

# **Institutions, Social Capital and Agricultural Change in Central and Eastern Europe**

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## **Abstract**

Data from a survey of agricultural stakeholders are used to demonstrate that institutions and social capital play an important role in agricultural success in Central and Eastern European Countries (CEECs). Protection of private property, freedom of exchange, consistency in monitoring environmental laws, governments that act neutrally and are not corrupt, and trust all contribute to agricultural success. We conclude that, given the importance of agriculture in CEEC economies and the size of agricultural subsidies in the EU, substantial improvements in economic institutions and social capital are still required in most CEECs.

**Key words:** Institutions and social capital; agricultural success

**JEL Category:** O 17, O 52

# **Institutions, Social Capital and Agricultural Change in Central and Eastern Europe**

## **1. Introduction**

On December 13, 2002, European Union (EU) Heads of State agreed on a formula for enlarging the EU by ten new members as of May 1, 2004. The countries to be added are Cyprus, Malta, Poland, Hungary, Estonia, Latvia, Lithuania, Slovenia, the Czech Republic, and the Slovak Republic (Slovakia). The latter eight, together with Bulgaria, Romania, Croatia and the Ukraine, are collectively referred to as the Central and Eastern European Countries or CEECs. Discussions concerning future membership in the EU of Croatia, Bulgaria and Romania have been underway since 1999, while Turkey's application for membership has been on hold because it fails to meet minimum requirements related to democracy and minorities. To become a member, each country must adopt the existing body of EU law – the *acquis communautaire*. Even for those scheduled to join the EU in 2004, adoption of the *acquis* has not yet been fully accomplished (European Commission 2002a, 2003).

In the CEECs, agriculture poses a particular challenge to adoption of the *acquis*, because a much higher proportion of the workforce of CEECs is engaged in agriculture (21.5% of the workforce in the CEECs compared to 4.3% in the EU-15). Accession by the CEECs also was resisted by some of the existing EU states on account of the Common Agricultural Policy (CAP). Simply expanding agricultural subsidies to new members would require significant income transfers to new members, thereby imposing too great a financial burden on the EU. Since any significant reduction in direct agricultural support payments to EU-15 producers and/or a loss of regional-development payments to extant countries, such as Spain, would likely lead to a backlash against potential entrants, a compromise decision on financing was reached. This decision included the phasing in of direct agricultural

payments, starting at 25% of the present EU payment in 2004, rising by five percentage points each year to 2007, and thereafter by 10 percentage points to 2013 when it reaches 100% of the support level available to current EU countries (European Commission 2002b). In the late 1990s, agricultural support payments in the EU were more than double those of the CEECs (Davidova and Buckwell 2000, pp.18-19), although some convergence in agricultural policies has since taken place (European Commission 2002a).

In this study, we use results from the Sustainable Agriculture in Central and Eastern European Countries (CEESA) Project (under the EU's 5<sup>th</sup> Framework Programme) to investigate how institutions and social capital affect performance of the agricultural sectors in twelve CEECs. In particular, given that countries such as Poland continue to experience difficulty in implementing the *acquis* as it pertains to agriculture (European Commission 2003), we want to know why some CEECs have been more successful than others in moving towards an agricultural sector that typifies that found in the West. Since "neither proper assessment of the economic situation nor good policymaking are possible without the support of adequate quantitative information" (Rose and Haerpfer 1994, p.5), we employ secondary data plus data from a survey instrument.

We begin our investigation in the next section by providing a theoretical context for the empirical analysis. The empirical models and data we employ for determining agricultural success in Central and Eastern Europe are described in section 3, while the statistical findings are provided in section 4. Conclusions follow in section 5.

## **2. Framework for Analyzing Agricultural Development**

Economists have long been interested in factors that contribute to economic development. The emphasis on pure economic explanations for economic development – namely monetary and fiscal policies, and trade policy – has shifted to focus on the role of cultural, historical, social and institutional factors (North 1990, 1994; Woolcock 1997;

Shleifer and Vishny 1998; Easterly 2001). The problem was not that economic explanations were inappropriate, but rather that they were incomplete. For a democratic market economy to function properly, or for market-oriented economic policies to have effect, three criteria or factors other than markets and private property are required (Fukuyama 2002).

### **Economic Institutions**

A country must have a set of institutions within which policy change can occur. Institutions consist of formal rules (constitutions, laws and property rights) that constrain political, economic and social interactions, and include such things as commercial and criminal courts. Unlike cultural constraints (see below), they are human-made and can thus be changed by government. But economists have often ignored institutions, while existing institutions have not always being the right ones (Bromley 1999, p.3). Recent research in economic development now stresses the need for good institutions, as some institutions retard rather than promote growth (La Porta et al. 1999).

In agriculture, the most important formal rules probably concern property rights over land and water. It is not possible, for example, to implement conservation easements on private agricultural land if private property rights are not enforceable and upheld by the courts (Barichello et al. 1995). Without the ‘right’ institutional environment, farmers are unlikely to be concerned about how their farming operations affect the future quality of the land and soil; they need to have a stake in the land (or feel morally obliged to do ‘the right thing’), or somehow be ‘coerced’ to take future land quality into account. Where the required institutions are lacking or nonexistent, it is usually not possible to use economic incentives to get agricultural producers to use less chemicals, to protect wildlife habitat, and so on. In the absence of appropriate property rights and their protection, farmers need to rely on personal networks rather than the rule of law, but this increases transaction costs relative to the situation where the pertinent institutions are in place.

