residing in the village. This is almost 98% of the whole Lobzy population. A striking feature of the sample is that less than 10% of the sample includes original inhabitants.

Table 2: Composition of the Lobzy population

	Whole sample	**Original Inhabitants**	**Early Migrants**	**Migrants 1890-1895**	**Migrants 1896-1900**
Total individuals	2473	156	252	497	1568
(%)		(6.3)	(10.19)	(20.09)	(63.4)
Families	530	21	49	100	360
(%)		(3.96)	(9.25)	(18.87)	(67.92)
Singles	70	1		20	49
(%)		(1.42)		(28.57)	(70)

Source: Manuscript returns from 1900 monarchy population census, author's computations

In the sample, more than 60% of the migrants came into Lobzy between 1896-1900, less than 20% between 1890-1895, and less than 10% before 1890.

Table 3 presents various characteristics of the migrant families. It is interesting to see a consistent pattern in the average age of both parents and children, irrespective of gender, for the whole sample. In every case, the average age of migrants increases over time. This might indicate a possibility of learning from the previous cohort of migrants. In other words, it may be likely that the success of earlier migrants in urban areas might have been perceived as an indication of a future prospect from moving to a town for elder people as well.

Also, the average number of children per family in every migrant category increases over time. In other words, on average, over the time the members of a migrant family are older and the family is larger. Tables A1 and A2 in the appendix present sensitivity analysis of the migrant summary statistics for various sample sizes. We see that in the case of the families with children, the averages increase by a significant margin, which indicates the presence of a significant share of families without children.

Table 3: Summary statistics of the Lobzy migrant families evaluated at the year of arrival

Average	Early Migrants	1890-1895 Migrants	1896-1900 Migrants
Age of HH	31.2	33.3	35.3
Age of wife	23.4	28.5	31.3
Age of female HH	30.2	39.4	47.8
Number of children per family	1.1	1.5	2
Age of children	2.5	3	4.8
Age of sons	2.3	3.1	7.3
Age of daughters	1.3	3.6	7.2

Source: Manuscript returns from 1900 monarchy population census, author's computations

In the case of families of up to four children, the results do not change dramatically which indicates no significant effect on families with five or more children.

Table 4 shows the occupational structure of the migrants' household heads. The data do not contain information about every household head, but the fraction of the household heads whose occupation is not known is small; hence, it possible to draw a valid conclusion based on the available information. In both groups, most of the household heads are craftsmen and then industry workers. Unskilled workers are the smallest proportion. The fractions of the household heads in each of the occupations show a stable pattern throughout the time period.

Table 4: Occupation structure of the Lobzy migrant families in 1900

	Early Migrants	Migrants 1890-1895	Migrants 1896-1900
Farmer (%)	1 (2.3)	0	0
Industry Worker (%)	11 (26.1)	34 (38.2)	126 (37.9)
Unskilled (%)	5 (11.9)	3 (3.37)	29 (8.7)
Craftsman (%)	25 (59.5)	52 (58.4)	177 (53.3)
Total	42	89	332

Source: Manuscript returns from 1900 monarchy population census, author's computations

The description of the control group as well as various statistics is provided in Table 5 and 6. Table 6 shows that except for the average age of sons, daughters and child in a

Table 5: Composition of the control group population

	1889	1895	1900
Total individuals	465	559	648
Families	120	120	120
Singles	45	47	51

Source: Manuscript returns from 1900 monarchy population census, author's computations

Table 6: Summary statistics of the control group families

	1889	1895	1900
Average age of HH	39.5	42.2	47.4
Average age of wife	32.4	38.4	43.4
Average age of female HH	43.6	49.5	54.7
Average age of child	4.5	7.9	11.1
Average number of children per family	1.5	2.4	3.1
Average age of son	4.3	6.8	10.4
Average age of daughter	4.8	8.5	12.8

Source: Manuscript returns from 1900 monarchy population census, author's computations

family, there is an increasing pattern in the rest of the categories. The comparison of the averages between the migrant group and the corresponding control group is part of the forthcoming analysis, hence the results are presented in the next section.

7 Demography and migration motives

7.1 Distribution of the household age

Figures A1-3 in the appendix depict the age distributions of the household head for each of the migrant groups in contrast with the age distributions of the household heads for the corresponding control group. A visual inspection of the graphs clearly indicates the different patterns of the distributions. The household heads of migrants are younger than the household heads who stayed in the hinterlands. However, there are differences across the migrant groups. The mode of the age distribution of early migrants is in the range 31-35, while the modes of the age distributions of 1890-1895 and 1896-1900 migrants are in the range 26-30. Also, the mode of the age distribution of the household heads in the 1889 control group is in the

range 36-40, while the modes of the other control groups are in the range 50 or more. The age distributions of migrants are skewed to the left while the age distributions of the control groups are skewed to the right. Table 7 presents the sensitivity analysis of the average age of household head for each of the migrant

