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MAKING TRANSITION WORK FOR EVERYONE

Poverty and Inequality in Europe and Central Asia

A WORLD FREE OF POVERTY

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Making Transition Work for Everyone:
Poverty and Inequality
in Europe and Central Asia

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Integration and Inequality: Lessons from the Accessions of Portugal and Spain to the EU

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January 2000

1. INTRODUCTION

International economic integration has institutional, political, economic, and social implications, many of them with distributive consequences. In principle, there are three main reasons why the income and wage distributions of a given country may change after accession to a wider economic area:

- First, liberalization of goods and factor markets, modernization of the economy, technological upgrading, which usually precede integration, and international factor flows may change the returns to capital and the wage share. For instance, Foreign Direct Investment (FDI) very often embodies technological transfers and, hence, changes of the aggregate production function, which are then reflected on factor returns. Even without technological upgrading, and provided that the aggregate production function is not Cobb-Douglas, the capital and the wage share react to real interests rates, markups, and so forth, which are affected by integration.[1]

- Second, there are the labor market effects of integration. It is well understood that trade flows may affect the sectoral and occupational composition of employment and wage premiums by skills and education, as countries exploit their comparative advantage in interindustry trade (Heckscher-Ohlin) or engage in intraindustry trade. Although this is an intensively researched area, the empirical relevance of international trade in explaining the rise of wage inequality observed in most Organization of Economic Cooperation and Development (OECD) countries (see Gottschalk and Smeeding 1997), and even some less developed countries, is still under discussion (see, for instance, Slaughter 1998; Wood 1998). FDI flows may also change the relative demand of high-skill and low-skill workers by targeting certain industries or by foreign firms' having a different skill composition of the labor force with respect to domestic firms (see Feenstra and Hanson 1995).

- Finally, there is some evidence that governments use social policies to ease the distributive consequences of international economic integration. Rodrik (1998) shows that there is a positive correlation between an economy's exposure to world markets and the size of its government, which is robust to additional explanatory variables and strongest when terms of trade risk are highest. Also, labor market institutions (such as unemployment benefits, wage determination mechanisms, job protection legislation) are changed to adjust to the new economic environment, often with evident implications for wage and income inequality. Agell (1999) shows that there is a negative relationship between some indicators of labor market rigidities and openness, what he interprets as globalization increasing demand for social insurance.

Moreover, the changes in the income and wage distributions caused by integration may vary across regions of the acceding country. First, factor mobility is typically concentrated in certain areas (FDI tends to go to the richest regions, while migration flows are higher in regions closer to the borders). Second, the regional distribution of domestic firms may also change after integration (as documented by Hanson [1998] for Mexico after the North American Free Trade Agreement (NAFTA). Third, some countries pursue regional policies in an attempt to reduce regional inequalities, and in some economic areas, notably in the European Union (EU), there are institutional arrangements to improve social cohesion among the member countries that basically amount to transfers to the lagging regions.

[1] On the determinants of the wage share, see Bentolila and Saint-Paul (1998). Blanchard (1997) provides an explanation of the recent evolution of the wage share in OECD countries.

In the economic literature there are three lines of research, somehow disconnected, addressing the determinants of inequality and the relevance of trade and economic integration among them. First, there are many studies documenting the evolution of inequality in different countries by exploiting microeconomic data on income and expenditure (see Gottschalk and Smeeding 1997 and the references therein) and several papers using the inequality indexes constructed by these studies to search for the determinants of inequality across countries. Broadly speaking, the latter studies typically find that exports-imports and FDI flows do not help to explain cross-country differences in inequality (see, for instance, Mahler, Jesuit, and Roscoe 1997). Second, with regard to regional evolutions, there are the empirical macroeconomic studies on regional convergence that search for the driving forces of either GDP per capita or labor productivity at the regional level within a given country (see Barro and Sala-i-Martin 1991; Sala-i-Martin 1996). A few studies, notably Ben-David 1993, which have tried to relate income convergence across countries and trade liberalization, find that the former occurs at the timing of the latter. Finally, there is the massive literature on the sources of increasing inequality since the early 1980s in developed countries, which some studies have related to international trade (see, for instance, Leamer 1993, 1998; and Wood 1994), while others pinpoint biased technological progress (Bound and Johnson 1992; Lawrence and Slaughter 1993; Berman, Bound, and Griliches 1994). Within this approach, there are some specific studies on the experiences of some developing countries undergoing trade reforms (see, for instance, Hanson and Harrison 1999 on Mexico; and Currie and Harrison 1994 on Morocco). In most developing countries small responses of employment and wages are found after large trade reforms. This can be a consequence of stringent labor market regulations constraining employment and wage adjustments, although, as pointed out by Harrison and Revenga (1995), output changes after trade reforms in these countries were also small and, hence, no significant wage and employment adjustments were needed.

It is somehow surprising that economic research on the consequences of economic integration has paid less attention to the European experience. In Europe there were middle-income countries that had trade reforms and became members of the EU at a later stage. In particular, Portugal and Spain joined the EU on January 1, 1986, after transition from an autocratic political regime to democracy in the mid-1970s and some reshuffling of their economic and institutional structures in the second half of the 1970s and first half of the 1980s. The reforms required by accession to the EU were gradual, as a seven-year transition period was agreed upon for dismantling of barriers to trade and labor mobility. Hence, since the beginning of the 1980s, when structural reforms in the southern countries started in preparation for accession, until the early 1990s, when the transition period ended, there have been significant changes in the regulation of trade, capital mobility, and the labor markets of the Iberian countries.

This report focuses on the distributive consequences of these changes. The joint consideration of both Iberian countries provides a good natural experiment on the distributive consequences of economic integration and the implications of different policies to ease these consequences. The two Iberian countries were at a different development stage at the moment of accession (with Purchasing Power Parity (PPP) adjusted GDP per capita being at 53 percent and 70 percent of the EU average, for Portugal and Spain, respectively). Since the mid-1980s, both Portugal and Spain have had some catching up to do with the rest of the EU, despite different macroeconomic outcomes. Whereas Portugal had high inflation and low unemployment throughout the 1980s, Spain achieved one-digit inflation rates in the early 1980s but has sustained unemployment rates in the 15-25 percent range. Portugal and Spain also had different degrees of openness to international trade, Portugal being substantially more open than Spain at the moment of accession. After accession, both countries' trade flows increased and concentrated mostly with the EU, so that their comparative advantage seems to be in products requiring low-skilled or

semiskilled labor. And regarding social policies, Portugal and Spain seemingly share many institutional features: most labor market institutions are apparently similar on paper (although in practice they seem to have different implications—see Bover, Garcia-Perea, and Portugal 1998), and social expenditures have increased in both countries since the early 1980s.[2]

Despite the coincidence in the moment of accession to EU and other similarities noted above, inequality trends have been different in the two countries in the last two decades. Some studies using microeconomic household data have documented a substantial reduction of household income inequality both in Portugal and Spain throughout the 1980s (see Rodrigues 1993, 1994; Gouveia and Tavares 1995 for Portugal; Del Rio, Ruiz-Castillo, and Sastre 1998; Del Rio and Ruiz-Castillo 1999; Sastre 1999 for Spain). However, during the first half of the 1990s, household income inequality rose in Portugal, while remaining more or less constant in Spain. During the 1980s household income inequality decreased both in Portugal and Spain in spite of increasing labor income and wage inequality (see Cardoso 1998; Rodrigues 1999 for Portugal; and Revenga 1991 for Spain). In this regard, it is important to notice the effects of several labor market reforms, especially the liberalization of fixed-term employment contracts in Spain, which have had very relevant consequences for wage inequality, creating a dual labor market. Finally, within each country, regional differences in labor productivity have also been falling, especially since the mid-1980s. EU transfers through Structural and Cohesion Funds and national-specific regional policies seem to explain a significant fraction of this regional convergence (see De la Fuente and Vives 1995 for Spain), although regional differences in employment rates have increased (see Jimeno and Bentolila 1998 for Spain) and regional convergence of GDP per capita has, if anything, occurred at a much lower pace.

Thus, the Portuguese and the Spanish experiences after accession to the EU provide a natural field in which to search for the determinants of the distributive implications of economic integration. Here we lay out the available microeconomic and macroeconomic evidence on the causes of changing inequalities in the Iberian countries. The report is in two parts: the first part (sections 2 and 3) describes the most relevant facts regarding macroeconomic evolutions and inequality trends in both countries. In section 2 we briefly describe the macroeconomic performance of Portugal and Spain before and after accession to the EU by documenting the differences between the two countries in relevant variables for the subsequent analysis, such as the level of productivity, the employment structure, the degree of openness, trade patterns, FDI inflows, and the transfers received by means of the EU Structural Funds. In section 3 we report trends in income and wage inequality during the 1980-95 period and discuss the main factors behind these trends. The second part of the report (sections 4 and 5) analyzes the microeconomic evidence on wage and employment adjustments after accession to the EU in both Portugal and Spain. In section 4 we look at individual and job characteristics in terms of remuneration in both countries by estimating wage regressions with microeconomic data. In Portugal, where microeconomic data are available for different years, we also look at the changes in the remuneration of those characteristics between 1985 and 1995. In section 5 we focus on the changes in employment and wage shares of different types of workers (classified by educational attainments and occupations) in different industries. First, we document the sectoral distribution of these changes, and, second, we relate within-firm changes to some firms' characteristics, such as foreign and domestic ownership and the proportion of sales and inputs that are exported and imported. Finally, section 6 provides our conclusions.

[2] Nevertheless, the coverage of unemployment benefits in Portugal was almost insignificant until the early 1990s, while in Spain it increased continuously throughout the 1980s. Also, despite similar wage determination procedures and similar trends in labor demand and labor supply, there are significant differences in the wage structure in both countries (see Cantó, Cardoso, and Jimeno 1998, and section 4 below).

2. SOME MACROECONOMIC FACTS

In this section we briefly document the macroeconomic performance of the Portuguese and the Spanish economies during the last four decades, with a special emphasis on the facts that may play a relevant role at shaping the income and wage distributions.

2.1 GDP per capita and labor productivity

We first provide a brief characterization of economic growth in the Iberian countries in the 1960-96 period by describing the evolution of GDP per capita and labor productivity in relation to the EU average (in PPS units). As seen in figure 1, regarding convergence of GDP per capita with the EU, three periods can be distinguished:

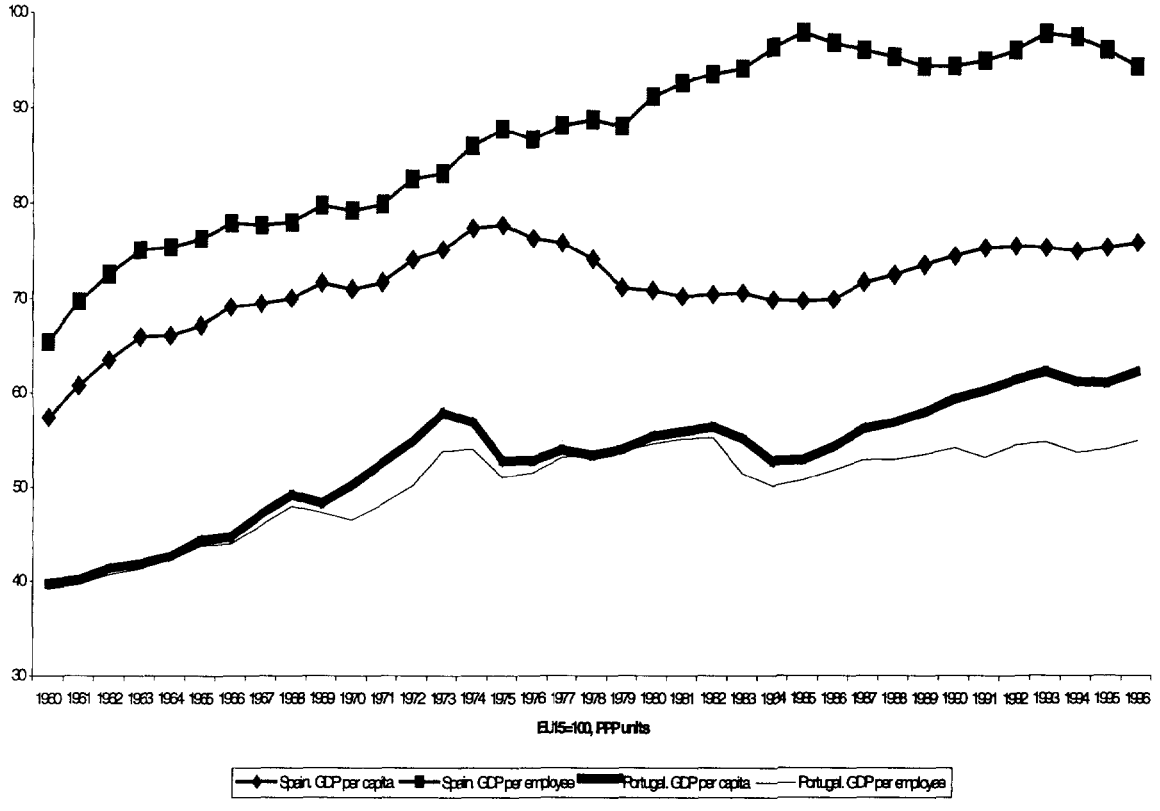
- Both Portugal and Spain were relatively backward economies in the 1960s. At the beginning of this decade GDP per capita (in PPS units) was about 40 percent and slightly above 55 percent of the EU average, respectively. During the 1960-75 period, both economies experienced some catching up (higher in Portugal) to reach almost 60 percent and about 75 percent, respectively, of the EU average, in 1975.

- During the second half of the 1970s and first half of the 1980s, a period of economic crisis in the Iberian countries, catching up in GDP per capita stopped in Portugal at a level around 55 percent of the EU average and even receded in Spain to less than 70 percent of the EU average.

- Since accession to the EU in 1986 and up to 1996, Portugal has improved its relative GDP per capita from about 53 percent to 63 percent, and Spain from about 70 percent to around 75 percent. Since 1996 both Portugal and Spain have had growth rates above the average of the EU.

Nevertheless, the evolution of GDP per capita conceals some important differences in the evolution of labor productivity (GDP per employee) and of employment rates. As seen in figure 1, Spain shows very rapid catching up in labor productivity in the 1960-86 period to remain at about 95 percent of the EU average after 1986. On the contrary, Portuguese convergence in labor productivity, which was faster in the 1960s and 1970s, has been almost nonexistent in the last decade (GDP per employee has risen only from about 52 percent in 1986 to 55 percent in 1996). Obviously, the different patterns of convergence in GDP per capita and labor productivity arise from the evolution of employment rates (employment as a proportion of the working age population). In the EU15, employment rates remained more or less constant in the 1960-75 period and then fell by 5 percentage points in the last two decades (from around 65 percent in 1975 to about 60 percent in 1996). In Spain the fall in employment has been much more dramatic, from about 57.6 percent in 1975 to less than 45 percent in 1985 to 47.2 percent in 1996. On the contrary, in Portugal the employment rate has remained more or less constant around the 1975 level—it was 66.4 percent in 1975, and 66 percent in 1996 after reaching a minimum of 63.5 percent in 1985.