In some jurisdictions agricultural land continues to be largely publicly owned, and farming may, in some cases, be performed by state-owned enterprises or collective farms. In other jurisdictions, sole proprietor (family) farms dominate. For economies in transition, both extremes of state ownership and single-family farms can be a problem. In Poland, for example, small family-owned farms dominate, but farms are too small to take advantage of economies of scale; then institutional arrangements will be needed to ensure farmers can efficiently contract with one another to achieve needed economies of size (e.g., to take advantage of large tractors or combines). In the Ukraine, on the other hand, state-run farm enterprises continue to exhibit inefficiencies caused by lack of incentives, incompetence, corruption, and so on. We postulate that those CEECs (such as the Czech Republic) that have transformed former collective farms and/or state farm enterprises into private agricultural enterprises have experienced better relative performance in their agricultural sector than other CEECs, because larger privately-owned farms can and will take advantage of economies of size. Thus, these countries should have experienced greater economic development of their agricultural sector.

### **Role of the State**

Second, economic policies can only be carried out by the state, but the state must be limited in scope and yet able to enforce the rule of law, competent and sufficiently transparent in formulating policy, and with enough legitimacy to be able to make painful decisions. The role and performance of government is essential to economic development (La Porta et al. 1997; Olson 1996). Good governments protect property rights and individual freedoms, keep regulations on businesses to a minimum, provide an adequate (efficient) level of public goods (e.g., infrastructure, schools, health care, police protection, court system), and are run by bureaucrats who are generally competent and not corrupt (La Porta et al. 1999). Unfortunately, regulatory agencies often prevent entry, courts resolve disputes

arbitrarily and sometimes dishonestly, and politicians use government property to benefit their supporters rather than the population at large (Shleifer and Vishny 1998, p.8).

In this study, it is assumed that, if determinants of good government can be identified, they can be used to judge government performance related to the agricultural sector: what is good for economic development is good for agriculture. We postulate (and later test) that the economic success of a country's agricultural sector will depend on the institutional environment, with institutions that encourage markets and lead to good government contributing more to agricultural development than other institutions.

### **Social Capital**

The third factor is “the proper cultural predispositions on the part of economic and political actors” (Fukuyama 2002, p.24). The ‘cultural factor’ constitutes informal constraints (sanctions, taboos, customs, traditions, and norms or codes of conduct) that structure political, economic and social interactions. Informal constraints are commonly referred to as ‘social capital’, which is “the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups of individuals bring to a recurrent activity” (Ostrom 2000, p.176). It refers to “features of social organizations, such as networks, norms, and trust, that facilitate action and cooperation for mutual benefit” (Putnam 1993, pp. 35-36).

Social capital can be thought of as having an individual and an aggregate component (Gelauff 2003). Individual social capital consists of intrinsic aspects (charisma, values) and aspects in which one can invest (trustworthiness, personal networks), although the two types are difficult to separate. Aggregate social capital, on the other hand, constitutes the total of the social capital of the individuals in society, varying by form (trust in people, trust in government, level of participation in society), place (firm, region in a city or country, neighborhood) and group (ethnic and religious groups, service organizations, sport

associations, gangs). The manner in which the social capital of individuals is aggregated is not clear, and therefore it is difficult for society to invest in aggregate social capital. How does a society invest in culture, except by somehow affecting individuals who do the investing? For example, society can encourage couples to stay together longer by making divorce more difficult, or encourage church attendance by providing greater tax incentives for tithing, but both actions fail to address culture directly.

Trust is perhaps the most important component of social capital: “Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time” (Dasgupta 2000, p.329). Trust is related to institutions and affects the costs of transacting: If one’s confidence in an enforcement agency falters, one may not trust people to fulfill their agreements and fewer agreements are entered into. There is an element of trust in any transaction where one has to decide (make a choice) before being able to observe the action of the other party to the transaction. One has to assume that the other person is not acting with guile, keeping hidden information that can be used to their advantage at the expense of the other party to the transaction. Like other components of social capital, trust makes an economy function more efficiently (Fukuyama 1999, pp.240-42).

In addition to trust, other elements of social capital include social norms, or behavioral strategies (always do  $p$  if  $q$  occurs) subscribed to by all in society, and networks of civic engagement (membership in swim clubs, church organizations, etc.) that enhance cooperation. Ostrom and Dasgupta (2001) provide a number of examples that demonstrate how social norms of reciprocity and trust have guided agricultural arrangements for centuries.

When it comes to agricultural development in the CEECs, it is important to consider trust, shared norms (social beliefs), and social networks – social capital. Practices that were

common under communism may now be a barrier for economies in transition. For example, workers on state dairy farms in the Ukraine simply took milk and whatever else they needed, often selling these items to relatives or acquaintances, in lieu of wages that were often not paid.<sup>1</sup> Although ‘acceptable’ under communism, such practices and attitudes undermine the transition to a market economy.