Table 7 Average age of household head: sensitivity analysis, average age of migrants is evaluated at the year of arrival

	Sample I	**Sample II**	**Sample III**	**Sample IV**
Early migrants	31.2	35.6	34.7	30.6
vs. control group	39.5	40.7	37.6	35.7
1895 migrants vs.	33.3	35.5	33.8	31.5
control group	42.2	43.6	39.1	37.3
1900 migrants vs.	35.3	36.5	33.6	32.5
control group	47.4	47.3	40.1	39.8

Sample I: the whole sample
Sample II: families with children
Sample III: families with children and household head younger than fifty
Sample IV: families with household head younger than fifty
Source: Manuscript returns from 1900 monarchy population census, author's computations

groups together with the corresponding control group for different sample sizes. We see that the average age of the household head is lower among the migrants than among the stayers across every migrant group, irrespective of the sample size.

I performed two non-parametric tests: the Mann-Whitney and the Kolmogorov-Smirnov test. The Mann-Whitney tests the null hypothesis that the median of the migrant household head age distribution is larger than the median of the stayer household head distribution. Kolmogorov-Smirnov tests the null hypothesis that the age distribution of migrant household heads has larger values than the age distribution of the household heads in the control group. Tables A3 and A4 (in the appendix) show the results of both tests. I performed the tests for various sample sizes to see how sensitive the results are to family size and age of the household. In every case but one we can reject the hypotheses at 1% which confirms the facts that the distributions of household head age is different for the migrants and stayers in a sense that younger household heads constitutes a larger share of the migrant population than of the stayer population.

Table 8 Distribution of migrant families by the household head age evaluated at the year of arrival

Household head age	Early migrants (%)	1890-1895 migrants (%)	1896-1900 migrants (%)
<20	6.82	8	0
21-25	22.73	15	16.39
26-30	20.45	27	26.39
31-35	29.54	21	18.89
36-40	4.54	8	11.67
41-45	6.12	9	9.44
46-50	6.68	5	5.56
50>	2.27	7	11.67

Source: Manuscript returns from 1900 monarchy population census, author's computations

Given the test results we can say that the behavior of the migrant household heads is such that most of them moved relatively at the beginning of their life-cycle. Nevertheless, one would expect them to move even earlier in their life-cycle – around the beginning of their twenties[29]. Unlike that, as we can see in Table 8 more than 50% of the household heads in every migrant group moved within the age range of 26-40. One might speculate that bad economic conditions in the hinterlands forced the families to migrate. There was a crisis in the agricultural sector at the beginning of the 90s, which corresponds to the second migration group[30]. However, since such a migration pattern is observed in every migrant group, it is doubtful that bad economic conditions in agriculture were the dominant push factor. Another possible explanation might be that the rising industrial sector in the city of Pilsen was a very strong pull-factor, strong enough to get household heads in their thirties and forties to move out of the hinterlands. This pull-factor had to be strong enough to outweigh the higher costs of raising children and the uncertainty connected with moving from the agricultural sector into the industrial sector (human capital transfer, unemployment, and a possibility of lower current urban real wage than rural real wage). Alternatively, learning from the experiences of early migrants might, as was already mentioned, might have caused older household heads to leave the hinterlands. Last, but not the least explanation may be that the household head moved because of their children. A move to town, as it was argued in the previous section, increases children's human capital. This raises children's expected income which, *ceteris paribus*, raises the delta (4) and hence motivates the household heads to leave the hinterlands. From the model, the effect of higher expected children's income can be twofold: it makes the effect of non-negative real rural-urban wage differential on migration more profound

[29] Steckel's (1989) study shows a migration peak in the early twenties of the household head age.
[30] Lacina (1990)

or may trigger migration by itself. As for the first effect, since we observe relatively older household heads migrating, we might be suspicious that their expected urban income is high enough to force them to leave the hinterlands. However, the presence of children may back up their migration decision.

7.2 Family size

Figures A4-6 in the appendix depict the distributions of the migrant families and the control group families by the number of children. A common pattern across these distributions is that all of them are skewed to the left. Figure 4 shows the distributions for early migrants and the corresponding control group. The mode of both distributions is at zero. Figure 5 presents the distributions for 1890-1895 migrants and the relevant control group. The mode of the former distribution is at zero while the mode of the latter is at one. Figure 6 depicts the distributions for 1896-1900 migrants and the corresponding control group. The mode of the former distribution is at one, the mode of the latter distribution is at five or more. An interesting feature of both distributions is that they are twin-peak distributions and that both of the peaks are positioned similarly – one child and more than five children respectively.

