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The Case of Germany

Abstract

In this paper we investigate the link between entrepreneurship and financial constraints. We develop a dynamic partial equilibrium model of an individual utility maximization that predicts that the person is more likely to start her business when financial constraints are eased. We test this hypothesis using German Socio-Economic Panel data covering the periods 2000–2002 and measure release from financial constraints by windfall gains. The estimates confirm that the individual has higher propensity to start her business when she gets windfall gains. Furthermore, there are stronger effects for persons that have sufficient, but not very high levels of income and abilities.

Keywords: Entrepreneurship, windfall gains, financial constraints.
JEL: G3, J2, L1

1 Introduction

The existence of funding gaps has generated intense debates in both economic theory and public policy for more than two decades. Accordingly, economic scientists have done a great deal of research to study the effects of financial constraints on entrepreneurship: Do individuals lack the chance of following their calling to be an entrepreneur because financial institutions hold back their funds? In the seminal article Stiglitz and Weiss (1981) show that information asymmetry leads to inefficient credit rationing. However, in a dissenting paper de Meza and Webb (1987) argue that information asymmetry induces overfinancing for entrepreneurs. Since governments and scientists identified entrepreneurship as an important source for employment and growth (Audretsch, 1995), the importance of this discrepancy has increased.[1]

Governments of various political hues and nationalities spend huge amounts of money to ease financial restrictions for potential entrepreneurs. For example, over the years the German Government and the federal states as well have launched a large variety of equity and debt programs to foster entrepreneurship. The programs include partial coverage of the financier's default risk by the state, interest subsidies and direct investment of state-owned financial institution. In 2003 the "Ich AG" program started which grants unemployed entrepreneurs 14400 Euros over a period of three years. In 2004 the German Government launched the "ERP-EIF Dachfonds"[2], a fund

[1] The European Commission considers entrepreneurship as a crucial element for achieving the political objectives set at the European Council Meeting in Lisbon, see http://www.europa.eu.int/comm/enterprise/entrepreneurship/.

[2] ERP and EIF are the abbreviations for European Recovery Program and European Investment Fund respectively.

of funds that provides 500 Mio. Euro for equity-investments in high-tech start-ups. Furthermore, a 240 Mio. Euro state-owned fund was established which directly invests in newly founded firms.

The recent literature does not give a uniform answer to the question whether entrepreneurs are financially constrained.[3] Theoretical and empirical results of Evans and Jovanovic (1989) and Evans and Leighton (1989) suggest a positive relationship between starting an own business and wealth. However, Cressy (2000) shows that this positive correlation may simply reflect a decreasing absolute risk aversion. Wealthy individuals have a higher inclination to take on risky assets such as starting their own businesses.

Empirical research on financial constraints for entrepreneurs has to deal with two major pitfalls. First, financial constraints cannot be measured directly.[4] Second, wealth as the most common proxy for the release from financial constraints may be endogenously determined.[5] Xu (1998) shows that individuals considering potential self–employment accumulate wealth prior to their decision to switch into self employment. Cressy (1999) argues that wealth is an indicator of the individual's ability. In another paper, Cressy (1996) finds no relationship between the access to bank finance and wealth for entrepreneurs of comparable ability.

To control for these effects and make results more consistent empirical re-

[3]We use self-employment and entrepreneurship interchangeable.

[4]Some studies use personal reports of entrepreneurs about financial constraints. However, reported constraints are also an imperfect measure of frictions in the financing markets, since they do not reveal whether the rejection is due to ability estimations by the bank or asymmetric information.

[5]The banking literature suggests that personal wealth is the most natural candidate for proxiing the relaxation of financial constraints as it can serve as equity or collateral, see for example Bester (1985) and Besanko and Thakor (1987).

search can take two approaches: first, exogenous increase in wealth might be employed as proxy for the release from financial constraints. Second, instead of testing for differences between groups of individuals the effect might be tested for a group of individuals having the same or similar characteristics. Most studies focus on avoiding the endogeneity problem. Blanchflower and Oswald (1998) and Holtz-Eakin, Joulfaian and Rosen (1994) use inheritance as an exogenous increase in wealth. Black, de Meza and Jeffreys (1996) investigate the impact of an increase in housing prices in the U.K. on the number of business registrations nationwide. Although a positive relationship between these indicators and entrepreneurship is found, the validity of the results may be questioned. The studies lack to test whether such a relation also exists for individuals that are otherwise fairly similar, but differ with respect to wealth increase. Following the path of Black et al. (1996) for the U.S.A, Hurst and Lusardi (2004) find no relationship between business entry and housing capital gains over most wealth groups. Only for the top 5 % wealthiest people the increase in financial resources via housing market gains had a significant impact on entrepreneurship.

