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ABSTRACT

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Using uncertainty about the future returns to migration, the option value theory of migration can explain low migration rates in spite of huge wage differences. This paper presents the theory in a simple two-period framework and uses ethnic Germans in the CIS to find empirical support for it. Since July 1990, ethnic German immigration from Eastern Europe and the CIS is restricted by means of a protracted application mechanism. In our data on ethnic Germans in Russia and Kazakhstan in the 1990s, we use information on the stage of the application process, migration intentions and ethnicity to construct close proxies for the option value of postponing migration and for migration costs. The link between the two is shown to be as theory predicts.

JEL Classification: D81, J15, J61

Keywords: Migration, option theory, ethnic Germans

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1. Introduction

Classical migration theory comparing wage differences suggests that, if migration takes place, it takes place immediately. As the migration cost incurs only once, in the period of migration, and the payoff of migration, i.e. the wage difference, is paid every period until the end of the migrant's life, the net present value of migration is higher the earlier migration takes place. Yet, what we observe in reality is that migration is often procrastinated for many years. For example, there is still considerable emigration from Eastern Europe and the former Soviet Union, though many of the present-day migrants could have migrated a decade ago already.

Introducing uncertainty can explain this kind of behavior. As shown in two papers by Burda (1993, 1995), the option to procrastinate migration has a positive value if there is uncertainty about future wage differences, i.e. the payoff of migration. Thus, if it is possible to procrastinate migration, the number of people who migrate immediately after a migration opportunity opens up will be lower than a comparison of net present values would suggest.[1] In the periods that follow, migration takes place only if the expected payoff of migration increases due to persistent negative (positive) shocks in the country of origin (destination country). Note that this is in contrast to the network theory of migration (Bauer and Zimmermann, 1997 and 1998, p. 102), which predicts that a migration wave will always be protracted over several periods, in spite of a constant payoff to migration, because of network effects. Earlier migrants build up a network for later ones, which means that migration costs decrease over time. In this paper, we confine our attention to the option value effect.

In his model, Burda uses an infinite time horizon, and the wage difference between the two countries follows a Brownian motion. In order to present the idea as simply as possible, we restrict ourselves to a two-period framework in which uncertainty comes from a normally distributed shock that is realized between periods one and two.

The main goal of this paper is to test the option value model empirically. Usually, we only observe whether people migrate or not. However, in order to test the model we need to observe what value people who stay attribute to the option of migration. We are able to

[1] Note that only uncertainty about the *future* payoff of migration or *future* migration possibilities lead to a reduction in the migration rate. In contrast, uncertainty about *current* conditions in the foreign country increases the migration rate. See O'Connell (1997) for a comparison of the two types of uncertainty.

do that with two data sets on ethnic Germans in Russia and Kazakhstan collected by the *Osteuropa-Institut* in Munich.

When emigration from the Soviet Union and the Eastern European countries became possible in the late 1980s, the number of ethnic German immigrants jumped up dramatically. Therefore, the immigration rules were changed. So far, anybody could enter Germany and then claim to be recognized as an ethnic German. However, since July 1990, ethnic Germans in Eastern Europe and the former Soviet Union are not allowed to enter Germany any more before they have been officially given the status of an "ethnic German" *(Aussiedler)*. The application procedure can take several years, so that it retards migration. The data sets on ethnic Germans we use were collected in 1991 and 1994 and have detailed information about migration intentions and the stage of the application procedure. This allows us to construct close proxies for the option value of migration. The data set also has a lot of information on ethnicity and connections to Germany, which we use to proxy migration costs. We are able to show that those who attribute the highest value to the option are those who have migration costs that are lower than the costs of those who do not want to leave and higher than the costs of those who want to leave, as predicted by theory.

Burda et alii (1998) use information about the intention of East Germans to move to the West to find evidence for the option theory of migration. Concerning migration intentions, they only know whether people intend to migrate or not. To get a proxy for the option value, they assume that those who do not intend to migrate attribute a high value to the option of migrating later, whereas those who say they intend to migrate actually move to the West, thus attributing a low value to the option to postpone. The immigration regulations for ethnic Germans and the fact that they are considered in our data allows us to construct a much more precise proxy for the option value.