Table 9 Average number of children in a family: sensitivity analysis; average number of children of migrants is evaluated at the year of arrival

	Sample I	**Sample II**	**Sample III**	**Sample IV**
Early migrants	1.1	2.2	2.2	1.1
vs. control group	1.6	2.4	2.6	1.7
1895 migrants vs.	1.5	2.6	2.6	1.5
control group	2.5	2.9	3.1	2.6
1900 migrants vs.	2	2.6	2.6	1.9
control group	3.1	3.4	3.6	3.4

Sample I: the whole sample
Sample II: families with children
Sample III: families with children and household head younger than fifty
Sample IV: families with household head younger than fifty
Source: Manuscript returns from 1900 monarchy population census, author's computations

Table 9 shows the sensitivity analysis of the average number of children in the family. We see that in every case the average number of children in the migrant family is lower than the average number of children in the stayer family.

I performed the Mann-Whitney test to test the null hypothesis that the median of the migrant family size distribution is larger than the median of the size distribution

of the families of stayers. Table A5 presents the results of the test for various sample sizes. We see that except for the early migrants, we can reject the hypotheses at 1% significance level. In the case of early migrants, we cannot reject the hypotheses for all but one case. These results are in accordance with the notion that the rural families are larger than the urban families[31] which might suggest that our assumption of a migrant family to be a rational forward looking rural family facing the opportunities of moving into the urban area is not far fetched. In light of our model, the differences in the distributions can be driven either by the differences in the total expected income or by the differences in the costs of raising children. Higher migration costs connected with having more children may also lead to these results. To evaluate the impact of each of these factors we need information on the development of the rural-urban income differences and the costs of living in the rural and urban areas.

Unfortunately, none of this is available to us. Nevertheless, certain speculations may be useful. As for the migration costs, modern literature states that the presence of children is a hindrance to migration.[32] This, however, might not be the case when we deal with the previous century migration as it was shown in Steckel (1989). As for the expected total family income, the more children the family has, the higher the expected total family income. This is, however, outweighed by the costs of raising children. Since these costs are higher in the urban areas than in the rural areas, the lower number of children in the migrant families can be explained by high costs of raising children in the urban areas.

Table 10 Distribution of migrant families by the number of children evaluated at the year of arrival

Number of children	**Early migrants (%)**	**1890-1895 migrants (%)**	**1896-1900 migrants (%)**
0	48.98	39	23.33
1	16.33	20	25.83
2	14.29	17	17.5
3	16.33	6	12.22
4	4.01	10	9.44
5>	0	8	11.67

Source: Manuscript returns from 1900 monarchy population census, author's computations

A striking feature of these distributions is the substantial share of large families. As Table 10 shows, in the case of 1890-1895 migrant families, thirty-three per cent of the sample includes families with two to four children. The case of 1896-

[31] see, e.g. Becker (1990)
[32] e.g. Long (1972); Sandell (1977); Mincer (1978)

1900 migrants is even more striking. Almost forty per cent of the sample consists of the families with two to four children and up to three children there were more migrant families than the control group families.

It could be doubted that families of up to four children are large and suggests that that the families are large if they have more than five children. Nevertheless, it is surprising that we do observe a large share of migrant families to have more than one child since we would expect predominantly families without or with one child to migrate. This indicates a very strong urban pull factor which attracted families with more than one child also. Using the model to explain this, it seems that either the expected household's head income was so high that the costs of raising many children would have been covered and there would have still remained the real rural-urban income differential to trigger migration or that the expected income of children was high enough to trigger migration despite the possibility that the costs of raising children could have outweighed the expected household head's income.

It is interesting to compare the distribution of the migrant families separately. In the case of early migrants, almost half of the sample includes families which migrated without children. In the second and the third group of migrants, the share of migrant families without children decreases and the share of families with children goes up. In the spirit of our theoretical framework we can interpret the results in the following way. One way of reasoning would be that, *ceteris paribus*, the costs of raising children in a town were decreasing with the passage of time. This, however, is not very likely. The other explanation would be that the expected future income of parents and children in the town was increasing, hence triggering migration.

7.3 The timing of migration

Before presenting the results of the analysis, I will reiterate the reasoning of the migration timing. As the model suggests, the timing of migration should be analyzed with respect to the household head age and the age of children. The timing of migration with respect to the household head alone is such that migration occurs at the early stage of the household head life-cycle. However, the presence of children makes the timing a more involved decision process. There are many factors which may come into play when the household head takes into account the age of his children. As it was argued in the previous section, the expected income of the

household head, children and the costs of raising children are among the main determinants of the migration decision process. To disentangle them, we necessarily have to make certain assumptions. Suppose that the household head's expected real rural-urban income differential is small. Then the decision to migrate is driven predominantly by the expected income of children and the costs of raising children. Since the expected income is positively related to the acquired education, we can say that the decision to migrate is driven by the children's return to education. It means that the children should be raised in the urban area at least from the age they start their compulsory primary education since, as it was argued in the previous sections, education was better in the urban areas than in the hinterlands. Till that time, it does not matter whether they are raised in a town or in a village. However, the costs of raising children are higher in the urban than in the rural areas. Thus, to save on the early costs of raising children, the household head decides to remain in the hinterland till the time his children starts their compulsory primary education.