Figure 1. GDP per Capita and Labor Productivity, Portugal and Spain, 1960-96



Source: EUROSTAT, *Statistical Appendix to European Economy.*

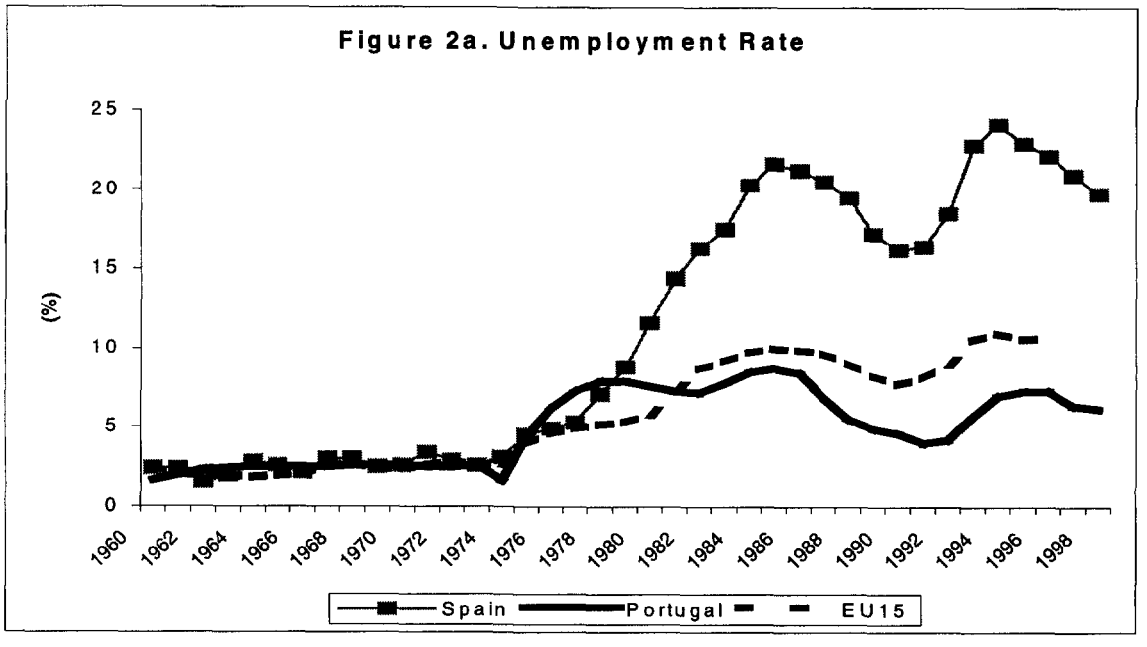
The relationship between economic development and inequality is thought of as an inverted U-shaped form. As economies embark in technological and structural changes, it is likely that the demand for capital and skills increases while the demand for unskilled labor decreases. Hence, at the early stages of economic development, there is a positive relationship between economic development and inequality, which is reversed as economic growth proceeds (this is called the Kuznets' hypothesis; see Higgins and Williamson 1999 for a recent empirical analysis of this hypothesis). Not only economic reform but also political reforms may have affected inequality. Rodrik (1999) argues that there is a positive relationship between the wage share and the "degree of democracy" across regions. In fact, wage shares increased in both Portugal and Spain during the second half of the 1970s after transition to democracy, and began decreasing in 1980 in Portugal and, since the mid-1980s, in Spain.

2.2 Unemployment and inflation

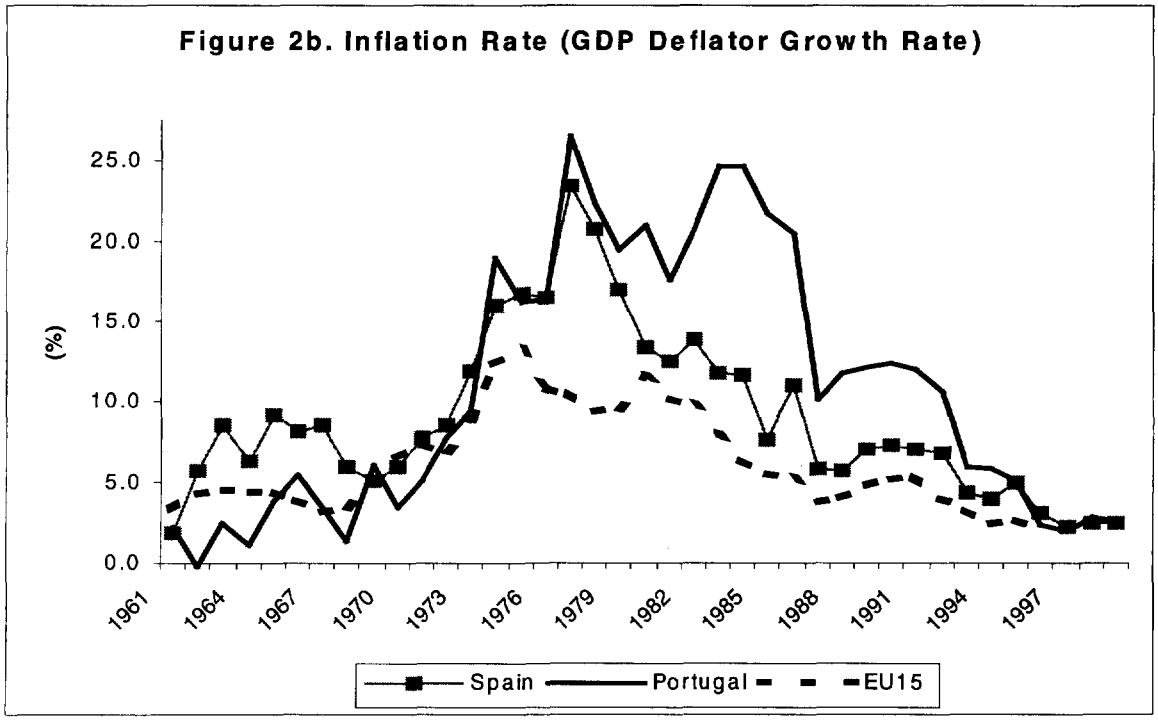
Figures 2a and 2b plot the evolution of unemployment and inflation rates in Portugal and Spain during the 1960-96 period. Unemployment rates have increased in the two countries since the 1960s and 1970s. The timing of the rise of unemployment is similar in both counties: it started in the mid-1970s just at the moment of the political transition. In fact, some authors (see Boeri et al. 1998) have argued that accession to the EU contributed to increased unemployment, since the structural reforms that were needed as a prerequisite for accession had negative effects on employment. However, while unemployment in Portugal remained below 10 percent with

cyclical fluctuations and no trend, in Spain unemployment soared to almost 25 percent and has shown, apart from cyclical fluctuations, a slightly increasing trend since the early 1980s.

As for inflation, the timing is different: Spain started the disinflation period in the late 1970s, although from a higher level and at a smaller pace than the core of the EU countries, while Portugal has reduced its inflation rate to the EU average only recently, in the early 1990s. Thus, in Spain the reduction of inflation from 10 percent to the current figure of below 2 percent took 15 years and was associated with a rise of 13 percentage points in unemployment, while in Portugal it was accomplished in only 5 years and with hardly any extra unemployment.[3]



[3] See Blanchard and Jimeno (1995) and Castillo, Dolado, and Jimeno (1998) for discussions of the causes of the unemployment differential between both countries.



Source: EUROSTAT, *Statistical Appendix to European Economy.*

As for the effects of unemployment and inflation on inequality, there are reasons to believe that the former is more relevant than the latter. Unemployment is unevenly distributed, being higher among youths and low-skilled workers (Nickell and Bell 1995), especially in Spain. Thus, unemployment and income inequality ought to be positively related, for a given country, across time. However, as for wage inequality, the effects may be the opposite: as the demand for high-skilled workers increases and the demand for low-skilled workers decreases, either the relative wage of the latter falls or low-skilled unemployment rises. Therefore, across countries, there is a negative relationship between changes in unemployment and changes in wage inequality (documented, for instance, in Bertola et al. 1999). As for inflation, its effects on inequality depend on the panoply of indexation provisions embedded in the tax system, in transfers, and in other contracts between different economic agents. There is, however, the presumption that people at the bottom tail of the income distribution are less perfectly hedged against inflation, so that inflation and income inequality are positively related.

2.3 The employment structure

Along with this evolution of unemployment, there have been significant changes in the sectoral composition of employment. In Portugal this composition diverges quite markedly from the EU average. However, the last decade has witnessed a rapid decline in agricultural employment and a sustained expansion in the service sector (see table 1). Currently 12 percent of the labor force is employed in agriculture, 30 percent in industry, and 58 percent in services, in contrast to 1985 when the shares were 22 percent, 33 percent, and 45 percent, respectively. Spain underwent intense employment reshuffling in the 1960s and early 1970s. The importance of the agricultural sector diminished in favor of industry and, especially, in favor of construction and service activities. Later on, the relative loss of agriculture and industry was significant as the service sector expanded to account for 52 percent of total employment in 1985. Whereas the reduction of the primary sector is comparable to that in Portugal, albeit starting from a much lower share, the fall in industrial activity can only be explained by a deep crisis in a number of sectors (steel, household equipment, shipbuilding) on which the Spanish authorities had counted

heavily in the past and which were severely hurt by the rise of energy prices. The need to undertake a drastic restructuring came only after the second oil price crisis during the early 1980s following the failure to modify the expansionary strategy pursued by the Spanish government in order to ease the political transition in the mid-1970s.

There is, however, an important difference between Portugal and Spain in this regard. In Spain the decrease in agriculture started in the 1960s and implied some flows from agricultural jobs to manufacturing. Then in the 1970s and 1980s, these flows continued, but the lack of job creation in manufacturing and the insufficient job creation in the service sector, despite the large increase in public jobs, resulted in a huge increase in unemployment (see Dolado and Jimeno 1997; Marimón and Zillibotti 1998). In contrast, in Portugal the largest flows from agriculture seem to have happened in the 1980s and resulted in a large increase of the service sector.

Table 1. Sectoral Composition of Employment, 1980-96

	Spain					Portugal				
	1960	1970	1980	1985	1996	1960	1970	1980	1985	1996
Employment ('000s)	11,450	12,433	11,551	10,875	12,394	3,316	3,362	3,940	4,064	4,475
Self-employment(%)	38.71	35.98	30.8	30.0	25.0	26.03	23.83	32.4	31.3	28.7
Agriculture (%)	43.69	30.39	19.3	16.2	8.7	44.36	30.22	27.3	21.9	12.2
Manufacturing (%)	23.24	27.88	25.5	22.7	18.9	21.26	24.15	26.0	24.5	22.2
Construction (%)	6.90	8.38	9.0	7.7	9.5	6.85	8.24	9.5	8.2	8.0
Services (%)	26.17	33.35	44.7	51.7	61.6	27.53	37.39	36.1	44.0	56.4
Social services (%)	n.a.	17.07	17.9	22.2	27.4	14.57	16.27	18.2	21.8	24.8

Source: OECD, *Labour Force Statistics.*

Obviously, the employment structure has relevant consequences for income and wage inequality. As workers move from low-productive agriculture to high-productive manufacturing, inequality falls. On the contrary, deindustrialization results in higher inequality (Bluestone 1990; Levy and Murnane 1992). On the latter, there is also reverse causality: higher inequality provokes more demand for services and, hence, a higher share of the latter in GDP and employment.

2.4 The skill upgrading of the labor force

Portugal and Spain are still among the OECD countries with the lowest levels of human capital, despite the very intense educational and skill upgrading they have had in the last two decades. As seen in table 2a, in 1995 only 31 percent of the Portuguese aged 25-64 years and 43 percent of the Spaniards of the same age have completed at least upper secondary education. However, the table also shows that the younger cohorts are much better educated than the older ones, reflecting large changes in the educational composition of the labor force. Table 2b confirms this fact by showing the educational attainments of new school leavers among the population aged 16-29 years of age. Moreover, the gender difference in skill upgrading shows that it is the female population that has most increased its educational level. Moreover, the participation rate of females has also increased substantially in both countries (from 59.8 percent in 1983 to 64.1 percent in 1995 in Portugal, and from 34.7 percent to 47.4 percent during the same period in Spain).

Table 2a. Educational Attainments by Age Group, 1995

	A. Upper secondary education				B. University degree			
	25-64 years	25-34/ 35-44	25-34/ 45-54	25-34/ 55-64	25-64 years	25-34/ 35-44	25-34/ 45-54	25-34/ 55-64
Portugal	20	1.3	1.9	3.4	11	1.0	1.4	2.3
Spain	28	1.5	2.6	4.7	16	1.5	2.5	4.5
OECD	60	1.1	1.3	1.7	22	1.0	1.3	1.9

Source: OECD (1997). Columns (2) and (6) give the percentage of the population aged 25-64 who have completed at least upper secondary and university education, respectively. The other columns give the ratios between proportions for those 25-34 of age and those corresponding to the other age groups.

Table 2b. Educational Attainments of New School Leavers Among the Population Aged 16-29 years, 1996

	Men		Women		Gender gap
	(A) Lower secondary or less	(B) University level	(C) Lower secondary or less	(D) University level	(E)
Portugal	51	15	33	26	29
Spain	44	25	23	39	35
OECD	36	23	31	26	8

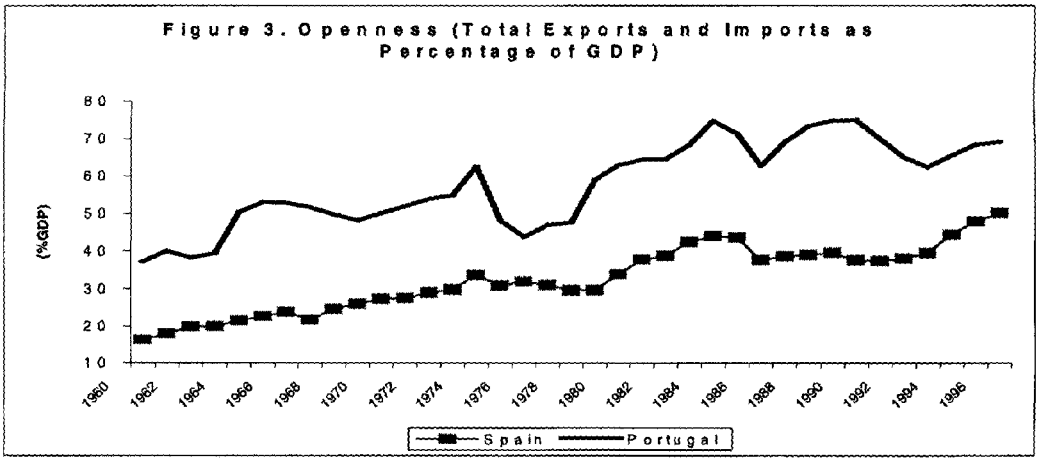
Source: OECD(1997). The gender gap is defined as [(A)-(B)]-[(C)-(D)].

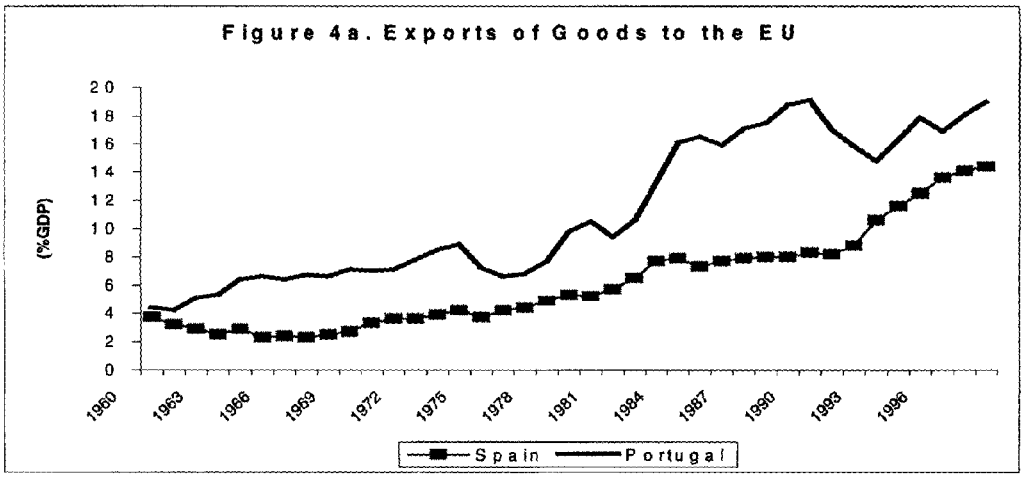
The changes in the composition of the labor force by age, sex, and educational attainments obviously have consequences for the income and wage distribution. In section 4 we will estimate how the remuneration to personal characteristics has changed in the 1985-95 period, that is, from immediately before to ten years after EU accession.

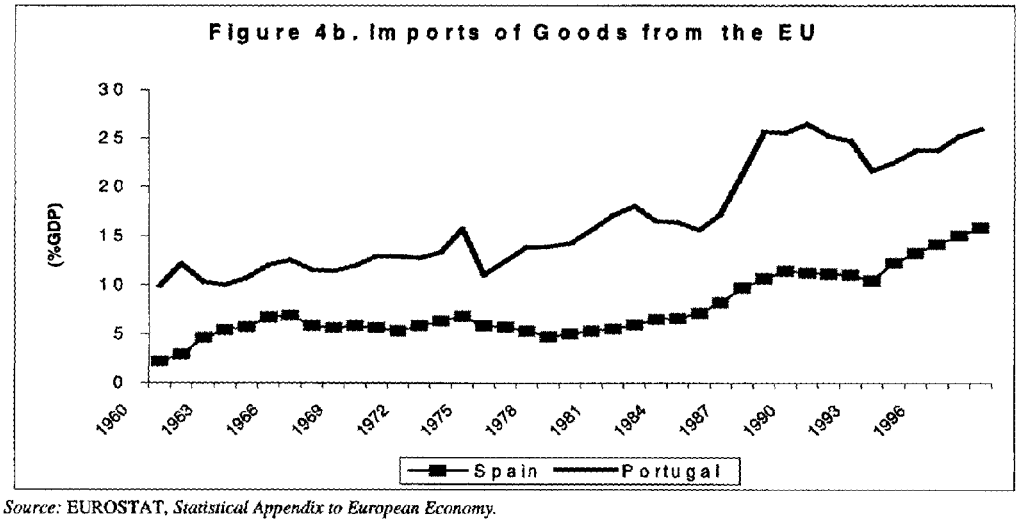
2.5 The external sector: Trade and foreign direct investment

The Portuguese economy has traditionally been more open than the Spanish economy. Although country size is an important determinant of openness, in this case historical reasons are also to blame for part of the difference: Portugal was a founding member of the European Free Trade Association (EFTA) in the 1960s. On the contrary, it was not until accession to the EU and, more apparently, since the early 1990s, after completion of the transition period for dismantling of barriers to trade and labor mobility specified by the accession treaties, that the Spanish economy increased substantially its trade shares, so that some of the differences in openness with respect to Portugal started to vanish.

