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Trade Liberalisation and Employment Effects in Ukraine

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June 2003

This paper is partially financed by the CERT-RWI project "Analysis of Labour Markets in Transition Countries Using Large Micro Data Sets." Kupets is grateful to the "INTAS" programme for facilitating her stay in Edinburgh, during which this first version of the paper started to took shape.

Abstract

JEL Classification Numbers: E24, F14, J63, P23.

Key Words: Job Creation; Job Destruction; Ukraine; Trade Flows

I. Introduction

The flexibility of labour markets is an important feature of well-functioning market economies. Davis and Haltiwanger (1999, 1992) and Baldwin, Dunne and Haltiwanger (1998) report that in the U.S. and in Canada roughly one in every ten jobs is created and one in every ten jobs is destroyed each year. Flexibility of the labour market is important because it permits the rapid reallocation of resources to the most efficient uses and thus it may be vital for economic growth. Labour reallocation is to a large extent driven by job creation and job destruction. Businesses react continuously to shocks by changing output and input levels at a high pace leading to substantial destruction and creation of jobs at high frequencies. Job creation and job destruction are thus intimately linked to productivity growth. Firms (sectors) that engage in restructuring destroy low productivity jobs and create high productivity ones, leading to large job turnover, an increase in labour productivity and better general performance.

A high degree of job reallocation, while beneficial for an economy as a whole, can, however, have large negative effects for those unfortunate workers who are displaced from their jobs. There is ample evidence, in particular from Anglo-Saxon labour markets, that the average displaced worker faces prolonged non-employment spells and long-term earnings losses (see e.g. Kuhn (2002) and Jacobson, Lalonde and Sullivan (1993a, 1993b)).

Labour reallocation, brought on by the reallocation of jobs across firms and sectors, is an especially pertinent issue in transition economies. The reallocation of labour from inefficient firms (usually non-restructured state and privatised firms) to efficient ones (usually new private and restructured state and privatised firms)

increases overall labour productivity and enhances efficiency during the transition from plan to market (Blanchard (1997)). How job creation and destruction have contributed to this reallocation process across businesses and sectors has been the subject of a growing literature on job gross flows in Central Europe and the CIS, which is summarised in Haltiwanger, Lehmann and Terrell (2003). Like in mature capitalist economies, the welfare gains generated by the ongoing process of labour reallocation are, however, not distributed evenly. Many low-skilled and older workers who are displaced from their jobs incur large costs above all in the form of long spells of non-employment, as Lehmann, Philips and Wadsworth (2002) have shown for Estonia where data on displacement are readily available.

Beneficial and detrimental outcomes of labour reallocation induced by changing trade patterns have been widely discussed in the literature on the impact of globalisation on Western domestic labour markets. However, there are only a few papers that look at how trade affects job creation and job destruction directly. While Klein, Schuh and Triest (2003) estimate the effects of real exchange rates on job creation and job destruction for the US manufacturing industry, Lewinsohn (1999) investigates the influence of trade liberalisation on job creation and destruction in Chile.

With respect to the impact of shifting trade patterns on domestic labour markets, transition economies provide something of a quasi-natural experiment. Under central planning the state had a foreign trade monopoly, so firms were in principle not acting autonomously in export markets. At the same time, enterprises were sheltered from import competition. So firms in most centrally planned economies were completely

isolated from world markets.[1] With the start of transition trade was liberalised, abolishing the foreign trade state monopoly. As a consequence of trade liberalisation, we see a strong re-orientation of trade away from the defunct CMEA trade area to Western markets, in particular to the EU. In addition, trade liberalisation implies that many firms engage autonomously in fast growing Western export markets. The same firms or other firms have to deal themselves with import competition. Firms' engagement in export markets and the abrupt exposure to import competition imply that some sectors of industry in transition countries open up to the world economy over a short time horizon at a very rapid pace. Industrial sectors in mature capitalist economies have opened up much more gradually over the eighties and nineties, making it difficult to isolate the effect of changing trade patterns on employment adjustment in domestic labour markets.

We try to take advantage of the rapid opening up of one transition country, Ukraine. As we shall show in the next section, Ukrainian trade flows to and from areas outside the Commonwealth of Independent States (CIS) have increased dramatically over the nineties. We exploit this dramatic increase and investigate whether and how trade liberalisation causally affects job creation and construction of three-digit industrial sectors. The sectoral gross job flows are based on establishment-level data from the Ukrainian registry data for the years 1993-2000. In an earlier study, two of us used Ukrainian establishment level data from the Amadeus data base to look at the impact of trade liberalisation on job gross flows at the establishment level in the late nineties (Konings, Kupets and Lehmann (2003)). The present paper is

[1] In Poland and Hungary, economic reforms of the central planning system gave some autonomy to state-owned enterprises in the eighties. Some of the Hungarian and Polish enterprises did have trade relationships with Western firms already in the eighties as a consequence of these reforms (see e.g. Repkine and Walsh (1999) who study Polish enterprises). In the Soviet Union, on the other hand, where the Classical Planning System was rather unaffected by economic reform throughout the

complementary insofar as it extends the analysis to the sectoral level and augments the time dimension to nearly the entire last decade. With data that have a substantial time series dimension we hope to better control for cyclical and idiosyncratic shocks. Using an GMM estimator we thus might be able to better isolate the effect of trade liberalisation on job gross flows.

The following section gives a short account of the developments of the industrial sector in Ukraine over the nineties and looks at the evolution of trade flows over the same period. In the subsequent section we describe our data sources, briefly review the job flow measures that we employ in the analysis and sketch the construction of indices of trade openness at the sector level. This is followed by a discussion of the raw correlations of the trends of job flows and of trade orientation of sectors. Section four develops the estimation framework and reports results from GMM estimations. The final section offers some conclusions.

II. Ukrainian Industry and trade in the nineties

Reform efforts to transform the Ukrainian economy have been either non-existent or very inconsistent since Ukraine gained its independence in December 1991. The capture of the state by a few oligarchic groups, the exclusion of the majority of the population from the decision making process and weak property rights resulted in stagnancy, corruption and a collapse in output for most of the decade (Aslund (2002). In the first half of the nineties runaway inflation, bordering for a prolonged period on hyperinflation, was one of the manifestations of the poor economic policies that brought Ukraine on the brink of collapse. Only towards the end of the nineties were

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Communist regime, the foreign trade monopoly of the state was not touched until the implosion of the centrally planned economy.

serious reforms undertaken that loosened the grip of the oligarchs and that spurned robust growth for the first time since the collapse of the Soviet Union.