Windfall gains or unexpected payments are a more appropriate proxy for exogenous wealth increases than housing capital gains. Nonetheless, research on how windfalls affect the propensity to become entrepreneur is limited so far. By analyzing Swedish micro data Lindh and Ohlsson (1996) find that the probability of being self-employed increases when people receive windfall gains in the form of inheritance and lottery winnings. Similarly, Taylor (1999) uses U.K. panel data from the British Household Panel (BHPS) to find that the type of windfalls matters. Redundancy payments increase but job–related

bonus payments decrease the probability of becoming an entrepreneur. These non–uniform results point again to the necessity of controlling for the windfall receiver's type by forming groups of individuals that are fairly comparable except for their level of exogenous wealth increase.

In our paper we want to contribute to this debate by formulating a dynamic partial equilibrium model of a representative individual's utility maximization problem and test it with German data. For that purpose, we use an unbalanced panel of individuals obtained from the German Socio–Economic Panel (GSOEP) database, a wide-ranging representative longitudinal study of private households which includes about more than 40,000 individual–year observations during 2000-2002. We also consider sample splits defining categories of individuals by income and abilities quartiles. The lifting of financial constraints is measured by windfall gains.

Our empirical conclusions are clear and appear robust to a number of alternative econometric specifications. We find that financial frictions indeed exist in Germany. Our results also highlight considerable variation across income and ability quartiles. Potential entrepreneurs living in households with an upper-medium wealth level and potential entrepreneurs with medium ability have higher sensitivity to an unexpected wealth gain.

The rest of this paper is organized as following. Section 2 develops the theoretical model. Section 3 gives a description of the data employed and illustrates the econometrical model. Finally, Section 4 concludes and proposes areas of further research.

2 Theoretical Model

In this section we develop a simple expected utility model of risk–neutral individual's behavior. Consider a person who divides her total available time of working $\bar{L}$ between her own business activity L_t, and time of working for somebody else, $\bar{L} - L_t$. Her utility is a linear function of consumption, C_t, and work $(L_t, \bar{L} - L_t)$. κ and ι are disutility coefficients of working. β is the discount factor. We assume a strict preference for consumption in the present period. The present value of a gain in the future from saving in period t is less than the loss in utility from foregone consumption in period t. E_0 is the expectations operator conditional on time 0 information set Ω_0.[6]

$$\max_{L_t, S_t, I_t} E_0 \sum_{t=0}^{\infty} \beta^t \left(C_t - \kappa L_t - \iota(\bar{L} - L_t) \right) \tag{1}$$

$$C_t + I_t = Y_t - r_{bt}(I_{t-1} - S_{t-1}) + (I_t - S_t) + w_t(L - L_t) \tag{2}$$

$$Y_t = \theta L_t^{\alpha} I_{t-1}^{\gamma} \xi_t \tag{3}$$

$$(I_t - S_t) \leq f(S_t) \tag{4}$$

$$\lim_{T \to \infty} \left[\prod_{j=t}^{T-1} \beta^j \right] (I_T - S_T) = 0 \tag{5}$$

The individual maximizes equation (1) subject to three constraints.[7] The first defines the person's consumption. Y_t denotes profits of the individual if he is self-employed, I_t is investment prepared for the next period, w_t is wage if the person is employed by somebody else, $I_{t-1} - S_{t-1}$ and $I_t - S_t$ is borrowing done in the previous period and in the current period, S_t denotes savings in period t, I_t denotes investment in t, and r_{bt} is gross interest rate for

[6] For simplicity we assume that total hours of work are constant for every period.