The evolution of the ratio of total exports and imports to GDP is shown in figure 3. For Portugal this ratio increased from about 40 percent to almost 70 percent in the 1960-86 period, and fluctuated around this level thereafter. Spanish exports and imports increased from about 15 percent of GDP in 1960 to almost 40 percent in 1986, and then again from about 40 percent in the early 1990s to around 45 percent in 1996. As for geographical patterns of trade of goods, there is an increasing concentration of exports and imports of the two countries to and from the EU. As shown by figures 4a and 4b, exports to the EU have more than doubled in the last decade, although the timing of the rise has been different. While Portuguese exports of goods to the EU increased mostly in the second half of the 1980s, it was only recently that the Spanish ones have risen significantly. As for imports of goods from the EU, a similar pattern arises—strong rise of the Portuguese imports in the second half of the 1980s and of the Spanish ones since the early 1990s.







Source: EUROSTAT, *Statistical Appendix to European Economy.*

Finally, concerning the evolution of intraindustry versus interindustry trade, one should expect that since the two countries had a larger labor intensity and a higher share of farming population than their trade partners (mainly the rest of EU countries), interindustry trade would be predominant. However, this has not been the case in Portugal and Spain, where the intraindustry trade share in total trade has gone up by 10 and 14 percentage points, respectively, between 1986 and 1995 (see *European Economy* 1996, no. 4). As regards specific sectors with a strong export orientation and, therefore, subject to stronger specialization in each country (see table 3), one should emphasize the role of textiles in Portuguese manufacturing, which still contributes 30 percent of export earnings, whereas there are other sectors (like food and beverage and electrical engineering) in which FDI flows have strengthened their comparative advantage. Spain, in turn, has intensified specialization in products of medium and low quality with strong or intermediate demand at the EU level. Thus, while food stuffs gradually lost ground, durable consumer goods (cars exported to the EU and capital goods to Latin-American countries) have seen a steep rise in importance. Overall, it seems that international trade should have increased the demand for products made by low-skilled and semiskilled workers and, hence, contributed to lower wage inequality.

Table 3. Trade by Types of Products

	Exports (as % of total exports)			Imports (as % total imports)		
	1985	1990	1996	1985	1990	1996
			Agricultural and food products			
Portugal	8.2	6.6	6.4	11.0	9.7	10.9
Spain	14.4	13.5	14.0	10.2	9.7	10.9
EU15	7.2	7.5	6.6	11.5	8.5	7.9
			Chemical products			
Portugal	6.1	5.3	4.5	11.5	9.2	10.1
Spain	8.2	8.8	8.3	11.8	10.1	11.8
EU15	10.4	11.5	12.9	6.3	6.5	7.7
			Manufacturing products			
Portugal	80.2	81.0	86.0	64.1	73.6	75.0
Spain	75.7	78.1	79.0	60.9	71.7	73.2
EU15	80.1	83.1	87.5	53.0	61.7	69.3
			Equipment and transportation materials			
Portugal	15.9	19.5	32.5	29.4	36.5	36.3
Spain	31.9	38.2	41.9	29.7	38.4	37.4
EU15	38.7	40.6	45.2	23.8	28.6	32.3

Source: EUROSTAT, *Yearbook '97.*

As for FDI, traditional theories stress the role of the divergence of factor prices, transport costs, and tariffs, together with ownership-specific advantages, locational advantages, and internalization opportunities in the case of multinational enterprises. According to these theories, we should expect FDI flowing in a single direction from capital-intensive, high-wage countries toward labor-intensive, low-wage countries. In this case, another important factor affecting FDI is economic stability and the degree of stringency of the labor market legislation (see OECD 1994, chapter 4). Moreover, high transport costs and low firm-level fixed costs may induce two-way FDI that will displace trade and become more intensive as countries converge in factor prices. Thus, on the one hand economic integration will tend to decrease FDI as tariffs are reduced, trade increases, and factor prices converge, and on the other hand will foster FDI if the determinants of two-way FDI are relevant.

First note that, as seen in table 4, the Iberian countries are low-wage countries for EU standards (Portugal more than Spain). However, since the early 1980s, average hourly labor costs relative to the EU average have increased in Portugal and Spain, although these increases were

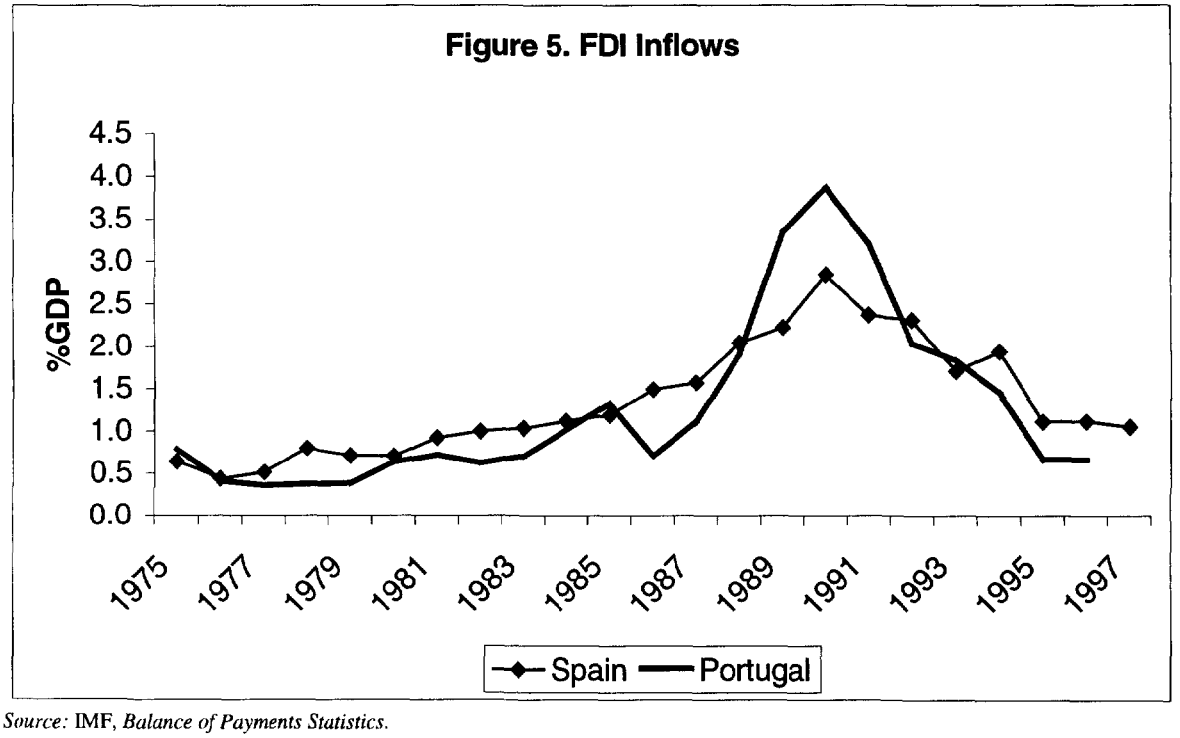
reverted by a sequence of currency devaluation episodes in the early 1990s. Arguably, the differences in average hourly labor costs reflect differences in productivity (so that human capital in the receiving country matters) and PPS, which firms take into account when deciding on FDI. However, it can be also argued that for FDI, differences in productivity and PPS across countries are not relevant, as a large fraction of productivity is firm specific (independent of location) and production is traded in international markets. In any case, on the labor cost front, Portugal and Spain seem good candidates to receive FDI inflows both before and after accession to the EU.

Table 4. Average Hourly Labor Costs (EU12 1990 = 100)

	Portugal	Spain
1984	23.61	73.02
1988	23.95	73.39
1992	34.80	94.73
1995	33.47	82.35

Source: EUROSTAT, *Labour Costs Survey.*
For Spain, 1984, International Labour Office, *Yearbook of Labour Statistics*, 1994.

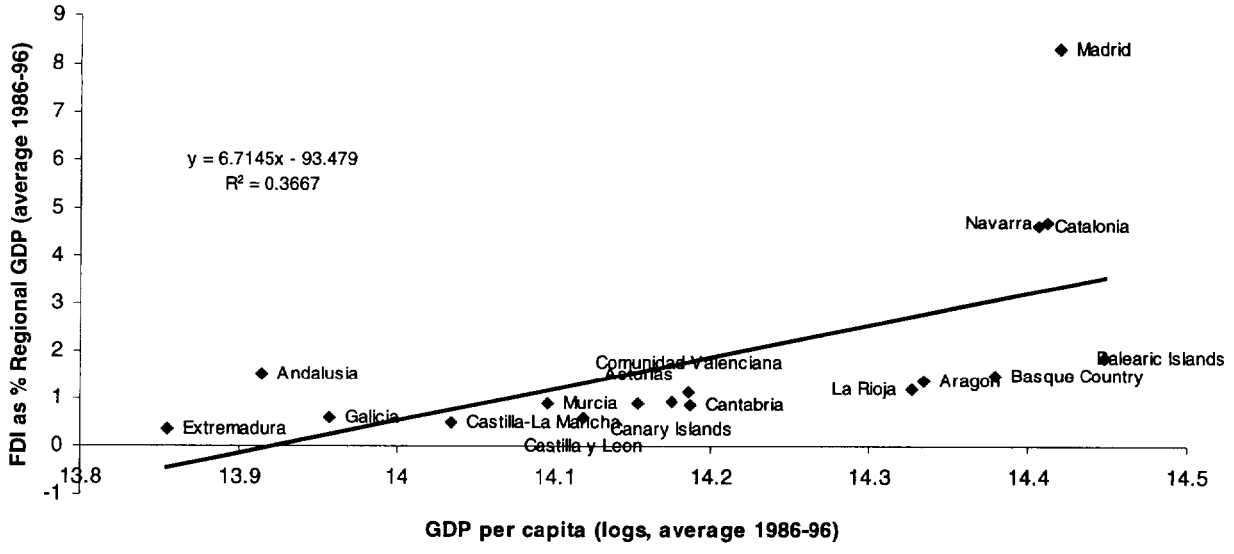
The evolution of FDI inflows in these two countries is given in figure 5. As seen in the figure, FDI inflows significantly increased in the 1980s (mostly in the second half of that decade) both in Portugal and Spain. This increase reflects an overall increase in FDI that has taken place across the world since the mid-1980s together with accession to the EU. The liberalization and structural reforms of the 1980s and 1990s, together with the implementation of more orthodox fiscal and monetary policies, surely contributed to the rise of FDI flows. However, the recent experience is not very encouraging in this regard. After the FDI boom of the second half of the 1980s, FDI inflows to both Portugal and Spain have decreased to almost the low levels of the 1970s and early 1980s, and are much lower than the inflows that other low-wage EU countries are receiving (for example, Ireland).



Source: IMF, *Balance of Payments Statistics.*

An important aspect of FDI in regards to inequality is its regional distribution. Figure 6 plots FDI inflows to Spanish regions and regional GDP per capita during the 1986-96 period. As can be seen in the figure, FDI inflows are heavily concentrated in the richest regions so that between regions, inequality increases. FDI will have an even higher positive effect on inequality if, as seems likely, FDI increases the demand for high-skilled workers and, therefore, within-region inequality.

Figure 6. Regional Distribution of FDI Inflows (Spain, 1986-96)



A similar concentration of FDI inflows in richer regions also can be found in Portugal. As shown in table 5, the Lisboan region and the North consistently receive around 90 percent of all FDI inflows.

Table 5. Regional Distribution of FDI inflows (%), Portugal.

	1990	1991	1992	1993	1994
Norte	18.1	11.2	5.7	22.3	9.1
Centro	11.3	3.1	2.8	6.8	7.0
Lisboa Vale Tejo	66.8	82.7	89.8	68.3	81.8
Alentejo	0.2	0.3	0.2	0.3	1.0
Algarve	3.5	2.7	1.6	2.4	1.1

Source: Santos 1997, p. 151.

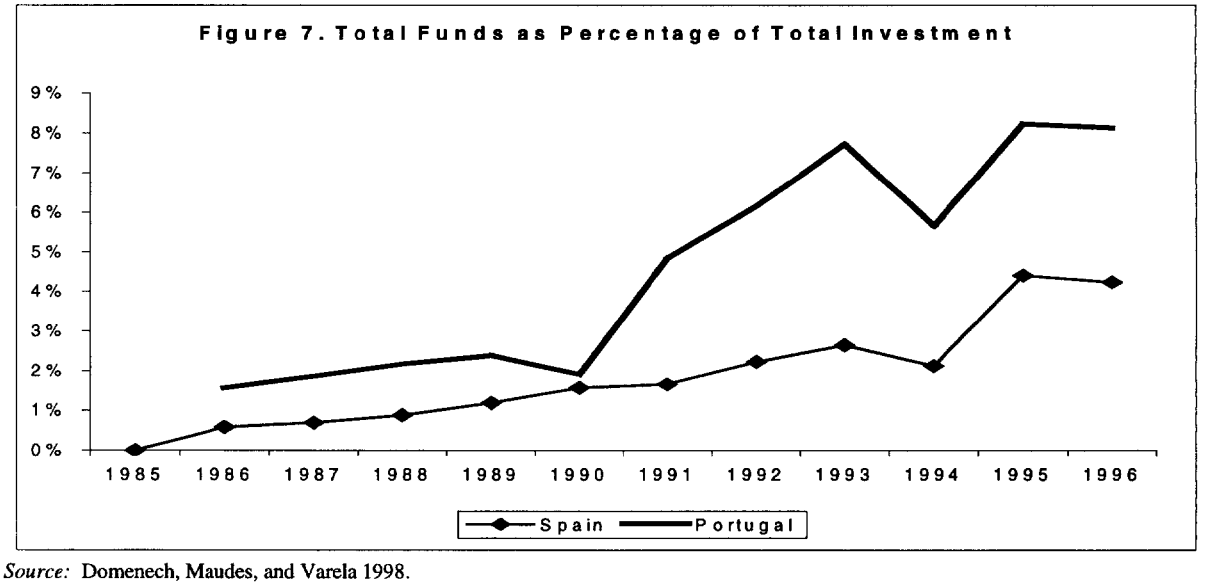
2.6 The incidence of EU funds

In the EU, regional policies are high on the political agenda as a means to improve social cohesion among the member countries and to foster economic development in the laggard regions. Thus, in addition to private FDI, since 1986 some member countries receive transfers from the EU's budget that are devoted to improve the infrastructure base and human capital resources. As seen in table 6, EU Structural Funds currently amount to approximately 3 percent of GDP in Portugal and 1 percent in Spain, and have been increasing since the early 1990s. Also, figure 7 shows that, in relation to total investment, these funds have represented a significant and increasing share of capital accumulation.

Table 6. Structural Funds and Cohesion Funds Receipts as Percentage of GDP

	Spain				Portugal			
	Regional funds	European social fund	Other structural funds	Cohesion funds	Regional funds	European social funds	Other structural funds	Cohesion funds
1986	.13	.07			.55	.32		
1987	.14	.12			.65	.55		
1988	.19	.14			.91	.55		
1989	.28	.14			.95	.52		
1990	.36	.16			.94	.14		
1991	.35	.16			1.79	.70		
1992	.45	.18			2.04	.80		
1993	.43	.20		.10	1.73	1.07		.13
1994	.33	.16		.10	1.57	.36		.35
1995	.71	.27	.04	.26	1.75	.70	.36	.50
1996	.46	.39	.06	.24	1.97	.67	.19	.40

Source: Domenech, Maudes, and Varela 1998.



Source: Domenech, Maudes, and Varela 1998.

Regarding inequality, the most relevant aspect of EU Structural Funds is obviously their regional distribution. FDI inflows have a very characteristics regional concentration in the richest regions and therefore tend to increase inequality between regions. Hence, international economic integration should be expected to increase regional differences in income and wages. To some extent, if regional policies are targeted to the poorest regions, they may counterbalance the regional effects of FDI inflows.