Table 11 Average age of children in a family: sensitivity analysis; average age of children of migrants is evaluated at the time of arrival

	Sample I	**Sample II**	**Sample III**	**Sample IV**
Early migrants	2.5	4.8	4.4	2.2
vs. control group	4.5	6.9	5.9	3.8
1895 migrants vs.	3	5	4	2.4
control group	7.9	9.7	7.8	6.5
1900 migrants vs.	4.8	6.3	5.1	3.9
control group	11.1	12.6	8.7	8.1

Sample I: the whole sample
Sample II: families with children
Sample III: families with children and household head younger than fifty
Sample IV: families with household head younger than fifty
Source: Manuscript returns from 1900 monarchy population census, author's computations

There is no satisfactory statistical measure or family structure indicators which would help to analyze the timing of migration. I opted to use the average age of children in the families and the age of the oldest child as I reasoned that the former describes the general pattern of children's age across the migrant groups at the time of migration and the latter seems to be, at first sight, a natural choice to base the migration decision in the presence of children. Several caveats, of course, apply. Gender for one, may become a factor (return to education for daughters seemed to be lower than the returns to education for sons), which may cause the household head to take into account the age of the oldest boy and not the age of the oldest child.

Table 11 shows the average age of children in a family for various sample sizes. The most relevant sample size is sample III. It is because it includes families with children – the average age is not biased downwards by the families without children – and it includes families with a household head younger than fifty – the average age is not biased upwards by the families with adult children. We see the average age of children is around four among early migrants and 1890-1895 migrants and around five among 1896-1900 migrants. Since the compulsory primary education started at the age six, these numbers indicate that the timing of migration does not perfectly correspond to the saving on the costs of raising children. Nevertheless, they are close enough to the age when compulsory education begins, hence we may say the saving on the costs of raising children seems plausible.

Figures A7-9 depict the distributions of the oldest child for each of the migrant groups. In the case of early migrants, the mode of the distribution is in the range four to seven. This suggests that the timing of migration is approximately consistent with the time the oldest child is supposed to start his/her compulsory primary education. An interesting feature of this distribution is that the second peak is in the range eleven to fourteen. This feature indicates that the family took into account children's work since it was possible for children to work from the age twelve. In the case of 1890-1895 migrants, the mode of the distribution is in the range one to three, the second peak is in the range eight to ten. These results are difficult to interpret. In the case of 1896-1900 migrants we observe that the mode of the distribution is in the range four to seven, even though the margin between this range and the range one to three is small. Nevertheless, it is a clear indication that the age when the oldest child was supposed to go to school played a crucial role in the family migration decision.

8 Conclusion

In this study I investigated the rural-urban migration of families in one of the most industrialized regions of the Austro-Hungarian monarchy in the last two decades of the 19th century. First, I explained the demographic differences between the migrant families and the families which remained in the hinterlands using the fertility decision framework with the dynastic utility function. Then, in the light of these differences and with the knowledge of the economic conditions in the urban area and the hinterlands I tried to decipher the migration motives. My working hypothesis was that

the real rural-urban wage gap is *not* the most decisive migration decision variable. The family structure matters a lot in deciding whether to migrate or not. I found that the migrant families are both younger and smaller than the families of stayers. However, the analysis showed that migration occurred not at the very beginning of the household head's life-cycle but later and that a significant portion of the sample includes families with a large number of children. Also, in a significant share of the sample, the timing of migration is mostly consistent with the time when the oldest child begins his/her compulsory primary education. Theses facts, together with the facts that the real rural-urban wage gap was small and that education was crucial in achieving a better living support the claim that the future prospects of children played a very important, if not in some cases the most important, role in the family migration decision.

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Appendix

Data description

ID – unit number, runs from 1 to 3121

House number – number of the house in which the individuals were residing, runs from 1 to 592

Member code – codes the status of an individual within a family, 1 stands for household head, 2 stands for wife, 3-15 stands for child

Sex – codes gender, m/f stands for male/female respectively

Birth year – year of birth of every individual in the village, runs from 1820 to 1900

Name – first name and the surname of every individual in the village, the surname of wife is the wife's husband surname

Place of birth – place of birth of every individual in the village, includes village/town of birth and the corresponding county

Status – determines marital status of every individual in the village, 1 stands for married, 2 stands for single and 3 stands for widow/er

Occupation – describes occupation of almost every household head, his wife and sometimes older children

Occupation status – describes status of an individual within occupation

Able to read and write – describes literacy of every individual in the village, 1 stands for able to read and write, 0 stands for not able to read and write