[7] See also models developed by Evans and Jovanovic (1989), Petrova (2004), Buera (2003).

borrowing. The amount of expenses in t, $C_t + I_t$, has to equalize the amount of inflows coming from return on entrepreneurship, wage income, borrowing and interest payment for previous borrowing.

The second constraint is the person's expected income in the case of self-employment, where θ is a measure of "entrepreneurial abilities", $0 < \alpha < 1$, $0 < \gamma < 1$, I_t is investment in the business, and ξ is a log–normal disturbance whose logarithm has variance σ_ξ^2 and $E(\xi) = 1$. At the time when investment decision is made, the risk–neutral person does not know the realization of ξ.

Financial frictions are introduced through the third constraint, $(I_t - S_t) \leq f(S_t)$ and the corresponding Lagrange multiplier λ_t. $f(S_t)$ is the borrowing capacity. At time t the person can borrow not more than $f(S_t)$, where S_t is the saving and $f'(S_t) > 0$. If the planned borrowing, $I_t - S_t$, exceeds the borrowing capacity the constraint holds as equality, $I_t - S_t = f(S_t)$, and the individual is financially constrained.

The phenomenon of borrowing capacity falling behind the desired borrowing level may be due to the fact that lenders limit their downside risk by binding the amount of credit on the borrower's lending capacity. Lending capacity is determined by S_t which can also be interpreted as the amount of equity that the potential entrepreneur puts into his business.

Equation (5) is the transversality condition which prevents the person from borrowing an infinite amount and consuming it. Solving the optimization problem we derive the following first–order conditions for investment, labor hours and saving for self–employment:

$$\begin{aligned} \alpha\theta L_t^{\alpha-1} I_{t-1}^{\gamma} &= w_t + \kappa - \iota \\ \gamma\theta L_{t+1}^{\alpha} I_t^{\gamma-1} &= \lambda_t/\beta + r_{bt+1} \end{aligned}$$

$$\lambda_t = \frac{1-\beta\, r_{bt+1}}{(f'(S_t)+1)}.$$

Given the strict preference for current consumption as defined above, $\beta\, r_{bt+1} < 1$ and $\lambda_t > 0$. If financial constraints ease, that is if $f'(S_t)$ increases, then λ_t decreases. Note that in the absence of financial constraints, when $\lambda_t = 0$, the individual invests until marginal product of capital equals interest rate for borrowing. However, in case of $\lambda_t > 0$, I_t marginal product of capital exceeds interest rate.

The optimal values of invested capital and hours spend in self–employment for the financially constrained person is:

$$I_t^* = \left[\frac{r_{bt+1}+\lambda_t/\beta}{\theta\gamma L_{t+1}^{\alpha}}\right]^{\frac{1}{\gamma-1}} \tag{6}$$

$$L_t^* = \left[\frac{\kappa+w-\iota}{\theta^2\gamma\alpha\left[r_{bt}+\lambda_{t-1}/\beta\right]^{\frac{\gamma}{\gamma-1}}}\right]^{-\frac{1-\gamma}{1-\gamma-\alpha}} \tag{7}$$

Intuition suggests that the individual would change the hours devoted to her business when the degree of financial constraints changes. As shown in equation (8) below, when the level of financial constraints decreases, the person is more likely to spend more time in her own business,

$$\frac{\partial L_t^*}{\partial \lambda_{t-1}} = -\frac{1-\gamma}{1-\gamma-\alpha}\left[\frac{\kappa+w-\iota}{\theta^2\gamma\alpha\left[r_{bt}+\lambda_{t-1}/\beta\right]^{\frac{\gamma}{\gamma-1}}}\right]^{-\frac{1-2\gamma-\alpha}{1-\gamma-\alpha}} \frac{\tau}{\theta\gamma} < 0 \tag{8}$$

where

$$\tau = \frac{\kappa+w-\iota}{\left[\theta\alpha\left[r_{bt}+\lambda_{t-1}/\beta\right]^{\frac{\gamma}{\gamma-1}}\right]^2} \frac{\gamma}{\beta(1-\gamma)}\ \theta\alpha\ \left[r_{bt}+\lambda_{t-1}/\beta\right]^{\frac{1}{\gamma-1}} > 0.$$

The negative relationship between financial constraints and time spend in start–up business is due to an opportunity cost effect. If financial constraints

are eased the increased level of investment generates a gap between the marginal return and the marginal opportunity costs of entrepreneurship. By increasing the time spend in start-up business the individual equalizes both again.