Figure 1, which shows the trends of production and employment, makes the point quite forcefully that the nineties were a lost decade for Ukraine. After a extremely sharp contraction of industrial output in 1993 (the year of the hyperinflation) we see a five year trough until there is some growth in 1999 and 2000. By the end of the decade industrial output had "recovered" to only about 60% of the pre-transition level, which points to a dismal performance in comparison with all those European transition countries that have not been affected by armed conflict.

It is also striking that employment shows a steady decline hinting at substantial labour shedding throughout the period. This labour shedding was driven by large job destruction as Table 1 makes clear. Throughout the decade we see job destruction rates at levels that are observed in Western economies with rather flexible labour markets (Davis and Haltiwanger (1999)), while job creation rates are small in international perspective. What is interesting, though, is that job creation does take place at all during this period and that it does gather pace in 1999 and 2000 when industrial output grows. Despite the enormous fall in industrial output and the cumulative employment contraction of roughly 40%, jobs are continuously reallocated at an increasing pace as the secular rise of the excess job reallocation demonstrates.

How much trade contributes to this reallocation is the focus of the paper. A first cursory look at Ukrainian trade flows (Figures 2 and 3) give two striking facts. First, the above-mentioned re-orientation from CIS to Western economies that one generally observes for transition countries is clearly given for Ukrainian trade. Both exports and imports are re-directed away from the CIS to the EU and the rest of the

world (ROW-all those areas that are not EU and CIS). Second, we see a spectacular rise of EU and ROW trade flows throughout the decade, while CIS trade flows decline in the second half of the nineties. This large increase in trade flows will be exploited by us in the analysis that follows.

III. Data

The empirical analysis is based on industry-level data for a panel of 100 three-digit NACE mining and manufacturing industries in Ukraine over the 1994-2000 period, containing information from 3 diverse sources. The panel is restricted to the subset of Ukrainian industries for which data on job and trade flows are available over the whole period.

Annual sectoral data on job creation, destruction and reallocation are constructed from the establishment-level registry data set from 1993 to 2000 provided by the State Statistical Committee of Ukraine ("Derzhkomstat")[2]. Although the initial registry data also cover establishments from some non-industrial sectors (4.84% of the initial sample), we restrict our analysis of job flows to firms in mining, manufacturing industries and electricity, gas and water supply (i.e. to 3-digit NACE sectors from 101 to 410)[3]. The manufacturing sample covers about 80% of officially reported total industrial employment. The data set that we use in the analysis comprises only firms that we can identify with certainty as continuing firms, i.e. firms that have positive

[2] Since the Derzkkomstat used the old classification of industries OKONKh (Classification of branches of national economy) till 2001 we converted 5-digit OKONKh industries to the 3-digit NACE sectors for our further analysis at the sectoral level.

[3] We also eliminated sectors 205 (Manufacture of other products of wood), 233 (Processing of nuclear fuel) and 372 (Recycling of non-metal waste) because of insufficient number of observations for sectoral analysis. All prison-based enterprises (about 170 establishments) were excluded from the sample.

employment at least for the two adjacent years. Information on ownership is based on the ownership codes of the enterprises in the registries and is available only for 2000[4]. Annual data on import and export flows come from the Ukrainian Customs Office data on import and export volumes in US dollars by countries of origin and destination disaggregated by the six-digit commodity groups according to the Harmonised Commodity Description and Coding System (HS)[5].

Since we attempt to compare and contrast the role played by trade with the EU countries from that of trade with the CIS countries in altering employment in Ukrainian manufacturing, we focus our analysis on the data set consisting of export and import volumes in three trading areas: CIS countries, EU countries and the rest of the world (ROW). We construct three different indices of openness as explained in Appendix 2. Fig. 3 depicts their percentile distribution over the sample period. What is evident is the large increase in trade openness over a relatively short period of time in many Ukrainian industrial sectors. The median (50^{th} percentile) value of the index rises from almost 1 percent in the beginning of the period to more than 20 percent at the end of 2000. It is also striking that a large number of closed sectors stayed closed over the same years, as shown by 10^{th} and 25^{th} percentile of the distribution. Panel B, in addition, shows that this increase occurred differently and more unevenly in trade orientation towards CIS countries.

Following Davis and Haltiwanger (1992, 1999) gross job creation (*pos*) is defined as the sum of all employment gains in all expanding firms, while gross job destruction (*neg*) is the sum of all employment losses in all contracting firms in an

[4] For the moment, we can distinguish only between state and non-state (including collective, private and foreign) ownership

[5] HS codes were also converted to the 3-digit NACE sectors. In our study we exclude sectors 296 (Manufacture of weapons and ammunition) and 362 (Manufacture of jewellery) because of non-availability of trade flows data for the whole interval from 1993 to 2000, and then we base our analysis only on sectors used in the manufacturing sample of the Derzhkomstat data set

economy or sector. Usually gross job destruction is expressed as a positive number. These gross job flows can be expressed as rates by dividing them by the total amount of jobs available in an economy or sector. The sum of the gross job creation rate and the gross job destruction rate is the gross job reallocation rate (*gross*), while the difference is the net aggregate employment growth rate (*net*) that can be observed in aggregate statistics. A measure of churning or reallocation of jobs which is over and above the amount of job reallocation necessary to accommodate a given net aggregate employment growth rate is the excess job reallocation rate (*excess*) and is defined as the gross job reallocation rate minus the modulus of the net aggregate employment growth rate. We interpret *excess* as a measure of genuine labour reallocation within a sector.

IV. Theoretical Framework, Empirical Specification and Results

There is little theoretical and empirical work relating gross job flows and international trade (Klein, et. al., 2002). In addition, Haltiwanger, et. al. (1996) establish "no systematic relationship" between job flows and openness to trade in US manufacturing for 1973 to 1986. To study the employment effects of exposure to international trade in Ukrainian industrial sectors, we closely follow Klein, et. al. (2003) who study the costly adjustment to trade flows using detailed data on US manufacturing for the period 1973-1993. We specify job flows as a function of trade flows that vary systematically by industry and control for other industry-specific effects (including privatisation) and explicitly model dynamic adjustment of labour reallocation in sectors by including lagged dependent variables. Earlier work has shown that adjustment costs in transition tend to differ in non-trivial ways according

to industry and ownership. We expect that opening of essentially closed (former CMEA) markets to international trade will affect different industries disproportionately.