Able to read – describes partial literacy of every individual in the village, 1 stands for able to read, o stands for not able to read

Permanent residency – the year of permanent residency of every individual in the village

Table A1 Summary statistics of the migrant families with children evaluated at the year of arrival

Average	Early Migrants	1890-1895 Migrants	1896-1900 Migrants
Age of HH	35.6	35.5	36.5
Age of wife	30.6	31.9	32.7
Age of female HH	30.2	39.4	47.8
Number of children per family	2.2	2.6	2.7
Age of children	4.8	4.9	6.3
Age of sons	3.7	3.9	7.5
Age of daughters	2.2	4.3	7.1

Source: Manuscript returns from 1900 monarchy population census, author's computations

Table A2 Summary statistics of the migrant families with up to four children evaluated at the year of arrival

Average	Early Migrants	1890-1895 Migrants	1896-1900 Migrants
Age of HH	35.6	34.6	35.3
Age of wife	30.6	30.6	31.5
Age of female HH	30.2	39.4	47.8
Number of children per family	1.1	1.2	1.5
Age of children	4.8	4.6	5.8
Age of sons	3.7	3.2	6.7
Age of daughters	2.2	3.7	6.7

Source: Manuscript returns from 1900 monarchy population census, author's computations

Table A3 The Mann-Whitney Test: Household Head Age

	Sample I	Sample II	Sample III	Sample IV
Early migrants vs. control group	**4.93*** **	**2.87*** **	**2.23** **	**3.94*** **
1895 migrants vs. control group	**5.62*** **	**4.74*** **	**3.95*** **	**4.4*** **
1900 migrants vs. control group	**9.43*** **	**7.89*** **	**5.93*** **	**7.02*** **

Sample I: the whole sample
Sample II: families with children
Sample III: families with children and household head younger than fifty
Sample IV: families with household head younger than fifty
*** indicates significance at 1 percent, ** indicates significance at 5 percent * indicates significance at 10 percent

Table A4 Kolmogorov-Smirnov Test: Household Head Age

	Sample I	Sample II	Sample III	Sample IV
Early migrant vs. control group	**-0.41*** **	**-0.45*** **	**-0.42*** **	**-0.33*** **
1895 migrants vs. control group	**-3.97*** **	**-0.39*** **	**-0.38*** **	**-0.35*** **
1900 migrants vs. control group	**-4.45*** **	**-0.41*** **	**-0.36*** **	**-0.39*** **

Sample I: the whole sample
Sample II: families with children
Sample III: families with children and household head younger than fifty
Sample IV: families with household head younger than fifty
*** indicates significance at 1 percent, ** indicates significance at 5 percent * indicates significance at 10 percent

Table A5 The Mann-Whitney test: Number of Children in Family

	Sample I	Sample II	Sample III	Sample IV
Early migrants vs. control group	**1.58**	**0.415**	**0.94**	**1.875***
1895 migrants vs. control group	**3.392*****	**1.123**	**2.014****	**3.859*****
1900 migrants vs. control group	**4.467*****	**3.313*****	**4.156*****	**5.318*****

Sample I: the whole sample
Sample II: families with children
Sample III: families with children and household head younger than fifty
Sample IV: families with household head younger than fifty
*** indicates significance at 1 percent, ** indicates significance at 5 percent * indicates significance at 10 percent

Figure A1: Distribution of the household heads age: early migrants vs. control group

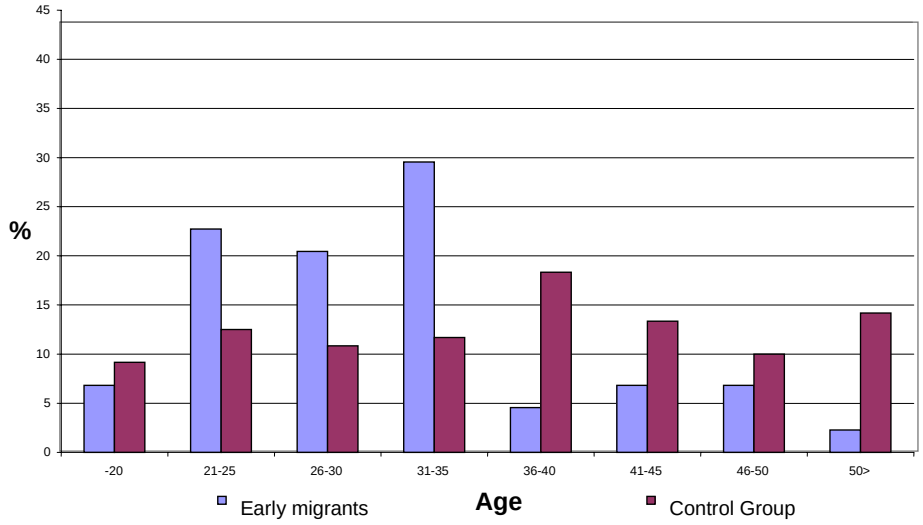


Figure A2: Distribution of the household heads age: 1890-1895 migrants vs. control group

