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Entrepreneurship from Scratch: Lessons on the Entry Decision into Self-Employment from Transition Economies

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ABSTRACT

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This paper exploits the rapid rise in self-employment rates in post-communist Eastern Europe as a valuable "quasi-experiment" for understanding the sources of entrepreneurship. A relative demand-supply model and an individual sectoral choice model are used to analyze a 1993 survey of 27,000 adults in six transition economies. Estimated self-employment earnings premia are positive, and the data imply positive selection into both employee and self-employment status. Structural probit estimates show the probability of self-employment entry is unassociated with former Communist Party affiliation but positively related to schooling, pre-transition family income, receipt of property in restitution, pre-communist family business-holding, and predicted earnings differential. Cross-country variation in predicted self-employment entry rates and relative earnings provide evidence on the demand and supply factors affecting the decision to become an entrepreneur.

JEL Classification: J23, J24, J62, M13, O57, P2

Keywords: Entrepreneurship, self-employment, transition, small business, selection bias, structural probit Eastern Europe, Bulgaria, Czech Republic, Hungary, Poland, Russia, Slovakia

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1 Introduction

The question of what factors lead individuals to become entrepreneurs is an old one in economics, but only relatively recently has systematic research begun to examine the empirical evidence on these decisions. In this paper, we address this question drawing upon the experience of post-communist Eastern Europe, where self-employment started at low to negligible levels in 1989 but then, following rapid economic liberalization, rose sharply in most countries of the region. Within just a few years, the rates of self-employment reached levels similar to those, and in some cases surpassing those, of industrialized market economies. We argue that the sudden and largely unanticipated opening of opportunities in transition economies offers a valuable quasi-experiment that may provide general lessons on the determinants of entrepreneurship.

Our analysis proceeds on two levels. First, we present a simple model of the determination of the aggregate self-employment rate, which is useful for interpreting cross-country differences and for classifying possible factors influencing self-employment. Secondly, we present a model of the self-employment entry decision by individual workers that shows how potential determinants – such as the self-employment earnings differential, financing ability, human capital, family background, previous economic and political status, and demographic characteristics – may affect the choice between the self-employment and paid employment sectors.

We apply these conceptual frameworks to data from a 1993 household survey with about 4500 individual respondents in each of six East European countries (Bulgaria, Czech Republic, Hungary, Poland, Russia and Slovakia) to assess the empirical importance of the hypothesized incentives and constraints affecting entrepreneurship. Our overall empirical strategy is to exploit the abrupt changes in the economic and policy environment of transition economies to address the identification problem that frequently arises with respect to a number of factors that, in the standard research setting of a market economy, may be jointly determined with self-employment status.

A first set of such factors concerns the possible presence of financing constraints on new business creation, which is one of the most studied issues in the self-employment literature (e.g., Evans and Jovanovic, 1989; Evans and Leighton, 1989; Holtz-Eakin *et al*, 1994; Lindh and Ohlsson,

1994; and Blanchflower and Oswald, 1998). Empirical research on start-up finance has faced difficulties isolating the impact of the constraint (usually proxied as wealth or some variable affecting wealth) on the probability of becoming self-employed. We argue that the unexpected nature of the transition implies that our proxies for financing ability – income prior to 1989 and the receipt of property through restitution – may be less likely to suffer from simultaneity bias than some other measures, thus offering a new perspective on the importance of such constraints.

Estimating the effects of a number of other interesting determinants of self-employment may be plagued by similar endogeneity problems in the usual setting of a developed market economy. Schooling choices may well be influenced by career plans including possible intentions concerning self-employment, suggesting that education should not be taken as exogenous in a self-employment function.[1] For most East European individuals in 1993, by contrast, schooling decisions had been undertaken at a time when there seemed to be little or no possibility of ever starting a business, so their choices could not have been made with such an expectation. The transition context thus functions as a quasi-experiment in breaking some of the connections among a number of variables that are usually jointly determined.

A particularly interesting type of human capital in the transition context concerns skills gained in the shadow economy of state socialism. Whether such prior experience in black or gray markets provide valuable human capital in the much more open setting created by economic liberalization has implications for evaluation of the role of the "unofficial economy" in economic development (e.g., Johnson, Kaufmann and Shleifer, 1997). Under the repressed socialist system, such skills were acquired without any expectation that they would ultimately be useful in the completely different setting of transition to the market. Our argument throughout is that the abrupt, unexpected arrival of transition generates exogenous variation in the potential determinants (financial or human capital, family background, political connections) of the decision whether to enter self-employment.

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[1] The relationship of self-employment with schooling is somewhat controversial: Schultz (1975) argued that "the ability to deal successfully with economic disequilibria is enhanced by education" (p. 843), an ability that could be particularly valuable for business owners, but Wolpin (1977), investigating labor market signalling, finds lower levels of schooling among the self-employed.

The transition context also helps to shed light on some of the more sociological determinants of entrepreneurship. To start with, previous research has faced difficulties distinguishing the effect of family background from that of wealth, but our analysis is able to exploit the fact that the prohibition of most forms of entrepreneurship under the socialist regimes greatly reduces the correlation of these variables.[2] In addition to such potentially important aspects of family background as parents' education and the ownership of a business by the family prior to the Communist takeover, we investigate the possibility that strong political connections under the socialist regime might have been transformed into economic success through business ownership in the transition.

We also investigate some indicators of individual attitudes towards risk and self-reliance, factors that play a role in most popular accounts, as well as in some research on self-employment.[3] Testing the validity of these views in the transition context takes on added interest due to the controversy over "homo sovieticus:" the hypothesis that decades of communism may have reduced risk tolerance, increased dependency on the state, and created psychological barriers to business creation and ownership. Some scholars have argued that such "Leninist legacies" may impede the development of new private businesses (e.g., Jowitt, 1992), while others have dismissed the possibility (e.g., Shiller, Boycko, and Korobov, 1991 and 1992).[4] Yet no research has estimated the direct impact of measures of such attitudes on the probability of entering self-employment.

Finally, we also examine standard demographic characteristics such as age, gender, marital status, and nationality, which have often been found to be correlated with self-employment.[5] We include local labor market characteristics such as the local unemployment rate and residence in a

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[2] Lentz and Laband (1990), Dunn and Holtz-Eakin (1996), Blanchflower and Oswald (1998), and Fairlie (1999) all find high intergenerational correlations in self-employment propensities, but it seems difficult to rule out the possibility that parental self-employment is proxying for some unobserved component of wealth in these equations.

[3] As discussed in Blanchflower and Oswald (1998), Knight (1921) and Schumpeter (1939) emphasized entrepreneurial ability and pscyhological factors other than risk aversion, while the latter has been stressed by recent authors such as Kihlstrom and Laffont (1979), who provide an explicit model of the negative relationship between risk aversion and the likelihood of being self-employed; but there appears to be rather little empirical evidence on the topic. Evans and Leighton (1989) find a significant role for "internal locus of control," which is related to our self-reliance measure, while Blanchflower and Oswald (1998) find little association of psychological traits with self-employment.

[4] Blanchflower and Freeman (1997) provide evidence of greater preference for egalitarianism and government intervention to provide jobs and control wages in several ex-communist countries of Eastern Europe relative to a set of capitalist countries.

[5] Fuchs (1982) has studied the propensity of older individuals to become self-employed, partly with the motivation of switching to part-time work, while gender and nationality effects may result from disadvantages associated with discrimination or language ability (Borjas, 1986; Borjas and Bronars, 1989; and Fairlie and

capital city, the former to capture possible labor supply effects and the latter as a proxy for demand for small-scale services. In all these cases, our work provides new evidence on the importance of such relationships.

To estimate the effects of these potential determinants on the self-employment entry decision, we apply a structural probit model that also includes the predicted earnings differential as an independent variable.[6] Calculated from selection-bias corrected earnings functions estimated separately for employees and for entrants into self-employment, the predicted differential may be important to control for when estimating the impact of the other potential determinants, as a number of these are likely to be correlated.

Furthermore, several outputs from the structural probit procedure are useful to us in shedding light on the character of self-employment. First of all, the method permits us to study the nature of any selection bias into self-employment status: are the new entrepreneurs selected from the top or bottom end of the employee earnings distribution? Secondly, the standard economic theory of sectoral choice suggests that self-employment entry decisions should respond positively to predicted relative earnings; but this relationship is inconsistent with sociological "disadvantage theory," which suggests that individuals may be forced into self-employment by discrimination or other barriers (see, e.g., Fairlie and Meyer, 1996, for a discussion). Wage rigidity and job rationing in the market for employees (due for instance to unions or state control of wages) could be another reason for not observing a positive impact of relative earnings on self-employment entry. Our structural probit estimates provide a test of the standard sectoral choice theory against these alternatives.

Finally, the procedure permits us to calculate the magnitude of predicted earnings differentials and predicted self-employment rates controlling for other factors. This is particularly useful for a cross-country comparison of the returns to self-employment and the growth in level of self-employment. In accounting for the dramatic rise of self-employment rates in transition economies, we distinguish two sets of factors, which although relevant in other contexts are more

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Meyer, 1996).
[6] Relatively few studies of self-employment have estimated the structural model, the only examples appearing to be Rees and Shah (1986) for Britain and Gill (1988) for the U.S., the former finding a positive response and the latter a negative response of the self-employment probability to the self-employment premium. In addition, Fairlie and Meyer (1986) adopt a similar approach using grouped data, finding a positive relationship between an ethnic group's self-employment rate and its predicted self-employment earnings differential.

pronounced in transition. First, the rise may be explained by the sudden economic liberalization that followed the socialist collapse, opening the opportunity for new businesses to exploit the gaps and inefficiencies of the economies inherited from central planning. Particularly given the lack of capital and of a banking system for financing such businesses, the start-ups would nearly always have begun as individual entrepreneurships.[7] In accounting either for the rise in the self-employment rate within a country or for differences in the rate across countries, this demand-side set of factors therefore emphasizes differences in the relative return to self-employment that would attract individuals from paid employment.