The rest of the paper is structured as follows. In section 2, we present a two-period model for the option value of migration. In section 3, we introduce the situation of ethnic Germans in the former Soviet Union and the two data sets we use. In section 4, we discuss our estimations methods and results. Section 5 concludes.

2. A two-period model for the option value of postponing migration

There are two countries, a rich one and a poor one. Agents in the poor country live for two periods. They are risk-neutral economic agents whose utility is linear in wages w, migration costs c, and a random shock ε.

First, we look at the case in which migration to the rich country is possible both in the first and in the second period. Then we look at the case in which moving is only possible in period 1. After that, we define the value of the option to postpone migration as the difference in expected utility in case there is an option to procrastinate migration and in case there is not.

2.1 Migration with the option to wait

In period 1, agents can decide whether to migrate to a rich country, which increases earnings in this period by the wage difference between the rich and the poor country, Δw_1. To do so, they have to bear a migration cost c. Between periods 1 and 2, a random shock ε with $\varepsilon \sim N(0,\sigma^2)$ is realized. The shock reflects changes in the economic and political situation in both countries and may therefore be correlated between individuals. However, it also reflects changes in the individual situation, like for example an illness or a promotion. In period 2, those who migrated in period 1 have to stay in the new country, earning Δw_2 more than in the poor country.[2]

We assume that $\Delta w_2 = \Delta w_1 + \varepsilon$. The model is solved by backward induction. In period 2, the condition for migration to take place is

(1) $C_2^{option} = \Delta w_2 - c = \Delta w_1 + \varepsilon - c > 0.$

The migration rate, therefore, is

(2) $prob(\varepsilon > c - \Delta w_1) = 1 - \Phi(z), \qquad z = (c - \Delta w_1)/\sigma.$

We assume that $z > 0$. In period 1, migration takes place if

(3) $(1 + \beta)\Delta w_1 - c > \beta\, E\left[\left(\Delta w_2 - c\right)^+\right]$

with β as discount factor. On the left-hand side is the discounted expected two-period wage gain through migration, diminished by the migration cost. To induce migration, this has to be bigger than the expected gain in period 2, given that migration then takes place if and only if

[2] We could allow for return migration and define the migration cost for return migration as prohibitively high as to completely avoid it. For the case of ethnic Germans, this seems realistic, as return migration is quasi zero.

the term in brackets is positive. Computation of the conditional expectation leads to the following condition for migration in the first period

(4) $C_1^{option} = [1 + \beta\Phi(z)]\Delta w_1 - [1 - \beta(1 - \Phi(z))]c - \beta\phi(z) > 0.$

Migration in period 1 increases earnings by a factor of $[1 + \beta\Phi(z)]$, and it increases migration costs by a factor of $[1 - \beta(1 - \Phi(z))]$ (first and second term in equation (4)). Third, it deprives the migrant of the possibility to use knowledge about the realization of the shock (third term in equation (4)). Intuitively, the incentive to migrate in period 1 is that the higher wage of the rich country can be obtained twice, whereas migration costs still have to be borne only once. The incentive to postpone the decision is that in period 2, the realization of ε is known, so that in case of a very low or negative ε it is still possible to stay at home.

2.2 Migration without the option to wait

Without the option to wait, the condition for migration to take place in period 1 is

(5) $C_1^{no\ option} = (1 + \beta)\Delta w_1 - c > 0,$

i.e. that the net present value of migration is positive. Comparing equations (4) and (5), we see that the second inequality is easier to fulfill than the first one if

(6) $\beta\phi(z) + \beta[1 - \Phi(z)][\Delta w_1 - c] = \beta\, E\left[\left(\Delta w_2 - c\right)^+\right] > 0.$

This expression is always positive, as it is equal to the discounted conditional expectation of the second-period wage difference if the migration decision is made in period 2. Thus, there will never be more migration in period 1 if there is a possibility to postpone than without this possibility.