### 3. Modeling Agricultural Success in Central and Eastern Europe

In anticipation of entry into the EU, many countries in central and eastern Europe have adopted certain EU laws directly, and even implemented many of the EU’s agricultural policies, although subsidy levels generally remain below those in the EU (Hartwell and Swinnen 2000). Despite a desire and attempt to implement the *acquis*, economic success in agriculture has not followed (European Commission 2003) – the needed policies do not seem to work as well as they do in western Europe. One reason is that the level of social capital is lower in the CEECs than in the EU-15 and needs time to build up, so the benefits of policy changes are not as strong as they are in the EU.

In this study, we examine the role of institutions and especially social capital in explaining why the agricultural sectors in some CEECs have performed better than those in other CEECs. To do so, we employ three simple ordinary least squares (OLS) regression models plus a logistics model. The OLS models are as follows:

$$y_{ij} = \alpha_{0i} + \alpha_{1i} x_{1j} + \dots + \alpha_{ni} x_{nj} + \varepsilon_{ij}, \quad (i = \text{model 1, model 2, model 3}) \quad (1)$$

where  $y_{ij}$  is a variable measuring the ‘success’ of agriculture,  $x_{ij}$  are institutional, social capital and control variables explaining ‘agricultural success’,  $\alpha_{ki}$  ( $k=1, \dots, n$ ) are parameters to be estimated,  $\varepsilon_{ij} \sim N(0, \sigma)$  are normally distributed error terms, and  $j$  refers to the twelve CEECs in our study. In the first model, we measure agricultural success ( $y_1$ ) by

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<sup>1</sup> An economist from the Ukraine visiting Wageningen University in Spring 1996 related this story.

the change in agriculture's share of GDP between 1990 and 1998. In the second model, agricultural success ( $y_2$ ) is measured by the change in agriculture's share of total employment between 1990 and 1998, while, in the third, agricultural success ( $y_3$ ) is the average annual growth in agricultural value added as a proportion of GDP between 1989 and 1999.<sup>2</sup>

Control variables are incorporated to take into account differences in the stages of development of various countries, and include income or GDP per head, growth in GDP, inflation, public debt, farm size, and so on. The other explanatory variables address the role of institutions and social capital. These include an index of trust in government, an index of trust in persons, an 'index of the effectiveness of environmental laws', an 'index of property rights protection in agriculture', participation in civic organizations (clubs, churches, etc), and an index of perceived government corruption. A list of explanatory variables, their expected signs and an explanation of the expected signs is found in Table 1.

<Insert Table 1 about here>

Any variables explaining economic development would probably have a negative impact on the 'success of agriculture' variable employed in regressions (1). The reason is that, if social capital does indeed lead to greater economic growth, the role of the agricultural sector can be expected to decline relative to the rest of the economy. Hence, the share of GDP accounted for by agriculture would be lower. Likewise, if unemployment in the economy rises, say because a country is less successful in making the transition from a communist economy to a market one, workers will turn to relatives living on farms to find

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<sup>2</sup>Certain agricultural data are not readily available. Thus, we employ data from Tanic et al. (2001) and Hagedorn et al. (2001) collected as part of the current research project under the EU's 5<sup>th</sup> Framework Programme. This explains the different time periods for  $y_2$  and  $y_3$  as opposed to  $y_1$ .

employment; agriculture is often an employer of last resort.

The fourth model is similar to the others, except that it employs a logistics function to model the success of agriculture. In this case, the dependent variable,  $y_4$ , is an index of success that takes on values between 0 (the agricultural sector's development since the collapse of communism is judged to be a complete failure) and 1 (total success). Thus,  $y_4$  can be interpreted as the likelihood of success. The regression model has a logistics functional form that can be estimated using OLS as follows:

$$\ln\left(\frac{y_4}{1-y_4}\right) = \alpha_{04} + \alpha_{14} x_{1j} + \dots + \alpha_{n4} x_{nj} + \varepsilon_{4j}, \quad (2)$$

where the dependent variable is expressed as a log-odds.

The expected signs on the explanatory variables in Table 1 will differ for the fourth model because agriculture's success is no longer considered to be relative to the rest of the economy – it is a pure index of success. Therefore, 'change in GDP per head', 'inflation', 'country debt', 'government debt', 'corruption', 'trust in people', and 'trust in government' are expected to have signs opposite those in Table 1. The effect of farm size on the likelihood of success should be positive, while the effect of strong environmental laws is unknown a priori. It may well be that, since they act as constraints on what farmers can do and thus reduce uncertainty, their effect on agricultural success is positive; it could also be that, because farmers need to spend money (forgo production) to address environmental concerns, their effect is negative. Protection of property rights, including enforcement of contracts that farmers enter into, should have a positive effect on the agricultural sector.