Second, all the post-communist countries appear to have experienced significant negative shocks, with large declines in aggregate output and employment (see, e.g., Blanchard, 1997, or Boeri *et al*, 1998, for a summary). Measured unemployment has risen from negligible to double-digit rates in most of the countries (the Czech Republic and Russia being important exceptions), and labor force participation has declined, particularly for women. The shocks have displaced large numbers of workers from the bloated industrial sectors in an environment where few firms are hiring, unemployment benefits tend to be modest in amount and duration, and welfare systems are poorly developed. This set of factors, the supply side of the self-employment market, then stresses the increased willingness of individuals to work as self-employed at a given level of return to self-employment. Our analysis examines differences in the predicted self-employment premia and rates and in selection bias across countries in order to assess the relative importance of the supply and demand side factors.

Despite the inherent interest and the usefulness of the transition setting for investigating broader issues of entrepreneurship, there has been essentially no prior research in this area by economists using microdata.[8] Economic research attempting to analyze self-employment and the new private sector in transition has been purely theoretical (e.g., Berkowitz and Cooper (1997) and Blanchard (1997)); or it has been forced to work with crude aggregate information (e.g., Aslund

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[7] Such new private sector growth may indeed be the primary source of economic growth in Eastern Europe, given the disastrous state in which decades of central planning left most state enterprises, even if many of them have been privatized recently (Murrell, 1992, and Blanchard, 1997).

[8] Sociologists have made a bit more headway. Hanley (1996) studies the development of a new bourgeoisie in the Czech Republic, Hungary, and Poland and Lengyel and Toth (1994) study "entrepreneurial inclinations" – the expressed desire of respondents to become entrepreneurs – in Hungary.

(1997), Boeri *et al* (1998), Gabor (1994), or Johnson *et al* (1997)), with case studies (e.g., Johnson and Loveman (1995)), or with small sample surveys restricted either to manufacturing firms (e.g., Webster 1993a and b, Richter and Schaffer (1996), or Earle, Estrin, and Leshchenko (1996)) or retail shops (e.g., Earle *et al* (1994), Barberis *et al* (1996), or Frye and Shleifer (1997)). The problem with analyzing firm-level data (or data on entrepreneurs themselves, as do Johnson and Loveman, 1995) is that the potential entrepreneurs who choose not to start businesses are not observed.

The rest of the paper is organized as follows. Section 2 contains a brief survey of the institutional background for the repressed level of self-employment prior to 1989 and its rapid growth thereafter. In Section 3, we develop the conceptual framework for understanding cross-country differences in the self-employment rate and individual variation in self-employment choices. Section 4 then describes our data set and provides measures of the growth and level of self-employment, of earnings in self- and paid employment, and characteristics of the self- and paid employed. Section 5 reports the results of estimating the earnings functions and the structural probit, and it analyzes the predicted cross-country differences in the self-employment rates and premia derived from those estimations, controlling for individual characteristics. Section 6 contains a concluding discussion.

2 Entrepreneurship under Central Planning and in Transition

It is difficult to imagine a regime more hostile towards entrepreneurship than the centrally planned economies of Eastern Europe. While not always completely prohibited, self-employment was heavily discouraged through explicit and implicit sanctions, and the expansion of a business through the accumulation of capital and the hiring of employees was nearly impossible in most countries for most of the pre-1989 period. High taxes, price and wage controls, centralized allocation of key inputs such as energy, credit and industrial materials, and shortages of other factors combined with the legal and bureaucratic obstacles to reduce incentives for entrepreneurship.

Although repressive everywhere, the economic policies of the socialist regimes did display some variation over time and across countries. Among the six countries in our sample, Hungary and Poland permitted small family undertakings to operate employing unpaid family helpers and a very small number of employees (according to Kornai (1992), generally not more than one) in some

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service sectors from the 1970s. Even so, the fraction of nonagricultural employment accounted for by the private sector in 1980 was only about 3 percent in Hungary and 5 percent in Poland, including both the self-employed and their employees.[9] Gradual liberalization – formally and informally – during the 1980s led to a rise in the levels of self-employment and private employment in these two countries, but the bases were so small that this sector was still tiny by the turning point in 1989, when radical reform became politically feasible.[10] Thus, even the most liberal countries had extremely restrictive policies toward small start-ups.

The other countries were even more restrictive, however. In the Soviet Union, modestly liberalizing reforms started with *perestroika* about 1987. The most dramatic growth occurred in the so-called "cooperatives," a somewhat nebulous group of new businesses that were sometimes founded as shells merely to facilitate asset-stripping from a state-owned enterprise, but sometimes represented genuine entrepreneurships with new products and their own lists of employees. According to Kornai (1992), the number of cooperative members grew from 15,000 in January 1987 to over 3 mln by July 1990, although no information appears to be available for the number of owner-entrepreneurs and employees, separately (partly because the cooperative legal form obscured the distinction). But even if as many as a third of these were genuine self-employed, the self-employment rate could hardly have exceeded one percent. Finally, the most repressed economic systems were Czechoslovakia and Bulgaria, where only extremely superficial reforms were undertaken prior to 1989 and the scope for entrepreneurship was tightly constrained to some sectors of arts and handicrafts, which probably constituted a trivial fraction of total employment although again few reliable estimates are available.

After 1989, legal restrictions on the entry of new businesses tended to be relaxed quickly in all the countries, but the extent of informal barriers and bureaucratic interference that remained appears to vary considerably across countries. While simple registration of a business became unproblematic for most types of activities, red tape, including permit and inspection requirements, and the legal environment could still pose obstacles to entrepreneurship. Frye and Shleifer (1997)

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[9] Sources for the Polish and Hungarian figures are Aslund (1985) and Hungarian Central Statistical Office (1980), respectively.

[10] See Rostowski (1989) for a discussion of Poland. According to the Polish Statistical Yearbook (1993), the nonagricultural self-employment rate was about 5 percent in 1989. Perhaps more significant than the self-employment experience open to Poles within their own country was their possibility to work abroad as guest workers; according to Gomulka (1998), these amounted to "some 15% of the non-agricultural labour force... for

discuss the role of contract enforcement and the development of a "rule of law" as important determinants of the quantity and quality of business formation in Poland and Russia. Their small survey of shops showed healthier growth in Warsaw than Moscow, attributed to the contrast between Poland's "invisible hand" versus Russia's "grabbing hand" style of governmental involvement in the economy. These intangible factors are difficult to measure, but a number of qualitative indices drawn up by various international organizations tell a rather consistent tale: in terms of ability for private enterprise to function free of interference and corruption, the Czech Republic is usually at the top of the list in Eastern Europe, followed closely by Poland, Hungary, and Slovakia, while Bulgaria is some distance behind, and Russia is far behind.[11]

Another potentially important barrier to new business startups likely to be especially acute in the transition is a lack of availability of financial and physical capital: credit, premises, and equipment. As a result of the socialist state monopoly on ownership of the "means of production," little privately owned capital existed when the regimes suddenly collapsed. This situation implied that privatization policies could have an impact in making available both real and financial assets to potential entrepreneurs. Perhaps most interesting in this regard were programs of restitution of property confiscated during the socialist period, which either provided compensation (Hungary) or returned specific real assets, generally land and structures (Bulgaria, and Czech and Slovak Republics). Particularly in the latter case, the restituted assets sometimes had substantial value to potential entrepreneurs, either for direct use in a new business or as collateral to obtain financing. Such privatization policies could play important roles in the development of well-functioning market for critical inputs and, since they differed across countries, could provide some explanation for cross-country differences.

Finally, the macroeconomic environment can affect the prospects for entrepreneurship. At the same time that liberalization opened a plethora of new opportunities, it was also associated with a drastic decline in the measured aggregate output of most East European economies in the early 1990s. Hiring rates of established enterprises have fallen, and in some countries there have been substantial layoffs. By 1992, official unemployment rates had risen from zero in most countries to over 10

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periods ranging from several months to several years."
[11] See, for instance, the ratings on "reform progress" in EBRD (1996) or in World Bank (1996), or the

percent in Bulgaria, Hungary, Poland, and Slovakia, although it was still under 5 percent in Russia and the Czech Republic; these rates have been roughly constant for the several years thereafter. The success of stabilization policies has also varied, with inflation falling quickly after the big bang liberalizations in Poland and Czechoslovakia, but staying quite high in Bulgaria and Russia until the mid-1990s, while the Hungarian experience was somewhere in between. The two sides of stabilization – stable prices enabling a better environment for investment decisions, and credit availability for starting or expanding a business – are clearly both relevant for understanding entrepreneurship in transition.

In the following section, we draw upon this analysis to motivate both a consideration of cross-country differences in self-employment rates and in earnings differentials and an analysis of the determinants of self-employment entry that require special attention in the transition environment.

3 Conceptual Framework

The first part of this section develops a simple relative supply-demand model of the determination of the aggregate self-employment rate. The second part considers the individual choice of entry into self-employment, taking into account the costs and benefits associated with self-employment and wage/salary work. The purpose of the relative supply-demand model is to provide a framework for interpreting differences in the level and premium of self-employment across countries and to motivate the set of determinants in the model of individual self-employment entry decisions.

3.1 An Aggregate Model of the Self-Employment Rate

We use a simple two-sector framework, where prices and quantities are measured in relative terms, and demand and supply relations are as follows:

$D = D(w, X_c, X_i)$ and

$S = S(w, Z_c, Z_i)$),

where D = aggregate demand for self-employed relative to employees,

S = aggregate supply for self-employed relative to employees,

w = relative earnings of self-employed (W_S/W_E),

X = vector of relative demand shifters

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summaries in Aslund *et al* (1996) or Murrell (1996).