2.3 The option value of migrating later

The value of the option to postpone migration, V, is the difference in the sum of expected utilities for both periods for the case in which there is an option to postpone and the case in which there is not. To calculate it, we have to distinguish three regimes. In the first regime, A, migration never takes place, no matter whether the option to postpone exists or not. In the second regime, B, migration takes place in case the agents do not have the option to delay, but there is no migration in case they have the option to wait. In both regimes, the expected utility with the option is equal to the right hand side of (3). The expected utility without the option is zero for regime A, and it is $[(1 + \beta)\Delta w_1 - c]$ for regime B. Finally, in

the third regime, C, migration takes place in both cases. As the expected utility is $[(1 + \beta)\Delta w_1 - c]$ with and without the option, the value of the option is zero.

$$(7) \qquad V = \begin{cases} \beta\sigma\phi(z) + \beta[1-\Phi(z)][\Delta w_1 - c] & \text{in A} \\ \beta\sigma\phi(z) - [1+\beta\Phi(z)][\Delta w_1 - c] - \beta c & \text{in B} \\ 0 & \text{in C} \end{cases}$$

Figure 1 plots the option value against the expected utility increase for migration. In regime A, the option value increases in Δw_1 and decreases in c. In regime B, it is the other way round.

The comparative static effects are as expected: An increase in σ increases the option value both in regime A and B, because the information about the realization of ε is more relevant. The impact of an increase in β is not clear, because it has two opposing effects. On the one hand, migration in the first period becomes more attractive, because migration costs are the same, and the expected return to migration, $(1 + \beta)\Delta w_1$, increases. On the other hand, it becomes more attractive to wait, because the regret someone feels in case migration takes place and this turns out to have been the wrong decision is more important. An increase in the migration cost has an opposite effect on the value of migration in regimes A and B.

$$(8) \qquad \frac{\partial V}{\partial c} = \begin{cases} -\beta[1-\Phi(z)] < 0 & \text{for A} \\ [1-\beta(1-\Phi(z))] > 0 & \text{for B} \\ 0 & \text{for C} \end{cases}.$$

In A, when migration does not take place anyway, the value of the option decreases. In B, when migration would take place if there was no option to postpone, the value increases. This is the phenomenon we use to test the option value model empirically. Note that the effect is mirrored for an increase in Δw_1. In regime A, an increase in $\Delta w1$ increases the value of procrastination; in regime B, it decreases the value of procrastination.

3. Ethnic German immigration: Regulations and Data

The right to immigrate to Germany and to obtain German citizenship for people of German ethnicity is guaranteed in the German basic law (article 116). When emigration from Eastern Europe and the Soviet Union became possible after the breakdown of the Communist regimes, the number of ethnic German immigrants to Germany rose dramatically. In 1989, 380,000 ethnic Germans entered Germany. As it was clear that this was only the beginning

and that the number of yearly immigrants would be much higher in the years to follow, the German government changed the rules for immigration. So far, people could enter Germany and then claim to be of German ethnicity. Since the 1st of July 1990, however, an ethnic German has to apply for recognition of this status in his country of origin and can enter Germany only after his application has been approved. As this procedure can take a considerable amount of time, the new regulation cut the peak in immigration in the early 1990s and distributed the influx of ethnic German immigrants more evenly over the whole decade (Locher, 2001). Figure 2 depicts the number of ethnic immigrants from the three main countries of origin and the number of applications from 1989 to 2000. The numbers are also in table 4. You can see that it was migration from the former Soviet Union in particular that was affected by the immigration restrictions. The main peak of immigration for Poland and Romania was in 1989 and 1990, respectively, before the application system was introduced. In 1991 and 1992, the number of applications was considerably higher than the number of immigrants.

In this paper, we are interested in those who, at a certain point in time, were still in their country of origin. We want to see whether the value they attribute to the option to migrate to Germany in the future is linked to their benefit of migration in the way as predicted by the model. To do so, we use two data sets collected by the *Osteuropa-Institut* in Munich. The first one has 1,013 observations. It was collected in six traditional settlement areas of ethnic Germans in the formers Soviet Union, three of them in Russia, three of them in Kazakhstan. The interviews were conducted in April and May 1991. The second data set has 1520 observations. The interviews were conducted in the Nowosibirsk area (Russia) and the Kustanaj area (Kazakhstan) from June to August 1994.