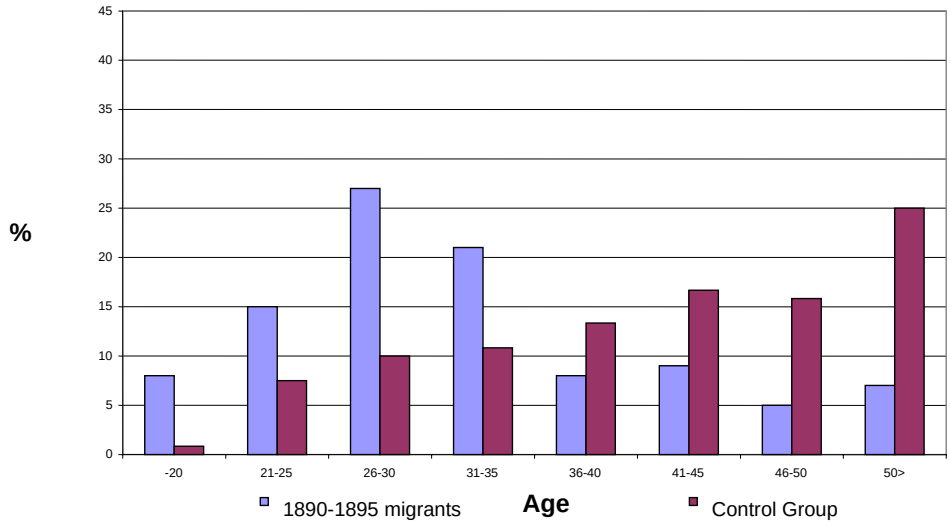


Figure A3: Distribution of the household heads age: 1896-1900 migrants vs. control group

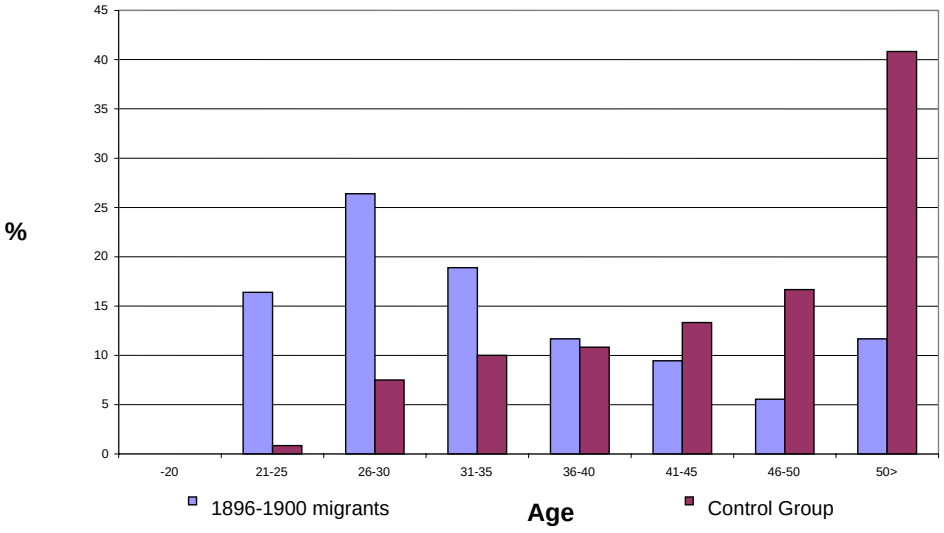


Figure A4: Distribution of families by the number of children: early migrants vs. control group

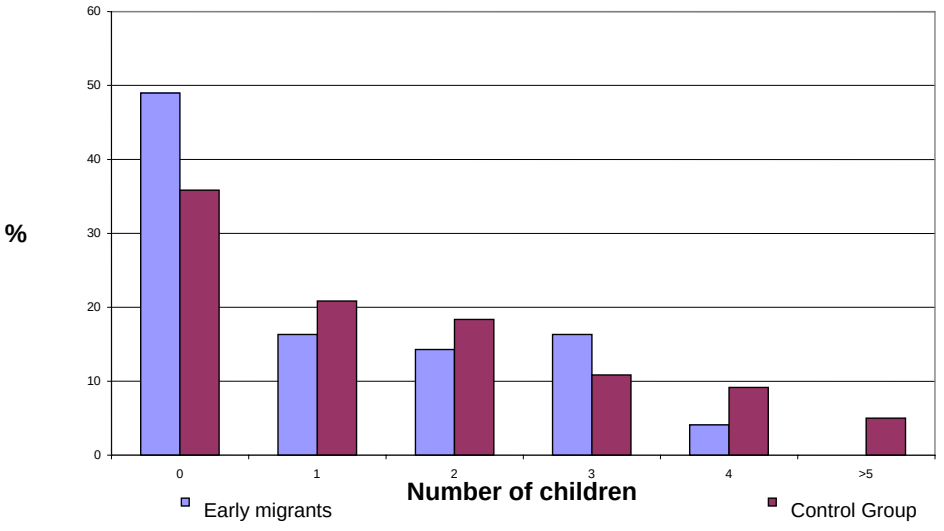


Figure A5: Distribution of families by the number of children: 1890-1895 migrants vs. control group