#### **4. Data for Central and Eastern European Countries**

In order to analyze our proposition that institutions and social capital are an important driver of agricultural performance, we employ secondary data from a number of sources as well as data from a survey of selected agricultural stakeholders conducted under

the auspices of the CEESA Project. The CEESA Project involved many researchers from the EU and partners (sometimes referred to as sub-contractors) representing each of the CEECs. The partners provided country-level data not available from other sources, identified appropriate agricultural stakeholders in each country (which were supplemented with a list of CEEC agricultural experts who had attended agricultural conferences or workshops in the EU or were members of an international agricultural scientific association), and administered the survey. Construction of the survey instrument itself was a collaborative effort that received input from all of the researchers and CEEC partners. As a result, the actual questionnaire was quite lengthy, containing much information not relevant to the current research.<sup>3</sup>

### **Country Overviews: Control and Dependent Variables**

The ‘control’ variables employed in the model are provided in Table 2. Slovenia has the highest per capita GDP (see column 1) followed by the Czech Republic and Hungary, while the Ukraine and Bulgaria have the lowest per capita GDP, about one-third as much as that of the richer CEECs. Change in GDP over the period 1989 to 1999 (col. 2) indicates that, with the exception perhaps of Croatia and Latvia that have shown some recovery in the past few years, the low-income countries had generally failed to show signs of recovery during the transition from communism to a market economy, and economic output in all the poorer CEECs remained in 1999 significantly below what it was in 1989. Measured economic output in the richer countries in 1999 was about what it was in 1989, with the exception of Poland, which had managed to increase output by some 30% above what it was in 1989.

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<sup>3</sup> The survey instrument can be found in an Appendix to the EU D5 report; a detailed descriptive overview of responses is available in Suchánek et al. (2001).

<Inset Table 2 about here>

Public debt (col. 5, Table 2) varied from a high of 81.5% of GDP (Bulgaria) to a low of 15.3% for Estonia, while government spending as a proportion of GDP (col. 6) varied from 10.4% (Hungary) to 26.8% (Croatia). Average government debt was lower than in the EU-15, while public spending as a proportion of GDP was generally significantly lower in the CEECs than in western European countries. With the exception of the Ukraine, all the CEECs in Table 2 experienced a current account trade deficit (data not provided), which was not outside the realm of experience in more developed countries and was offset to some extent by foreign direct investment (FDI) (col. 7). The Czech Republic is the largest recipient of FDI in 1999, both in total and on a per capita basis, partly because of its institutional environment, level of social capital and general economic freedom (see below).

The unemployment rate (column 4, Table 2) was highest in Croatia (22%) followed by Slovakia (19%). The latter is somewhat surprising given that the Czech Republic had one of the lowest unemployment rates and that the economy of Slovakia was doing reasonably well. Likewise, it is surprising that Romania and the Ukraine had the lowest unemployment rates (except for Hungary), despite economies that were not performing well; indeed, per capita GDP in the Ukraine had fallen by nearly half in the past decade and corruption remained rife. Reasons, perhaps, why unemployment rates had remained low are that Romania and the Ukraine had high inflation rates (col. 3, Table 2), and public sector employment (including on collective farms) remained high.

Finally, average farm size is provided in the last column of Table 2. Information on number of farms and farm size is available by farm type (Tanic et al. 2001). In terms of numbers, family farms and household plots dominate in all countries; if actual area of land is taken into account, they accounted for more than half of the agricultural land area in eight

of the twelve countries in this study. With the exception of the Baltic States, household plots average about 0.5 ha. Large numbers of small family farms dominate the agricultural landscape, especially in Romania, Croatia and Poland, where such farms averaged 2.1 ha, 5.2 ha and 7.0 ha, respectively. Small farms prevent achievement of economies of size needed to support high incomes, while large numbers of producers on small farms have the potential to create a problem for agricultural policy under an expanded European Union.

Collectivization of farms began in the Ukraine, as elsewhere in the Soviet Union, in the late 1920s and continued throughout the 1930s until 97% of all peasant households had been collectivized and private ownership of property almost entirely eliminated. Because of the opposition to and cruelty of the collectivization process, the experience of the other CEECs was different because they did not fall under communism until the mid 1940s. The extent and type of collectivization of agricultural land varied from one country to another, depending on the government in power. In Czechoslovakia, for example, landowners never lost ownership of their property under communism, but were simply forced to merge their holdings into larger entities (cooperatives at the time) and produce what the government demanded. When communism ended, unraveling of assets became difficult and some owners simply became shareholders in corporate farms rather than farmers. In countries such as Hungary and Poland, private land holdings continued, but lack of markets during the communist era prevented consolidation and rationalization.

The advantages that countries with large, potentially efficient farm enterprises might have in meeting EU rules and/or competing effectively in the future depend on social capital. In the Ukraine and Bulgaria, a culture of cronyism and corruption is associated with the vestiges of communism and government corruption during the inter-war period. As a result, market signals are not the most important, determinant in decision-making in agriculture even today. In contrast, corporate and cooperative farms in the Czech Republic

and Slovakia are run as private businesses that rely on market signals for decision-making.

The dependent variables employed in the model are provided in Table 3. These also provide an indication of the role of agriculture in the economy of the CEECs. The agricultural sector in Bulgaria accounted for the highest proportion of GDP of any CEEC in 1998, followed by that of Romania; however, only agriculture in Bulgaria increased as a proportion of GDP between 1990 and 1998. As expected, agriculture also plays an important role in the economies of the Ukraine and Lithuania, both countries with a low GDP. The share of agriculture in employment was greatest in Romania, followed by Poland, Bulgaria and the Ukraine (Table 3). This is surprising only for Poland as it is a relatively well-off country, but again there are quite a few small farms in Poland.