Thus, we study the effects of trade liberalization on job creation, destruction, and labour reallocation by analysing differences in international exposure of industrial sectors in Ukraine controlling for idiosyncratic shocks and ownership structure at the end of period. We construct three different measures of trade openness towards three different groups of countries (EU, CIS (former Soviet Union countries) and the rest of the world (ROW)). In addition, we interact these indexes with a trade weighted (multilateral) real exchange rate to isolate the effects of relative prices and productivity differences according to industrial sectors at 3-digit level. See Appendix 2 for definition of these and other variables used in our estimation.

We estimate these specifications using generalized method of moments (GMM) estimator to account for potential endogeneity problems. The resulting general specification is[6]:

$$JF_{it} = \alpha_0 + \alpha_1 JC_{it-1} + \alpha_2 JD_{it-1} + \alpha_3 OI_{it} + \alpha_4 OI_{it-1} + \alpha_5 E_{it} + \alpha_6 E_{it-1} + \alpha'_7 D_i + \varepsilon_{it} \qquad (1)$$

This equation is motivated by the model presented in Klein, et. al.(2003), where JF_{it} is the job flow rates in 3-digit NACE industry i at time t. These include job creation, destruction, net employment growth and excess reallocation rate. OI_{it} is defined as the trade openness variable (see Appendix 2) and E_{it} is the industry-specific real exchange rate. D_i captures the effect of privatisation and ownership at the end of period. We also include other industry-specific variables that affect job reallocation rates and time dummies to account for aggregate shocks.

[6] We determine the lag structure empirically with a general-to-specific approach to establish a more parsimonious representation of the data. Initially, we used two lags on all variables. We also estimated

The panel structure (100 e-digit level industries over 6 years) of our sample allows us to study the dynamics of partial adjustment in the transition period as well as differing exposure to trade openness, with the inclusion of a lagged dependent variable among the other regressors in the model. It is well accepted that in such dynamic models with relatively large cross-sections over a short time period, 1994-2000, the fixed effects model yields inconsistent estimates. Thus, as pointed out in Eq. 1 above, we specify an error components model (random effects) with $\varepsilon_{it}=\lambda_t+\eta_i+\nu_{it}$. In the presence of lagged dependent variables, this raises well-known additional problems. Earlier work has used maximum likelihood estimators (MLE) and a simple instrumental variable (IV) approach (Bhargava and Sargan, 1983 and Anderson and Hsiao, 1981) to address the issues (endogeneity and inconsistency). The relatively strong assumptions on the distributions of the individual effects and the initial conditions necessary to implement the MLE approach, and the lack of efficiency of the IV, has encouraged the use of the Generalized Method of Moments (GMM) (Hansen, 1982) estimation in recent studies of dynamic panel regressions.[7]

In what follows we use the asymptotically efficient (one-step) GMM advocated by Arellano and Bover (1995) and more recently by Blundell and Bond (1998). This type of GMM estimator usually exploits a different number of instruments in each time period. Under weak assumptions the additional orthogonality conditions that become available here have not been previously used with IV estimators. Therefore, we use transformations of the data that allow lagged endogenous or predetermined variables as instruments in the transformed equations, where the transformed error term does not contain η_i and orthogonality among the

(1) with the growth rate of the real exchange rate rather than the level, and found no significant differences.

errors is preserved (the original errors may be heteroskedastic but not autocorrelated and we treat all variables in our models as endogenous). To ensure consistency, we check for serial correlation in the errors. If ε_{it} are serially uncorrelated, then $\Delta\varepsilon_{it}=\Delta\lambda_t+\Delta\nu_{it}$ may be moving average errors but should not be second-order serially correlated to assure the reliability of our results. Diagnostics, reported in Tables 5 and 6, show that neither the robust Sargan nor MA(1) and MA(2) tests provide evidence to suggest that the assumption of serially uncorrelated errors (second-order) is unrealistic. These tests also show that the choice of the instruments used appears to be appropriate[8]. We use MA(1) and Sargan jointly to determine the validity of our instruments and the correctness of our assumptions. These are reported in the diagnostics section of Tables 5 and 6 to whose main findings we now turn.

The four sector-level job flow measures appear to be mainly driven by the lagged values of job creation and destruction. This finding suggests that idiosyncratic factors explain most of the variation of employment adjustment. In addition, ownership structure seems to be strongly correlated with job flows, as revealed by the significant and large coefficients on the variable *Privshare* in both Tables 5 and 6. A larger private share in an industry leads to less job creation and more job destruction resulting in an increased labour shedding. It is also appears that an industry with a larger private share exhibits less excess job reallocation. From these results we should not, however, infer a causal effect of ownership structure of industries on employment adjustment since the variable Privshare does not capture the evolving ownership distribution in industrial sectors over time. It is instead an-end-of-period

[7] For background and a detailed discussion see Baltagi (1995, Ch.8). For an overview, see Bond (2002) and Hall (2003).

variable controlling for the cumulative ownership changes that have occurred in an industry.

Does trade liberalisation affect these job flows? In Table 5, we report a significant positive coefficient on the lagged openness index for EU trade in the job creation and excess job reallocation regressions. Other things equal, sectors engaging in more trade with the rest of the world show increased job destruction rates.

In Table6, where we interact the industry-specific real exchange rate with the openness indices, we find a small positive effect on job destruction for sectors trading with the rest of the world. We also establish that sectors with more trade to CIS countries have a smaller job destruction rate. The positive effect of openness for EU trade does not disappear when the index is interacted with the real exchange rate. Finally, net employment growth occurs in sectors that maintain strong trade ties in the CIS area.

VI. Conclusions

To follow

[8] Where possible, in addition to predetermined variables, we use the lagged differences and levels of real industrial output as instrument in our regressions.