As a measure of financial constraints we employ a windfall gain proxy. The intuitive reason is that windfalls provide the would–be entrepreneur with additional money that is neither dependent on his ability nor on his accumulated wealth. Being exogenous, windfall gains have the effect of independently relaxing financial constraints and increasing the propensity to enter entrepreneurship if such constraints exist. Thus, taking the argument in reverse, for similar groups of individuals a positive dependence between the propensity to enter entrepreneurship and the exogenous windfall proxy proves that financial constraints limit entrepreneurship.

On the basis of our theoretical predictions, the individual i becomes an entrepreneur at time t if $L_{it} > 0$. We estimate the following specification of the reduced form self–employment selection equation

$$L_{it} = \Lambda(\delta\lambda_{it-1} + \nu Z_{it} + X_i + \varepsilon_{it}) \tag{9}$$

where i indexes individuals, t corresponds to periods, L_{it} is a dummy variable equal to one if the person decided to be self–employed in the next period and zero otherwise, λ_{it-1} is a dummy variable equal to one if the person got windfall gains and zero otherwise in the previous period, Z_{it} is a vector of the person specific variables, X_t is a set of time dummies, and Λ is the c.d.f. of the logistic distribution.

The vector Z_{it} includes several characteristics of the individual. The

dummy variable *sex* is equal to one, if the person is female and zero otherwise. The variable *age* represents the age of the individual, and *agesq* is the squared version of age. For indicating the person's roots *germborn* is used. The variable is equal to one if the person is born in Germany or is immigrated before 1948 and zero otherwise. The variable *married* provides information about the marital status, it is equal to one if the individual is married and lives together with the partner and it is zero otherwise. This variable characterizes some kind of a typical family background. *hhsize* is a variable that includes the number of persons living in the particular household. Finally we employ three dummy variables, which reflect the person's level of education or training (in years). High school education level is represented by *educ2*. It ranges from 10 to 13 years. *educ3* ranging from 14 to 16 years indicates (school)graduation and some kind of apprenticeship and *educ4* (17 to 18 years) is the indicator for university studies.

We employ panel data random-effects logistic regression for estimating the econometric model. Using panel data approach allows to control for the cluster effects that produces robust results. Furthermore, on the basis of Hausman (1978) specification tests the random effects models are found to be favorable.

3 Empirical Evidence

3.1 Data

We work with the German Socio-Economic Panel (GSOEP) database, a wide-ranging representative longitudinal study of private households. It provides

information on all household members, consisting of Germans living in the Old and the New German States, foreigners, and recent immigrants to Germany. The Panel started in 1984. In 2003, there were more than 12,000 households, and nearly 24,000 persons sampled. Windfall gains are defined as inheritance, donations and lottery winnings. The information of windfall gains is not available for all years. In our research we use data for years 2000–2002 that contains about 20,000 individual characteristics annually.[8]

We also apply a number of selection criteria to the data. First, we drop all unemployed people from our analysis. Second, we excluded individuals older than 65 and younger then 20 years old. Descriptive statistics for the annual means of all variables employed in the analysis are described in Table 1. From Table 1 we see that about one percent of individuals started their own businesses, and 3 percent of individuals received windfall gains.

In our analysis of subsamples of individuals, we focus on the applicability of the general model to a group of similar persons rather than testing for differences between groups of individuals, which would impose the constraints across these groups.

First, we investigate the effects of financial constraints on entrepreneurship by wealth quartiles. Descriptive statistics by income quartile are described in Table 2. We can see that about one percent of individuals becomes self–employed. Moreover, richer people are likely to get their wealth from windfall gains.