<Insert Table 3 about here>

Employment in agriculture relative to the rest of the economy rose between 1990 and 1998 in half of the twelve CEECs, suggesting that agriculture is an employer of last resort, with those losing jobs in the non-agricultural sector returning 'home' to the farm to find work.

Finally, the average annual growth of agricultural value added as a percent of GDP over the period 1989-1999 is provided in the last column of Table 3. For both Latvia and the Ukraine, the decline in agricultural value added averaged more than 6% per year, while the Czech Republic and Romania experienced increases in agricultural value added as a proportion of GDP.

### **Institutional Environment and Social Capital**

In this subsection, we examine those variables that constitute our measures of the institutional environment (rules of law, enforcement, monitoring) and social capital (trust,

perceptions of corruption). An excellent summary measure of the institutional environment is the index of economic freedom (Gwartney et al.). Indexes for 1999 are provided in column (1) of Table 4 for each of the CEECs. Data on personal choice, protection of private property and freedom of exchanges are used to construct the index, which ranges from 0 (least economic freedom) to 10 (greatest economic freedom). The economic freedom index was used to rank 116 countries in 1990 and 123 countries in 1999.

To provide an indication of the position of the central and eastern European countries relative to other countries in the 1999 ranking, Hungary is ranked equivalent to South Korea and Uganda using the general index, Lithuania equivalent to Mexico, Slovakia to Zambia and Kenya, and Slovenia to Turkey. Based on a more detailed index of economic freedom (not available for all CEECs and hence not reported here), Bulgaria scores the same as Brazil, the Czech Republic the same as Turkey, and Poland and Slovakia as equals of Columbia. Note that the Ukraine and Romania have the least economic freedom (and are even on the low end compared to the rest of the world), while Hungary, the Czech Republic and the Baltic States have the most economic freedom of CEECs.

A comparison of economic freedom over time is only available for six of the CEECs, because some of the central and eastern European countries were still emerging as separate countries at the time the 1990 index was compiled. This is certainly true of the Baltic States and the Ukraine, which were in the process of separating from the collapsed Soviet empire, and Slovenia and Croatia, which were being carved out as a result of civil war in Yugoslavia. Data for 1990 for the Czech Republic and Slovakia are based on a united Czechoslovakia. Nonetheless, the available data on economic freedom for 1990 (not reported here) and 1999 indicate that there has been a tremendous increase in economic freedom in the CEECs during the 1990s.

Respondents to our questionnaire were asked whether or not their government

generally acted in a neutral fashion; a 5-point scale was used, with 5 representing the greatest confidence that government actions are neutral. Country-level average values are provided in column (2) of Table 4. As expected, there appears to be a weak inverse relationship between this measure and per capita GDP (see Table 2). Together with the index of economic freedom, the ‘government is neutral’ variable is used to represent the ‘effectiveness of private property rights’ variable in Table 1.

<Insert Table 4 about here>

Two additional measures of the institutional environment for agriculture are related to the monitoring and enforcement of environmental laws in agriculture, both of which are constructed from our survey. We asked a number of questions about monitoring and enforcement of environmental laws dealing with soil, air, water and nature in each of the twelve CEECs using a scale that runs from 1.0 (no monitoring or enforcement) to 5.0 (strong monitoring or enforcement). The responses were averaged for each of the monitoring and enforcement measures, and are provided in columns (3) and (4), respectively, of Table 4. With some exceptions (principally Lithuania), monitoring and enforcement of environmental laws are inversely related to per capita GDP. Poorer countries in central and eastern Europe are more lax about monitoring and enforcing environmental regulations, and thus one would expect their agricultural sectors to be less sustainable and thus less successful.

We employ three measures of social capital, two of which come from our survey. Indexes of trust in government and of trust in fellow citizens are available from responses to questions in the stakeholders’ survey. Both measures range from 1 (total lack of trust) to 5 (complete trust). The respective, country-average trust indexes are provided in columns (5)

and (6) of Table 4.

Finally, Transparency International (2001) in Berlin develops an annual corruption perceptions index (CPI). It is based on data from 14 sources (surveys of businessmen, the general public and country analysts) from seven independent institutions (see Lambsdorff 2001a, 2001b; The Economist). The CPI ranges from 10 (highly clean) to 0 (highly corrupt). Finland (CPI of 9.9) appears to be the least corrupt country and Nigeria (1.0) possibly the worst, with the 12 central and eastern European countries in our study falling in the middle to the low end of the scale. Estonia is the least corrupt of our CEECs and Ukraine is the most corrupt. Since the 2001 CPI is the same for several CEECs, we employ an average of the 2000 and 2001 CPIs. It is provided in column (7) of Table 4.

#### **4. Empirical Results**

Our objective here is to determine whether institutions and social capital affect the performance of the agricultural sectors in central and eastern European countries. Due to the nature of the econometrics (country-level observations cannot be regressed on stakeholder responses due to incompatibility of the left and right hand sides of the equations), the regressions use only limited summary data from our survey. We use regression analysis to test for a statistical relationship between performance of countries' agricultural sectors and measures of the institutional environment and social capital. In practice, measures based on expressed opinions can be used as explanatory variables in regression analysis, but they themselves cannot generally be regressed on secondary data (Bertrand and Mullainathan 2001).