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APPENDIX 1:

Table 1. Gross Job Flows in Manufacturing

Year	***pos***	***neg***	***gross***	***net***	***exc***	***n***
1993-94	0.009	0.108	0.118	-0.099	0.019	7768
1994-95	0.016	0.098	0.114	-0.082	0.033	8023
1995-96	0.019	0.105	0.123	-0.086	0.037	7897
1996-97	0.018	0.113	0.132	-0.095	0.037	8163
1997-98	0.022	0.091	0.113	-0.069	0.045	7670
1998-99	0.030	0.094	0.124	-0.064	0.060	9066
1999-2000	0.041	0.081	0.122	-0.041	0.081	8077

Table 2. Distribution of Annual Employment Growth Rates: Firm level

Year	1%	5%	10%	25%	50%	75%	90%	95%	99%	Mean	StDev	N
93-94	-0.547	-0.332	-0.255	-0.158	-0.078	-0.007	0.043	0.086	0.304	-0.091	0.159	7768
94-95	-0.579	-0.321	-0.239	-0.137	-0.052	0.000	0.059	0.104	0.323	-0.073	0.164	8023
95-96	-0.750	-0.378	-0.273	-0.161	-0.068	0.000	0.061	0.108	0.347	-0.093	0.196	7897
96-97	-1.012	-0.405	-0.280	-0.163	-0.078	-0.004	0.055	0.121	0.522	-0.101	0.234	8162
97-98	-0.957	-0.386	-0.272	-0.145	-0.059	0.006	0.090	0.204	0.852	-0.071	0.254	7670
98-99	-1.283	-0.541	-0.333	-0.164	-0.063	0.014	0.131	0.300	1.077	-0.082	0.320	9066
99-00	-1.267	-0.588	-0.358	-0.167	-0.050	0.037	0.157	0.297	0.777	-0.082	0.309	8077

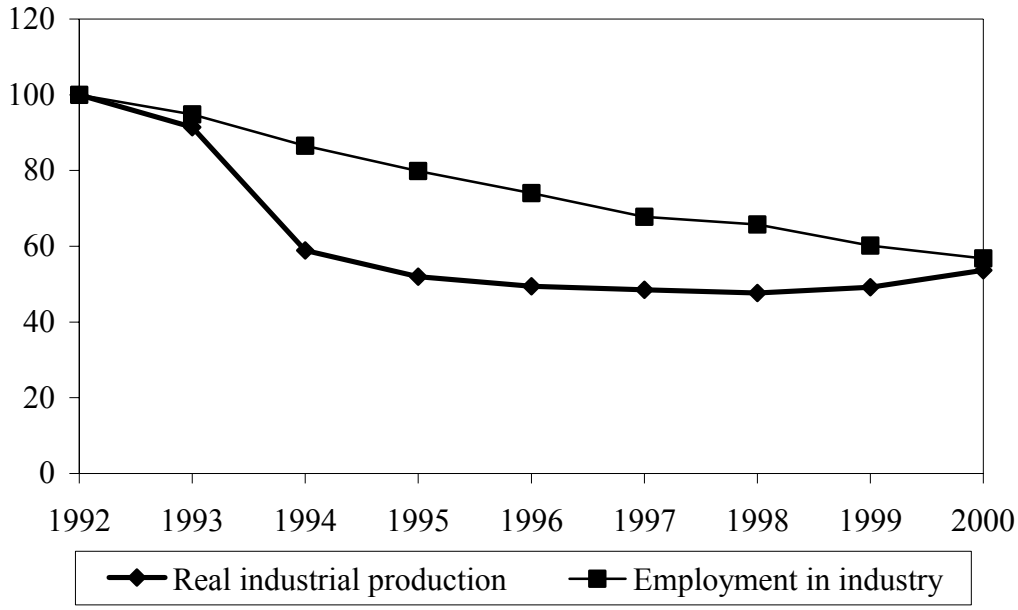
Table 3. Distribution of Annual Sectoral Job Creation Rates

Year	1%	5%	10%	25%	50%	75%	90%	95%	99%	Mean	StDev
93-94	0	0	0	0.001	0.004	0.012	0.030	0.071	0.226	0.013	0.029
94-95	0	0	0	0.002	0.008	0.023	0.045	0.061	0.156	0.016	0.024
95-96	0	0	0	0.003	0.009	0.024	0.048	0.087	0.318	0.023	0.046
96-97	0	0	0	0.002	0.010	0.021	0.038	0.086	0.143	0.018	0.027
97-98	0	0.001	0.002	0.008	0.018	0.032	0.045	0.067	0.104	0.023	0.020
98-99	0	0	0.002	0.008	0.025	0.046	0.070	0.090	0.428	0.034	0.049
99-00	0	0.003	0.011	0.019	0.033	0.060	0.090	0.120	0.219	0.044	0.038

Table 4. Distribution of Annual Sectoral Job Destruction Rates

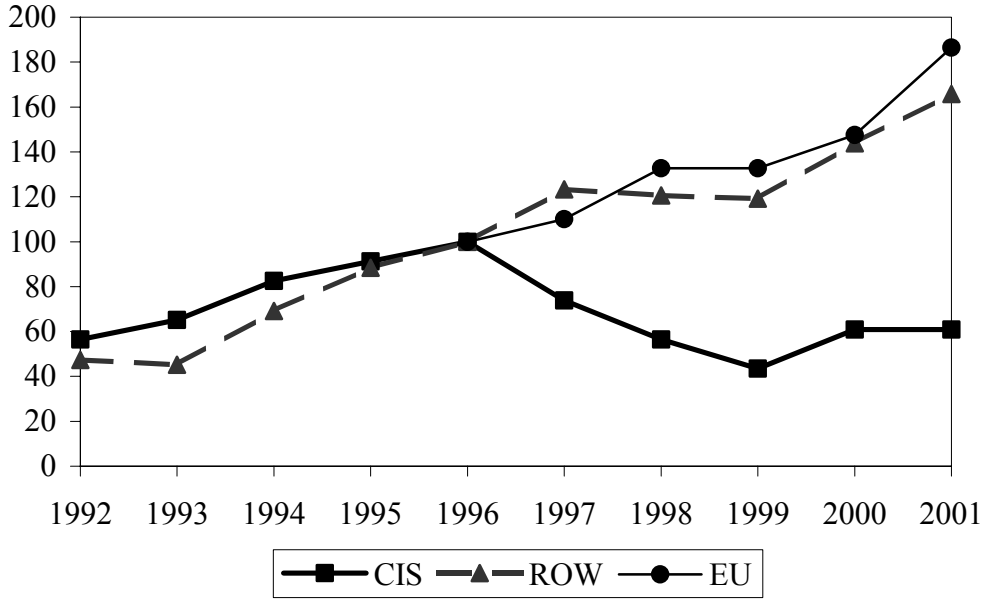
Year	1%	5%	10%	25%	50%	75%	90%	95%	99%	Mean	StDev
93-94	0	0.018	0.038	0.064	0.113	0.146	0.184	0.212	0.263	0.111	0.057
94-95	0	0.007	0.017	0.045	0.085	0.130	0.193	0.222	0.405	0.095	0.071
95-96	0	0.008	0.026	0.050	0.106	0.156	0.215	0.286	0.404	0.116	0.080
96-97	0.011	0.022	0.033	0.075	0.114	0.160	0.196	0.241	0.369	0.121	0.067
97-98	0.006	0.022	0.035	0.060	0.100	0.144	0.171	0.199	0.555	0.107	0.070
98-99	0	0.012	0.017	0.069	0.111	0.148	0.212	0.301	0.433	0.118	0.080
99-00	0	0.011	0.028	0.070	0.103	0.135	0.179	0.207	0.335	0.104	0.060