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Z = vector of relative supply shifters

"c" subscript refers to X and Z variables pertaining to cross-country variation, and

"i" subscript refers to X and Z that vary across individuals.[12]

The Demand function can be thought of as the inverse function of the relative opportunities in self-employment compared to paid employment; we assume the value (productivity) of these opportunities declines with higher relative quantities, so that $\delta D/\delta w < 0$.

The Supply function reflects the ease of labor mobility between the self-employment and paid-employment sectors; we assume that some distribution of entrepreneurial ability (as in Lucas, 1978), of risk-aversion (Kihlstrom and Laffont, 1979), or of liquidity constraints (Evans and Jovanovic, 1989; and Blanchflower and Oswald, 1998) makes the relation upward sloping, so that $\delta S/\delta w > 0$. X and Z are defined so that $\delta D/\delta X > 0$ and $\delta S/\delta Z > 0$.

The impact of shifts in X and Z on the equilibrium relative quantity and price can be easily derived. Totally differentiating the equilibrium condition D = S yields

$$(\delta D/\delta w) \bullet d + (\delta D/\delta X) \bullet dX = (\delta S/\delta w) \bullet dw + (\delta S/\delta Z) \bullet dZ.$$

Clearly, if dZ = 0, then dw/dX > 0, and if dX = 0, then dw/dZ < 0. Eliminating dw, it is easy to show that both dQ/dX > 0 and dQ/dZ > 0. This establishes the simple result that the movement of the relative return to self-employment versus paid employment provides useful information on the extent to which the shift in demand or supply may be dominating and possibly on the shapes of the functions. Of course, individuals are heterogeneous and sectoral choice and earnings may differ for other reasons (e.g., human capital or discrimination), thus we must control for such factors in estimating the probability of self-employment and the magnitude of the self-employment premium. We exploit these insights in our cross-country comparative analysis below.

3.2 A Microeconomic Model of Self-Employment Choice

Turning to the individual level, we present a modified Roy (1951) model of sectoral choice.[13] We assume that workers choose self-employment entry based on maximization of a utility function that has the earnings, amenities, and disamenities of each sector as arguments and where entry into

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[12] A similar framework has been employed by a number of researchers studying the rise in returns to skills. See, e.g., Katz and Murphy (1992), Juhn *et al* (1993), and Katz *et al* (1995).

self-employment entails some costs (monetary or psychic). Under fairly general conditions, the decision to enter self-employment can be represented as the comparison between the relative earnings expected in self-employment and paid employment and a certain "reservation" proportion:

(1)   If $\log(W_{iS}/W_{iE}) > W_i^*$, then individual i chooses self-employment ($SE_i = 1$);

otherwise, i chooses to work as an employee ($SE_i = 0$);

where W_{iS} = wage that would be received by i if $SE_i = 1$,

W_{iE} = wage that would be received by i if $SE_i = 0$, and

W_i^* = i's reservation wage ratio.

The reservation proportion W_i^* varies across individuals according to two sets of variables: first, preferences concerning risk, independence ("being one's own boss"), and other characteristics of self-employment and wage/salary work; and second, the costs of entry into self-employment. W_i^* is of course not directly observable and we assume it to be a linear function of a vector of individual characteristics, X_i; an index of the costs to the individual of entering self-employment, K_i; a vector of country fixed-effects, C_i; and other random factors, ε_i:

(2) $W_i^* = \alpha_1 X_i + \alpha_2 K_i + \alpha_3 C_i + \varepsilon_i.$

The cost index K may reflect both the monetary costs of financing a business, the psychic costs (or benefits) from incurring risk, acting independently, etc., and the value placed on nonpecuniary amenities or disamenities in the two sectors. Under our maintained assumption in this paper that the processes generating self-employment decisions differ across countries only by a constant in each equation, we include country effects but not full interactions with the X_i vector and K_i. In equation (2), for instance, the country effects represent some constant differences in tastes for self-employment across countries: perhaps some cultures are simply more "entrepreneurial" than others.[14]

The cost index K_i is of course unobservable, and we take it to be a linear function of X_i; a vector of other variables representing preferences over workplace amenities and disamenities, financing and other constraints, Z_i; country effects, C_i, and other unobservables, ω_i:

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[13] This section draws on the seminal papers on self-selection by Lee (1978) and Willis and Rosen (1979), who applied similar models to trade unionism and education, respectively. Our exposition parallels Lee's.
[14] We have also estimated the model with full interactions, but this is unwieldy in estimation, it sometimes runs into degrees of freedom difficulties in Russia and Bulgaria, and it would multiply by several-fold the number of issues the paper addresses. We comment below on a few differences that appear in those results, but most of our findings concerning the determinants of self-employment are robust across countries; full results are

(3) $K_i = \gamma_1 X_i + \gamma_2 Z_i + \gamma_3 C_i + \omega_i.$

Here the country effects γ_3 represent cross-country differences in the cost of entry into self-employment – possibly associated with differences in economic policies towards small businesses and in the macroeconomic environment.

Substituting relation (3) into (2), and (2) into (1), and regrouping, the choice of entering self-employment may be defined by the latent variable SE*:

(4) $SE_i^* = \delta_0 \log(W_{iS} / W_{iE}) + \delta_1 X_i + \delta_2 Z_i + \delta_3 C_i + v_i ,$

where self-employment is chosen if $SE_i^* > 0$ (in which case, the dummy $SE_i = 1$), and wage/salary work is chosen otherwise ($SE_i = 0$). Estimating SE_i requires information on expected wages for each individual in each sector, which we obtain by imputation (described below), and a specification of the distribution of v_i. If ε_i and ω_i are assumed to be mean-zero, normally distributed variables, then so is v_i and the model can be estimated as a probit. In the empirical work, reported in Section 5, below, we permit δ_0 to vary across countries, in order to assess differences in the extent to which self-employment entry decisions are motivated by earnings differentials as opposed to other factors. Cross-country differences also enter through the country effects δ_3, which represent the combined influences of country differences in preferences, α_3, and in the level of entry costs, γ_3 (the latter multiplied by the responsiveness of individuals to entry costs, α_2). Clearly, the model is under-identified in that the separate influences of country-specific preferences and costs cannot be distinguished.

In imputing wages, several econometric issues arise. First, observed wages are censored due to self-selection: when $SE_i^* > 0$, then we observe $W_{iS} > 0$ (but not W_{iE}), and when $SE_i^* \leq 0$, then we observe $W_{iE} > 0$ (but not W_{iS}). To test for selection bias and to obtain unbiased estimates of the predicted wages, we use control function methods (Lee, 1978; Heckman, 1979), first estimating a reduced form probit with SE_i as a function of X_i, Z_i, and C_i only:

(5) $SE_i^* = \beta_1 X_i + \beta_2 Z_i + \beta_3 C_i + \xi_i ,$

where we assume $\xi_i \sim N(0, 1)$. From the probit estimation results we calculate inverse Mill's ratios for insertion in each of the earnings functions. Second, identification in the estimation of the index

available on request.

function requires the exclusion of some determinant(s) of earnings from the X_i, Z_i and C_i vectors; in the empirical work, we assume that industry, full-time schedule, years of work experience, and experience squared are determinants of earnings but not directly of self-employment choice.[15] Third, estimation of the index function is feasible also only if the self-employment premia vary across individuals; our specification permits complete interactions in the impact of the X_i, Y_i and C_i variables with self-employment status so that earnings functions are estimated separately for the self-employed and employees. Finally, the choice model assumes that individuals respond to expected earnings; we assume that these expectations are unbiased and thus can be inferred from observations on actual earnings. Our expected earnings model for each type of employment is therefore:

(6) $W_{Si} = \pi_S X_i + \tau_S Y_i + \psi_S C_i + \theta_{S\xi}\lambda_{Si} + \mu_{Si}$ and

(7) $W_{Ei} = \pi_E X_i + \tau_E Y_i + \psi_E C_i + \theta_{E\xi}\lambda_{Ei} + \mu_{Ei}$,

where $E(\mu_{Si} \mid X_i, Y_i, C_i, \lambda_{Si}, SE = 1) = 0$,

$E(\mu_{Ei} \mid X_i, Y_i, C_i, \lambda_{Ei}, SE = 0) = 0$,

$\lambda_{Si} = \phi(\beta_1 X_i + \beta_2 Z_i + \beta_3 C_i)/\Phi(\beta_1 X_i + \beta_2 Z_i + \beta_3 C_i)$, estimated from (5),

$\lambda_{Ei} = \phi(\beta_1 X_i + \beta_2 Z_i + \beta_3 C_i) / [1 - \Phi(\beta_1 X_i + \beta_2 Z_i + \beta_3 C_i)]$, estimated from (5),

ϕ and Φ represent the standard normal density and cumulative distribution functions,

$\theta_{S\xi} = \text{cov} (\mu_{Si} , \xi_i)$,

$\theta_{E\xi} = - \text{cov} (\mu_{Ei} , \xi_i)$, and

Y_i represents determinants of earnings not included in X_i and Z_i.

Note that in this formulation of the microeconomic problem we have defined the selection λs to facilitate interpretation of results: a positive coefficient would imply corresponding positive selection into that category, while a negative coefficient implies negative selection. In our empirical analysis, we permit $\theta_{S\xi}$ and $\theta_{E\xi}$ to vary across countries.

We have also retained the notation of the aggregate analysis in the previous subsection: the X_i are variables influencing the relative demand (the return) for self-employment, while the Z_i are

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[15] As discussed in Section 4 below, we have a complete work history for each individual, thus we are able to measure actual, rather than just potential work experience; age enters the structural probit in quadratic form. In principle, the equation might be identified off the nonlinearity in the ratio of earnings, but this would depend on the characteristics of the data, and fortunately we have natural exclusion restrictions.

variables affecting the relative supply (the costs). Our empirical specifications include standard determinants of earnings in X_i, such as years of schooling, gender, nationality, capital-city location, full-time work schedule, and industry, and we use industry of employment, actual work experience (in quadratic form) and full-time/part-time work schedule as our Y_i variables. The Z_i include age (inversely related to the time horizon over which benefits from entry may be obtained), marital status (insurance within a family), family background (affecting preferences), financing ability (measured by pre-1989 income and receipt of property in restitution), political connections (proxied by former membership or office-holding in the Communist Party), and the local unemployment rate.[16] The specific measures for these variables are discussed in the next section (subsection 4.4).