The dependent variables that we use to represent 'performance' in the agricultural sector are: (1) the change in agriculture's share of GDP between 1990 and 1998, (2) the change in agriculture's share in employment over the same period, and (3) the average growth in value added by agriculture as a percent of GDP over the period 1989-1999. The

values for these variables are found in Table 3.

We also constructed an index of agricultural performance using data from the survey of country subcontractors. It is based on responses to the following questions:

- i. Does your country have an established Farm Accountancy Network following EU guidelines? The response is binary, with a value of 1 representing a ‘yes’ response. If the respondent indicated that their country employed a system similar to the EU one, a score of 0.5 was assigned; if the respondent indicated that their country was on the verge of establishing such an accountancy network, a score of 0.75 was given.
- ii. What proportion of agricultural output is accounted for by state enterprises?
- iii. What proportion of total employment is accounted for by the agricultural sector?
- iv. What proportion of total land ownership is in private hands?

Responses to the latter three questions have a value between 0 and 1. The dependent variable – index of agricultural performance (IAP) – is constructed as

$$IAP = 0.25 [i + (1 - ii) + (1 - iii) + iv]. \quad (3)$$

The IAP is not based on opinion questions and takes on values between 0 (poor performance) and 1 (excellent performance). It measures the success or extent to which a country’s agricultural sector deviates from that found under a communist system. Clearly, some countries had progressed further towards communism in agriculture than others, so this static measure fails to address the dynamics within the sector since 1990. Nonetheless, in the absence of another measure of ‘performance’, we feel that ‘nearness to an EU-type sector’ is the best measure available. Values of the index of agricultural performance are provided in Table 5.

<Insert Table 5 about here>

Each of the four dependent variables was regressed on the 15 explanatory variables described in Table 6. (Variables 9, 10, 13, 14 and 15 in Table 6 are derived from the survey of stakeholders.) Many of the variables are described above. Since the number of observations is 12, it was impossible to enter all 15 explanatory variables at one time and a step-by-step regression procedure was employed. For each model, explanatory variables were introduced one at a time in the order given in Table 6. If the t-statistic on an entered variable was less than 1.0, the variable was removed in the next step. (The intercept term was always included in the regressions.) The order for entering variables was specifically chosen so control variables entered before institutional and social capital variables to ensure that the latter were the true drivers of agricultural success. The final regression results are provided in Table 7.

<Insert Tables 6 and 7 about here>

Interestingly, the institutional environment and social capital are the most important factors explaining success in agriculture, regardless of how success is measured. Of the control variables, only public debt (model #1), foreign direct investment per person (models #2 and #4), change in GDP between 1990 and 1999 (model #3), and farm size (model #4) – four of eight variables – are important in explaining agricultural success in the central and eastern European countries being considered for membership in the EU. Of the institutional environment and social capital variables, trust, economic freedom, perceived corruption and the extent to which the government is perceived as being neutral are the most important factors explaining economic success – or six of seven potential variables. The economic freedom index and perceptions about government neutrality are used to represent the ‘protection of private property’ variable in Table 1.

Consider each of the models in turn. Public debt, economic freedom, and trust in government explain the change in agricultural output as a proportion of GDP. From Table 1, the signs on the three entered explanatory variables are as predicted for two of the variables. Greater public debt (+ sign) and less economic freedom (– sign) result in lower overall economic growth, causing agricultural output to increase relative to output in other sectors. We postulated that, as trust in government increases, workers would move out of agriculture into other sectors, thus reducing agricultural output and increasing output in other sectors. The empirical results show an opposite relationship, but this might be due to the fact that government plays a bigger role in agriculture than in other sectors of the economy. An expressed trust in government therefore implies that public policies will tend to favor the agricultural sector, perhaps to the detriment of other sectors, causing agriculture’s share of GDP to increase.

In model #2, the signs on foreign direct investment and trust in people are as expected (see Table 1), but the sign on perceived corruption (a lower score implies higher perceived corruption) is opposite what is expected. However, neither perceived corruption nor trust is statistically significant.

In model #3, change in GDP is statistically significant but has an estimated coefficient that is opposite in sign to what is predicted in Table 1. An interpretation opposite that given in Table 1 is that agriculture is an economic driver in developing countries, with an increase in agriculture’s share of total value added not unexpected as the economy grows. Trust in people has the correct expected impact. The predicted impact of property rights protection is unclear (Table 1), and this appears to be supported by the evidence. In the regression, the estimated coefficients on economic freedom and ‘the perception that government acts neutrally’ have opposite signs, although the sign on the latter is statistically insignificant.

Finally, model #4 is perhaps the easiest to interpret, because the index of success is not directly related to GDP. As expected, higher levels of foreign direct investment per head will increase success in the agricultural sector. Increased farm size reduces success, but that is because countries such as the Ukraine continue to have large, inefficient (even state-run) farms. The larger, efficient farms of the Czech Republic do not offset this impact. Monitoring of environmental laws and higher economic freedom are indicative of institutions associated with capitalistic countries, and lead to greater success in the agricultural sector of CEECs. The perception that government acts neutrally has an opposite impact on agricultural success to what might be expected (as was the case for trust in government in model #1). Perhaps this is because those in agriculture – the stakeholders that answered this question – prefer a government that acts in anything but a neutral fashion towards this sector.