Figure 1. Employment and Production in Ukrainian Industry, 1992-2000 (1992=100)



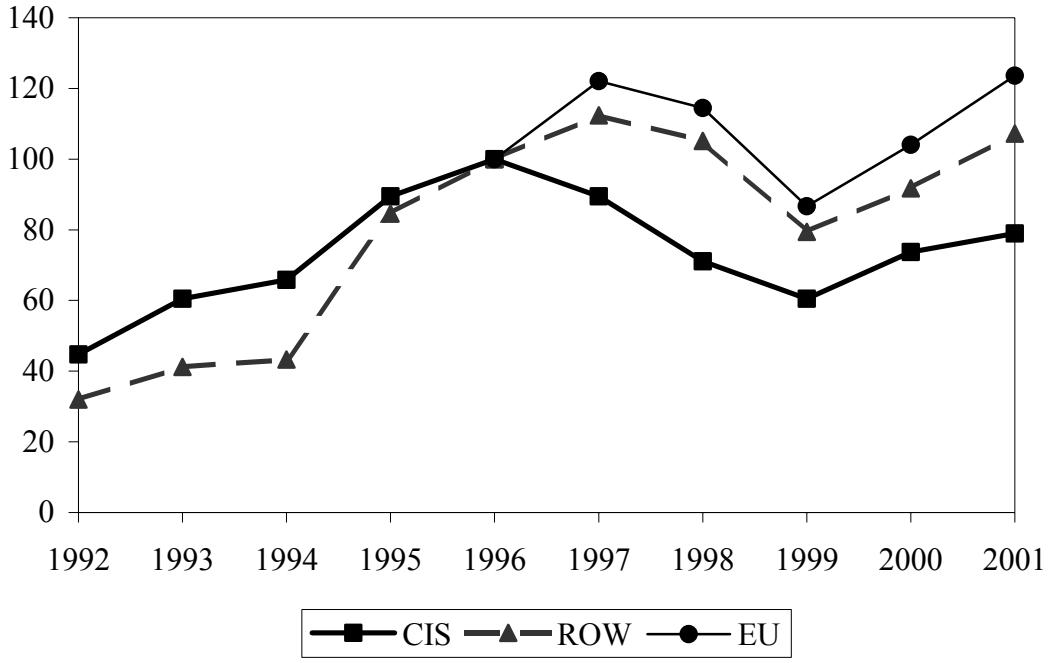
Source: Derzhkomstat, TACIS

Figure 2. Dynamics of Ukrainian Exports, 1992-2001 (1996=100)



Source: Commonwealth of Independent states in 2001 (2002)

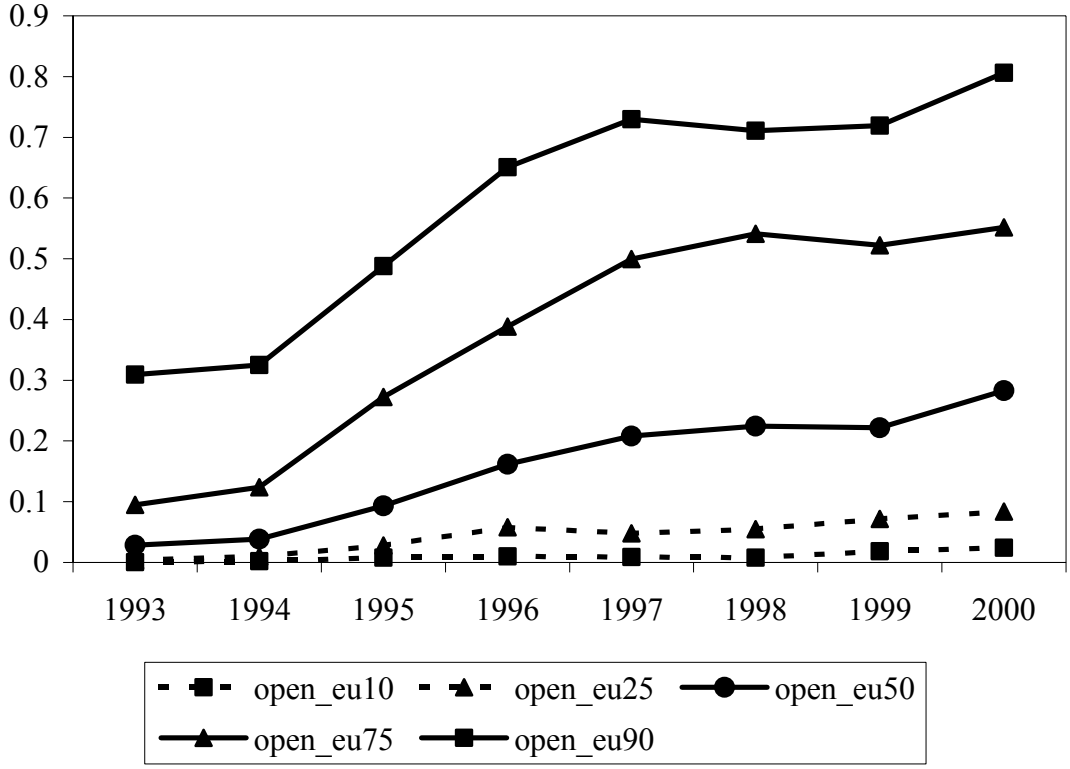
Figure 3. Dynamics of Ukrainian Imports, 1992-2001 (1996=100)