What makes the data interesting for our purpose is the detailed information it has on migration intentions and on ties to Germany and the German ethnicity. We use the information on migration intentions to construct proxies for the option value of postponing migration, and we take ties to Germany and affiliation to the German culture and ethnicity as proxies for migration costs. The closer someone is related to Germany, the lower are migration costs. In the 1991 data set, there is also information on wages. So we could, in principal, use $\partial V/\partial \Delta w_1$ to test the model, instead of equation (8). We do not do that because the wage data does not seem to be very reliable and because what we would need is the difference between the Russian or Kazakh wage and the wage that the same person

would get in Germany. The latter is hard to construct, because it is not clear to what extent human capital from the former Soviet Union can be used on the German labor market, and unemployment benefits or social security benefits depend on a number of things we know nothing about from the data. Thus, we concentrate on the differences concerning migration costs; differences in the wage difference are captured by the error term.

Table 1 lists the explanatory variables we use. Apart from personal and family characteristics, we have some variables that proxy the degree to which someone feels German like whether German is his native language. We also use whether a person has relatives in Germany and whether he expects to get help from them in case of migration to proxy whether the person could rely on networks in Germany. The more affiliated an ethnic German is towards the German culture and the more he can rely on networks, the lower are his migration costs, and thus the farther on the right should he be on the x-axis in figure 1.

In our data, there are always several respondents who come from different families, but live in the same village. As their decision to migrate might be related, i.e. because there is herd behavior, we correct standard errors for correlation of error terms within persons from the same village.

4. Estimation Procedures and Results

In this section, we estimate the relation between migration costs and the option value, first for the 1991, then for the 1994 data set. In both cases, the relation turns out to be as predicted by theory. Finally, we discuss what we can learn from these results for future migration. In the tables, the variables that proxy migration costs are printed in bold.

4.1 Estimations with data set (1)

In the 1991 data set, respondents are asked whether they intend to emigrate from the Soviet Union or whether they have not decided yet. The possible answers are “yes, we intend to emigrate”, given by 52% of respondents, “no, we do not want to”, given by 18%, and “we do not know yet”, which 31% respond is the case. As the option value is the value attributed to the option to migrate later but not to migrate now, we assume that those who say that they do not know yet have the highest option value. In terms of figure 1, they are located at the right end of regime A and the left end of regime B. Those who say that they

do not want to emigrate are located on the left part of regime A, and those who say that they intend to migrate are located on the right part of regime B. We do not observe anybody in regime C, as they have left for Germany already.

To test whether our predictions about the location of the three groups are correct, we estimate an ordered logit and a multinomial logit with the three possible answers as the dependent variable. The dependent variable is zero if no migration is intended, it is one if the respondent does not know yet, and two if migration is intended. According to the option value model, an ordered logit model with "we do not know yet" as the category in the middle should be superior to a multinomial logit. Also, in the multinomial logit with "we do not know yet" as the base category, the signs of the dependent variables for the two estimations should be opposite.

In table 2, the results of the two estimations are presented. The ordered logit model in column (1) has the expected signs for the migration cost proxies we use. Personal and family characteristics do not seem to matter. In column (2a), the base category "do not know" is compared with "yes, we intend to migrate", in column (2b), it is compared with "no, we do not want to migrate". The five explanatory variables that proxy migration costs indeed do have opposite signs, though three of them are not significant in column (2b). The likelihood of the multinomial logit estimation is only slightly bigger, although the number of degrees of freedom is roughly twice as large. Thus, the ordering according to the option model seems to make sense.

4.2 Estimations with data set (2)

In the 1994 data set, people are asked not only whether they intend to migrate, but also what they did to realize their intentions. People can answer that they did not apply for immigration to Germany because they do not want to leave (46%), that they did not apply, but they intend to do so (16%), that they applied, but have not got an answer yet (18%), that they applied and got a rejection (1%), or that they applied and got an approval (10%). As having applied and getting a rejection happened only to eight respondents, we drop that category in our estimations.