Despite some contrary findings, what the empirical analysis presented in Table 7 indicates is the importance of institutions and social capital in explaining ‘success’ in the agricultural sectors of the CEECs. This finding supports the central theme of this study.

## **5. Conclusion**

It is now well known that institutions and social capital play an important role in economic development. This study demonstrates that this is true even at the sector level and for a small group of countries in central and eastern Europe that are, in many ways, quite similar in terms of their history and culture. In particular, protection of private property and freedom of exchange (components making up the index of economic freedom), consistency in monitoring environmental laws, governments that act neutrally and are not corrupt, and trust in government and people all contribute to agricultural success in central and eastern European countries about to enter, or vying for membership in, the European Union.

If the results of our analysis of agricultural stakeholders and agricultural

performance in central and eastern Europe are any indication, it will be interesting challenge for both the EU-15 and the ten CEECs that have been accepted for membership to integrate the agricultural economies of the latter into an expanded EU. It would appear that substantial improvement in economic institutions and social capital are still required in the CEECs, but it may well be the case that the required improvements can best be accomplished within the EU polity rather than outside it.

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**Table 1: Explanatory Variables and Expected Signs for Models 1, 2 and 3 (Eq. 1)**

<b>Variable</b>	<b>Sign</b>	<b>Explanation</b>
<b>Control variables</b>		
GDP per head	+	Countries with higher GDP are likely more successful in making the transition from communism to a market economy
Change in GDP/head	-	Agricultural success relative to the rest of the economy will be lower for a country that grows faster.
Inflation rate	+	Higher inflation leads to lower overall economic development and a relative increase in agriculture's role.
Unemployment rate	+	Higher unemployment indicates lower non-agricultural GDP, so agriculture's share is higher; it also indicates that more workers will return to the farm to find employment.
Government spending as proportion of GDP	+	Higher debt leads to lower rates of economic development and better relative success of agriculture
Public debt as proportion of GDP	+	Same as for country debt.
Foreign direct investment (FDI) per head	+	FDI is an indicator of how outsiders perceive the investment climate in a country. The higher the degree of FDI, the better the investment climate and the greater is the chance agriculture will thrive.
Farm size	+ (1) + (2) - (3)	Larger farms can take advantage of economies of size, thus leading to higher rates of growth in agriculture (models 1 & 2). Larger farms also mean fewer farms, so less opportunity for unemployed workers to return to family on the farm (model 2)
<b>Institutional environment</b>		
Effectiveness of environmental laws	-	In general, environmental laws can be expected to slow growth of the agricultural sector relative to all other sectors.
Effectiveness of private property laws	?	In general, protection of private property can be expected to boost the agricultural sector as well as other sectors. It is not possible to determine which sector benefits the most.
<b>Social capital</b>		
Corruption	+	General corruption drives people into agriculture to avoid corruption in the rest of the economy.
Trust in people	-	Trust in people leads to greater overall economic success, with lower relative success of agriculture.
Trust in government	-	Trust in government leads to greater overall economic success, with lower relative success of agriculture.

**Table 2: Control Variables Describing the Economy, plus Average Farm Size, Central and Eastern European Countries, 1999**

Country	GDP per capita (\$US) (1)	$\Delta$ in GDP, 1989-99 (2)	Inflation rate (3)	Unemployment rate (4)	Public debt <sup>a</sup> (5)	Gov't. spending <sup>a</sup> (6)	FDI per capita (\$US) (7)	Average farm size <sup>b</sup> (ha) (8)
Bulgaria	6,335	0.76	0.03	0.14	0.815	0.159	98.01	844
Croatia	8,028	0.84	0.04	0.22	0.394	0.268	312.99	170
Czech Rep	12,749	0.97	0.02	0.09	0.423	0.203	497.85	630
Estonia	9,203	0.83	0.04	0.12	0.153	0.237	218.62	123
Hungary	10,361	0.99	0.09	0.07	0.600	0.104	199.28	193
Latvia	9,939	0.58	0.02	0.15	0.417	0.190	147.48	22
Lithuania	9,401	0.68	0.03	0.12	0.399	0.225	132.56	69
Poland	5,752	1.32	0.07	0.14	0.330	0.160	188.31	83
Romania	7,006	0.81	0.46	0.09	0.271	0.147	44.79	417
Slovak Rep	9,475	1.02	0.07	0.19	0.556	0.202	178.40	1,168
Slovenia	13,083	1.09	0.07	0.08	0.279	0.208	33.64	33
Ukraine	7,815	0.41	0.24	0.11	0.408	0.190	9.83	2,208

<sup>a</sup> As a proportion of GDP

<sup>b</sup> Calculated from Tanic et al.