Regional policies in Portugal

Until accession to the European Community, Portugal had no tradition of regional policy. Indeed, no budget line was specifically set for that purpose, no policy instruments were defined, and planning at the national level was basically dissociated from planning at the regional level; whereas the former was assigned to the Ministry of Finance and Planning, the latter was assigned to commissions under the supervision of the Ministry of Internal Administration (see Pires 1998, on which this section is based, for details on the evolution of the Portuguese regional policy). The

foreseen accession to the EU led, in 1983, to changes in the structure of the government, to accommodate for the first time a department specifically in charge of the coordination of the regional policy, which should implement in Portugal the distribution of the Community regional funds. In 1984 and 1985, the goals, the strategy, the instruments, and the resources for regional policy in Portugal were first laid out, together with a statement of the interactions between regional goals and the other government policies. However, by 1986 the regional modulation of the Portuguese policy was still judged as insufficient by the European Commission, and a transition period was therefore defined. It was only in 1988 that a definite set of national rules for the distribution of the EU regional funding was approved at the Community level.

Table 7. Regional Distribution of Regional Funds, Portugal.

	1986-88		1989-93	1994-96	
	Share of total funding (%)	Per capita funding (1000 PTE)	Share of total funding (%)	Share of total funding (%)	
				Regional funds and agricultural funds	Social cohesion fund
Norte	30	14.9	26	28	28
Centro	19	19.4	18	17	5
Lisboa e V. Tejo	19	10.2	38	33	53
Alentejo	13	41.6	6	6	5
Algarve	6	33.2	3	3	8
Açores	7	52.1	4	7	-
Madeira	6	41.6	5	8	1

Source: Pires 1998, p. 50.

The regional policy in Portugal was therefore set with the integration in the European Community in the background, and it has since accession been implemented in the framework of the EU regional policy. Table 7 reports the regional partition of the EU Funds in Portugal between 1986 and 1988. Lisbon and the Northern Region shared the lowest per capita Regional Funds, revealing the regional concerns in the splitting of these types of subsidies. During the preparation of the Regional Development Plan for 1988-93, the conflict between competitiveness goals and regional equity goals was apparent (Pires 1998, p. 93). The regional partition of the Regional Funds in Portugal between 1989 and 1993 reveals weaker regional equity aims. When compared to the previous three-year period, the trend towards the concentration of the funding in the most developed region is noticeable. In fact, Lisbon and the Tagus Valley gathered 38 percent of the Regional Funds for the period 1989-93. Such a situation is partly explained by the funds aimed at recovering the Setúbal region, a declining industrial area south of Lisbon, where subsidized FDI was prominent during this period. Between 1994 and 1996, the trend towards the concentration of a major share of the subsidies in the Lisbon region does not show signs of declining. Nevertheless, because of the amounts of funding channeled to Portugal after 1991, it can be claimed that EU regional policies and their implementation in Portugal had a certain equalizing impact across regions. Indeed, this type of funding cannot be dissociated from the convergence of regional per capita GDP that, though in a slight way, took place in Portugal after 1991. While from 1985 to 1990 the regional dispersion of per capita GDP increased, between 1990 and 1993 it showed signs of a slight decline (see table 8).

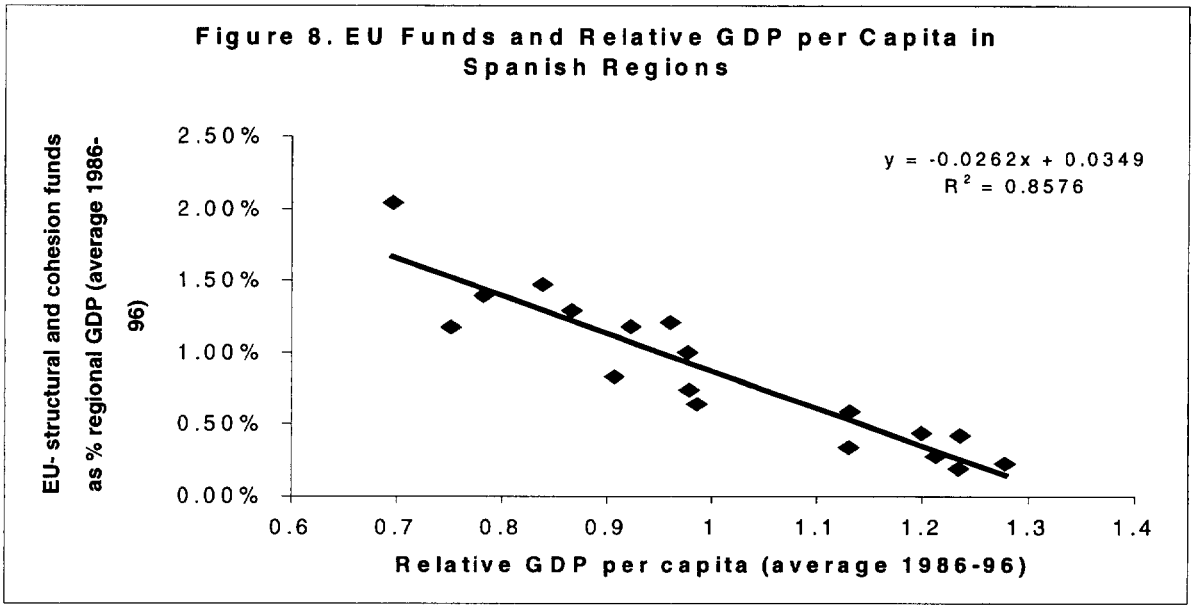
Table 8. Coefficient of Variation, Regional GDP Per Capita, Portugal, 1985-1993

	Coefficient of variation (1)	
1985	26.56	
1986	26.47	
1987	27.54	
1988	26.26	
1989	26.64	
1990	27.59	21.49
1991		22.45
1992		21.09
1993		20.94

Note: Methodological changes implemented in 1991 by the National Statistical Office resulted in a break in this series.
Source: Pires 1998, pp. 59, 130.

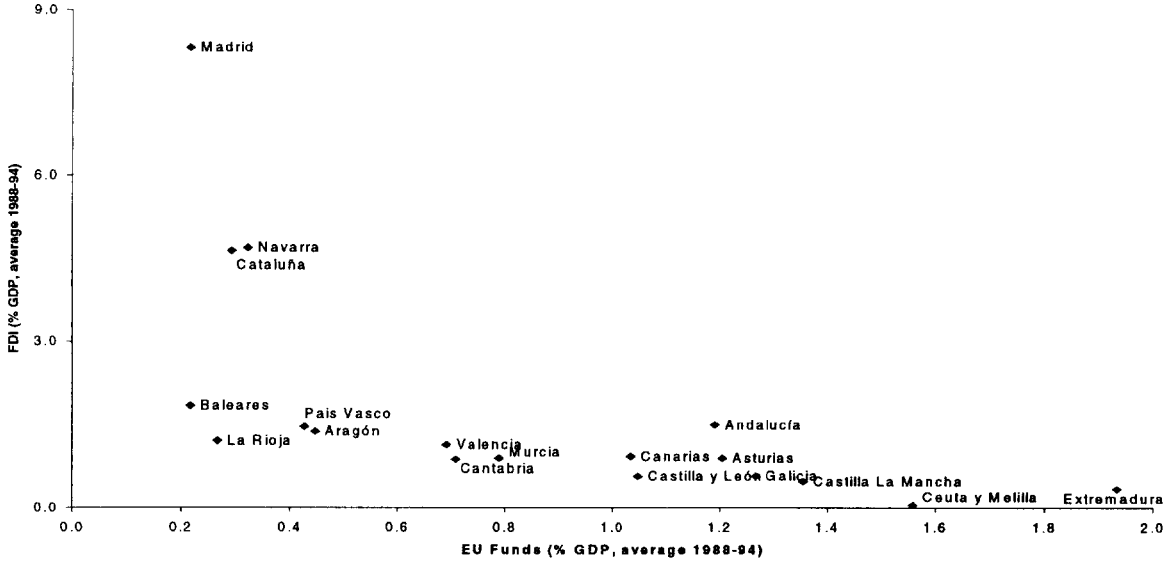
Regional policies in Spain

Spain had no regional policy of any sort until the late 1960s when incentives to private investment in lagged regions (mainly, Andalucia, Extremadura, Galicia, Castillas, and Aragon) were put in place (see Mancha-Navarro and Cuadrado-Roura 1996 for a detailed description). At that initial stage regional policies had a subsidiary character, resources devoted to them were scarce, and they followed the sectoral guidelines of industrial growth patterns of those years. Recently, since mid-1980s, regional policies have begun to take on increasing importance as the political decentralization gained momentum. Furthermore, with the accession to the EU, given the requirements to achieve EU funding, formal Regional Development Plans (RDPs) have been implemented for the periods 1986-1989, 1989-1993, and 1994-99. The main objective of the RDPs is to reduce interregional inequality, supporting a sustainable growth pattern that will lead to convergence with average income per capita in the EU. They comprise three main instruments: (1) investment in infrastructures, (2) capital transfers to accumulate social equipment in health, education and housing, and (3) incentives to private productive activities. Thus, EU funding has been key for modern Spanish regional policies, resulting de facto in significant transfers to the regions with the lowest levels of GDP per capita (see figure 8).



However, the regional concentration of FDI inflows has been even more intense, so that EU regional policies have not totally compensated for the lack of private investment in the poorest regions. Figure 9 plots the relationship between total foreign capital inflows (as a percentage of regional GDP and average for the 1988-94 period) and regional GDP per capita. As can be seen in the figure, some of the richest regions (Madrid, Navarra, and Catalonia) have received total flows well above the rest. In the rest of regions, the differences between the contribution of foreign funds and capital accumulation have been much less noticeable, with the poorest regions (particularly Extremadura) relying heavily on EU funding in this regard.

Figure 9. FDI and EU Funds in Spanish regions, 1988-94



To what extent do FDI inflows result in widening regional differentials in labor productivity? To what extent have EU funds contributed to reduce these differentials? Under the

assumption that capital goods are homogeneous and, hence, regional production has the same elasticity with respect to all kind of investments (either private-public or domestic-foreign), the relative impact of FDI inflows and EU funds on regional productivity differentials may be approximated by the contributions of both to capital accumulation. However, there is an additional reason why FDI inflows and EU funds can make a difference for the evolution of regional productivity. Being capital not homogeneous, it is likely that the elasticity of production with respect to capital accumulation is not invariant to the different kinds of investment. Thus, we proceed to perform regression analysis on the determinants of regional productivity (and regional GDP per capita) to assess the contribution that FDI inflows and EU funds, besides their direct contribution to capital accumulation.

For this analysis, we use a sample of 17 Spanish regions (corresponding to the NUTS2 level of EUROSTAT's regional classification) during the 1988-94 period (for which the regional disaggregation of FDI inflows is available). Following De la Fuente and Vives (1995), we postulate a constant return to scale with three types of capital: private and public physical capital and human capital. We have data on the stock of each kind of capital in each region (but do not distinguish between domestic and foreign), on the proportion of employees who have at least completed secondary education (our proxy for human capital), and FDI inflows and EU Structural Funds (as proportions of regional GDP). Under the assumption that the domestic-foreign distinction is not relevant, the production function, in log-differenced form, becomes:

$$\Delta(y_{it} - l_{it}) = \alpha\Delta(k_{it} - l_{it}) + \beta\Delta(p_{it} - l_{it}) + \gamma\Delta h_{it} + \varepsilon_{it} \qquad (2.1)$$

where y is (the logarithm of) production, l is employment, p is public physical capital, k is private physical capital, h is human capital; i denotes region, t denotes time, and ε is a random error term. For the estimation of the differential effects of FDI inflows and EU Structural Funds on regional productivity, we extend the previous specification as follows:

$$\Delta(y_{it} - l_{it}) = \alpha_1\Delta(k_{it} - l_{it}) + \beta_1\Delta(p_{it} - l_{it}) + \gamma\Delta h_{it} + \alpha_2 FDI_{it} + \beta_2 EUSF_{it} + \alpha\varepsilon_{it} \qquad (2.2)$$

where FDI and EUSF represent FDI inflows and EU Structural Funds (both as a proportion of regional GDP), respectively. Under the assumption of constant returns to scale and perfect mobility of private capital, the change in the private capital per employee can be eliminated from the equation (see De la Fuente and Vives 1995), which is convenient since available regional data on private investment per employee are not completely reliable.

We estimate the simplified version of equation (2.2). The regressors are public capital per employee (in log-differences), the change in the proportion of employees with at least a secondary education, the ratio of EU Structural Funds to regional GDP accumulated over the current and last two years, and FDI inflows as a proportion of regional GDP also accumulated over the current and last two years. We accumulate these latter flows to take into account some likely delayed effects of both EU funds and FDI inflows on regional labor productivity.

We estimate this specification in log-differences (in contrast to De la Fuente and Vives 1995, who estimate a similar specification in levels without considering separately the effects of EU Funds and FDI inflows). We use both OLS and IV estimators to handle the endogeneity of EU Funds and FDI inflows. As instruments we use the (2nd order) lags of these two variables and the second-order lags of regional labor productivity and regional GDP per capita.

The results from the estimations are presented in table 9. The simplest specifications (columns 1 to 4) estimated by OLS yield elasticities of production with respect to public capital

between .14 and .31 (but which are statistically significant in two out of the four cases). As for human capital, our proxy (the proportion of employees with at least secondary educations) has mostly crossregion variations and, hence, it is highly correlated with regional dummies, which results in loss of statistical significance when regional dummies are included. Nevertheless, the point estimates of both elasticities in columns 3 and 4 are close to those estimated by De la Fuente and Vives (1995) using regressions specified in levels rather than in differences. In any case, our motivation was to analyze the differential impact of FDI inflows and EU Structural Funds on regional labor productivity. In this regard, we obtain some suggestive results. First, the OLS estimates indicate a negative differential impact of EU Structural Funds and a positive differential impact of FDI inflows—with respect to domestic public and private investment. However, while the former finding is not very robust—it disappears when IV are used for the estimation (see columns 7-9)—the latter finding still remains in one of the specifications estimated by IV (see column 9). Thus, overall, our results seem to suggest that the widening effects of FDI inflows on regional labor productivity arise from two facts: the concentration of these flows on the richest regions and a positive differential impact with respect to other types of investment. On the contrary, although EU Structural Funds contribute very significantly to equalize the level of public capital across regions, their equalizing effects on regional labor productivity may be hindered by a lower elasticity of regional production per employee.

Table 9. Estimations of the Effects of FDI Inflows and EU Structural Funds on Regional Productivity and Regional GDP Per Capita
Dependent Variable: Regional Labor Productivity (in Log-Differences)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	IV (2nd. lag*)	IV (2nd. lag*)	IV (2nd. lag of labor product. and GDP per capita)
Constant	.01	-.00	-.01	-.01	.01	-.01	.02	.01	-.02
	(.01)	(.02)	(.01)	(.02)	(.02)	(.01)	(.04)	(.04)	(.05)
Δ(p-l)	.14	.21	.17	.31	.18	.32	.16	.28	.32
	(.08)	(.17)	(.08)	(.23)	(.09)	(.09)	(.08)	(.14)	(.16)
Δh	.09	.01	.54	.29	.05	.38	.04	.33	.39
	(.24)	(.20)	(.47)	(.34)	(.15)	(.19)	(.23)	(.21)	(.23)
EUSF*	--	--	--	--	-.27	-.56	-.33	-.82	-.60
					(.39)	(.23)	(1.01)	(.96)	(1.09)
FDI*	--	---	--	--	.21	.16	.06	-.15	.28
					(.12)	(.07)	(.47)	(.36)	(.15)
Regional dummies	NO	YES	NO	YES	YES	YES	YES	YES	YES
Time dummies	NO	NO	YES	YES	NO	YES	NO	YES	YES
Adjusted R-squared	.03	.13	.13	.21	.22	.39	.21	.35	.39

3. TRENDS IN INCOME INEQUALITY (1980-95)

In this section we document changes of income inequality in Portugal and Spain during the 1980-95 period. Following most studies on this topic, we use data from the Surveys of Household Budgets conducted by the corresponding National Statistical Institutes at the beginning of the 1980s (1980-81), the beginning of the 1990s, (1989-90, in Portugal and 1990-91

in Spain), and the mid-1990s (1995 for both Portugal and Spain).[4] In order to have a global overview of the changes in the income-expenditure distributions, we use several indicators: the household distribution of total expenditure-income and the individual distribution of the per capita and per equivalent adult expenditure-income.[5] The definition of income includes earnings, investment income, transfer and capital receipts, and income in kind as production for home consumption and imputed rents; and it is net of income taxes and social security contributions. Households with negative incomes have been excluded. Making use of the consumer price index as a deflator, we report incomes and expenditures in 1990 prices. Unless otherwise stated, the OECD equivalence scale has been used to compute the equivalent income of each individual in the household. We compute both the Gini coefficient and the Theil index of the expenditure and income distributions and exploit the properties of the Theil index to break down income inequality in within-groups and between-groups inequality. We also break down income inequality by sources of income.