Second, we categorize individuals by abilities. We proxy the individual's

[8]The data for windfall gains is available for 2000–2003. However, we excluded 2003 because in this year a new law aiming at promoting small entrepreneurship substantially changed the incentives to enter self-employment.

abilities as individual specific term from the following regression

$$Income_{it} = \alpha_0 + \alpha_1 educ_{it} + \alpha_2 exper_{it} + \alpha_3 married_{it} + \alpha_4 sex_{it}$$
$$+\alpha_5 age_{it} + \alpha_6 age_{it}^2 + u_i + \varepsilon_{it}$$

where i is individual index, t is time index, $Income_{it}$ is total household income, $educ_{it}$ is the amount of education or training in years, $exper_{it}$ is the length of time with firm in years, $married_{it}$, sex_{it}, age_{it} and age_{it}^2 is defined as before. Finally u_i is an individual specific term which can be interpreted as a proxy of the person's abilities.[9] Descriptive statistic by abilities quartiles is described in Table 3.

3.2 Econometric Results

In this section we present the estimation results on the link between the propensity of being self–employed and windfall gains. Based on the prediction of the dynamic partial equilibrium model, we hypothesize that individuals are more likely to start their businesses when they get unexpected wealth.

The results of estimating Equation (9) are given in Tables 4-6. Table 4 presents results from regressions of self–employment dummy variable on windfall gains and our control variables for sex, household size, age, age squared, marriage, education and origin.

Five different regression models are presented. In model (1), we examine the correlation between propensity of being self–employed and windfall gains, controlling just for sex. In model (2) we also control for age and age squared.

[9]See Griliches (1977) for more details.

Place of birth and marriage are controlled for in model (3). Finally, we control for household size and education in models (4) and (5), respectively.

The results indicate that the propensity of becoming an entrepreneur increases if the person gets a windfall gain. The coefficient on $windfall$ varies from 0.498 in model (2) and significant at the 5 % level to 0.448 in model (5) and significant at the 10 % level. Moreover, women are less likely to start their own businesses. This is also found in Lindh and Ohlsson (1996).

Table 5 reports results for the four income quartiles of individuals. For each quartile, we report just estimates of model (5). The results vary dramatically. The poorest people in the sample are not affected by windfall gains. They are more likely to start a busines when they are getting older. Moreover, household size and university education also have a positive effect on their propensity of starting own businesses. The model is not successful for the second income quartile, even though there is positive, but statistically insignificant relationship between windfall gains and entrepreneurship. Positive and statistically significant relationship between entrepreneurship and windfall gains is observed for the third income quartile. The coefficient on windfall is 0.950 compared to 0.448 for all individuals. Finally, the results for the forth quartile indicate that "the very rich" people are less likely to start their own business when they get windfall gains. Moreover, there are negative and statistically significant coefficients on education dummies and sex.

Thus, depending on the level of income, windfall gains have a distinct impact on self–employment. Our results support Hurst and Lusardi (2004) who find that the propensity to become a business owner in the United States

is a non–linear function of wealth. However, they concluded that only at the top of the wealth distribution there is a positive and significant relationship between wealth and entrepreneurship, whereas our own study identifies only the group of individuals with an upper-medium wealth level as sensitive to exogenous wealth increases.

We also find an interesting difference in the results for ability quartiles reported in Table 6. The positive and statistically significant relationship between entrepreneurship and windfall gains is observed for the second ability quartile. The coefficient on windfall gain variable is 1.228 comparing to 0.448 for all individuals. Interestingly, a negative relationship between the same factors is observed for the forth quartile. This might be interpreted as the best abilities' people do not have any financial constraints and could get sufficient funds without obstacles. The people from the second ability quartile have enough skills, but lack funds to start their businesses. The insignificant positive relationship for the first quartile can be explained by the fact that these people do not have enough skills to start own business.

In summary, we find clear support for the hypothesis of Equation (8). Individuals are more likely to start their businesses when they get windfall gains. The results differ for different income and ability quartiles. The windfall gains have much higher effect on the propensity of being self–employed when a person has sufficient levels of abilities and income. However, "too rich" and "too smart" people do not face any financial constraints.[10]

[10]In the case of Italy Colombo, Delmastro and Grilli (2004) conclude that only sufficiently able entrepreneurs are financially constrained.

4 Conclusions

The paper explores the link between the probability of starting an own business and windfall gains by analyzing longitudinal data from the German Socio Economic Panel. Based on theoretical predictions we expect that individuals are more likely to start their businesses when financial constraints are released. In order to empirically test our theoretical model we employ windfall gains as an exogenous measure for the release from financial constraints. The results suggest positive and statistically significant effects of windfall gains on entrepreneurship for German individuals during 2000–2002.