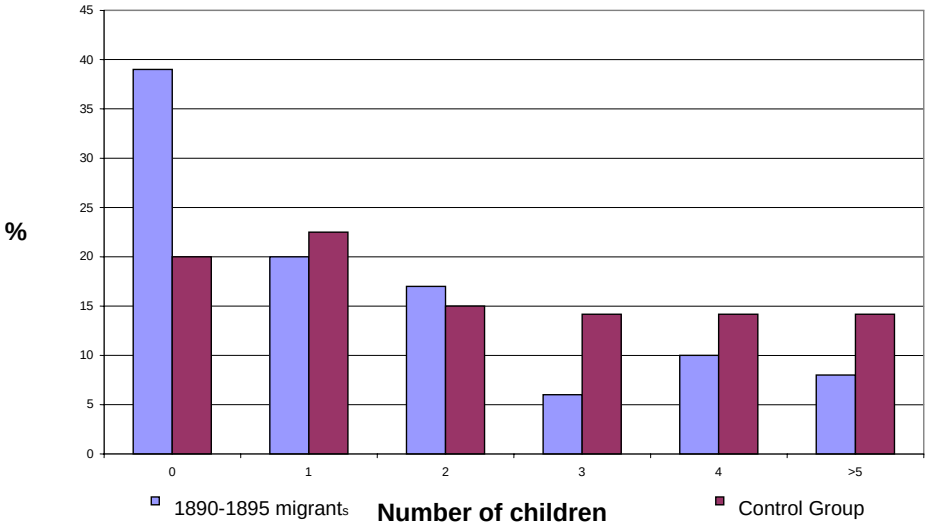


Figure A6: Distribution of families by the number of children: 1896-1900 migrants vs. control group