3.1 Household income inequality

Table 10 presents the main facts regarding household income inequality in Portugal and Spain during the 1980-95 period. For Portugal, regardless of the concepts of expenditure-income used, inequality decreased during the 1980s but increased during the first half of the 1990s. Rodrigues (1993) shows that the decline during the 1980s resulted in particular from the changes taking place at the bottom of the distribution, due to a much higher increase in the average living standards of those people at the bottom of the distribution (average real income grew by 15 percent between 1980 and 1990, 24 percent for the poorest 10 percent of the population, and 14 percent for the richest 10 percent of the population, with the share of total income received by the bottom fifth of the population rising from 7.9 percent to 8.3 percent). For Spain, where inequality was lower than in Portugal in 1980 (see the Lorenz curves for each country in figures 10a-10c), the decrease of total income inequality took place during the whole 1980-95 period. As in Portugal, the fall of inequality is mostly due to a much higher increase of incomes at the bottom of the distribution. For instance, for equivalent income, the 10th percentile increased by 42.9 percent between 1980 and 1990 and by 8.8 percent between 1990 and 1995, while the corresponding rates of growth for the 90th percentile were 31.6 percent and 4.0 percent, respectively. Nevertheless, the surveys for Spain in 1990 and 1995 are not directly comparable: the 1990 survey is a cross-section Household Expenditure Survey, while the 1995 survey is a longitudinal Household Expenditure Survey with a smaller sample size, and the latter systematically produces lower inequality indexes than the former. When only the longitudinal survey is used to compare 1990 and 1995, household inequality is reduced, inequality of expenditure and income per capita slightly increased, and inequality of income on a equivalent basis decreased by an amount less than that presented in table 10.

In any case, earnings inequality (measured by the distribution of total labor income, per capita labor income, and per adult equivalent labor income) did not show such a declining trend in either of the two countries. In Spain, the household distribution of labor income became more unequal during the 1980s, especially during the first half of the 1990s. This is partly due to the family concentration of employment: the households in the upper half of the distribution not only have higher individual labor incomes but also more individuals receiving earnings. In Portugal increasing inequality in labor income is a more recent phenomenon of the first half of the 1990s.

[4] The methodology and the variables covered by the surveys are very similar in both countries so that comparisons of inequality indexes can be performed with some confidence.

[5] For the reasons to use expenditure as a measure of income, see Gouveia and Tavares (1995) and the references therein.

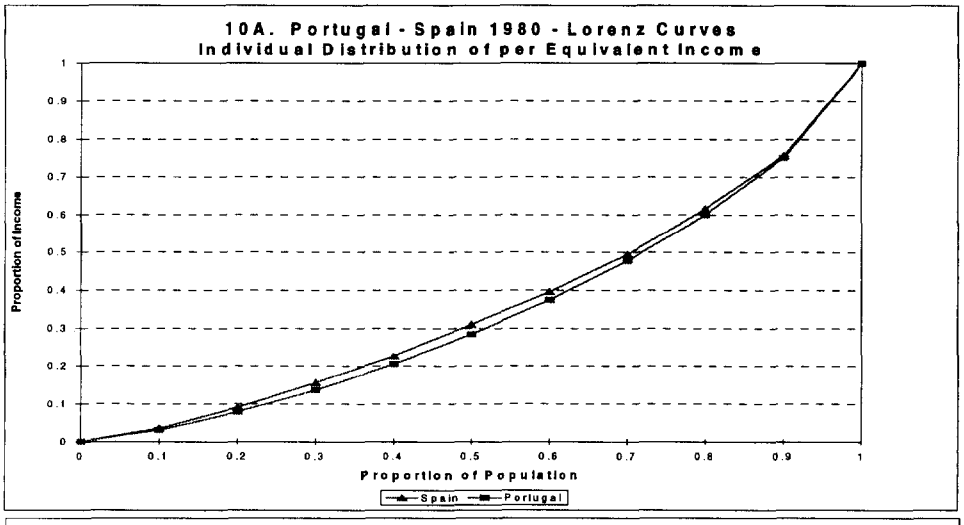
Thus the decreasing household income inequality in Spain between 1980 and 1995 contrasts with increasing household income inequality in Portugal, especially when we take into account that labor earnings inequality has increased more in Spain than in Portugal. This suggests that other sources of income, mainly transfers, are playing a very redistributive role in Spain and much less in Portugal. Hence, we now further investigate the main factors behind income inequality in both countries by breaking down inequality indexes in different relevant dimensions.

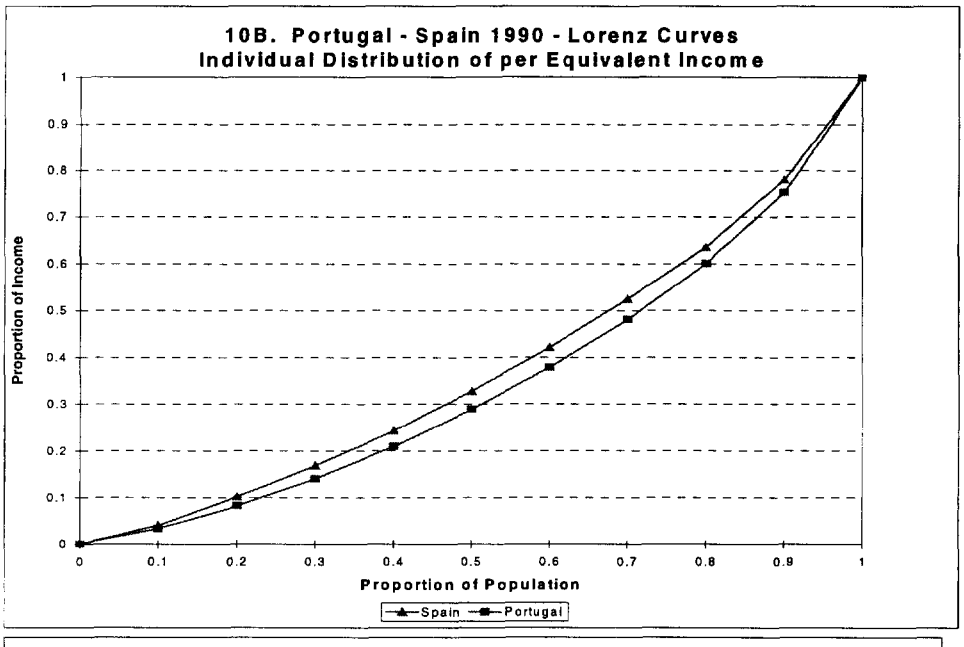
Table 10. Income Inequality in Portugal and Spain, 1980, 1990, 1995

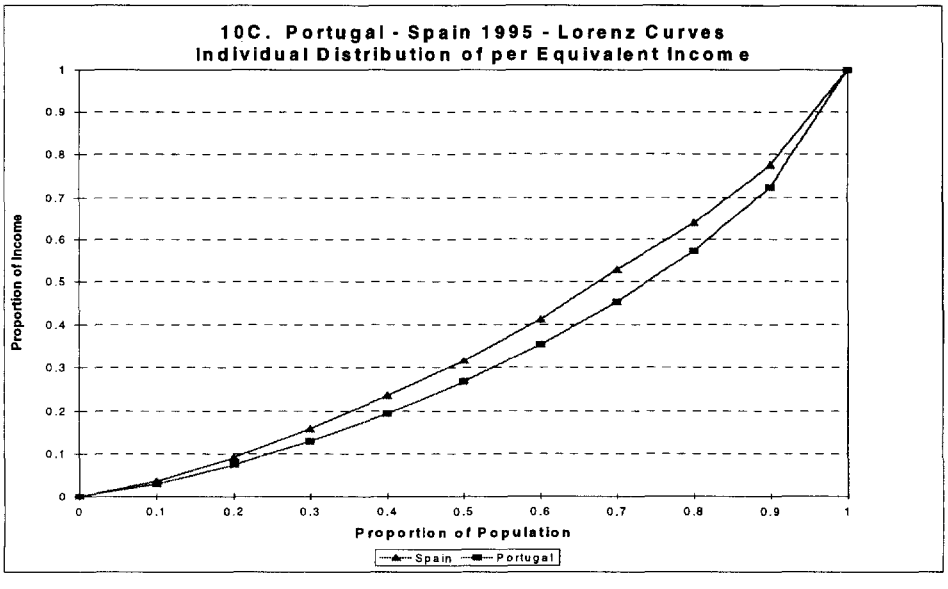
	PORTUGAL			SPAIN		
	1980	1990	1995	1980	1990	1995
	Household distribution of household expenditure					
Gini Coefficient	.423	.408	.435	.357	.347	.309
Theil Index	.310	.282	.323	.215	.203	.159
	Individual distribution of per capita expenditure					
Gini Coefficient	.396	.369	.394	.333	.318	.296
Theil Index	.279	.214	.270	.192	.175	.153
	Individual distribution of per equivalent expenditure					
Gini Coefficient	.388	.363	.389	.314	.301	.271
Theil Index	.266	.229	.261	.167	.155	.124
	Household distribution of household income					
Gini Coefficient	.368	.367	.400	.343	.330	.307
Theil Index	.231	.229	.274	.209	.192	.155
	Individual distribution of per capita income					
Gini Coefficient	.331	.321	.355	.337	.316	.299
Theil Index	.194	.183	.228	.211	.184	.156
	Individual distribution of per equivalent income					
Gini Coefficient	.319	.313	.348	.309	.293	.273
Theil Index	.178	.172	.216	.174	.155	.124
	Total household labor income[a]					
Gini Coefficient	.352	.358	.387	.325	.343	.374
Theil Index	.208	.215	.257	.179	.209	.233
	Per capita labor income[a]					
Gini Coefficient	.382	.372	.403	.364	.371	.395
Theil Index	.246	.234	.257	.227	.247	.265
	Per equivalent labor income[a]					
Gini Coefficient	.368	.360	.393	.328	.342	.370
Theil Index	.253	.219	.270	.183	.207	.230

a. It only includes households with labor income.

Figure 10. Lorenz Curves. Portugal and Spain, 1980, 1990, and 1995.







3.2 Some dimensions of income inequality

Here we focus on two important factors behind changing income inequality. The first one is the contribution to inequality of the different sources of income (labor earnings, self-employment, transfers, and so forth). The second important dimension of inequality refers to territorial aspects, particularly differences between regions. Both countries have been subject to some reshuffling regarding the political power of regional and local governments, and this has affected between-regions inequality.[6] Moreover, regional policies have been used intensively as means of redistributing income across regions (as seen in section 2.6).

As for the sources of income, Shorrocks (1982) showed that under certain restrictions the proportional contribution of a factor income to total inequality would be invariant to the choice of inequality measure and would, for any inequality measure, be uniquely defined. By exploiting this result, table 11 presents results concerning the decomposition of inequality by income sources in Spain and Portugal.

[6] This is particularly relevant for Spain, where the decentralization of political power has been very intense since the transition to democracy in the mid-1970s. In many regards, except on the formal side, Spain is a federal state in which regional governments have competence in many economic issues.

Table 11. Decomposition of Inequality by Income Sources

PORTUGAL						
Income source (net)	Share of total income (%)			Contribution to inequality (%)		
	1980	1990	1995	1980	1990	1995
Labor income	49.4	47.8	46.6	42.5	41.9	48.7
Income from self-employment	19.8	13.9	12.7	28.1	14.8	13.1
Nonwork private income	5.7	7.9	5.1	13.9	19.3	12.4
Pensions and other Social Security benefits	10.9	13.3	17.8	2.5	1.9	9.0
Labor income in kind	0.9	1.2	0.9	1.5	3.1	0.7
Self-consumption	7.3	4.8	2.8	1.7	1.1	0.0
Imputed rents	2.3	5.6	10.4	3.7	6.7	13.0
Other nonmonetary income	3.7	5.6	3.7	6.2	11.3	3.2
Disposable income	100	100	100	100	100	100
SPAIN						
Income source (net)	Share of total income (%)			Contribution to inequality (%)		
	1980	1990	1995	1980	1990	1995
Labor income	57.5	51.0	48.0	42.1	50.6	52.9
Income from self-employment	14.3	12.3	11.3	14.8	13.1	11.3
Nonwork private income	1.3	1.0	1.2	22.2	4.9	3.8
Pensions and other Social Security benefits	13.3	18.8	20.8	3.3	18.2	12.7
Labor income in kind	0.0	0.0	0.4	0.0	0.0	0.2
Self-consumption	1.7	0.8	0.8	0.1	0.1	0.0
Imputed rents	11.1	15.7	16.8	8.1	12.5	19.0
Other nonmonetary income	0.7	0.4	0.7	9.4	0.5	0.1
Disposable income	100	100	100	100	100	100

As seen in the table, labor income is the most relevant component of income and yields the highest contribution to overall income inequality. Moreover, the contribution of labor income to overall inequality rose from 43 percent to 49 percent in Portugal and from 42 percent to 53 percent in Spain between 1980 and 1995. Note, however, that the share of transfers in total income and their weight at shaping the income distribution (contribution to inequality) is higher in Spain than in Portugal, which is consistent with the view that the Spanish government plays a more intense redistributive role.

Additionally, following the procedure proposed by Jenkins (1995), changes in income inequality can also be broken down into income components. Jenkins (1995) proves that if we use I_2 as the inequality measure[7], then the change in aggregate inequality is decomposed into an exact sum of changes in the contributions of the various factor components, which in turn depend on changes in correlations, factor shares, and factor inequalities. Table 12 shows the decomposition of the changes in income distribution by income sources in Spain and Portugal.

[7] I_2 is a member of the general entropy measure suggested by Cowell and Kuga (1981) and corresponds to half of the square of the coefficient of variation.

Table 12. Decomposition of the Changes in Income Inequality by Income Sources, 1980-1995 (%)

PORTUGAL			
Income source			
	90-80	95-90	95-80
Labor income	-1.7	20.6	18.3
Income from self-employment	-13.8	2.0	-11.9
Nonwork private income	5.0	-3.4	1.6
Pensions and other social security benefits	-0.7	9.6	8.7
Labor income in kind	1.5	-2.2	-0.7
Self-consumption	-0.6	-1.0	-1.6
Imputed rents	2.9	10.0	12.6
Other nonmonetary income	4.8	-7.2	-2.2
Disposable income	-2.7	28.3	24.8
SPAIN			
Income source			
	90-80	95-90	95-80
Labor income	0.7	-17.1	-13.7
Income from self-employment	-3.7	-5.9	-8.7
Nonwork private income	-18.1	-2.4	-20.2
Pensions and other social security benefits	12.1	-10.2	3.5
Labor income in kind	0.0	0.1	0.1
Self-consumption	0.0	-0.1	-0.1
Imputed rents	2.5	-0.5	2.0
Other nonmonetary income	-8.9	-0.5	-9.3
Disposable income	-15.4	-36.7	-46.4

These results suggest that there is a high relation of labor income inequality to the increase of total inequality in Portugal. In Spain the results seems more complex. Although the importance of labor income inequality on total inequality increases during the period, labor income also seems to have a remarkable effect on the global trend of decreasing inequality.[8]

We now turn to the territorial dimension of inequality. For inequality between regions, table 13 shows that territorial regional factors do not seem to play a very important role in the level of inequality in either Portugal or Spain. The proportion of total inequality attributable to inequality "between-regional groups" is not very significant (less than 3 percent in Portugal and around 7 percent in Spain), and its importance declines over the decade, particularly in Portugal. However, this perception of the little relevance of regional effects in explaining income inequality is somewhat misleading. Given the high degree of heterogeneity in the personal characteristics across individuals in the same region, it is not surprising that the contribution of regional differences to inequality is relatively low.

[8] As Jenkins (1995) points out "there need not be a close association between factors with a large inequality contribution in a given year and the factors with the largest contributions to inequality change."

Table 13. Decomposition of Overall Inequality by Territories

	Between-groups inequality (%)				
Characteristic of household	Portugal Theil index			Spain Theil index	
	1980	1990	1995	1980	1990
Region	4.05	2.62	2.69	7.58	7.11
Rural-urban	5.07	4.17	8.07	5.88	5.22

4. WAGE INEQUALITY

As seen in section 3, labor income inequality seems to have increased in both Portugal and Spain in the 1980-95 period. We now document in more detail the main patterns of changing wage inequality in both countries. For this purpose we analyze the available microeconomic databases providing information on the wage distribution and individual and job characteristics. First, from wage regressions we estimate how different individual and job characteristics have been remunerated in the Portuguese and the Spanish labor markets. Secondly, we relate the observed differences in the wage structure of both countries to some specific labor market institutions. Appendix 1 contains a description of these databases, together with the descriptive statistics of the samples used for the estimations of wage equations presented in this section.