4 Data

This section provides information on our data sources and sample choice, and it reports estimates of the unconditional self-employment rates, wage differentials associated with self-employment, and characteristics of the self-employed and employees in the sample.

4.1 Data Sources

We employ data from a survey of about 4500 adult individuals (aged 20 to 69) in each of six countries: Bulgaria, Czech Republic, Hungary, Poland, Russia, and Slovakia. The sample was drawn by random selection of regions within each country, followed by random sampling of households or individuals (from either residence or voting lists) within the selected regions. The survey was carried out in spring 1993 (with the exception of Poland, which was done in early 1994) by the local Institutes of Sociology of the Academy of Sciences in each country under the general rubric of "Social Stratification Survey." Weights that enable the sample to reproduce census proportions of key variables (gender, age, community size, and education) are provided with the data; all results reported in the paper are so weighted.

The survey questionnaire contained extensive questions on a variety of economic activities, including informal activities, and on family background. A complete retrospective work history is provided for "main-activity," so we are able to trace the evolution of each respondent's employment

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[16] As pointed out by Willis and Rosen (1979, p. S19) in the context of schooling choices, it is conceptually difficult to distinguish the contents of the vectors of variables affecting demand and supply (the X_i and Z_i

status (although earnings are available only contemporaneously). More detailed information concerning secondary activities and side businesses is available for 1988 and 1993. The questionnaire was designed to be nearly identical across countries, thus facilitating the cross-country comparative analysis we undertake in this paper.[17]

4.2 Sample for Analysis

Our analysis of self-employment in this paper is restricted to non-agricultural new entrants into main-activity self-employment, individuals who have begun main-activity non-agricultural self-employment since 1989 and continued it until January 1993. We compare these individuals with workers reporting their main activity was paid employment (a wage-salary job) in that same month. We focus on the individual's reported main activity to exclude minor income- and consumption-generating activities that are more appropriately studied as multiple job-holding or home production.

We exclude agriculture for several reasons. First, the decision to enter agricultural self-employment is likely to be heavily conditioned by considerations of location and land availability. Second, a variety of evidence suggests that individual and family farmers are primarily engaged in subsistence rather than market-oriented, entrepreneurial activities. In our survey data, for instance, the proportion of self-employed who hire regular employees is only .07 in agriculture, compared to .29 in non-agricultural activities. Both of these factors suggest that the determinants and characteristics of self-employed in agriculture are likely to differ substantially from those in non-agriculture. Finally, most of the standard literature on self-employment excludes the agricultural sector, and following this approach therefore facilitates comparisons with the results for other countries.

We also follow much of the self-employment literature in focussing on transitions of new entrants to self-employment. As emphasized by Evans and Leighton (1989), Fairlie (1999) and others, this procedure permits a number of characteristics to be treated as pre-determined, although it alone does not fully solve the potential endogeneity problems discussed in the introduction, above. The transition context, moreover, suggests particularly strong reasons for adopting this approach: the legal regime and economic environment prior to 1989 was so different that the motivations for

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vectors), yet some such division is necessary to identify the model.

[17] More information about the survey and sample can be found in Treiman and Szelenyi (1993), Mateju (1995),

individuals to enter self-employment were also completely different. If these self-employed remained there after the transition, this was probably because of the skills they had acquired in their occupations and not necessarily because the self-employment choice would have been optimal for them *ex ante*.[18]

Finally, we somewhat arbitrarily chose January 1993 as the date for analysis. As mentioned above, the survey fieldwork took place at slightly different times in the six countries, and we wanted to avoid inconsistencies associated with seasonal fluctuations. Some respondents, moreover, provided their earnings on an annual basis, generally the calendar year 1992. Given that we found there was negligible turnover in the self-employed who entered after 1988, January 1993 seemed to represent the best date to achieve consistency in the cross-country comparisons while recognizing the tradeoff between closeness to survey date and the possibility that earnings pertained to the prior year.

Table 1 shows the number of observations in the sample constructed according to these principles. The fraction of the total sample reporting that their main activity in January 1993 was employment in a non-agricultural sector was just over half the initial sample. Only a tiny fraction of the employed in non-agricultural sectors failed to provide information on whether they were self-employed in 1993 and 1988, so the sample is only marginally reduced by missing values for these variables.[19] The proportion with missing values for wages was 13 percent, reducing the effective sample for the earnings functions to 13,108 respondents. As described below, the variable representing the self-employment earnings premium in the structural probit regression was imputed on the basis of the earnings functions estimated on this sample. For other variables, we imputed missing values with the corresponding mean of the variable in the non-missing sample. The qualitative implications of the analysis differed little, however, when we estimated our equations only on observations with non-missing values for all variables.

4.3 Self-Employment Rates and Earnings Differences

Our first use of the data is to provide simple computations of the evolution of the composition

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and Hanley (1996).

[18] Blanchflower and Oswald (1998) argue that the object of study should be the self-employment rate rather than transitions, since it is the former variable that is relevant for policy purposes. In our study, this makes little difference, however, as almost no self-employed entering since 1988 had exited by January 1993: leaving aside the inherited stock of self-employed, the rate of self-employment actually equals the rate of entry.

[19] In our data, as in nearly all the analyses of individual data in this literature, self-employment is self-defined. Due to lack of information on the legal form of the self-employed individual's business, we are unable to exclude owners of incorporated businesses for consistency with the U.S. definition (but not that of most other

of the sample by self-employment status, for the month of January in each of the six years from 1988 to 1993. Official figures suffer from severe biases in these early transition years, because labor force surveys commenced only in 1992 (in Hungary) and in 1993 (the other countries, except Russia), and the former statistical methods were not well adapted for following small-scale activities. Estimates of employment status such as those in ECE (1995), and cited in aggregate analyses such as that of Boeri *et al* (1998), are largely based on enterprise reports and registrations, administrative records, and "guesstimates" of officials in the national statistical agencies. All of these sources are particularly suspect when it comes to measuring the magnitude of self-employment. Thus, our analysis may be useful in providing new estimates of self-employment that are comparable across countries.

A problem in estimating the evolution of self-employment with our data, however, stems from the nature of the sample: while the samples are national probability samples of adults aged 20 to 69, which are (when weighted) representative for that age range in each country in 1993, their retrospective nature implies that they may be unrepresentative for earlier periods. The sample is aging over the period of observation, which is problematic if age is correlated with self-employment decisions. To address the potential bias resulting from age changes, we imputed self-employment rates for each country and year based on the predicted probabilities from inserting each country's 1993 age structure into an estimated probit function. The dependent variable in the probit, estimated for each country, was a self-employment dummy (SE), independent variables consisted of a sixth-order polynomial in age, and the sample consisted of the employed population in each country for January of each year from 1988 to 1993. Figure 1 shows the results from simulating the impact of a constant 1993 age structure on the predicted self-employment probabilities; they differ only trivially from the unconditional self-employment rates, implying that the age-related bias poses no serious problems. The data show that the rate more than doubled in all countries and rose by a factor of 10 in the Czech Republic over the five year period from 1988 to 1993. Although differences in measurement practices preclude exact comparisons, the figures for Bulgaria, the Czech Republic, Hungary, and Poland are in the general range of OECD countries, while Poland is on the high side, and Russia remains very low (see, e.g., Blanchflower (1998)). Clearly, the countries also began the transition at very different levels of self-employment, consistent with our discussion in Section 2

countries).

above, but the transition produced dramatic changes in all countries.

Next we turn to the measurement of earnings of the self-employed and employees in each country. The earnings variable is defined as the "net income from the main activity in the previous month or year" (i.e., preceding the survey). Most respondents reported income on a monthly basis; where it was reported annually (for 9 percent of employees and 26 percent of the self-employed), we divided by 12 to obtain comparable figures. These data may suffer from a variety of biases. To start with, the broader literatures on self-employment and taxation frequently observe that the self-employed are more likely to understate their earnings, as they have more opportunities to hide income and face fewer controls than an employee of a large firm.[20] This consideration is no less likely to be true in Eastern Europe, suggesting that reported self-employed earnings may be understated. On the other hand, another standard problem in measuring self-employed income is the treatment of returns to capital, and we do not know how these were treated by the respondents in our data. If no measure of the opportunity cost of the entrepreneur's investment (such as depreciation allowance or cost of capital) was subtracted from income, then self-employed income could be overstated.[21] Relative to a developed market economy, however, rather little capital was available for the self-employed in the immediate post-socialist period we are studying in this paper; this would suggest that the overstatement in earnings, assuming capital income is indeed included in reported earnings, would be small. The opportunity cost of entrepreneurial investments are extremely difficult to measure, moreover, in the transition environment where financial markets are poorly functioning. Finally, so-called "13th salaries" are somewhat common in Eastern Europe; thus annual income divided by 12 may overstate the monthly equivalent. The net result of these biases is difficult to sort out, but their consideration led us to estimate some quantile regressions to check the robustness of our earnings functions, reported in section 5 below.

With these caveats in mind, we can turn to Table 2, which shows that the differences between the unconditional means of earnings are positive in all countries, although varying widely from about .4 in Hungary to over 5 in Russia, when self-employment earnings are taken as a ratio to the mean of the employee wage. Unfortunately, the survey provided reliable information on hours of work for

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[20] See Aronson (1991). Parker (1997) discusses the under-reporting bias in U.K. data.
[21] Hamilton (1998) contains a detailed discussion of these measurement issues.

only a subsample of the respondents (as described below), but our calculations of the hourly earnings differentials for this subsample display a very similar pattern across the countries. We also examined the distribution of earnings, finding a positive differential at the median in all countries and at the 25th percentile in every country except Hungary, where it is only slightly negative (-.03). In general, the size of the differentials seems to suggest a fairly clear picture of a substantial self-employment premium even taking into account the measurement problems discussed above.