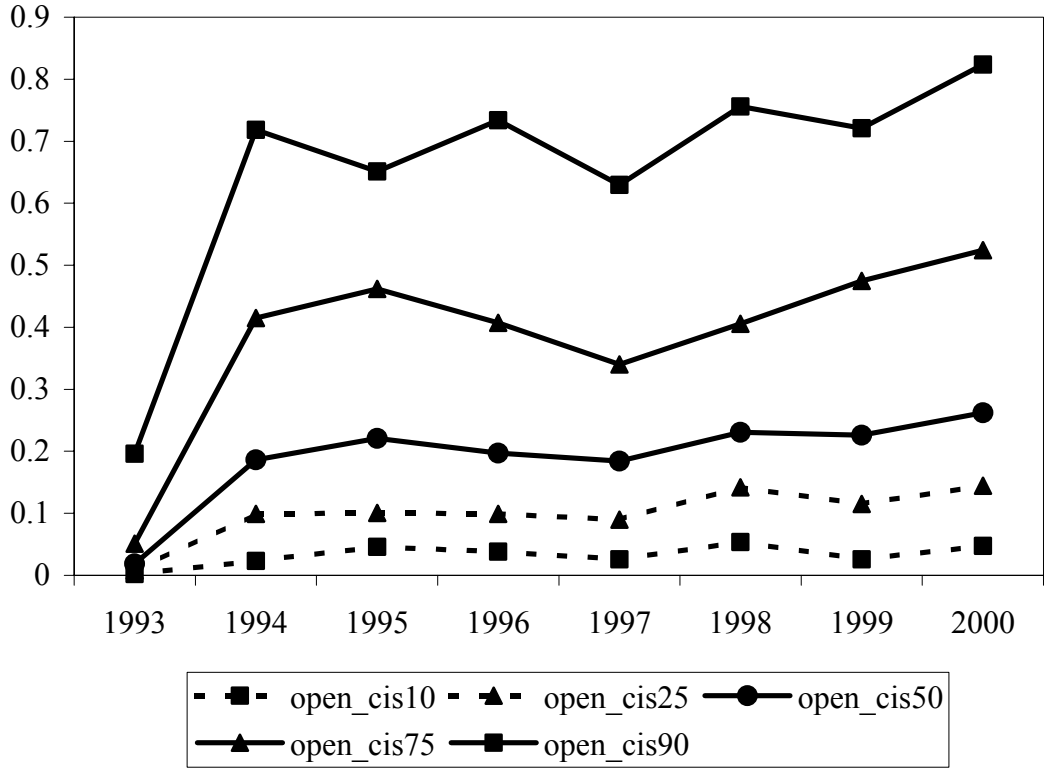
Source: Commonwealth of Independent states in 2001 (2002)

Figure 3. Percentile distribution of openness over 3-digit sectors

A) EU countries



B) CIS countries



C) Rest of the World

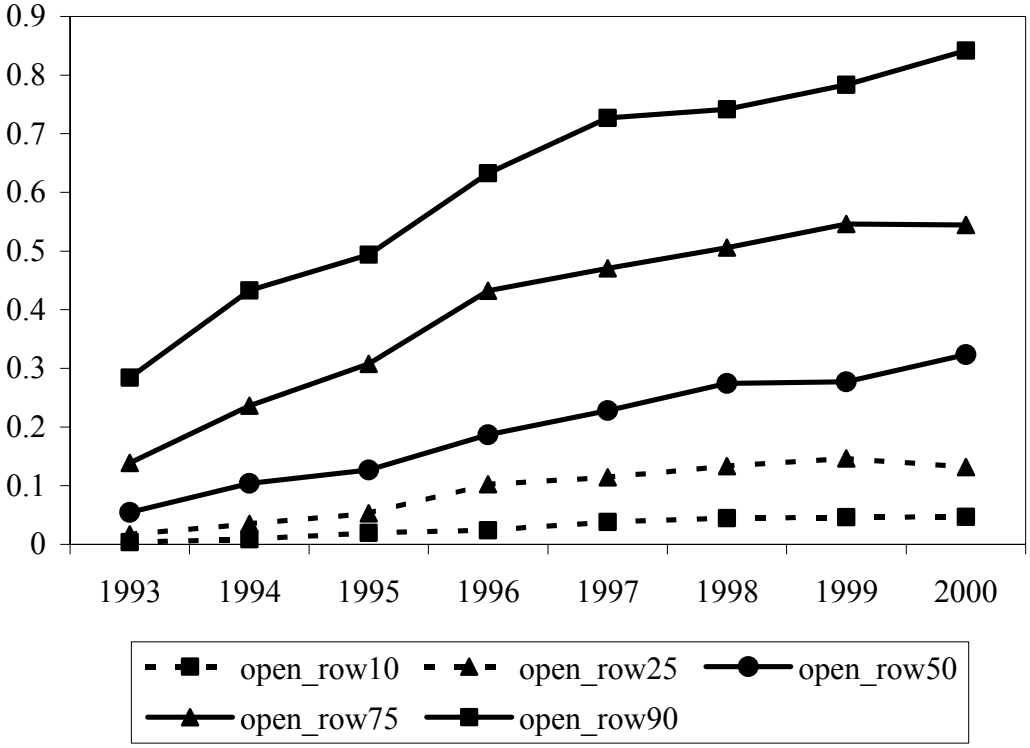
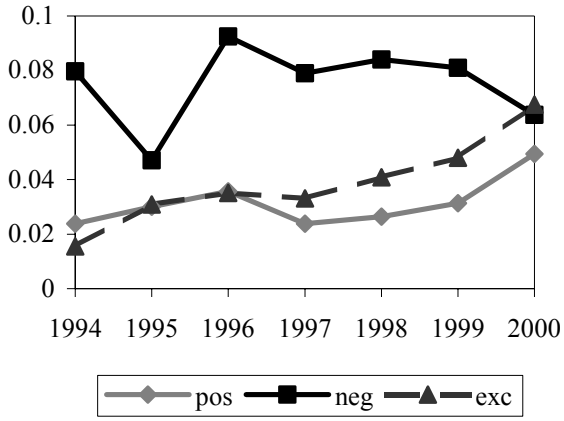
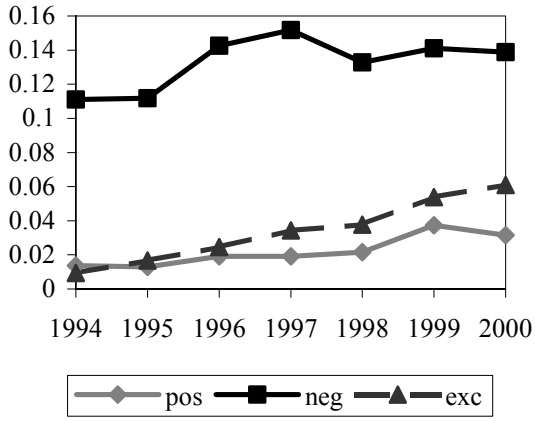