4.1 The wage structure and its recent changes

Here we aim at two goals: (1) consideration of changes in the Portuguese wage structure between 1985 and 1995 by running standard wage regressions for both years, a comparison allowing us to assess how the remuneration of observable individual and job characteristics has evolved and (2) examination of the Spanish wage structure for 1995 by means of similar wage regression on Spanish data. The comparison with Portugal will allow us to identify the main reasons for the different level of wage inequality in both countries.[9]

Table 14 presents wage inequality indicators for Portugal for 1985 and 1995, and for Spain in 1995. As can be seen from the table, wage inequality steadily increased in Portugal from 1985 to 1995, mostly because of increasing dispersion at the right tail of the distribution, which confirms the findings in section 3 from Household Expenditure Surveys data. For Spain there is also some evidence of increasing wage inequality since the mid-1980s (not shown in the table). This evidence is based on the evolution of average wages of production and nonproduction workers, and the fact that the share of fixed-term employees, who earn about 10 percent less than permanent employees (after conditioning for observable characteristics), increased from about 15 to 32 percent during the 1985-95 period.[10] However, the increase of wage inequality in Spain has been smaller than in Portugal, and the comparison for 1995 reveals that the Spanish distribution is less compressed at the bottom and less disperse at the top than the Portuguese distribution. The different shapes of the wage distribution at the upper and bottom tails with respect to the Spanish result from some features of the Portuguese minimum wage (which in relation to average earnings is higher—around .45—and applies to a higher proportion of workers) and the higher returns to education in Portugal (see below).

[9] On this comparison, see also Cantó, Cardoso, and Jimeno (1998).
[10] See Jimeno and Toharia (1993).

Table 14. Wage Inequality in Portugal, 1985 and 1995

	Portugal		Spain
	1985	1995	1995
Gini Index	0.31	0.36	0.32
Theil Index	0.20	0.26	0.21
Wage ratio Q90/Q10	3.37	4.09	3.62
Wage ratio Q50/Q10	1.50	1.58	1.66
Wage ratio Q90/Q50	2.26	2.59	2.18
Coefficient of variation	0.83	0.96	1.14

Source: Computations based on MTS (1985, 1995) for Portugal; *EES* for Spain.

Both the Portuguese and the Spanish labor markets are characterized by sharp regional contrasts. In fact, in both countries between-regions wage inequality is higher than between-regions total income inequality. In Portugal, regions accounted for 13.6 percent of overall earnings inequality in 1985 and 11.0 percent in 1995. Decomposing the Theil Index for Spain, we get a somewhat different picture. Regions accounted for only 6.6 percent of overall earnings inequality in Spain in 1995. This is around less than half of what we found for Portugal. Unfortunately, the lack of individual data for the 1980s does not allow us to find out how regional evolutions have contributed to changing wage inequality in Spain.

Despite all of the above, a better understanding of the evolution of the wage structure requires the estimation of wage regressions to estimate the remuneration of observable individual and job characteristics. The evolution of this remuneration across time can also provide some insight into the causes of changing wage inequality. Unfortunately, with available data, we only observe this evolution in Portugal.

The results of these wage regressions (see table 15) lead us to highlight the following facts:

- The female wage gap in Portugal has increased from 17 percent to 23 percent, as opposed to the trend in most other countries. Indeed, the average wage of women relative to that of men has remained stable when evaluated in gross terms. However, as new cohorts enter the labor market, the qualification of women—evaluated as schooling, for instance—has improved at a faster pace than that of men. Therefore, the negative wage differential for female workers has been getting higher, once we take into consideration the human capital of the worker.[11] As the qualification of female workers has improved faster than that of men, especially as new cohorts enter the labor market, a rising gender wage gap could therefore result, probably as a transitory phenomenon, while the rising qualifications exhibited by women in the labor market are not matched by a comparable improvement in the type of occupations they reach and in the wage profiles they face.

- Portuguese employers have been attaching less relevance to the human capital acquired in the workplace, as suggested by the decline in the returns to tenure, and the lower wage disadvantage imposed on newcomers in the firm. Instead, the returns to schooling increased

[11] One should keep in mind that the female activity rate is very high in Portugal, unlike in the other southern European countries, having increased from very low levels in the early 1960s. Several factors have contributed to this outcome. Massive male emigration and the colonial war in the 1960s, the revolution in the 1970s, growing labor market flexibility in the 1980s, and, throughout the period, low wages as the basis for international competitiveness have led to the integration of Portuguese women in the labor market, especially in traditional activities and occupations and in the lower rungs of the qualification ladder. However, an additional motivation has more recently been impelling women to join the labor market—the growing investment in human capital.

between 1985 and 1995, especially during the second half of the 1980s, which can be observed from the results of a similar regression for 1991 (not shown in the table). Another remarkable fact is the huge decrease of the relative wage of production workers (the corresponding coefficient goes from -.09 in 1985 to -.22 in 1995).

- Workers in the textile industry, which accounts for a high share of Portuguese exports, are subject to a strong wage disadvantage, after controlling for a wide set or worker and firm attributes (see the coefficient of the dummy variable for this industry, -0.11 in 1995). Thus it seems that low wages remain the basis for the Portuguese competitiveness in international markets. Nevertheless, it should be noted that this negative wage differential remained more or less constant during the decade. In another major exporting industry—machinery and transportation equipment industry—the wage was slightly above the rest of manufacturing (the coefficient for the dummy variable was 0.01 in 1985) and increased during the decade. Also, the wage premium of mining workers increased over the decade. At the other extreme, the negative wage differential of hotel and restaurant workers became higher. In finance, as well as real estate, services to companies, and transportation and communications, the large wage premiums of the mid-1980s declined sharply.

- Larger firms pay higher wages, a situation that changed little during the 1985-95 period.

- Bargaining at intermediate levels—over firm type of agreements—yielded a wage premium that increased over the decade, relative to the centralized bargaining at the national or industrial level. By 1995 the wage premium associated with this type of bargaining was higher than the premium in firm-level agreements.

- Foreign firms pay higher wages (about 20 percent), although this wage premium has declined over the 1985-95 period. Thus, FDI flows have had a positive but decreasing effect on wage inequality.

- Wages in the Northern Region and in Lisbon, the largest employers, further widened once controls for a wide set of variables were included in the regression. In fact, the coefficient on the dummy variable for Lisbon increased from 0.08 in 1985 to 0.13 in 1995, relative to the reference category, the North. On the other hand, wages in the Algarve steadily increased with respect to the other regions, to reach in 1995 a premium similar to Lisbon.

Thus increasing wage inequality in Portugal seems to arise mainly from changes taking place within industrial sectors rather than changes across industrial sectors. First, the interindustrial wage structure has changed only slightly between 1985 and 1995, with the fall in the wage premium of the finance sector being the most relevant fact in this regard. Secondly, the increasing returns to schooling and the huge decrease in the relative wage of production workers seem to be the main causes of increasing wage inequality in Portugal. Apart from education and skills, the labor market institutional features (like the impact of collective bargaining at the intermediate level) and regional factors (increasing wage premium in Lisbon and the Algarve) have also been relevant in shaping the wage distribution.

4.2 Institutional factors shaping the wage structure in Portugal and in Spain

The second and third panels of table 15 illustrate the source of differences in wage inequality between Portugal and Spain. In particular, by comparison of the estimated coefficients of the variables included in the specification of the wage equations, the following conclusions can be made:

- The female wage gap is slightly lower in Spain than in Portugal. Precise estimates on the evolution of the female wage gap in Spain are not available. However, estimates from different cross-section samples at different years suggest that it has remained more or less stable, in contrast to Portugal where it has increased, as noted in the previous section. In any case, in Spain there has been an intense skill upgrading of the new cohorts of women relative to men (see table 2b), which has resulted not only in increasing employment rates but also in a "downgrading" of the entry jobs in which wages are lower and less disperse (see Dolado, Felgueroso, and Jimeno 1999).

- Returns to tenure are still significantly higher in Spain than in Portugal, particularly given the sharp decrease observed in Portugal in late years. Also, the wage penalty to newcomers in the firm (less than one-year tenure workers), which has declined in Portugal, is still high in Spain. This is related to the high incidence of fixed-term employment contracts in Spain, which provide lower wages and have shorter job tenure than permanent contracts for employees.

- Production workers' wages are 11 percent lower than those of nonproduction workers, a similar level to that of the Portuguese blue collar workers in the mid-1980s but around half of the current one. This lower gap between the wage of production and nonproduction workers in Spain can be explained by the compressing effects of trade union intervention in wage determination, which results in binding bargained wages and higher unemployment for low-skilled workers (see Dolado, Felgueroso, and Jimeno 1997).

- Interindustry wage differences are lower in Spain than in Portugal. As in the latter country, workers in the finance sector in Spain receive a wage premium above 30 percent. Workers in transportation and communications are relatively better paid in Portugal. However, above all, the most interesting fact is the negative gap observed for Portuguese workers in the textile industry and in the hotel and restaurant industry, which is not present in Spain. Thus it seems that in Portugal there are some low-wage, labor-intensive industries in which low-skilled workers can still be employed. This is in contrast to Spain, where relatively high wages in these types of industries have resulted in high unemployment among low-skilled workers

- Finally, the regional differences in wages are much larger in Spain than in Portugal. Wages in Extremadura, Galicia, and Murcia, for instance, are more than 20 percent lower than in Madrid. Interestingly, Extremadura and Galicia are the two Spanish regions geographically closest to Portugal.

Overall, institutional factors, like fixed-term employment in Spain and trade union effectiveness at compressing the wage distribution, are key for understanding wage inequality in both countries. The incidence of the minimum wage in Portugal is the main reason for a compressed wage structure at the bottom tail, but higher returns to education (mainly due to still low relative supply of educated workers) result in high-wage inequality for European standards. In Spain the main dimensions along which wage inequality is increased are returns to tenure, due to the incidence and characteristics of fixed-term employment, and the territory, due to large differences in wages among regions.

Table 15. Wage Regressions

	Portugal, 1985		Portugal, 1995			Spain, 1995	
Variable	Coefficient	t-stat.	Coefficient	t-stat.	**Variable**	Coefficient	t-stat.
Female	-.173	-81.296	-.234	-106.467	**Female**	-.198	-71.739
Tenure (yrs.)	.005	34.411	.004	26.080	**Tenure (yrs.)**	.007	41.890
Tenure < 1	-.053	-19.371	-.035	-13.152	**Tenure < 1**	-.051	-15.580
Shooling (yrs.)	.053	156.107	.062	150.234	**Shooling (yrs.)**	.059	159.114
Experience (yrs.)	.027	83.276	.030	88.683	**Experience (yrs.)**	.030	73.387
Exp-squared	-.0003	-65.897	-.0004	-65.067	**Exp-squared**	-.0003	-49.013
Blue collar	-.095	-38.931	-.219	-77.703	**Blue collar**	-.110	-30.745
Industry (other manufacturing omitted)							
Textiles	-.121	-39.161	-.114	-33.818			
Machin., equip.	.014	4.180	.040	10.563			
Mining	.078	8.697	.161	15.289	**Mining**	.173	.012
Electricity, gas	.397	46.699	.369	28.750	**Electricity, gas**	.170	19.541
Building	.029	8.165	.037	9.862	**Building**	.048	10.333
Trade	.023	.003	.016	.003	**Trade**	-.057	-14.095
Hotels, restaurants	-.051	-9.943	-.114	-22.413	**Hotels, restaurants**	-.013	-2.338
Transp./comm.	.185	41.723	.135	24.917	**Transp./comm.**	.0004	0.072
Finance	.523	70.977	.368	43.694	**Finance**	.342	70.597
Services to comp.	.261	39.151	.047	9.003	**Services to comp.**	-.045	-8.038
Firm size (10-19 employees omitted)							
20-49	.074	27.098	.072	27.526	**20-199**	.100	34.459
50-99	.122	37.649	.131	40.084	**> =200**	.186	.004
100-199	.164	46.321	.153	41.651			
>= 200	.217	71.997	.182	55.172			
Level of collective bargaining (national agreements omitted)							
Over firm	-.003	-0.445	.110	12.371	**Over firm**	.001	0.427
Firm	.070	.005	.069	.009	**Firm**	.156	.003
					Other	.0004	0.028
Company ownership (private firm omitted)							
Public	.080	.005	.031	.008	**Public**	.024	.0095
Mostly public	.172	21.668	.198	15.935			
Foreign	.236	63.175	.181	49.483			
Region (Norte omitted in Portugal, Madrid omitted in Spain)							
Centro	-.026	.003	.005	.003	**Andalucia**	-.108	-22.393
Lisboa VT	.088	37.395	.132	52.497	**Aragon**	-.078	.006
Alentejo	.021	2.764	.048	6.620	**Asturias**	-.158	-23.129
Algarve	.046	6.644	.125	18.689	**Baleares**	-.149	-19.908
Constant	4.320	658.262	5.552	728.928	**Canarias**	-.196	-30.864
					Cantabria	-.197	-24.853
					Cas-LM	-.162	.006
					Cas-Leon	-.163	-30.594
					Cataluña	-.012	-2.915
					C. Valenc	-.106	-21.997
					Extremad	-.282	-32.535
					Galicia	-.258	-48.164
					Murcia	-.214	.007
					Navarra	-.029	-4.360
					Pvasco	-.008	.005
					Rioja	-.156	-19.815

					Ceuta, Melilla	-.108	-3.363
					Constant	5.825	716.197
R-squared	.62		.59		**R-squared**	.46	
N	123,437		147,017		**N**	130,197	

5. INTERNATIONAL TRADE, WAGES, AND EMPLOYMENT

In the previous section we have described the main changes in wage inequality observed in Portugal and Spain during the 1980-95 period. One interesting finding is that increasing wage inequality in Portugal seems to be driven mainly by increasing returns to education and falling relative wages of production workers. In Spain, where data are not available at the level of disaggregation needed to perform a similar analysis, the wage differences among industries and occupations are smaller, but the incidence of unemployment is especially higher for uneducated, low-skilled workers. This suggests the conventional explanation of the increasing demand for high-skilled workers and falling demand for low-skilled workers, which has been postulated to explain changing wage inequality in other countries. In contrast with more developed countries, however, the trade patterns of Portugal and Spain seem to be conducive to increasing demand for semiskilled and low-skilled workers and decreasing demand of high-skilled workers. In this section we document the changes of wage and employment shares of different types of workers according to their skills and industries. This will lead us to conjecture on the importance of trade regarding the recent evolution of wage inequality in both countries.

5.1 Employment and wage shares by skill and industry

First, we look at changes in the employment and wage shares by sectors. For Portugal we compute these changes with the data provided by MTS (see Appendix 1). For Spain we have average wages and employment across firms from the 1988 and 1992 *EUROSTAT Labour Cost Surveys* (LCS). We group workers in four categories: high-skill, nonmanual semiskilled, manual semiskilled, and nonskilled. As a good approximation to the change in the relative demand of skills, we take the change in the shares of employment and of the total wage bill for these categories of workers between 1988 and 1992 (see tables 16a and 16b).

As can be seen from the table, in all industries in Spain there is an increase in the wage share of high-skilled workers of about 3 percentage points (except for the building sector). This increase is, in general, larger in manufacturing than in services (commerce and restaurants, transports) and is, in a larger fraction, due to changes in the corresponding employment shares, although changes in average relative wages are also relevant, especially in the metal industry, the manufacturing industry, and the building sector. In Portugal changes concerning high-skilled workers were smallest in traditional activities—the manufacturing, trade, and restaurant sectors—both in terms of employment and wage shares. On the contrary, in the transportation and energy sectors, the increase in the wage share reached 8 and 4 percentage points, respectively, largely due to rising employment shares. In the financial and energy sectors, the impact of rising employment shares was also high.

In Spain, losses in the wage share are observed for nonmanual, semiskilled workers in commerce and restaurants, manual semiskilled workers in manufacturing, and nonskilled workers in all the industries. In the first two cases, changes in average relative wages explain 40 percent and 50 percent, respectively, of the corresponding loss in wage share. As for nonskilled workers, the fall in employment shares is the main cause of declining wage shares. In Portugal, in almost every industry, the gains in the wage share of highly skill workers were obtained at the expense of

every other skill group. Exceptions to be noted are the building industry, in which only the nonskilled workers saw their wage share decline, and the financial sector, where manual semiskilled workers were the only group whose wage share declined; in manufacturing and the metal industries, exporting sectors, manual semiskilled workers, and nonskilled workers, respectively, also saw their wage shares increase. Overall, in Portugal the impact of declining employment shares was more pronounced for the least skilled workers, in every industry.