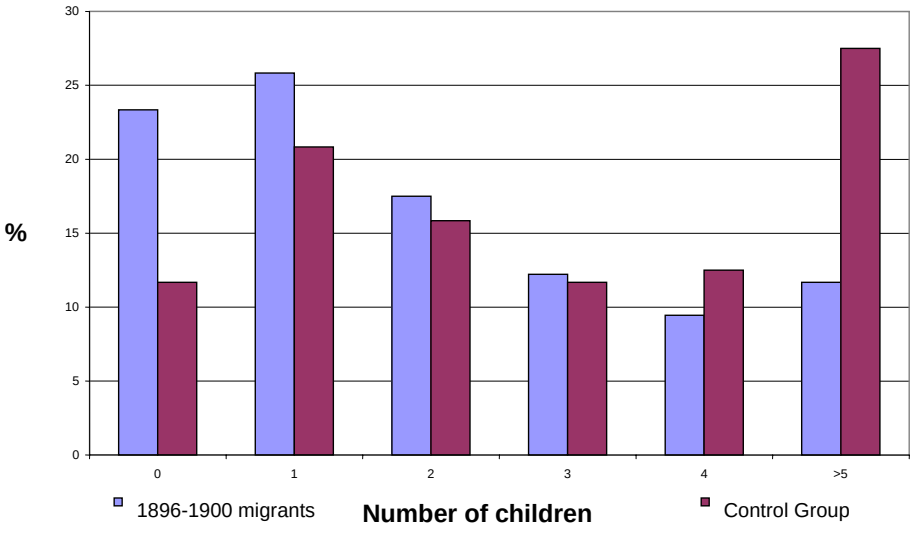


Figure A7: Distribution of the age of the oldest child: early migrants

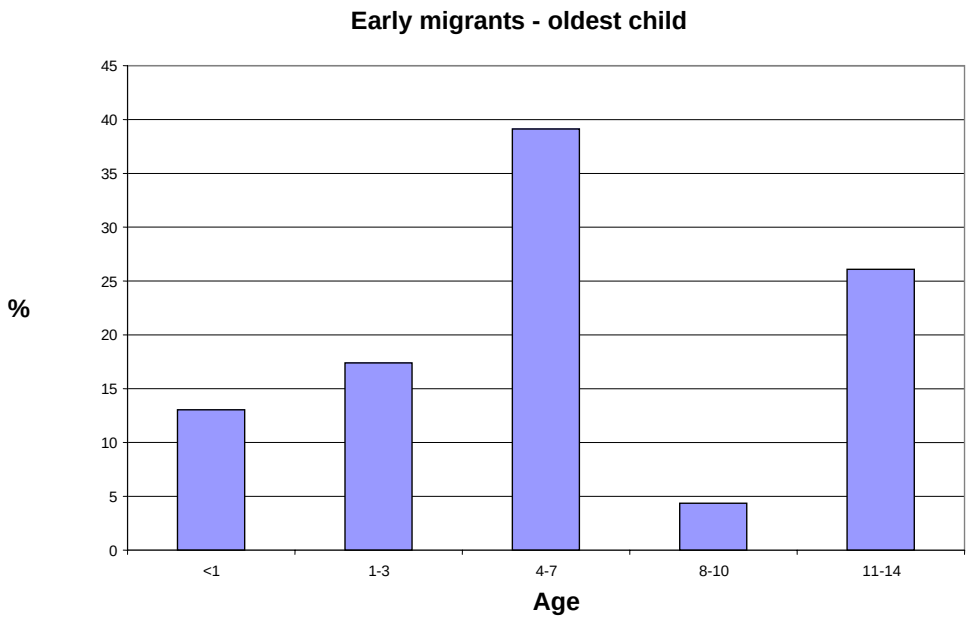


Figure A8: Distribution of the age of the oldest child: 1890-1895 migrants

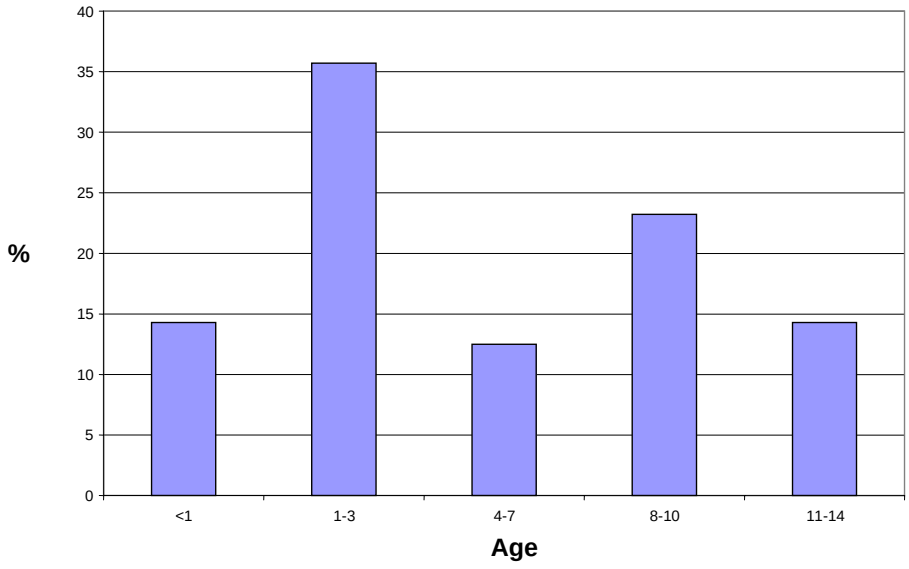
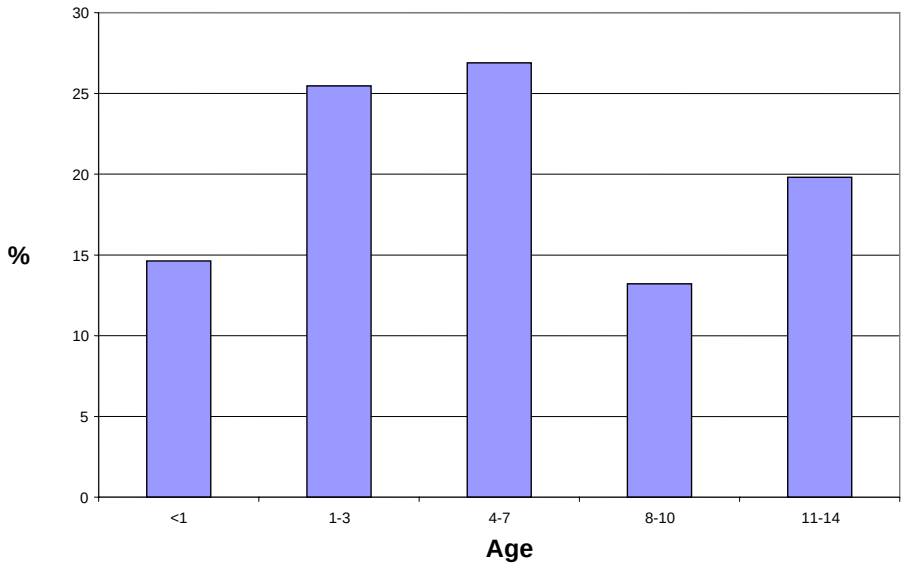


Figure A9: Distribution of the age of the oldest child: 1896-1900 migrants



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