4.4 Characteristics of Self-Employed and Employees

Table 3 shows the characteristics of the sample, divided into self-employed and employees. The two employment types differ along a number of dimensions. With respect to demographic characteristics, the self-employed are typically younger and more likely to be male and married than paid employees. Concerning "Majority Nationality," which is a dummy coded separately for each country, we find no difference between these unconditional means, however.

The family background variables show substantial differences. "Parent's Education" is a dummy equal to one when either parent of the respondent had attained university education or higher. "Large Business" is a dummy equal to one if the respondent claims that any of the parents or the grandfathers of the respondent owned a large business prior to 1949. (Size was subjectively determined by the respondent, who was given three alternatives: "none," "small or medium," or "large.") In both cases, the incidence is higher among self-employed.

Concerning human capital characteristics, the self-employed tend to have spent more years spent at school, but their work experience is lower. Our experience variable is actual, not potential; it is measured as the cumulative sum of tenure on all main-activity jobs (including self-employment). This is useful for identifying the structural probit estimation, as we include experience as a determinant of earnings, but age as a determinant of self-employment entry while controlling for the earnings differential (while including schooling in both equations). The rate at which the self-employed had been involved in side businesses in 1988 was higher than for employees in 1993.

We constructed attitudinal indicators from a set of qualitative questions about respondents' opinions concerning the chief factors necessary to "get ahead." Each potential factor was evaluated by respondents on a scale from one to five, where 1 indicated essential and 5 not important. "Self-

reliance" combines four such variables: hard work, individual ambition, political connections, and personal network. We inverted the scale for ambition and hard work, summed the four answers, and then normalized by subtracting the country mean and dividing by the country standard deviation, in order to control for any systematic differences in language or meaning that might have tended to bias the responses. "Risk" represents the similarly normalized and inverted response to the importance of taking risks for getting ahead. The means show higher weights placed on both of these traits by the self-employed than by employees.

Financing ability is proxied by two variables: receipt of property in restitution and level of income in 1988. Restitution is a simple dummy equal to one if the respondent was returned property that had belonged to his/her family but was expropriated under the Communist regime. Our pre-transition income measure is a subjective indicator of the level of income in 1988, derived from a set of categorical responses to the question: "Compared with other families of your country, would you say your family income in 1988 was far below average, below average, average, above average, or far above average?" We interpreted this question as asking respondents to place their total family income in a quintile of the 1988 income distribution, which on a retrospective survey in countries that had in the interim experienced high rates of inflation, seems like a fairly good measure of the family's ability to save. This variable was also normalized by mean and variance (by country). Both measures show both higher levels for the self-employed.

To examine the possibility that "political capital" under the old regime might have been transformed into business ownership in the transition, we examine two variables: former membership in the Communist Party without office-holding, and former officer-status in the Communist Party. The differences between the self-employed and employees in the unconditional means of both variables are very slight.

The roles of the local economy and labor market are captured by two variables: location in a capital city and the local unemployment rate. The former comes from the survey, but the latter was computed by the authors using official statistical reports on local unemployment rates in each country in January 1993. The self-employed are more likely to live in a capital, but they also have a slight tendency to locate in higher unemployment areas.

The table also shows the composition of employment by sector. Unfortunately, the data do not permit much disaggregation by sector, and the table shows the division between four sectors: services, industry, construction and transportation. The self-employed are disproportionately represented in services and construction.

Finally, we report the extent of full-time versus part-time work schedule. The self-employed are slightly more likely to report that their main activity is part-time. We include both full- and part-time workers in our analysis, however, because the meaning of the distinction is not entirely clear in Eastern Europe and because our analysis of the limited information available on hours of work shows only trivial differences between those of the "part-time" self-employed, who reported working an average of 198.7 hours in the previous month, and the "full-time" self-employed who reported an average of 199.6 hours of work. The problem here is that, unfortunately, the survey questionnaire did not request information on hours of work on the main activity, instead only a single measure of hours on all types of work including all side jobs and businesses and even family agriculture. As such activities are common in Eastern Europe, although even much more so in Bulgaria and Russia, restricting the analysis to those who do not engage in them (in order to obtain a reliable hours of work variable) could bias the results. Moreover, the self-employed may find it particularly difficult to estimate their hours. There is some evidence that self-employed workers are likely to take fewer and shorter breaks (Hamermesh, 1990), and presumably they are less likely to shirk on the job. On the other hand, the dividing line between work and leisure may be less clear cut for the self-employed, particularly if they work out of their homes. For these reasons, we feel that our hours measures are quite noisy and our earnings analysis below pertains to monthly rather than hourly earnings, but we also provide comments on the results using the hourly measure as well.[22]

5 Estimation Results

This section reports our empirical findings in three steps: first, the estimates of selectivity-bias-corrected earnings functions for self-employed and employees; second, the estimate of the

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[22] Perhaps similar difficulties explain why most other studies of self-employment earnings also analyze annual, monthly, or weekly earnings (as indeed is also fairly common in research on other aspects of earnings differentials); for instance Rees and Shah (1986), Borjas and Bronars (1989), Evans and Jovanovic (1989), Evans and Leighton (1989), and Fairlie and Meyer (1996). Gill (1988) and Hamilton (1999) are exceptions.

structural probit model of self-employment entry; and finally, the predicted self-employment rate and earnings premium, derived from those estimated functions, for each country.

5.1 Earnings Functions

As described in Section 3, above, we first estimate a reduced form probit (equation 5) from which we calculate inverse Mill's ratios for insertion in separate earnings functions for the self-employed and employees. The specification of the earnings functions (equations 6 and 7) is standard and the results of the estimation, to be found in Table 4, display standard shapes.[23] Given the presumed volatility of self-employment earnings and based on the standard deviation of earnings in Table 2, above, we would have expected that the employee earnings function would fit the data better than the self-employed, and consistent with most other studies we find a significantly higher R^2 for the former compared with the latter.[24]

The data show a larger gender gap among self-employed than employees, while majority nationality increases the earnings of employees, but is estimated to have a negative although statistically insignificant impact on self-employed earnings.[25] Previous research has mostly relied upon potential rather than actual experience measures, but our finding is similar: based upon actual labor market experience, the earnings-experience profiles show a concave shape for both employees and the self-employed. The curvature is greater for the latter than the former, however; the implied earnings maximum is achieved at about 25 years of experience for the self-employed and 29 years for employees.[26]

Because the educational choices of East European workers in 1993 had been undertaken under the socialist system, which provided relatively small returns to additional schooling and little or

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[23] To standardize the units of the dependent variable across countries, earnings are divided by national means. Thus, the estimated coefficients on the country dummies in the regressions reflect only differences in the composition of the sample across countries according to the individual characteristics included in the equations.

[24] This finding is consistent with Rees and Shah (1986), Borjas and Bronars (1989), Fairlie and Meyer (1996), and Hamilton (1999), but inconsistent with Gill (1986) and Evans and Leighton (1989), both of whom use NLS data.

[25] Taken at face value, the finding on gender would appear to provide more support for theories of discrimination based on customer prejudice than for those based on employer and employee prejudice, while the nationality result appears to provide more support to employer and employee prejudice models. Of course, the gaps might also be explicable on other grounds (for example, omitted variables).

[26] Although in principle the data would have permitted it, we did not split the experience variable into separate self-employment and wage/salary experience, as has been done by Evans and Leighton (1989) and Hamilton (1999). The reason is that our exclusion of the pre-1989 self-employed from the sample implies that all the self-employed in 1993 would have very low self-employment experience, and in fact this variable displays very little variation. We also did not include job tenure for the same reason.

no prospect of utilizing it in self-employment, the schooling results are of particular interest. We find higher measured returns to years of schooling among employees (.042) than among the self-employed (.027). The higher return for wage/salary employees is consistent with Rees and Shah (1986) and Hamilton (1999), but contrary to Borjas and Bronars (1989), Evans and Leighton (1989), and Fairlie and Meyer (1996). All of these studies, however, have had to contend with the difficult problem that schooling, self-employment, and earnings may be jointly determined variables, while we have argued that in the transition context they are not – certainly it is true that schooling choices were made with little or no expectation of a possibility of self-employment and to a considerable extent with little expectation of enhanced earnings as well.[27] Both point estimates are low, however, implying either that the socialist educational system was deficient at producing skills valued in a market (or during the transition), that institutional factors compress the earnings structure, or that schooling in truth has little impact either through human capital or signaling. Further investigation of these possibilities must be left for future research.

The equations also include controls for location in a capital city, full-time work schedule, industry of employment, and country. Residence in a capital city may reflect cost-of-living as well as differences in demand conditions, but the fact that the coefficient is substantially higher for the self-employed than for employees implies that the latter condition dominates. Although the limited information in the data suggests that the self-employed work long hours, even when claiming a part-time schedule, as discussed in the previous section, we include the dummy for full-time schedule in the earnings functions, however, because of the possible correlation with earnings and because this provides a useful exclusion restriction (together with actual experience) when we estimate the structural probit; the coefficients are almost identical for the two categories. The industry controls are included because of the possible presence of sector-specific rents affecting earnings, of selection of employees across sectors again affecting earnings, and of differences in amenities and disamenities of jobs that vary across sectors.

Finally, the table shows the results for the selection terms λ_S and λ_E, where we permit their coefficients $\theta_{S\xi}$ and $\theta_{E\xi}$ to vary across countries by interacting with the country dummies. The results

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[27] A number of studies, including Sakova (1997), Brainerd (1998), Chase (1998), and Flanagan (1998), have

imply positive selection into employee-status in every country: entrants into self-employment would have had lower wage/salary earnings (conditional on the included regressors) than individuals who chose wage/salary work.[28] The estimated coefficients on λ_S are also positive for every country, although they are statistically significant only in Bulgaria and Russia. Interpreted within the framework of the Roy (1951) model, the results are consistent with selection according to comparative advantage, and do not appear to support hierarchical sorting, but the model does not take into account costs of mobility between sectors, which could be quite substantial in the case of entry into self-employment.