There are significant differences in the results for different income and ability quartiles, though. Windfall gains have positive and statistically significant effects on the propensity of being self-employed if a person possesses a certain level of ability and earns sufficient but not a very high income.

Policy-wise these results imply that state programs promoting start–up creation need to be refined. In particular, our research suggests that such programs should concentrate more on specific target groups. An appropriate design of programs requires that promotion is bound on personal characteristics of potential entrepreneurs.

The natural next step in our line of research is the investigation of how windfall gains affect the survival of the entrepreneur's business. If windfalls influence the fate of the business as well, then financial constraints do not only exist prior to entrepreneurship but also during the lifetime of the business. Given that financial constraints are a result of asymmetric information such an investigation would also give some clues about how effectively banks learn

their clients' type during a financing relationship. Furthermore, since the existence of financial constraints and the efficiency of a certain policy design is probably linked to the financial system a country employs, cross-country studies on financial constraints and entrepreneurship are in order.

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Table 1: Descriptive Statistics

All firms	μ	σ^2	$p25$	$p50$	$p75$	N
self–employment	0.01	0.01	0.00	0.00	0.00	41234
windfall	0.03	0.03	0.00	0.00	0.00	40938
germborn	0.86	0.12	1.00	1.00	1.00	40650
married	0.71	0.21	0.00	1.00	1.00	41226
sex	0.51	0.25	0.00	1.00	1.00	41234
age	41.22	105.88	33.00	41.00	49.00	41234
hhsize	3.14	3.61	2.00	3.00	4.00	41234

Note: p25, p50 and p75 represent the quartiles of the distribution, N is sample size, while σ^2 and μ represent its variance and mean respectively.

Table 2: Descriptive Statistics by income quartiles

	μ	σ^2	$p25$	$p50$	$p75$	N
Income 1						
self–employment	0.01	0.01	0.00	0.00	0.00	9658
windfall	0.01	0.01	0.00	0.00	0.00	9613
Income 2						
self–employment	0.01	0.01	0.00	0.00	0.00	10457
windfall	0.03	0.03	0.00	0.00	0.00	10392
Income 3						
self–employment	0.01	0.01	0.00	0.00	0.00	10263
windfall	0.04	0.04	0.00	0.00	0.00	10202
Income 4						
self–employment	0.01	0.01	0.00	0.00	0.00	8925
windfall	0.05	0.05	0.00	0.00	0.00	8811

Note: p25, p50 and p75 represent the quartiles of the distribution, N is sample size, while σ^2 and μ represent its variance and mean respectively.

Table 3: Descriptive Statistics by ability quartiles

	μ	σ^2	$p25$	$p50$	$p75$	N
Ability 1						
self–employment	0.01	0.01	0.00	0.00	0.00	8809
windfall	0.02	0.02	0.00	0.00	0.00	8762
Ability 2						
self–employment	0.01	0.01	0.00	0.00	0.00	8750
windfall	0.03	0.03	0.00	0.00	0.00	8706
Ability 3						
self–employment	0.01	0.01	0.00	0.00	0.00	8632
windfall	0.04	0.04	0.00	0.00	0.00	8574
Ability 4						
self–employment	0.01	0.01	0.00	0.00	0.00	7784
windfall	0.05	0.05	0.00	0.00	0.00	7690

Note: p25, p50 and p75 represent the quartiles of the distribution, N is sample size, while σ^2 and μ represent its variance and mean respectively.