It is clear that those who say that they do not want to migrate should attribute a very low value to the option, even lower than those who say that they would like to migrate, but did not apply for immigration to Germany. By 1994, it should be clear to all ethnic Germans

in the former Soviet Union that migration to Germany is only possible if the application for immigration has been approved, and that this procedure can take several years. Thus, those who have not applied yet do not seem to seriously intend migration. Unfortunately, it is hard to discriminate among the two remaining groups who either filed an application which has not been answered yet or actually have been given the right the immigrate. The time it takes for an application to be treated varies considerably. The federal state *(Bundesland)* an ethnic German is assigned to double checks the affirmative decision made by the federal administration, and the duration of double checking varies considerably among the different federal states. Thus, those who already have an approval in the data set are not necessarily those who filed the application earlier. Also, with the data we have we are not able to discriminate between those who attribute a high value to the option, and those who actually want to emigrate. Both groups should concert efforts to get the immigration application approved by the German administration. In terms of figure 1, those who say that they do not intend to migrate are the farthest on the left in regime A, those who say that they intend to, but have not applied for immigration yet are in the middle of A, and the rest is on the right part of regime A and in regime B.

To test that, we estimate both an ordered probit with three categories and a multinomial logit with four categories. The results are presented in table 3. First look at the results of the multinomial logit. Those who have filed an application, but have not got an answer yet are in the base category. The last column (2c) compares them with those who got a positive answer. Note that the distinction between the two groups indeed does not seem to make sense. All variables that proxy migration costs are insignificant. In columns (2a) and (2b), migration costs have a negative sign, as expected, and are significant. The results of the ordered probit model in which the two categories are pooled, depicted in column (1), are as expected. All variables that measure migration costs, including having a Russian spouse, are highly significant. The fact that ethnic Germans in Kazakhstan are more inclined to leave than those living in Russia is probably due to the fact that ethnic Germans feel more inclined to the Russian than to the Kazakh culture. Also, the economic situation of Kazakhstan is worse than that of Russia.

4.3 Projections for the future

In the option value model, two things lead to migration of those who now stay in their country of origin, but have the option to migrate in the future, first, a shock that increases the wage difference between the two countries, and second, the fear that the option might not be valid in the future. In the extreme case when the expiration of the option for a given date is certain, everybody in regime B would leave before that.

In the German case, both things happened to a certain degree. In terms of GDP growth rates, 1994 was the worst year for Russia and Kazakhstan, but growth rates persisted on a very low or even negative level in the years to follow. Also, Germany continued to restrict immigration. The application system was a first step, which informally imposed an upper limit on the number of immigrant per year. From 1994 onwards, there was also an official upper limit. From 1994-1999, the maximum number of immigrants was restricted to about 200,000, since 2000, it is restricted to about 100,000. Obviously, as long as the restriction is binding, the number of immigrants is lower than without a restriction. However, according to option theory, if the restriction is not binding, the number of immigrants can be larger with the restriction than without, because the restriction makes people afraid that their option might expire.

Let us have another look at figure 2 and the respective numbers in table 4. Although the number of applications peaked in 1991, there were also many applications made after 1991 and after 1994, meaning that people reacted both to the negative shocks concerning the development of the Post-Soviet economy and the restrictions made on the German side. Note that the official upper bound for immigration was not binding in 1996-1999. Yet, the number of applications was higher than the number of immigrants in these years, and when the restriction was announced to be tightened in 2000, the number of applications went up again in 1999. In August 2001, 380,000 applications were under examination, while 150,000 ethnic Germans in the former Soviet Union had an approval (Press release of the Ministry of Interior, August 7, 2001).

5. Summary and Conclusions

This paper uses data on ethnic Germans in Russia and Kazakhstan to see whether the link between the value the potential migrants attribute to the option to migrate in the future and

their migration costs is as predicted by the option theory of migration. To do so, we first present the theory in the simplest framework possible, a two-period model with one shock. We sort people into three groups according to their migration behavior in case they have the option and in case they do not. In our estimations, we look at those who stay in case they have the option to procrastinate migration. To measure the value people attribute to the option, we make use both of the institutional restrictions Germany imposes on ethnic Germans prior to immigration and the detailed questions about migration plans and the state of their realization in the data set. As predicted by the theory, those who attribute the highest value to the option are in the middle concerning migration costs.