One of our primary motivations for estimating the earnings functions is to calculate the conditional earnings differential associated with self-employment, once other factors including potential selection bias have been controlled for. Taking the mean across i of the predicted values of W_{Si} and W_{Ei} for each individual i, we find an average predicted self-employment premium of 33 percent. We discuss the cross-country variation in this differential in Section 5.3 below.

5.2 Estimating the Determinants of the Decision to Enter Self-Employment

The results from estimating the structural probit, equation (4) in Section 3 above, are shown in Table 5. As noted earlier, we have maintained the hypothesis that country effects enter only through the intercept and the log earnings differential in this equation (recall that the earnings differential itself contained country-specific effects and permitted cross-country differences in the nature of the selection bias). The estimated impacts of the other variables, representing aspects of preferences and costs, are what remains once the country effects and earnings differential have been controlled for: costs and preferences pertaining to self-employment entry. In addition to estimated coefficient and asymptotic t-statistics, marginal effects for continuous variables and the probability difference associated with a change from zero to one for dummy variables, in both cases estimated at the means of all the independent variables, are also shown.

The estimated impacts of demographic characteristics are mostly similar to studies of self-employment in other countries: higher probabilities of entry into self-employment for males, majority

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documented the rather low return to schooling under socialism and the rise in the return after economic liberalization began.

[28] Recall from Section 3.2 that we have defined $\lambda_{Ei} = \phi(\beta_1 X_i + \beta_2 Z_i + \beta_3 C_i) / [1 - \Phi(\beta_1 X_i + \beta_2 Z_i + \beta_3 C_i)]$, so that the coefficient on $\lambda_{E\xi}$ in the earnings function $\theta_{E\xi} = - \text{cov}(\mu_{Ei}, \xi_i)$.

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nationals, and married individuals. Although implying a mildly concave shape, the age effects are small and statistically insignificant.[29]

The equation includes two human capital variables, in addition to the indirect effects of work experience and schooling working through the predicted wage differential. Controlling for this differential and the other included variables, we find that years of schooling has a substantial, positive impact on the probability of entering self-employment. Other studies have reported contradictory findings: for instance, Rees and Shah (1986) report a positive and Gill (1988) a negative relationship with the probability of self-employment in structural probits, while Fairlie (1999) finds little impact of education on self-employment entry, and the results of Evans and Leighton's (1989) reduced-form probits vary across data sources and definitions (with respect to entry, they show statistically insignificant schooling coefficients for three waves of the NLS, but positive coefficients on higher educational categories using matched CPS files). The inconsistency in these findings may be due to the fact that educational decisions in developed market economies such as the US and UK, the countries studied in these papers, may be made with some expectation of the future possibility of self-employment; thus the estimated coefficients may suffer from simultaneity bias of an unknown size and magnitude. In those settings, little can be done about this problem, but we have argued that the possibility that economic liberalization would create the opportunity of opening a business was unforeseeable for most East European individuals at the time they made their schooling choices, thus schooling can be taken as exogenous. The results show that schooling does in fact lower the costs of or increase tastes for self-employment, perhaps by developing confidence, knowledge of alternative opportunities, or social networks.[30]

A less conventional sort of human capital is captured by the dummy variable for owning a side business in 1988, which we take as an indicator of some potentially relevant experience in the

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[29] A possible explanation for this finding could be that age in these equations is not only representing preferences and time horizon (which, according to standard human capital investment theory, would suggest that younger individuals should be more likely to enter), but may also be proxying for some unmeasured component of assets that is correlated with age and that could reduce the costs of entry. The correlation between age and assets should be substantially lower in the transition economies where there was little possibility to save, than in the standard market economy setting, however. Among other analyses of self-employment entry, Gill (1988) and Evans and Leighton (1989) also find statistically insignificant age effects, while Rees and Shah (1986) and Fairlie (1999) find significant effects; all these studies employ a quadratic specification.

[30] We also experimented with a parameterization of schooling by a set of qualitative variables representing level and type rather than the continuous variable in years, but the impact of schooling appeared to be monotonic in

"grey economy." Section 2 discussed the very narrow scope for main-activity self-employment prior to 1989, but it was possible to conduct some business – frequently illegal, or only semi-legal – on the side ("on the left," went the phrase in Russia). Whether one regards this activity as "productive" or "unproductive" entrepreneurship, the former because it improved on the allocation achieved by central planning, the latter because it involved considerable rent-seeking, is a matter of judgment.[31] Here we are interested in the question whether this experience represented any valuable human capital, in the sense of raising the probability of participating as a "legitimate," main-activity entrepreneur once economic liberalization made that possible, and our result provides evidence that the answer is yes.

One of the most studied issues in self-employment is the possibility of intergenerational transmission in the propensity to become self-employed. Lentz and Laband (1990), Dunn and Holtz-Eakin (1996), Blanchflower and Oswald (1998), and Fairlie (1999) find a high intergenerational correlation, but this finding has multiple interpretations. Self-employed parents may teach skills or inculcate values that raise the self-employment probability of their offspring, but it is also possible that parental self-employment in these studies is proxying for some unobserved component of wealth. The post-socialist environment, as we have argued, may provide some leverage to sort out these alternatives, because wealth accumulation had been extremely limited, bequests and gifts could transfer little wealth across generations, and almost no one's parents had been self-employed in recent memory. In the early socialist years (the "heroic age), moreover, families of "bourgeois" and "capitalist" origins faced not only the expropriation of most or all of their property, but also explicit discrimination in university admission and career advancement. All of these factors tend to cut the usually strong link between family background and family wealth.

Our principal measure of family background, prior ownership of a "large" business by a parent or either grandfather, is particularly appropriate for this analysis, as it captures any such substantial ownership on either side of the respondent's family. The result from including this variable in the structural probit is a large estimate of the impact on the probability of becoming self-

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level and little additional variation was displayed by type.

[31] Baumol's (1990) analysis of productive and unproductive entrepreneurship discusses the issue in ancient and medieval history, but the situation of entrepreneurship under socialism seems like a particularly interesting case for his framework.

employed; the probability difference of about 3 percent implies a substantially higher rate for such individuals (an increase from 50 to 90 percent in countries with low self-employment entry rates, such as Bulgaria and Russia).[32]

The second measure of family background in the equation, a dummy representing university education by either parent, also shows a strong estimated impact. As before, the peculiar nature of education selection and career advancement mechanisms under the classical socialist system, suggest that parental education is more likely to be independent of wealth and other aspects of family background than in the standard setting. We find a strong positive effect.

The structural probit estimation results also provide evidence concerning the entrepreneurship issue that has perhaps received the most attention from economists: the potential financing constraint on starting a new business. The argument is that because banks are generally reluctant to make unsecured loans for start-ups, the individual's own assets may play a key role in enabling her to pursue some entrepreneurial idea; Evans and Jovanovic (1989) and Blanchflower and Oswald (1998) contain formal models. The empirical literature has attempted to circumvent possible endogeneity problems in the individual assets variable by measuring wealth prior to entering self-employment (e.g., in Evans and Leighton (1989) and Evans and Jovanovic (1989)), while others have used events such as inheritance (Holtz-Eakin *et al*, 1994) and Blanchflower and Oswald, 1998) or lottery winnings (Lindh and Ohlsson, 1996) as the regressor instead. But it is not hard to think of plausible arguments why each of these alternative measures might also suffer from simultaneity bias: prior wealth is influenced by prior savings which may be correlated with a planned business startup; inheritance may have a substantial expected component; and while winning the lottery is presumably exogenous, entering it is probably correlated with attitudes toward risk.

Each of these studies attempts to treat the possible endogeneity problem in estimating the importance of capital constraints for entrepreneurship, but the transition situation we observe in our data offers an unusual opportunity to contribute to this literature, because of the unanticipated arrival of the opportunity to become a business owner. Furthermore, as we discussed in Section 2, above, few individuals in these countries had significant savings in 1989, and a main source of capital for

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[32] We also investigated an alternative definition of this variable that included "small or medium" businesses in addition to large ones, and the results were qualitatively similar.

start-ups could have been restitution of property nationalized by the socialist regimes. Soon after the Communist collapse, the question of how to handle the large amounts of nationalized property immediately came on the agenda in all the countries. After all the passage of time and economic changes, the value of these pieces of property, generally small parcels of land or a house in the countryside or, less frequently, in a city (since rebuilding was more common in the latter), bore little relation to what they might once have been. Indeed, this problem of valuation was one of the principal issues that came up in political discussions of restitution of real property and compensation for lost property. The Czech Republic and Slovakia ultimately returned substantial amounts of property (mostly land and structures) as did Bulgaria, while compensation was used in Hungary (although the value of the coupons distributed was usually small). In the other countries of our sample, restitution only of housing has taken place, and that mostly in small quantities by the time of the survey.[33]

The results show a significant rise in the probability of entry into self-employment for restitutents compared with non-restituents, suggesting that restitution lowered the costs of entry, raising the probability by 1.1 percent. Given the heterogeneity in the meaning of this variable across countries, we also estimated the structural probit for some countries separately. The results showed a particularly strong impact of restitution in the Czech Republic, where the probability difference is 3.8 percent, statistically significant at the one percent level.

As an additional wealth measure, the equation also includes a measure of income level in 1988, again under the argument that such income could not reflect planned self-employment in the future. This variable again shows a positive, statistically significant impact on the probability of entry into self-employment.