Table 16a. Wage and Employment Shares by Workers' Skills and Industries, Portugal 1988-92

	Wage share				Employment share				Change in employment share/ Change in wage share
High-skilled	1988	1992	Dif.	sd(dif)	1988	1992	Dif.	sd(dif)	
Energy and water	0.3099	0.3719	0.0620	0.0065	0.3099	0.2670	0.0431	0.0055	0.69
Mining	0.1279	0.1638	0.0359	0.0097	0.1279	0.1206	0.0208	0.0083	0.58
Metal Industry	0.1748	0.2042	0.0294	0.0024	0.1748	0.1393	0.0167	0.0020	0.57
Manufacturing	0.1407	0.1487	0.0080	0.0013	0.1407	0.1044	0.0031	0.0011	0.39
Building	0.1382	0.1814	0.0431	0.0026	0.1382	0.1244	0.0317	0.0022	0.73
Commerce and restaurants	0.1544	0.1728	0.0185	0.0017	0.1544	0.1253	0.0096	0.0014	0.52
Transports	0.2795	0.3677	0.0882	0.0028	0.2795	0.2916	0.0833	0.0024	0.95
Finance and serv. to comp.	0.3395	0.3748	0.0353	0.0032	0.3395	0.2882	0.0252	0.0027	0.71
Nonmanual, semiskilled									
Energy and water	0.4276	0.3849	-0.0427	0.0064	0.4276	0.4570	-0.0302	0.0064	0.71
Mining	0.0559	0.0530	-0.0029	0.0096	0.0559	0.0563	-0.0002	0.0097	0.07
Metal industry	0.0963	0.0880	-0.0083	0.0024	0.0963	0.0910	-0.0062	0.0024	0.74
Manufacturing	0.0832	0.0813	-0.0019	0.0013	0.0832	0.0769	-0.0011	0.0013	0.56
Building	0.0486	0.0545	0.0059	0.0026	0.0486	0.0542	0.0080	0.0026	1.35
Commerce and restaurants	0.4284	0.4246	-0.0037	0.0016	0.4284	0.4351	0.0085	0.0017	-2.28
Transports	0.2298	0.1966	-0.0332	0.0028	0.2298	0.2269	-0.0298	0.0028	0.90
Finance and serv. to comp.	0.1853	0.1982	0.0129	0.0031	0.1853	0.2162	0.0171	0.0032	1.33
Manual, semiskilled									
Energy and water	0.2074	0.2056	-0.0018	0.0080	0.2074	0.2216	0.0087	0.0081	-4.74
Mining	0.6927	0.6712	-0.0214	0.0121	0.6927	0.6886	-0.0092	0.0122	0.43
Metal industry	0.5950	0.5670	-0.0280	0.0030	0.5950	0.5865	-0.0182	0.0030	0.65
Manufacturing	0.5508	0.5656	0.0147	0.0016	0.5508	0.5768	0.0241	0.0016	1.64
Building	0.5039	0.5216	0.0178	0.0032	0.5039	0.5208	0.0375	0.0033	2.11
Commerce and restaurants	0.2139	0.2059	-0.0081	0.0021	0.2139	0.2072	-0.0085	0.0021	1.05
Transports	0.4091	0.3785	-0.0306	0.0035	0.4091	0.4031	-0.0251	0.0035	0.82
Finance and serv. to comp.	0.4070	0.2836	-0.1234	0.0040	0.4070	0.3234	-0.1213	0.0040	0.98
Nonskilled									
Energy and water	0.0551	0.0376	-0.0175	0.0073	0.0551	0.0544	-0.0217	0.0077	1.24
Mining	0.1236	0.1120	-0.0116	0.0109	0.1236	0.1345	-0.0114	0.0116	0.98
Metal industry	0.1339	0.1408	0.0069	0.0027	0.1339	0.1832	0.0076	0.0028	1.11
Manufacturing	0.2253	0.2045	-0.0209	0.0014	0.2253	0.2419	-0.0262	0.0015	1.26
Building	0.3093	0.2425	-0.0668	0.0029	0.3093	0.3006	-0.0771	0.0031	1.15
Commerce and restaurants	0.2034	0.1967	-0.0067	0.0019	0.2034	0.2324	-0.0096	0.0020	1.44
Transports	0.0816	0.0572	-0.0244	0.0032	0.0816	0.0785	-0.0285	0.0034	1.17
Finance and serv. to comp.	0.0682	0.1434	0.0752	0.0036	0.0682	0.1722	0.0790	0.0038	1.05

Note: Only full-time workers are included, and the monthly wage was considered (including the base wage, and other regularly paid subsidies). Top managers and professionals and personnel declared highly skilled were coded as highly skilled; personnel declared skilled or semiskilled were included in the semiskilled group; unskilled workers are a separate group in the original data set.
Source: MTS, 1988, 1992.

Table 16b. Wage and Employment Shares by Workers' Skills and Industries, Spain 1988-92

	Wage share				Employment share				Change in employment share/Change in wage share
High skilled	1988	1992	Dif.	sd(dif)	1988	1992	Dif.	sd(dif)	
Energy and water	0.2156	0.2517	0.0361	0.0109	0.1507	0.1838	0.0330	0.0087	0.91
Mining	0.1796	0.2119	0.0323	0.0062	0.1154	0.1417	0.0263	0.0049	0.81
Metal industry	0.1798	0.2117	0.0318	0.0051	0.1186	0.1400	0.0214	0.0040	0.67
Manufacturing	0.1428	0.1769	0.0341	0.0044	0.0897	0.1091	0.0195	0.0035	0.57
Building	0.1241	0.1479	0.0239	0.0063	0.0834	0.0948	0.0114	0.0050	0.48
Commerce and restaurants	0.1618	0.1908	0.0290	0.0048	0.1090	0.1242	0.0152	0.0038	0.52
Transports	0.1764	0.2093	0.0329	0.0081	0.1232	0.1449	0.0217	0.0064	0.66
Nonmanual, semiskilled									
Energy and water	0.2104	0.2212	0.0108	0.0121	0.2263	0.2381	0.0118	0.0126	1.09
Mining	0.1533	0.1650	0.0117	0.0069	0.1606	0.1703	0.0097	0.0071	0.82
Metal industry	0.1429	0.1615	0.0187	0.0057	0.1510	0.1664	0.0154	0.0059	0.83
Manufacturing	0.1471	0.1659	0.0187	0.0048	0.1468	0.1623	0.0154	0.0050	0.82
Building	0.1073	0.1216	0.0143	0.0071	0.1079	0.1212	0.0134	0.0073	0.93
Commerce and restaurants	0.3283	0.3136	-0.0146	0.0054	0.3340	0.3251	-0.0088	0.0056	0.60
Transports	0.2777	0.2880	0.0104	0.0090	0.3048	0.3131	0.0083	0.0093	0.80
Manual, semiskilled									
Energy and water	0.3605	0.3517	-0.0088	0.0153	0.3690	0.3685	-0.0005	0.0155	0.06
Mining	0.3252	0.3328	0.0076	0.0087	0.3271	0.3447	0.0176	0.0087	2.32
Metal industry	0.3354	0.3278	-0.0075	0.0071	0.3303	0.3362	0.0059	0.0072	-0.78
Manufacturing	0.3567	0.3328	-0.0239	0.0061	0.3546	0.3439	-0.0108	0.0062	0.45
Building	0.4496	0.4419	-0.0077	0.0091	0.4448	0.4409	-0.0039	0.0092	0.50
Commerce and restaurants	0.2490	0.2598	0.0108	0.0071	0.2544	0.2697	0.0154	0.0071	1.43
Transports	0.3428	0.3358	-0.0071	0.0114	0.3474	0.3517	0.0043	0.0115	-0.61
Nonskilled									
Energy and water	0.2135	0.1754	-0.0381	0.0152	0.2539	0.2096	-0.0443	0.0159	1.16
Mining	0.3419	0.2903	-0.0516	0.0086	0.3969	0.3433	-0.0536	0.0090	1.04
Metal industry	0.3420	0.2990	-0.0430	0.0070	0.4001	0.3574	-0.0427	0.0074	0.99
Manufacturing	0.3534	0.3245	-0.0289	0.0060	0.4089	0.3847	-0.0241	0.0063	0.83
Building	0.3191	0.2886	-0.0305	0.0091	0.3640	0.3431	-0.0209	0.0095	0.69
Commerce and restaurants	0.2609	0.2358	-0.0251	0.0071	0.3026	0.2809	-0.0217	0.0074	0.87
Transports	0.2031	0.1669	-0.0362	0.0113	0.2246	0.1903	-0.0343	0.0119	0.95

Note: High-skilled workers include workers with a university degree and managers. Nonmanual semiskilled workers include assistants without a university degree, administrative officers, and auxiliary administrators. Manual semiskilled workers include auxiliary personnel and production workers with some qualifications.
Source: Labour Cost Survey, EUROSTAT, various years.

5.2 Some determinants of the changes in employment shares by skills

For a better understanding of the driving forces of changing employment and wage shares, we now turn to the analysis of within-firm changes. For Spain we can use a panel database containing information on a sample of manufacturing firms starting in 1990, provided by the *Encuesta de Estrategias Empresariales* (EEE). This source gives the composition of employment and wages for workers' occupations in each firm every four years. Thus we can observe within-firm changes in employment and wage shares for the 1990-98 period, when the degree of

openness of the Spanish economy experienced the highest increase (see section 2.5). We group workers in four categories, depending on educational attaintments (workers with and without a university degree) and on occupations (production and nonproduction workers). The changes in employment shares at the sectoral level in this sample are broadly consistent with the changes noted above (see table 17). Thus we observe a significant increase in the employment shares of workers with university degrees and a noticeable fall in the employment share of production workers.

Table 17. Employment Shares in Manufacturing Industries, Spain 1990-98

	1990	1998	Difference	Standard error (Difference)
	Workers with a university degree			
Mining	.104	.139	.035	.007
Metal Industries	.089	.126	.037	.005
Other manufacturing	.046	.078	.032	.004
	Production workers			
Mining	.645	.617	-.028	.012
Metal Industries	.707	.689	-.018	.008
Other Manufacturing	.727	.705	-.022	.007

Source: EEE.

With this sample we can search for the determinants of within-firm changes of employment shares of workers with university degrees and production workers. We start by running several specifications of the following OLS regression: $\Delta ESHARE_I = \lambda_J + \alpha X_I + \varepsilon_I$ where i stands for firms, λ_j is industry dummies, X_i is a vector of firms' characteristics, and ε_i is a random error term. In the vector of firms' characteristics, we include some measure of technological innovation (expenditures in R&D) the proportion of firms' sales being exported to foreign market exports, the participation of foreign capital in the firm, and some others. Tables 18a and 18b show the results.

Table 18a. Some Determinants of Changes in the Employment Share (%)
Dependent Variable: Change in the Employment Share of Workers with a University Degree, Spain 1990-98

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant (x100)	2.71	2.45	2.68	2.53	2.30	2.27	2.02
	(.39)	(.41)	(.43)	(.40)	(.45)	(2.04)	(2.06)
R&D expenditures (log)	0.16	0.11	0.15	0.12	0.12	0.12	0.11
	(.06)	(.06)	(.06)	(.06)	(.07)	(.07)	(.07)
Imports/material inputs	--	0.92	1.13	--	--	1.15	1.09
		(1.01)	(1.02)			(1.03)	(1.04)
Foreign capital	--	1.24	1.47	1.41	1.30	1.56	1.39
		(.79)	(.80)	(.76)	(.82)	(.83)	(.87)
Export/sales	--	--	-2.37	--	--	-2.38	-2.61
			(1.32)			(1.37)	(1.4)
50-200 workers	--	--	--	--	1.35	--	1.60
					(.9)		(.92)
> 200 workers	--	--	--	--	0.06	--	0.32
					(.91)		(.96)
Nonmetal, minerals products	--	--	--	--	--	-0.58	-0.67
						(2.27)	(2.27)
Chemical products	--	--	--	--	--	1.12	1.10
						(2.3)	(2.31)
Metal products	--	--	--	--	--	0.37	0.26
						(2.22)	(2.23)
Machinery	--	--	--	--	--	1.91	1.80
						(2.33)	(2.34)

Office machinery	--	--	--	--	--	13.04	13.04
						(3.98)	(3.98)
Electric materials	--	--	--	--	--	-0.19	-0.31
						(2.22)	(2.23)
Motor vehicles	--	--	--	--	--	-0.51	-0.51
						(2.39)	(2.39)
Transportation material	--	--	--	--	--	1.53	1.36
						(2.71)	(2.71)
Meat processing	--	--	--	--	--	0.63	0.59
						(2.63)	(2.63)
Food and tobacco	--	--	--	--	--	1.20	1.21
						(2.2)	(2.2)
Drinks	--	--	--	--	--	3.31	3.26
						(2.89)	(2.88)
Apparel and textiles	--	--	--	--	--	-0.53	-0.59
						(2.23)	(2.23)
Leather, footwear	--	--	--	--	--	-0.56	-0.48
						(2.72)	(2.74)
Furniture and fixtures	--	--	--	--	--	-0.94	-0.79
						(2.46)	(2.47)
Paper and printing	--	--	--	--	--	0.54	0.57
						(2.31)	(2.31)
Rubber and plastic products	--	--	--	--	--	0.33	0.32
						(2.39)	(2.39)
Other manufacturing products	--	--	--	--	--	2.57	2.67
						(2.77)	(2.78)

Note: Standard errors in parenthesis. (metal minerals omitted).

Table 18b. Some Determinants of Changes in the Employment Share (%)
Dependent Variable: Change in the Employment Share of Production Workers, Spain 1990-98

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant (x100)	-1.91	-2.10	-2.10	-1.96	-2.01	-1.90	-1.62	-1.41
	(.62)	(.65)	(.66)	(.69)	(.74)	(.75)	(3.32)	(3.29)
R&D expenditures (log)	-0.06	--	--	-0.07	--	-0.13	-0.10	-0.04
	(.09)			(.1)		(.12)	(.12)	(.11)
Imports/material inputs	--	-1.38	-1.39	-1.28	-1.50	-1.38	-0.82	-0.75
		(1.55)	(1.62)	(1.63)	(1.59)	(1.59)	(1.67)	(1.66)
Foreign capital	--	--	0.03	0.21	--	--	-0.40	-0.09
			(1.25)	(1.28)			(1.4)	(1.32)
Export/sales	--	0.99	0.98	1.42	0.69	1.14	1.08	1.32
		(1.94)	(2.00)	(2.11)	(2.11)	(2.15)	(2.25)	(2.21)
50-200 workers	--	--	--	--	-1.35	-1.05	-0.94	--
					(1.4)	(1.43)	(1.47)	
> 200 workers	--	--	--	--	0.68	1.48	1.37	--
					(1.23)	(1.42)	(1.55)	
Nonmetal, minerals products	--	--	--	--	--	--	-1.19	-1.49
							(3.66)	(3.65)
Chemical products	--	--	--	--	--	--	-1.88	-2.33
							(3.71)	(3.69)
Metal products	--	--	--	--	--	--	0.80	0.39
							(3.59)	(3.57)
Machinery	--	--	--	--	--	--	1.66	1.15
							(3.77)	(3.75)
Office machinery	--	--	--	--	--	--	1.13	0.96
							(6.41)	(6.41)
Electric materials	--	--	--	--	--	--	-2.69	-3.18
							(3.59)	(3.57)
Motor vehicles	--	--	--	--	--	--	2.46	2.39
							(3.84)	(3.84)
Transportation material	--	--	--	--	--	--	-3.91	-4.12
							(4.36)	(4.35)
Meat processing	--	--	--	--	--	--	1.21	1.04
							(4.24)	(4.24)
Food and tobacco	--	--	--	--	--	--	1.53	1.37
							(3.54)	(3.54)
Drinks	--	--	--	--	--	--	-4.67	-4.69
							(4.65)	(4.65)

Apparel and textiles	--	--	--	--	--	--	-0.93	-1.20
							(3.59)	(3.59)
Leather, footwear	--	--	--	--	--	--	-1.44	-1.99
							(4.42)	(4.38)
Furniture and fixtures	--	--	--	--	--	--	0.24	0.03
							(3.97)	(3.96)
Paper and printing	--	--	--	--	--	--	-1.45	-1.55
							(3.72)	(3.72)
Rubber and plastic products	--	--	--	--	--	--	1.47	1.17
							(3.85)	(3.85)
Other manufacturing products	--	--	--	--	--	--	-3.75	-4.12
							(4.48)	(4.46)

Note: Standard errors in parenthesis. (metal minerals omitted).