Source: World Bank

**Table 3: Share of Agriculture in GDP and Total Employment, and Change in Agricultural Value Added, by Country, 1998**

Country	Share of agriculture in GDP		Share of agriculture in employment		1989-99 average annual growth in value added <sup>a</sup>
	1998	$\Delta$ 1990-98	1998	$\Delta$ 1990-98	
Bulgaria	0.188	1.062	0.247	1.380	-0.5
Croatia	0.070	0.686	0.024	0.667	-2.5
Czech Rep.	0.018	0.621	0.054	0.458	2.6
Estonia	0.038	0.447	0.068	0.527	-5.0
Hungary	0.052	0.800	0.054	0.412	-3.8
Latvia	0.045	0.213	0.157	1.013	-6.8
Lithuania	0.100	0.362	0.214	1.202	-3.0
Poland	0.042	0.356	0.269	0.989	-0.2
Romania	0.160	0.734	0.356	1.228	0.6
Slovakia	0.044	0.595	0.082	0.683	-1.6
Slovenia	0.034	0.680	0.120	1.043	-0.1
Ukraine	0.105	0.430	0.225	1.154	-6.3

<sup>a</sup> Agricultural value added as a proportion of GDP

Source: Hagedorn, Gatzweiler and Judis; Tanic et al.

**Table 4: Perceptions of Monitoring and Enforcement of Environmental Laws, Indexes of Economic Freedom and Perceived Corruption, Perceptions of Trust, and Perceived Neutrality of Government, Central and Eastern European Countries**

Country	Index of economic freedom <sup>a</sup>	Gov't actions neutral <sup>b</sup>	Indexes pertaining to environmental laws <sup>b</sup>		Trust in: <sup>b</sup>		Perceived corruption index <sup>c</sup>
			Monitoring	Enforcement	People	Government	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bulgaria	5.9	2.500	2.081	1.902	3.071	2.286	3.70
Croatia	5.2	2.231	1.981	1.881	3.538	3.231	3.80
Czech Rep.	6.6	2.708	2.630	2.249	3.250	3.167	4.10
Estonia	7.4	3.250	2.429	2.223	3.625	2.375	5.65
Hungary	7.1	2.500	2.884	1.891	3.714	3.375	5.25
Latvia	7.0	1.800	1.663	1.265	2.800	2.600	3.40
Lithuania	6.5	2.900	2.634	2.992	3.714	3.238	4.45
Poland	5.7	2.909	2.642	1.885	3.500	3.303	4.10
Romania	3.8	2.818	2.257	1.664	3.273	2.636	2.85
Slovak Rep.	6.3	2.833	2.969	2.250	3.583	3.000	3.60
Slovenia	6.2	3.000	2.875	1.792	3.667	3.667	5.35
Ukraine	4.6	2.200	1.725	1.250	3.800	2.400	1.80

<sup>a</sup> Source: Gwartney et al.

<sup>b</sup> Source: Survey

<sup>c</sup> Source: Transparency International

**Table 5: Indexes of Agricultural Performance, Central and Eastern European Countries**

Country	IAP	Country	IAP
Bulgaria	0.63	Lithuania	0.81
Croatia	0.83	Poland	0.82
Czech Rep.	0.88	Romania	0.58
Estonia	0.76	Slovakia	0.82
Hungary	0.94	Slovenia	0.67
Latvia	0.84	Ukraine	0.24

Source: Authors' calculations

**Table 6: Description of Explanatory Variables used in the Regression Models**

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Control variables

1. GDP per head in 1990 (\$US)
2. Change in GDP between 1990 and 1999 (ratio)
3. 1999 rate of inflation (proportion)
4. 1999 unemployment rate (proportion)
5. Public debt as a proportion of GDP in 1999
6. Government spending as a proportion of GDP in 1999
7. Foreign direct investment in 1999 (\$US per person)
8. Average farm size (ha)

Institutional and social capital variables

9. Index indicating effectiveness of environmental monitoring (1 to 5, with 1=least)\*
  10. Index indicating effectiveness of environmental enforcement (1 to 5, with 1=least)\*
  11. Index of economic freedom (0 to 10, with 0=least freedom)
  12. Corruption perceptions index (0 to 10, with 0=most corrupt)
  13. Index indicating trust in people (1 to 5, with 1=least trust)\*
  14. Index indicating trust in government (1 to 5, with 1=least trust)\*
  15. Index indicating degree to which government actions are considered neutral people (1 to 5, with 1=least trust)\*
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\* indicates variable was constructed using data from survey of stakeholders.

**Table 7: Regression Results<sup>a</sup>**

Explanatory Variable	#1 Δ in agric output 1990-98 as proportion of GDP	#2 Δ in agric employ 1990-98 as proportion of total employ	#3 Average annual growth in value added as % of GDP, 1989-99	#4 Index of agricultural success <sup>a</sup>
Intercept	-0.101 (-0.20)	2.580 (3.41)	4.642 (0.57)	0.284 (0.30)
1990-98 growth in GDP			6.460 (2.07)	
Public debt	1.056 (3.05)			
Per capita FDI		-0.002 (-3.50)		0.003 (3.38)
Farm size				-0.001 (-3.89)
Economic freedom	-0.074 (-1.42)		-1.127 (-1.90)	0.149 (1.30)
Perceived corruption		-0.066 (-1.03)		
Trust in people		-0.322 (-1.44)	-3.825 (-1.64)	
Trust in government	0.260 (1.75)			
Index for monitoring of environmental laws				1.349 (3.84)
Government actions are neutral			2.892 (1.40)	-1.284 (-3.46)
R <sup>2</sup>	0.5645	0.7054	0.6805	0.9376
F-statistic	3.457	6.384	3.727	18.025

<sup>a</sup> t-statistics provided in parentheses.

<sup>b</sup> Estimated as a logit model, but in log-odds form so that OLS regression could be used.