A particularly interesting hypothesis in the transition context is whether the former Communist leaders (the so-called "nomenklatura") have managed to convert their "political capital" into positions of economic advantage. Are the communists of yesterday the new entrepreneurs of today? The possibility has potent political implications and has been much discussed in the East European press. A positive finding could be explained by two possible causes: unfair advantage (the

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[33] See Earle *et al* (1994) for further discussion on these issues and in particular for a detailed description of the Czech restitution program.

popular interpretation), or the socialist selection and training mechanisms produced more entrepreneurially minded leaders. Our findings, however, show negative point estimates for both variables (former non-office-holding member and officer in the Communist Party), thus implying that the data provide support for neither of these causes.

A number of self-employment studies have estimated the relationship between various attitudes and inclination towards entrepreneurship. The results have been mixed: Evans and Leighton (1989) find a positive impact of the "Rotter Score," a measure of "internal locus of control," but Blanchflower and Oswald (1998), using an array of psychological indicators find only very weak relationships. Our measures of the evaluation placed by an individual on the importance of risk-taking and self-reliance both show strongly significant impacts on the self-employment entry decision.[34]

One somewhat surprising result may be that location in a capital city is estimated to lower the probability of entry into self-employment, but this coefficient controls for the earnings differential (itself a function of Capital), thus reflects costs and preferences not reflected in the differential. The local unemployment rate has a negligible effect on the entry probability.

Finally, we examine the responsiveness of self-employment entry to the predicted wage differential an individual faces in self-employment compared with wage/salary work. Permitting the coefficient to vary across countries, we find positive, statistically significant relationships for every country.[35] The data appear to support the economic model of sectoral choice, rather than sociological theories of disadvantage or a model of job rationing. The magnitude of the impact varies, however, with one highly responsive group of countries (the Czech Republic, Russia, and Slovakia) having twice the marginal effect of the other group of countries (Bulgaria, Hungary, and Poland). We analyze cross-country differences in the implied self-employment entry rates in the next subsection.

5.3 Cross-Country Comparative Analysis

In addition to providing information on the origins and character of entrepreneurship at a

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[34] The result for self-reliance is consistent with Evans and Leighton (1989). Note (as discussed in Section 4, above) that our risk measure cannot be easily interpreted as a measure of risk-aversion, but simply reflects whether the person thinks that taking risks is necessary "to get ahead."

[35] This result is consistent with Rees and Shah (1986) and with Fairlie and Meyer's (1996) analysis of grouped data, but inconsistent with Gill's (1988) negative coefficient (although Gill himself explains his finding as a result of measurement error in his measure of the earnings differential).

microeconomic level, the foregoing estimations also permit us to extract country effects that we use to construct predicted self-employment entry rates and earnings differentials for each country, holding constant the other characteristics of individuals. Ideally, we would like to estimate the relative demand-supply model from Section 3, in order to test formally the importance of each set of factors, but the lack of data limits us to a more informal discussion. Taken together with other information on the labor market performance, however, we believe that the data are quite suggestive.

The self-employment entry probabilities are constructed from the estimated structural probit in Table 5, from which we simulated an entry probability for each individual in the sample conditioning on coming from each country, in turn. The means of these predicted probabilities are shown in Table 6. The rank order of the countries is similar to the raw estimates, but the differences between them – those that remain after other factors have been taken into account – are more pronounced. The Central European countries show the largest booms in self-employment, with Bulgaria significantly less and Russia almost negligible by comparison. The Czech Republic has the highest predicted entry rate, at 16.2 percent, followed in order by Slovakia, Hungary, Poland, Bulgaria, and finally Russia at only marginally above zero: .7 percent. Evidently, once other factors are controlled for, the Russian inclination towards self-employment is even smaller than in the raw data.

The wage differentials in Table 6 are constructed from the estimated regressions in Table 4, where we performed the analogous simulations, predicting the log self-employment and employee wages for each individual in the sample under the assumption that he/she come from each country in turn. Taking antilogs and calculating the ratio $(W_{Si} - W_{Ei})/W_{Ei}$ yields a differential for each individual for each country, the means of which are shown in the table. Again, the rank order of self-employment premia is roughly the same as those shown by the descriptive statistics in Table 3, although the magnitudes tend to be smaller in the simulations controlling for individual characteristics and selection bias. By far the highest differential is in Russia, estimated at 123 percent, followed by Poland and the Czech Republic at 53 and 44 percent, while the lowest is in Hungary at just below zero.

These patterns may be interpreted in light of the model of relative demand and supply in Section 3.2, together with collateral information on these economies. Beginning with the Czech Republic, which has the highest predicted entry rate as well as a high self-employment premium, this combination suggests that the self-employment rise may be the result of a predominance of demand factors working to raise both the relative quantity and price of self-employment. It is also consistent with well-known facts about Czech labor markets in transition: low rates, high turnover and short duration of unemployment; rapid expansion of the trade and service sectors, particularly in the Prague area; relatively few layoffs and mostly voluntary labor mobility. By contrast, Slovakia has had relatively high and longer duration of unemployment, more layoffs, and somewhat slower expansion of services.[36] This would suggest more expansion of the relative supply of the self-employed and less increase in relative demand: the net effect is a self-employment rate not much lower than that for the Czech Republic but with a substantially smaller premium.

The Polish economy has had one of the strongest macroeconomic performances in Eastern Europe, with very rapid growth in aggregate output and in private sector employment although with substantial rates of unemployment as well. We find, however, that the predicted entry rate controlling for other factors is slightly lower than in the rest of Central Europe, perhaps because Poland began the transition with a relatively high rate of non-agricultural self-employment, a fact we discussed in Section 2 and for which we provided estimates in Section 4.2. The simulated return to self-employment in Poland is the highest among the Central European countries, consistent with a strong expansion of relative demand and little movement of relative supply.

Hungary has a similar entry probability but a much lower predicted premium compared to Poland. The negative earnings differential suggests that relative supply may have expanded more than in the other countries, perhaps because of layoffs in privatized firms and sluggish growth performance in the early 1990s.

The simulations for Bulgaria show a low entry rate and premium for self-employment, again consistent with an important role for shifts in relative supply. Bulgaria had some of the highest rates

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[36] See, e.g., Ham, Svejnar, and Terrell (1998).

of unemployment in Europe in 1992-93, and the difficulty of finding wage/salary work may have expanded the supply of self-employed.

Finally, Russia displays the most extreme behavior with a very low entry rate and a very high premium. We believe this can be best understood as the result of a very inelastic relative supply curve together with some expansion in demand, as in the other countries. There had been but few layoffs in Russia by 1993, the year of our focus, and the unemployment rate was under one percent. The relative return to self-employment expanded with economic liberalization, but a number of studies of private sector development in Russia have shown that new businesses face considerable interference from both mafia and government, particularly local government (e.g., Frye and Shleifer, 1997). In our context, such interference may be viewed as creating barriers to entry, resulting in a steeper relative supply curve, a low level and high premium of self-employment.

The relative demand-supply framework is highly instructive for interpreting the aggregate country effects in our earnings functions and self-employment probits, showing that the six countries in our sample are quite heterogeneous with respect to the magnitude and character of self-employment[37]

6 Conclusion

The post-socialist transition offers a fruitful setting for investigating the determinants of entry into self-employment. Starting from a situation in which private initiative had been severely repressed and possibilities to save had been extremely limited for decades, the liberalizations of prices, business entry, capital accumulation, and employee hiring and firing came abruptly and unexpectedly at the beginning of the 1990s. Under these new conditions, individuals considering self-employment entry had characteristics – schooling, black market experience, attitudes, family background – that they had acquired during a period when they had no reason to hope that they would ever be able to start their own businesses. Moreover, the redistribution of nationalized property through programs of restitution suddenly put physical assets in some individuals' hands. Our argument is that these rapid, unanticipated changes created a "quasi-experiment," in which some key variables are arguably much closer to exogenous than in the typical research setting.[38]

Our results provide new evidence of the importance of a number of determinants of self-employment entry: financing ability, family background, schooling, black market experience, and attitudes towards risk and self-reliance. They also suggest that political connections, at least those inherited from the old regime, do not promote entrepreneurship. We have found that the self-employed tend to earn a substantial premium over employees, with a mean conditional differential of 33 percent across countries. In all countries, the earnings function estimates imply positive selection bias into both employee and self-employment status, and the structural probit results show a positive response of the entry probability to the predicted earnings premium, supporting the economic theory of sectoral choice.

Large differences appear across countries, however, both in self-employment rates and earnings differentials; the pattern of differences remains qualitatively similar even after we control for other factors and take into account selection bias. Although a sample of six countries is not sufficient to permit estimation of the full model, our supply-demand analysis suggests a number of interpretations for these differences. The high rate of self-employment and high premium in the Czech Republic may reflect a large relative demand shift, while the somewhat lower rate and premium in Slovakia may reflect some outward shift of relative supply. The high rate but negligible premium in Hungary may reflect an even larger shift in supply. Finally, we find that the low rate but very high premium in Russia may be interpreted as the result of a substantial demand shift coupled with an inelastic supply curve, perhaps due to the many barriers to entry faced by new businesses in Russia. While the sample limitations preclude rigorous testing of these cross-country differences, it is striking how well the self-employment behavior observed in our data conforms with other important

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[37] Johnson, Kaufmann, and Shleifer (1997) emphasize another perspective on the new private sector in transition economies: the extent to which it operates "unofficially," defined as not paying taxes or benefitting from public goods. They provide some aggregate measures and cross-country comparisons of the unofficial sector and they argue that the choice to operate informally has negative externalities, so that there is a "bad" and a "good" equilibrium in which all or nearly all resources are unofficial or official, respectively. We are not able to measure whether the self-employed business people in our sample pay their taxes, so we cannot test the "bang-bang" implication of their argument.

[38] See Meyer (1995) for a methodological discussion of natural and quasi-experiments.