The option theory of migration can explain why, once a new migration possibility opens up, a large percentage of people may not take use of it immediately. It also tells us that the options will never be realized if the net present value of migration does not increase and if it is perfectly clear that the option will be of infinite validity. If, however, shocks increase the wage gap between the countries and it is not clear whether the option does not expire one day, migration will go on. This is what happened in our example of ethnic Germans.

6. Literature

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Tables and Figures

Table 1: Description of variables

Mean (standard deviation) of variables		Variable name	Description of variable
1991 data	1994 data		
36.6 (11.8)	32.9 (11.9)	Age90	Age of the respondent in 1990
1479 (971)	1224 (838)	Age90sq	Age squared of the respondent in 1990
3.52 (1.23)	3.25 (1.10)	Education	Levels of education degrees in the Soviet system, increasing from 0-6
.291 (.454)	.302 (.459)	Married Russian	Married to a person who is not of German nationality (a Russian in the overwhelming majority of cases)
.465 (.499)	.477 (.450)	Married German	Married to a person of German nationality
.634 (.482)	.605 (.489)	Kids	Dummy for having children
1.21 (1.14)	1.09 (1.09)	Number kids	Number of children
.600 (.490)	.590 (.388)	Native German	Being German native speaker
.319 (.466)	.535 (.499)	Religion	Being member of a church, excluding Russian orthodox (mainly protestant churches)
.683 (.466)	.796 (.403)	Relative German	Respondent has relatives in Germany
.359 (.480)		Help relatives	In case of migration, help from relatives in Germany is expected
.147 (.354)		Wiedergeburt	Member of Wiedergeburt (union of ethnic Germans, tried to reestablish the autonomous Volga republic)
.506 (.500)	.665 (.472)	Russia	Respondent is from Russia

Table 2: Estimation results with data set (1)

	Ordered logit	Multinomial logit	
	(1)	(2a) (migration)	(2b) (no migr.)
Age90	-0.053 (0.041)	-0.020 (0.037)	0.051 (0.052)
Age90sq	0.000 (0.000)	0.000 (0.000)	-0.000 (0.001)
Education	-0.015 (0.077)	-0.823 (0.072)	-0.128 (0.085)
Married German	0.123 (0.163)	-0.019 (0.255)	-0.380 (0.283)
Married Russian	**-0.229 (0.208)**	**0.134 (0.322)**	**0.534 (0.327)***
Kids	0.264 (0.293)	-0.208 (0.268)	-0.737 (0.447)*
Number kids	-0.083 (0.133)	0.009 (0.136)	0.170 (0.199)
Native German	**0.680 (0.166)*** **	**0.395 (0.201)** **	**-0.696 (0.273)** **
Religion	**0.733 (0.222)*** **	**0.736 (0.195)*** **	**-0.104 (0.308)**
Wiedergeburt	**0.808 (0.237)*** **	**0.611 (0.195)*** **	**-0.743 (0.581)**
Relative German	**1.07 (0.201)*** **	**0.615 (0.182)*** **	**-1.053 (0.313)*** **
Help relatives	**0.380 (0.164)** **	**0.398 (0.160)** **	**-0.004 (0.331)**
Russia	-0.466 (0.279)*	-0.528 (0.214)**	0.043 (0.408)
Constant	Ancillary parameters not reported	0.644 (0.850)	-0.264 (1.173)
Number observations	1,002	1,002	
Log likelihood	-893.78	-880.55	
Pseudo R^2	0.12	0.13	

Note: Robust z-statistics in parentheses, * significant at 10% level, ** significant at 5% level; *** significant at 1% level, clustering for villages, dependent variable is 0=no migration intended, 1=not decided yet, 2=migration intended

Table 3: Estimation results with data set (2)