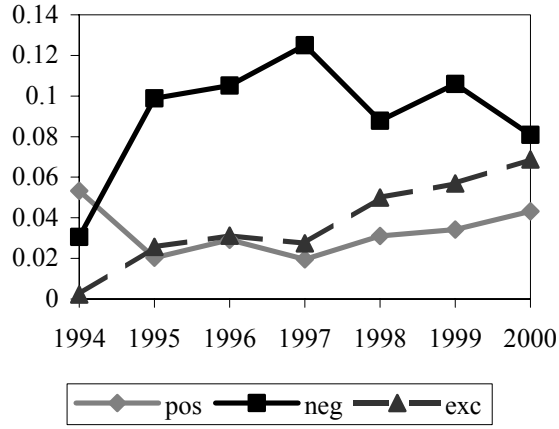
Figure 4. Trade openness and sectoral job flows



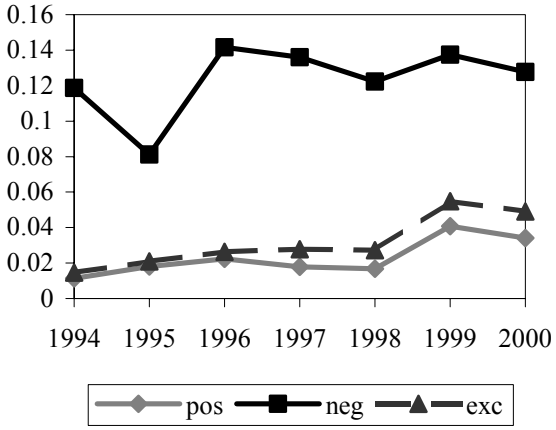
EU countries – lower 25%



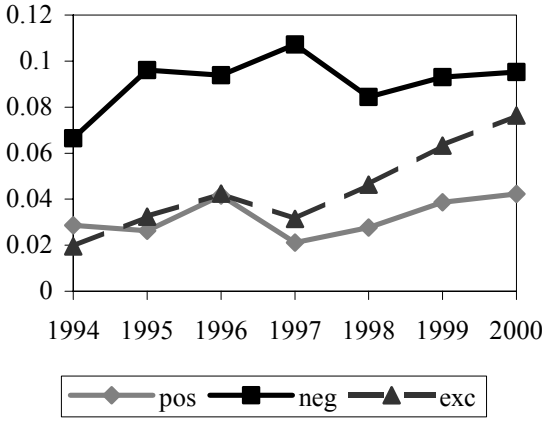
EU countries – upper 25%



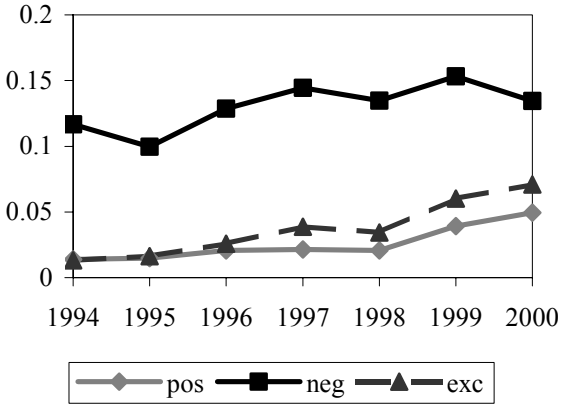
CIS countries – lower 25%



CIS countries – upper 25%



ROW countries – lower 25%



ROW countries – upper 25%

TABLE 5

JOB FLOWS: GMM-system estimates: Dependent variable JOB CREATION, JOB DESTRUCTION, NET EMPLOYMENT GROWTH and EXCESS REALLOCATION

Period 1994-2000, 576 Observations available for estimation

Independent Variables	JOB CREATION	**JOB DESTRUCTION**	NET EMPLOYMENT GROWTH	EXCESS REALLOCATION
$\mathbf{JC_{i(t-1)}}$	0.284	0.048	0.236	0.378
	(4.51)	(0.77)	(2.42)	(5.23)
$\mathbf{JD_{i(t-1)}}$	0.119	0.470	-0.351	0.168
	(1.28)	(8.14)	(-2.78)	(1.94)
$\mathbf{OI\_EU_{it}}$	-0.039	0.055	-0.094	-0.091
	(-0.57)	(0.74)	(-0.91)	(-1.32)
$\mathbf{OI\_EU_{i(t-1)}}$	0.066	-0.077	0.144	0.079
	(1.69)	(-0.93)	(1.58)	(2.06)
$\mathbf{OI\_CIS_{it}}$	0.031	0.015	0.016	0.037
	(0.35)	(0.19)	(0.11)	(0.50)
$\mathbf{OI\_CIS_{i(t-1)}}$	0.062	-0.078	0.139	0.065
	(1.19)	(-1.14)	(1.50)	(1.26)
$\mathbf{OI\_ROW_{it}}$	-0.005	0.155	-0.160	-0.004
	(-0.07)	(1.85)	(-1.18)	(-0.08)
$\mathbf{OI\_ROW_{i(t-1)}}$	-0.072	-0.078	0.006	-0.087
	(-1.27)	(-1.28)	(0.07)	(-1.28)
$\mathbf{E_{it}}$	0.011	-0.005	0.015	0.020
	(0.75)	(-0.29)	(0.56)	(1.59)
$\mathbf{PRIV\ SHARE_i}$	-0.203	0.169	-0.373	-0.106
	(-2.32)	(2.32)	(-2.81)	(-1.01)
Diagnostics:				
MA(1)	-1.822	-4.101	-2.591	-2.124
MA(2)	1.172	0.113	-0.365	0.674
Sargan Test	82.12	79.96	82.81	83.71
	(77)	(77)	(77)	(77)
Wald Test for Time Dummies	12.25	20.83	17.89	25.96
	(5)	(5)	(5)	(5)

NOTES: 1) System GMM estimates are obtained by stacking (T-2) equations in first differences and in levels corresponding to periods 3,…,T. We then use lagged differences of the variables as instruments in levels (dated t-1, etc.) in addition to the instruments specified for the difference equations.

2) The t-statistic, reported in the parenthes below the point estimates, is corrected and robust to heteroskedasticity over industries and time. A Constant and Time dummies are always included but not reported; the Wald test for the joint significance of those is reported in the last row of the table; it is chi-square under the null of no significance (degrees of freedom are in parenthesis). MA(1) is a test of first-order serial correlation, based on the standardized first-difference residual autocovariances asymptotically distributed as N(0,1) under the null of no autocorrelation. Sargan's test is a test of over-indentifying restrictions, which is a chi-square under the null of no significance or instrument validity (degrees of freedom (number of restriction) given in parenthesis).