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Chart 1
Evolution of Non-Agricultural Self-Employment
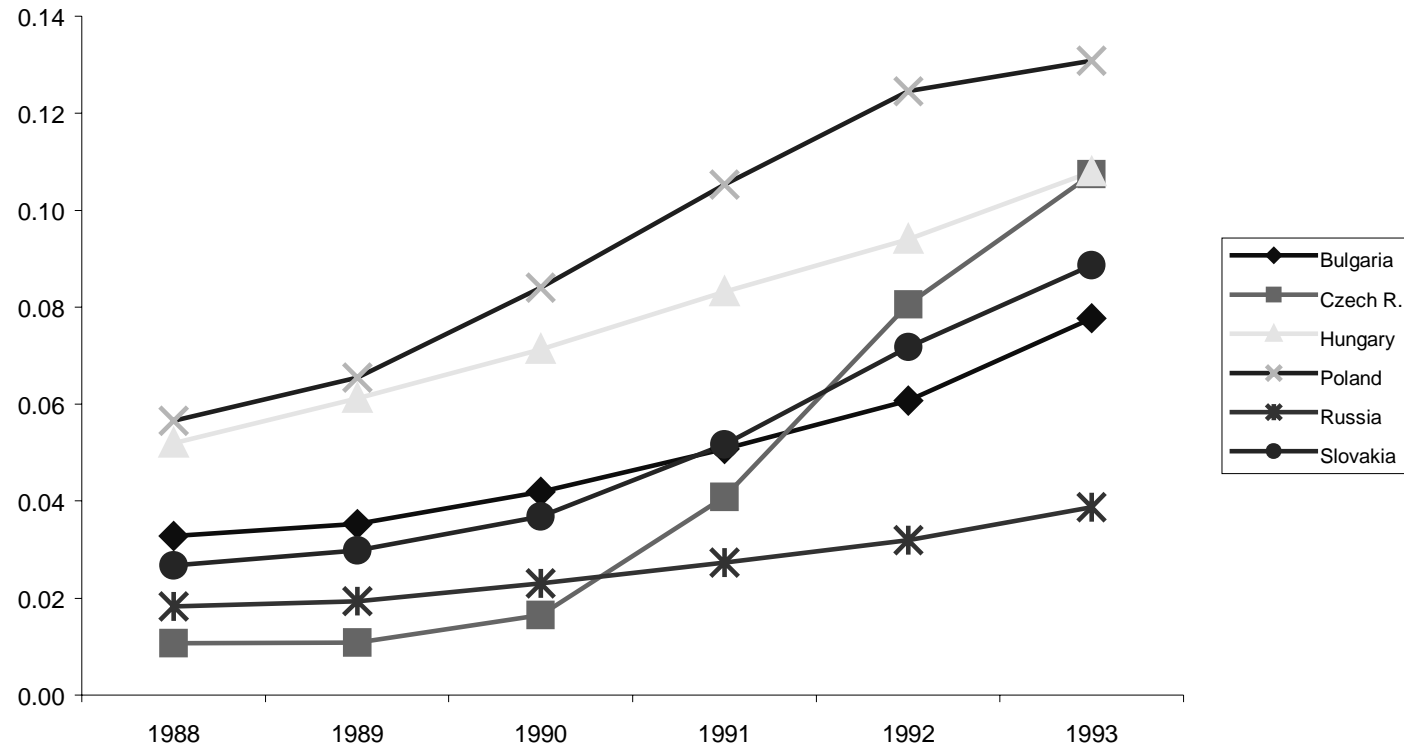
Note: Non-agricultural self-employment rates are computed for each country assuming a constant 1993 age structure.

Table 1
Number of Observations

	Bulgaria	Czech R.	Hungary	Poland	Russia	Slovakia	Total
Total N	4907	5620	4286	3520	4734	4876	27944
of which							
N of non-agricultural employed	2374	3300	2052	1854	3032	2799	15411
of which							
N with non-missing self-employment variable	2293	3287	2037	1850	3022	2781	15271
of which							
N excluding self-employed in 1988	2250	3285	1954	1771	2977	2771	15012
of which							
N with non-missing wage variable	1791	3147	1682	1419	2669	2400	13108

Table 2
Monthly Earnings by Self-Employment Status and Country

		Employee	Self-Employed
Bulgaria	Mean	2261	3910
(Lev)	Std Deviation	1434	3184
	(N)	(1705)	(86)
Czech R.	Mean	4097	7771
(Czech Koruna)	Std Deviation	5029	16349
	(N)	(2845)	(303)
Hungary	Mean	15820	22118
(Forint)	Std Deviation	10222	26613
	(N)	(1642)	(40)
Poland	Mean	3750	6290
(Zloty)	Std Deviation	2630	6128
	(N)	(1290)	(129)
Russia	Mean	27544	139630
(Ruble)	Std Deviation	33267	397426
	(N)	(2601)	(68)
Slovakia	Mean	4140	8945
(Slovak Koruna)	Std Deviation	4695	24623
	(N)	(2225)	(175)

Table 3
Sample Characteristics by Self-Employment Status

		Employee	Self-Employed
Demographics	Male	0.50	0.69
	Majority Nationality	0.90	0.90
	Age (yrs)	40.52 (11.24)	37.73 (9.59)
	Single	0.23	0.18
Family Background	Parent's Higher Education	0.20	0.29
	Large Business	0.01	0.03
Human Capital	Schooling (yrs)	12.00 (3.11)	12.91 (2.91)
	Experience (yrs)	20.46 (11.55)	16.71 (9.63)
	Side Business in 1988	0.04	0.06
Attitudes	Self-Reliance [N(0,1)]	-0.02	0.14
	Risk [N(0,1)]	-0.01	0.27
Financing Ability	Restitution	0.10	0.14
	Income in 1988 [N(0,1)]	-0.03	0.18
Communist Party	Member	0.09	0.10
	Officer	0.04	0.04
Local Economy	Capital	0.11	0.16
	Unemployment Rate	9.33	9.71
Sector	Services	0.46	0.66
	Industry	0.36	0.13
	Construction	0.08	0.13
	Transport	0.10	0.07
Work Schedule	Full-time	0.97	0.93

Note: Except where noted, all variables are dummies. Standard deviations shown in parentheses for continuous variables except for normalized variables(denoted [N(0,1)]).

Table 4
Earnings Functions

Independent Variables	Employee		Self-Employed	
	Coeff.	t-value	Coeff.	t-value
Constant	-1.486	-34.2	-1.081	-4.3
Male	0.219	18.7	0.308	4.0
Majority Nationality	0.051	3.4	-0.139	-1.5
Schooling	0.042	25.3	0.027	2.5
Experience	0.019	13.3	0.025	2.5
Experience squared/100	-0.035	-10.1	-0.057	-2.1
Capital	0.096	6.6	0.321	4.0
Selection terms interacted with country dummies				
λ_S*Bulgaria			3.934	2.1
λ_S*Czech Republic			0.153	0.2
λ_S*Hungary			1.561	0.8
λ_S*Poland			0.615	0.5
λ_S*Russia			5.838	1.8
λ_S*Slovakia			1.397	1.4
λ_E*Bulgaria	2.131	5.9		
λ_E*Czech Republic	1.015	5.5		
λ_E*Hungary	0.839	2.9		
λ_E*Poland	1.967	7.3		
λ_E*Russia	5.379	10.4		
λ_E*Slovakia	1.497	6.1		
Adjusted R^2	0.222		0.155	
N	12469		834	

Note: λ refers to computed selection bias terms (Inverse Mill's Ratio) computed for each sample. Also included were dummy variables representing four sectors, six countries and full-time schedule.

Table 5
Structural Probit Estimates

Independent Variables	Dependent Variable: Self-Employed in 1993		
	Coeff.	t-value	dF/dx
Constant	-2.693	-11.9	
Male	0.221	6.4	0.026
Majority Nationality	0.249	3.1	0.026
Age	0.010	0.9	0.001
Age squared/100	-0.023	-1.2	-0.018
Single	-0.147	-3.7	-0.018
Parent Education	0.203	4.1	0.022
Large Business	0.288	2.3	0.031
Schooling	0.044	5.3	0.005
Side Business in 1988	0.197	2.6	0.024
Self-Reliance	0.085	4.8	0.008
Risk	0.131	7.0	0.014
Restitution	0.087	1.7	0.011
Income in 1988	0.085	5.1	0.008
Member	-0.087	-1.5	-0.010
Officer	-0.040	-0.5	-0.002
Capital	-0.295	-4.0	-0.029
Unemployment rate	-0.008	-1.6	-0.001
Czech Republic	0.004	0.0	0.005
Hungary	0.326	2.9	0.039
Poland	0.220	1.5	0.023
Russia	-1.635	-4.4	-0.101
Slovakia	-0.086	-0.7	-0.008
log(w_S/w_E) interacted with country dummies			
log(w_S/w_E)*Bulgaria	1.048	3.49	0.101
log(w_S/w_E)*Czech Rep.	1.945	6.40	0.199
log(w_S/w_E)*Hungary	0.789	2.31	0.079
log(w_S/w_E)*Poland	0.924	2.35	0.107
log(w_S/w_E)*Russia	1.733	4.00	0.206
log(w_S/w_E)*Slovakia	2.048	6.05	0.215
Log Likelihood	-3388.04		
Chi-squared	682.24		
N	15258		

Note: dF/dx is the marginal effect evaluated at the mean of x's for the continuous variables, and the difference in probability associated with a change in the variable from 0 to 1 for discrete variables, in both cases evaluated at the mean of the other variables. Bulgaria is the omitted country dummy.

Table 6
Mean Predicted Self-Employment Probability and Wage Differential,
By Country

	Bulgaria	Czech R.	Hungary	Poland	Russia	Slovakia
Predicted Probability of Self-Employment	0.093	0.162	0.131	0.121	0.007	0.154
$(w_S - w_E)/w_E$	0.159	0.440	-0.026	0.527	1.226	0.296

Note: Predicted probabilities of becoming self-employed are calculated from structural probit for each individual. Predicted wages calculated for each individual based on the regression estimates reported in Table 4.
w_S = predicted wage as self-employed
w_E = predicted wage as employee