	Ordered logit	Multinomial logit		
	(1)	(2a) (no migration planned)	(2b) (wants to file application)	(2c) (application approved)
Age90	-0.001 (0.030)	-0.025 (0.043)	-0.025 (0.058)	-0.089 (0.051)*
Age90sq	-0.000 (0.000)	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)*
Education	0.179 (0.063)***	-0.131 (0.092)	0.212 (0.103)**	0.253 (0.106)**
Married German	-0.164 (0.159)	0.145 (0.220)**	0.100 (0.276)	-0.313 (0.340)*
Married Russian	**-0.448 (0.184)****	**0.530 (0.249)**	**0.640 (0.256)****	**-0.281 (0.368)**
Kids	0.402 (0.210)*	-0.321 (0.281)	-0.463 (0.277)*	0.740 (0.303)**
Number kids	-0.177 (0.091)*	0.161 (0.123)	0.073 (0.146)	-0.200 (0.192)
Native German	**1.11 (0.202)*****	**-1.31 (0.281)*****	**-0.291 (0.318)**	**0.264 (0.292)**
Religion	**0.531 (0.170)*****	**-0.697 (0.237)*****	**-0.766 (0.180)*****	**-0.041 (0.298)**
Relative German	**1.17 (0.176)*****	**-1.67 (0.304)*****	**-1.06 (0.336)*****	**-0.212 (0.440)**
Russia	-1.93 (0.229)***	2.48 (0.295)***	0.681 (0.239)***	-0.213 (0.295)
Constant	Ancillary parameters not reported	1.51 (0.645)**	0.115 (1.04)	-0.579 (0.941)
Number of observations	1,424	1,424		
Log likelihood	-1,175.8	-1,1454.2		
Pseudo R^2	0.19	0.17		

Note: Robust z-statistics in parentheses, * significant at 10% level, ** significant at 5% level; *** significant at 1% level, clustering for villages, dependent variable is state of the application for immigration to Germany

Table 4: Number of ethnic German immigrants

Year	FSU	Kazakhstan	Russia	Poland	Romania	Total	Applications
1987	14,488			48,419	13,990	78,523	
1988	47,572			140,226	12,902	202,673	
1989	98,134			250,340	23,387	377,055	
1990	147,455			113,253	107,189	397,075	128,844
1991	147,320			40,129	32,178	221,995	561,352
1992	195,576	114,382	55,875	17,742	16,146	230,565	402,375
1993	207,347	113,288	67,365	5,431	5,811	218,888	241,178
1994	213,214	121,517	68,397	2,440	6,615	222,591	237,291
1995	209,409	117,148	71,685	1,677	6,519	217,898	260,556
1996	172,181	92,125	63,311	1,175	4,284	177,751	168,758
1997	131,895	73,967	47,055	687	1,777	134,419	147,577
1998	101,550	51,132	41,054	488	1,005	103,080	100,421
1999	103,599	49,391	45,951	428	855	104,916	117,101
2000	94,558	45,657	41,478	484	547	95,615	106,895
Sum	1,884,298			622,919	233,205	2,783,044	2,472,348

Source: Federal Administration Office Cologne, applications in 1990 only for July-December.