TABLE 6

JOB FLOWS: GMM-system estimates: Dependent variable JOB CREATION, JOB DESTRUCTION, NET EMPLOYMENT GROWTH and EXCESS REALLOCATION

Period 1994-2000, 588 Observations available for estimation

Independent Variables	JOB CREATION	**JOB DESTRUCTION**	NET EMPLOYMENT GROWTH	EXCESS REALLOCATION
$\mathbf{JC_{i(t-1)}}$	0.258 (2.75)	-0.020 (-0.21)	0.278 (1.86)	0.279 (3.93)
$\mathbf{JD_{i(t-1)}}$	0.076 (1.09)	0.469 (9.18)	-0.393 (-4.30)	0.152 (2.25)
$\mathbf{OI\_EU_{it}*E_{it}}$	-0.011 (-1.08)	0.012 (0.91)	-0.023 (-1.36)	-0.014 (-1.55)
$\mathbf{OI\_EU_{i(t-1)}*E_{i(t-1)}}$	0.013 (1.38)	-0.011 (-0.81)	0.025 (1.43)	0.019 (2.17)
$\mathbf{OI\_CIS_{it}*E_{it}}$	0.015 (0.95)	-0.046 (-2.74)	0.061 (2.20)	0.025 (1.72)
$\mathbf{OI\_CIS_{i(t-1)}*E_{i(t-1)}}$	-0.003 (-0.42)	0.032 (1.98)	-0.035 (-1.67)	-0.016 (-1.33)
$\mathbf{OI\_ROW_{it}*E_{it}}$	0.005 (0.46)	0.024 (1.88)	-0.018 (-0.99)	-0.000 (-0.03)
$\mathbf{OI\_ROW_{i(t-1)}*E_{i(t-1)}}$	-0.010 (-0.43)	-0.022 (-1.96)	0.019 (1.21)	-0.002 (0.19)
$\mathbf{PRIV\ SHARE_i}$	-0.104 (-1.89)	0.084 (1.78)	-0.189 (-2.36)	-0.075 (-1.73)
Diagnostics:				
MA(1)	-1.947	-4.060	-2.518	-2.255
MA(2)	1.078	0.740	-0.316	0.704
Sargan Test	90.13 (95)	87.55 (95)	86.58 (95)	91.87 (95)
Wald Test for Time Dummies	19.10 (5)	15.59 (5)	22.60 (5)	25.17 (5)

NOTES:

1) See 1) and 2) of Table 5.

APPENDIX 2

Definitions of variables used in estimation

Variable	Description	Definition	Source
JC_{it}	Job creation rate in industry *i* in year *t*	$\frac{\sum_{p \in M^+} \Delta Emp_{pit}}{1/2(Emp_{it} + Emp_{i(t-1)})}$, where $M^+ = \{p \mid \Delta Emp_{pit} > 0\}$	Derzhkomstat registry of industrial enterprises, 1993-2000
JD_{it}	Job destruction rate in industry *i* in year *t*	$\frac{\sum_{p \in M^-} \lvert \Delta Emp_{pit} \rvert}{1/2(Emp_{it} + Emp_{i(t-1)})}$, where $M^- = \{p \mid \Delta Emp_{pit} < 0\}$	Derzhkomstat registry of industrial enterprises, 1993-2000
JF_{it}	Job flow rates in industry *i* in year *t*	$\{JC_{it}, JD_{it}, JR_{it}, JN_{it}, JE_{it}\}$	Derzhkomstat registry of industrial enterprises, 1993-2000
OI_EU_{it}	Openness index with EU countries in industry *i* in year *t*	$\frac{Exp\_EU_{it} + Imp\_EU_{it}}{Exp\_EU_{it} + Imp\_EU_{it} + Prod_{it}}$ where Exp_EU denotes exports to EU countries (nominal USD), Imp_EU denotes imports from EU countries (nominal USD), and Prod denotes sectoral production in nominal USD (converted from UHA using official average annual exchange rate)	Derzhkomstat registry of industrial enterprises for production, Ukrainian Customs Committee data on import and export volumes by countries of origin and destination
OI_CIS_{it}	Openness index with CIS countries in industry *i* in year *t*	$\frac{Exp\_CIS_{it} + Imp\_CIS_{it}}{Exp\_CIS_{it} + Imp\_CIS_{it} + Prod_{it}}$ where Exp_CIS denotes exports to CIS countries (nominal USD), Imp_CIS denotes imports from CIS countries (nominal USD), and Prod denotes sectoral production in nominal USD (converted from UHA using official average annual exchange rate)	Derzhkomstat registry of industrial enterprises for production, Ukrainian Customs Committee data on import and export volumes by countries of origin and destination
OI_ROW_{it}	Openness index with countries from the rest of the world in industry *i* in year *t*	$\frac{Exp\_ROW_{it} + Imp\_ROW_{it}}{Exp\_ROW_{it} + Imp\_ROW_{it} + Pr}$ where Exp_ROW denotes exports to ROW countries (nominal USD), Imp_ROW denotes imports from	Derzhkomstat registry of industrial enterprises for production, Ukrainian Customs Committee data on import and export volumes by

		ROW countries (nominal USD), and Prod denotes sectoral production in nominal USD (converted from UHA using official average annual exchange rate)	export volumes by countries of origin and destination
E_{it}	Multilateral real exchange rate	$\sum_{j=1}^{3} w_{ij(t-1)} E_{jt}$, where j indexes 3 trading areas (EU, CIS, ROW), Ejt denotes bilateral real exchange rate (UHA to Euro, Russian Ruble and USD correspondingly) defined as [ln(nominal exchange $rate_{jt}$) +ln($ukrppi_t$)-ln(ppi_{jt})], and $w_{ij(t-1)}$ denotes industry-specific trade share weights in the previous year	National Bank of Ukraine (http://www.bank.gov.ua) for the official exchange rates, *OECD Economic Trend*s for PPI in EU countries, *Russia in Figures* for PPI in Russia, *Ukrainian Economic Trends* for PPI in Ukraine, BLS data base for US PPI
$Privshare_i$	Share of non-state firms in sector *i* in 2000		Derzhkomstat firm-level data on ownership in 2000