Table 4: Individual logit results for the full sample

	(1)	(2)	(3)	(4)	(5)
$windfall_{it-1}$	0.479**	0.498**	0.489**	0.491**	0.448*
	[0.242]	[0.242]	[0.243]	[0.243]	[0.243]
sex_{it}	-0.433***	-0.445***	-0.440***	-0.437***	-0.426***
	[0.108]	[0.108]	[0.108]	[0.108]	[0.108]
age_{it}		0.026	0.036	0.044	0.033
		[0.040]	[0.042]	[0.043]	[0.043]
age_{it}^2		-0.001	-0.001	-0.001	-0.001
		[0.000]	[0.001]	[0.001]	[0.001]
$germborn_{it}$			0.141	0.158	0.162
			[0.163]	[0.164]	[0.171]
$married_{it}$			-0.101	-0.116	-0.100
			[0.126]	[0.126]	[0.126]
$hhsize_{it}$				0.032	0.036
				[0.026]	[0.026]
$educ2_{it}$					-0.099
					[0.183]
$educ3_{it}$					0.159
					[0.209]
$educ4_{it}$					0.303
					[0.226]
N	40938	40938	40349	40349	40349
Log likelihood	-2116.351	-2104.321	-2098.477	-2097.750	-2093.998
χ^2	39.920	61.420	61.986	63.591	71.105

Note: Every equation includes constant and time dummy variables. Robust standard errors are reported in the brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Individual logit results by income quartiles

	1st quartile	2nd quartile	3rd quartile	4th quartile
$windfall_{it-1}$	0.017	0.296	0.950**	-0.033
	[1.019]	[0.594]	[0.375]	[0.482]
$germborn_{it}$	0.010	-0.323	0.299	0.086
	[0.320]	[0.311]	[0.443]	[0.430]
$married_{it}$	-0.133	-0.207	-0.051	0.123
	[0.294]	[0.263]	[0.254]	[0.273]
sex_{it}	-0.371	-0.398*	-0.350	-0.701**
	[0.254]	[0.228]	[0.215]	[0.225]
age_{it}	0.262**	0.244**	-0.054	-0.047
	[0.120]	[0.117]	[0.082]	[0.087]
age_{it}^2	-0.003**	-0.004**	0.000	0.000
	[0.002]	[0.002]	[0.001]	[0.001]
$hhsize_{it}$	0.083*	0.047	0.049	-0.012
	[0.050]	[0.049]	[0.054]	[0.069]
$educ2_{it}$	0.278	0.379	-0.206	-1.360***
	[0.377]	[0.449]	[0.400]	[0.358]
$educ3_{it}$	0.569	0.633	-0.118	-1.343***
	[0.488]	[0.496]	[0.454]	[0.398]
$educ4_{it}$	1.359**	0.747	0.450	-1.457***
	[0.582]	[0.601]	[0.468]	[0.406]
N	9601	10375	10109	8445
Log likelihood	-371.630	-458.166	-543.934	-546.578
χ^2	24.074	23.859	32.277	33.890

Note: Every equation includes constant and time dummy variables. Robust standard errors are reported in the brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Individual logit results by ability quartiles

	1st quartile	2nd quartile	3rd quartile	4th quartile
$windfall_{it-1}$	0.312	1.228***	0.580	-0.906
	[0.726]	[0.422]	[0.475]	[0.731]
$germborn_{it}$	-0.285	0.569	-0.392	-0.263
	[0.330]	[0.423]	[0.346]	[0.391]
$married_{it}$	-0.347	0.395	0.091	0.187
	[0.287]	[0.296]	[0.273]	[0.273]
sex_{it}	-0.241	0.109	-0.074	-0.845***
	[0.254]	[0.232]	[0.227]	[0.242]
age_{it}	0.090	0.038	0.052	-0.007
	[0.114]	[0.104]	[0.094]	[0.089]
age_{it}^2	-0.001	-0.001	-0.001	-0.000
	[0.001]	[0.001]	[0.001]	[0.001]
$hhsize_{it}$	0.010	0.081	0.091*	0.039
	[0.063]	[0.049]	[0.053]	[0.060]
$educ2_{it}$	0.582	0.094	1.282**	-0.142
	[0.746]	[0.460]	[0.615]	[0.441]
$educ3_{it}$	0.892	0.686	1.072	0.041
	[0.760]	[0.515]	[0.675]	[0.490]
$educ4_{it}$	1.297*	0.782	1.158	0.163
	[0.780]	[0.556]	[0.723]	[0.511]
N	8730	8675	8505	7390
Log likelihood	-380.573	-433.821	-459.867	-502.229
χ^2	22.936	31.474	12.688	23.958

Note: Every equation includes constant and time dummy variables. Robust standard errors are reported in the brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.