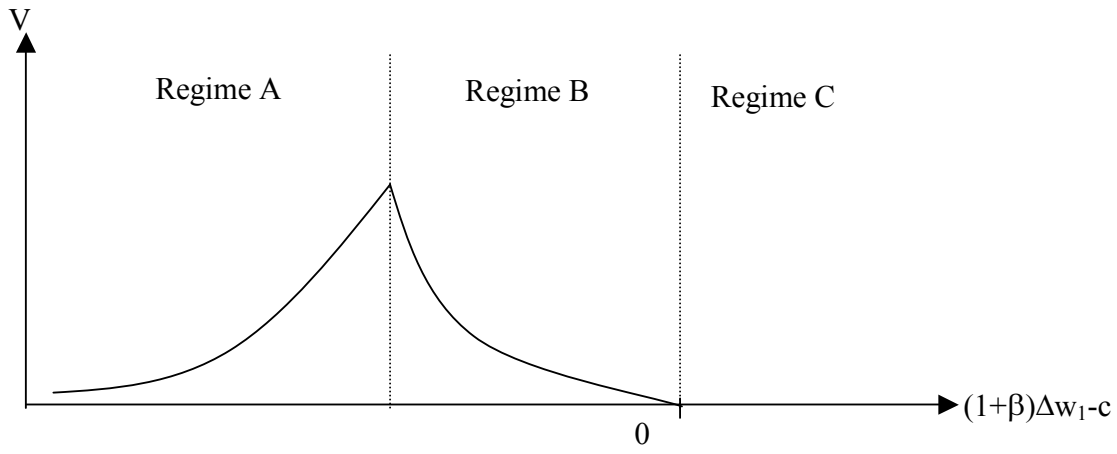
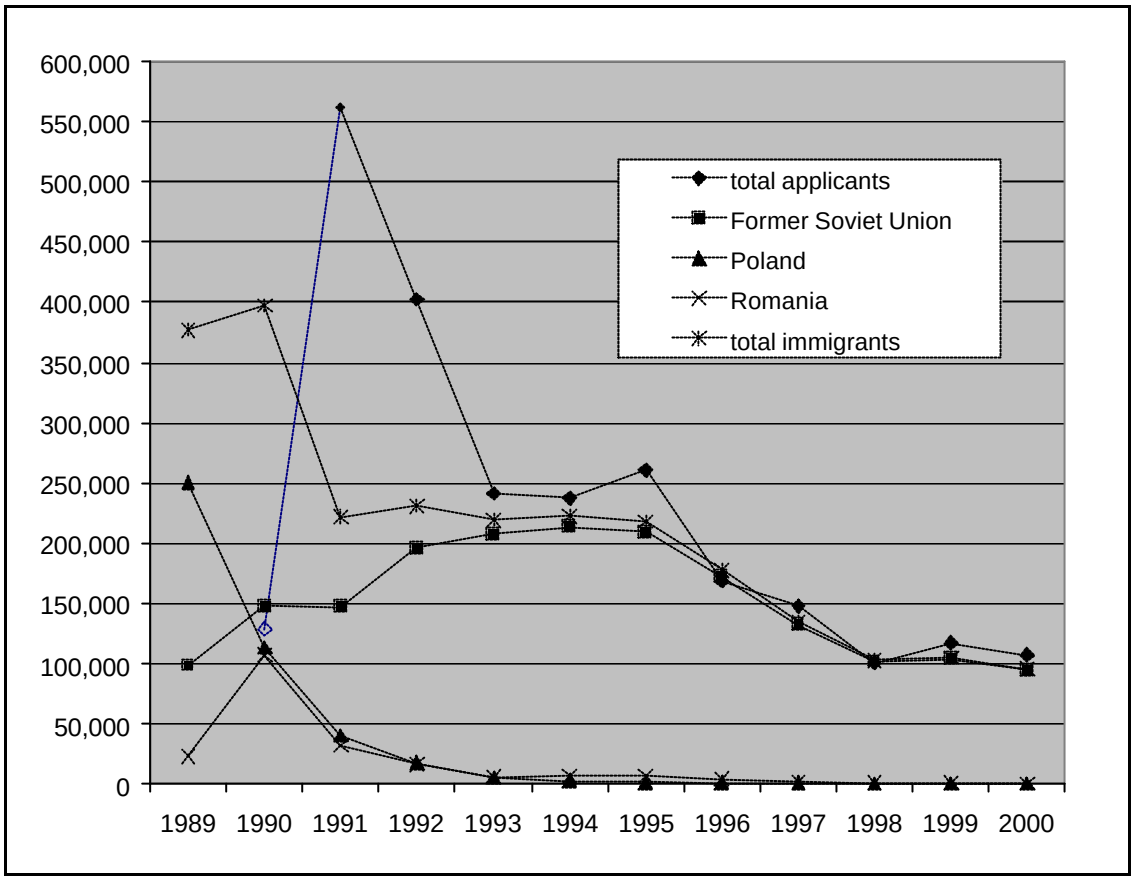


Figure 1: The option value of migration for the three regimes



Source: Federal Administration Office, Cologne

Figure 2: Number of ethnic German immigrants per year, 1989-2000, applicants for 1990 only since 1st of July,

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