In table 18a we present the results regarding the changes in the employment shares of workers with a university degree. As seen in the first four columns of the table, the increase in the employment share of workers with a university degree seems to be positively related to expenditures in R&D and the presence of foreign capital in firms' ownership, and negatively related to the ratio of exports to total sales. However, the statistical significance of these two variables is only marginal, and decreases of either firms' size dummies or industrial dummies (or both) are included as regressors (see columns 5 to 7). In fact, besides industry affiliation and firms' size, we fail to find some other observable firms' characteristics, helping to explain within-firms changes in the employment share of workers with a university degree. As for production workers, Table 18b shows that the fall in employment shares is general and is not related to any of the variables included as regressors.

The results from the regression analysis above have some interesting implications. First, the fact that the increase in the employment share of workers with a university degree seems to be mostly driven by industry affiliation and firms' size (mainly in firms over 200 workers) suggests that the industry bias of technological progress is the main force behind the increasing demand for high-skilled workers. In this regard, the highest increases is in office machinery. Secondly, the fact that exporting firms had a lower decrease in the employment share of production workers is in line with the prediction of standard trade theory for countries like Spain and Portugal, who specialize in products requiring low skilled and semiskilled workers.

6. CONCLUDING REMARKS

This paper has collected some evidence on the trends in income and wage inequality in Portugal and Spain since the early 1980s. In contrast with Portugal, where household income inequality fell during the 1980s but increased in the first half of the 1990s, in Spain income inequality fell during the 1980s and did not increase as much as in Portugal during the first half of the 1990s. The redistributive role played by transfers seems to be at the root of these different trends. However, despite having labor markets with a very different degree of flexibility and different wage structures, wage inequality has increased in both countries. The conventional explanation of decreasing demand of low-skilled workers and increasing demand of high-skilled workers seems also to be relevant for these two countries. Despite differences in the composition of trade flows, in both countries the reduction of the employment and wage shares of manual, semiskilled workers and nonskilled workers is especially high in manufacturing, but also in nontradeable sectors like transportation. The rise of employment and wage shares of high-skilled workers is general across all the sectors. For within-firm changes in the employment share of production workers, we find a positive correlation with the export-to-sales ratio of the firm. Finally, as for differences in regional labor productivity, FDI inflows seem to have a positive impact, besides its direct effect on capital accumulation.

After the review of the available evidence, our account of the distributive consequences of the Portuguese and Spanish experience with EU integration is as follows:

- First, redistributive policies seem to have played a very important role in reducing income inequality. In Spain the tax reforms of the late 1970s and the articulation of a Welfare State close to European standards are the main reasons for decreasing household income inequality throughout the 1980s and first half of the 1990s. In Portugal, on the contrary, national redistributive policies seem to have been less relevant in shaping the income distribution than in Spain.

- EU regional policies and transfers seem to have contributed to reduced regional differences in labor productivity. However, given the low fraction of total inequality explained by between-regions inequality, and the divergence of employment rates (especially in Spain), the impact of EU policy instruments explicitly aimed at promoting social cohesion and the reduction of inequalities in GDP per capita have been relatively small.

- As for wage inequality, it is important to bear in mind the existence of some duality in the Portuguese economy and, to a lesser extent, in the Spanish economy. Some segments of both economies changed at a fast pace, undergoing modernization and some technological upgrading. The impact of these changes was most noticeable in the labor market. In the "modern segments," the demand for skilled workers increased sharply. In Portugal the relative supply of highly educated workers increased at a lower rate and, therefore, rising wage premiums for certain worker attributes, in particular workers with university degrees, arose. In Spain the relative supply of highly educated workers increased very rapidly (especially in the case of females since the mid-1980s),[12] and wage inequality did not increase as much as in Portugal.

- As for trade patterns, while Portugal retained its traditional export specialization, with low wages as the basis for international competitiveness, Spain shifted from traditional sectors to semiskilled and high-skilled products, its export composition being closest to that of the other EU countries and engaging mostly in intraindustry trade rather than interindustry trade. Thus in Portugal international trade contributed to sustain the wages and the employment shares of low-wage, low-skilled workers, driving part of the compression that took place at the bottom half of the wage distribution and generating low unemployment levels. Some institutional arrangements, such as the minimum wage and the action of collective bargaining, also contributed to such compression. However, this effect did not counterbalance the increasing wage premium for high-skilled workers resulting from modernization and technological upgrading and, as a result, wage inequality has increased since the early 1980s. In Spain demand of low-skilled workers decreased sharply because of technological changes and the reduction of traditional sectors, which, combined with a fairly rigid labor market, resulted in high unemployment. Collective bargaining and other labor market institutions also contributed to increased wages at the bottom of the distribution and, hence, to increased unemployment of low-skilled workers. In the first half of the 1980s, wage inequality was reduced because of the labor market institutional environment. Only since the mid-1980s, after the liberalization of fixed-term contracts, is the increase in wage inequality more noticeable, although the bottom tail of the wage distribution continues to be compressed by unemployment of the least productive workers.

[12] See Dolado, Felgueroso, and Jimeno 1999.

Finally, FDI had an impact mostly on the regional differences of labor productivity. However, FDI inflows have not been a very relevant part in the explanation of the within-regions trends in the earnings distribution, since FDI boomed during a short period of time, returning to relatively low levels afterwards and, more importantly, foreign companies slightly increased their employment share (from 6.9 percent in 1985 to 8.6 percent in 1995 in Portugal). Furthermore, the wage setting behavior of foreign firms in both countries has become increasingly close to national standards, as the wage premium associated with foreign companies decreased (from 0.24 to 0.18 in Portugal during the 1985-95 period, according to the coefficient of the dummy variable in wage regressions presented in section 4.1; in Spain, as shown in section 5.2, the participation of foreign capital does not seem relevant to explain changes in the employment shares of high-skilled and low-skilled workers).

Appendix 1. Databases on Wages in Portugal and in Spain

In Portugal there is very detailed information on the wage structure since 1982. An extensive data set is gathered annually by the Ministry of Employment and Solidarity *(Quadros de Pessoal*, or—QP*)*, based on a questionnaire that every establishment with wage earners is legally obliged to complete. Reported data match the *establishment* (location, economic activity, and employment), the *firm* (location, economic activity, employment, sales, legal setting), and each of the *workers* (gender, age, skill, occupation, schooling, tenure, earnings—split into base wage, tenure-related earnings, other regular paid subsidies, irregular subsidies and overtime pay, duration of work—normal and overtime), as well as the *mechanism* of wage bargaining. By design, public administration and domestic work are not covered by the database (though state-owned companies are), and in practice neither is agriculture. For the remaining sectors, QP is a very reliable source of information, being in fact a census of firms, establishments, and their employees.

However, in Spain reliable microeconomic data on wages are available only for 1988 (when EUROSTAT *Labour Costs Survey* [LCS], was first conducted in this country), 1992 (the second Spanish wave of the LCS), and 1995 (*Encuesta de Estructura Salarial* [EES], conducted by the Spanish National Statistical Office). The latter collects detailed information on individual earnings as well as employers'(economic activity, size, legal setting, type of wage bargaining) and workers'characteristics, information that is missing in the LCS. The EES sample is selected from the population of establishments with more than ten dependent workers in a two-stage sampling method. The economic activity, region, and size of the firm determine the first-stage selection, while the number of workers within each of the groups was chosen in a second stage. Our EES sample refers to 1995 and includes 14,636 establishments and 130,197 full-time workers between 16 and 65 years of age. For our measures of inequality we only consider full-time employees. To guarantee comparability of the Portuguese data with the available Spanish data set, we draw a sample from the QP following similar procedures to those the Spanish National Statistical Office uses to choose the sample of the EES. [13] Tables A.1.1. and A.1.2. present the main descriptive statistics of our Portuguese and Spanish samples of employees.

[13] The sampling process involved two steps: a 75 percent random sample of firms was drawn, stratified according to industry (48 categories), region (5 categories), and firm size (5 categories); subsequently, workers within the firm were sampled. Five workers were selected from firms with 10-19 wage-earners; 25 percent of the wage earners were kept from firms with 20-49 wage earners; 17 percent, 13 percent, and 10 percent workers were drawn from firms with 50-99, 100-199, and over 200 wage-earners, respectively.

Table A.1.1 Descriptive Statistics, Portugal 1985 and 1995

Firms' characteristics	1985	1995
Size (%)		
10-19 workers	46.2	49.8
20-49 workers	31.6	31.9
50-99 workers	11.2	10.2
100-199 workers	6.1	4.9
>=200 workers	4.9	3.3
Firm Economic Activity (%)		
Mining	1.0	1.0
Manufacturing	51.1	46.7
Electricity and Gas	0.1	0.1
Building	11.2	12.1
Trade	25.1	24.6
Hotels and Restaurants	5.0	5.9
Transport, Communications	3.2	3.5
Finance	0.6	1.4
Real Estate, Services to Co.	2.7	4.6
Region (%)		
North	33.5	37.0
Center	22.6	22.1
Lisbon and the Tagus Valley	39.4	35.6
Alentejo	2.1	2.3
Algarve	2.5	3.0
Firm Ownership (%)		
Public	0.6	0.3
Private	95.2	94.6
Mostly public	0.5	0.2
Foreign	3.8	4.9
Number of observations	11,367	16,234

Workers' characteristics	1985	1995
Gender (%)		
Male	69.3	63.3
Female	30.7	36.7
Age		
16-25	20.2	20.3
26-39	44.3	43.9
40-65	35.6	35.8
School (yrs.) (1)		
0	9.3	3.0
4	57.6	43.4
6	12.9	22.0
9	6.8	14.1
12	11.1	13.0
15	0.9	1.4
17	1.5	3.1
Occupations (%)		
Industrial directors and executives	(2)	2.8
Professionals and scientists		2.3
Middle management and technicians		9.2
Administrative and related workers		16.2
Service and sales workers		8.6
Farmers and skilled agricultural and fish. workers		0.2
Skilled workers, craftsmen and similar		31.3
Machine operators and assembly workers		15.4
Unskilled workers		14.1
Firm Size (%)		
10-19 workers	21.2	27.5
20-49 workers	22.1	26.9
50-99 workers	12.1	13.1
100-199 workers	9.8	9.7
>=200 workers	34.7	22.8
Firm Economic Activity (%)		
Mining	1.0	0.9
Manufacturing	52.5	47.6
Electricity and Gas	1.5	0.9
Building	9.2	10.6
Trade	17.3	19.6
Hotels and Restaurants	3.7	4.9
Transport, Communications	8.9	6.6
Finance	3.8	4.5
Real State, Services to companies	2.1	4.4
Region (%)		
North	31.4	35.2
Center	17.4	19.9
Lisbon and the Tagus Valley	47.7	40.7
Alentejo	1.5	1.9
Algarve	1.9	2.4
Firm Ownership (%)		
Public	10.5	4.5
Private	81.2	86.2
Mostly public	1.3	0.7
Foreign	6.9	8.6
Collective Agreement (3) (%)		
National	85.2	90.7
Over firm	4.4	3.7
Firm	10.4	5.6
Mean tenure in years	9.3	8.1
Mean hourly wage	206.2	735.2
Number of observations	123,437	147,017

Note: Education below the primary level was coded as 0. (2) The Portuguese Classification of Occupations in 1985 and 1991 was not strictly comparable to this one. (3) Agreements signed between one or several unions and one or several employers' associations, often covering an economic sector, were coded as national/industrial level bargaining.

Table A.1.2 Descriptive Statistics, Spain 1995

Firms' characteristics	
Size (%)	
10-19 workers	36.1
20-199 workers	54.8
>=200 workers	9.1
Firm Economic Activity (%)	
Mining	1.1
Manufacturing	62.0
Electricity and Gas	1.4
Building	7.4
Trade	8.8
Hotels and Restaurants	5.3
Transport, Communications	4.2
Finance	5.2
Real Estate, Services to Firms	4.5
Region (%)	
Andalucía	8.3
Aragon	5.6
Asturias	4.0
Baleares	3.4
Canarias	4.6
Cantabria	2.8
Castilla-La Mancha	5.5
Castilla-León	6.3
Cataluña	12.3
Comunidad Valenciana	8.6
Extremadura	2.5
Galicia	6.5
Madrid	10.2
Murcia	4.7
Navarra	4.1
País Vasco	6.9
Rioja	3.2
Ceuta y Melilla	0.2
Firm Ownership (%)	
Public	0.9
Private	99.1

Workers' characteristics	
Gender (%)	
Male	78.6
Female	21.4
Age (%)	
16-25	11.3
26-39	44.0
40-65	44.6
School (yrs.)	
0	2.3
5	32.0
8	31.0
10	4.9
11	5.0
12	12.9
14	1.0
15	4.7
17	5.8
Occupations (%)	
Industrial directors and executives	4.1
Professionals and scientists	4.7
Middle management and technicians	10.6
Administrative and related workers	14.0
Service and sales workers	6.2
Farmers and skilled agric. and fish. workers	0
Skilled workers, craftsmen and similar	21.9
Machine operators and assembly workers	26.9
Unskilled workers	11.4
Firm Size (%)	
10-19 workers	19.2
20-199 workers	58.5
>=200 workers	22.3
Firm Economic Activity (%)	
Mining	0.8
Manufacturing	62.7
Electricity and Gas	1.7
Building	6.6
Trade	8.5
Hotels and Restaurants	4.5
Transport, Communications	4.0
Finance	6.6
Real State, Services to companies	4.2
Region (%)	
Andalucía	8.7
Aragon	5.1
Asturias	3.3
Baleares	2.6
Canarias	4.0
Cantabria	2.2
Castilla-La Mancha	5.0
Castilla-León	6.4
Cataluña	15.4
Comunidad Valenciana	8.9
Extremadura	1.8
Galicia	6.3
Madrid	13.0
Murcia	3.6
Navarra	3.6
País Vasco	7.2
Rioja	2.3
Ceuta y Melilla	0.1
Firm Ownership (%)	
Public	1.4
Private	98.5
Collective Agreement (%)	
National	34.3
Over firm	41.6
Firm	23.5

		Other	0.6
		Mean tenure in years	10.9
		Mean hourly wage	1 366
Number of observations	14,636	**Number of observations**	130,197

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Welfare Impacts of Russia's 1998 Financial Crisis and the Response of the Public Safety Net

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Abstract

We compare welfare indicators for a nationally representative sample of Russians interviewed shortly after the 1998 financial crisis with data on the same people two years earlier. Both objective and subjective measures reveal a widespread, though not universal, deterioration in welfare. Current expenditures generally contracted more than incomes. Inequality fell. There were both gainers and losers at all levels. The safety net's response fell far short of what was needed to protect living standards, but it did help prevent even higher poverty. Even without better targeting, a modest expansion of the safety net could have prevented an increase in income poverty in the aftermath of the crisis.

Key words: Russia, financial crisis, household welfare, safety net, panel data

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1. Introduction

By mid-1998, the Russian economy was showing signs of recovery after several years of aggregate economic decline, and rising inequality and poverty (Milanovic, 1998a; World Bank, 1995, 1998; Commander, et al., 1999). Inflation fell from 800% per annum in 1993 to 15% in 1996-97, and dropped to an annual 6% by July 1998. GDP stabilized too, growing slightly in 1997 (0.4%, the first case of positive GDP growth since reforms began) and dropping only 0.2% in the first five months of 1998 (Government of Russia, 1998.)

Then a severe financial crisis hit in August 1998. The crisis combined a devaluation of the ruble, default on both domestic and foreign debts, and a collapse of the stock market (Brown, 1999; Buchs, 1999.) Several events preceded the crisis. In October of 1997, world commodity prices—commodities account for about 70% of Russia's merchandise trade—started to fall, partly due to lower demand from Asia. In real terms, the commodity price index sank to the lowest level in history by August 1998. The Russian trade balance deteriorated sharply.

Turmoil in the Asian markets in August 1998 fostered worries about the possibility of a new round of devaluations of the Asian currencies. These concerns spread to other emerging markets and led to capital flight. The effort to shore up the ruble had increased the domestic bond yield and depleted foreign reserves. Taxes could pay for only one-half of T-bills that fell due each month.

On August 17, 1998, the Russian government devalued the ruble by more than 70% and defaulted on its domestic debt (GKO[2].) The ruble fell from around 6 per $US in the first half of August to about 21 in the end of 1998. Russian GDP contracted by 5% in 1998. The

2. GKO (Gosidarstvennue Kratkosrochnue Obyazatelstva) are Russian Treasury bills with a maturity of less than one year.

collapse of the major commercial banks effectively deprived most Russians of their savings and once again undermined the trust of the population in financial institutions.

For many Russians, it is clear, hopes for positive change in the mid-1990s turned into a deep sense of despair in the wake of the 1998 crisis. The events in the fall of 1998 were no doubt seen by many as forbearing even worse to come. In addition to the immediate wealth effects, the financial collapse would no doubt have led to concerns about the future, though some positive effects could also have been anticipated.

However, there were signs of macroeconomic recovery in the year following the crisis. IMF statistics indicate that industrial production grew by 6% for the first nine months of 1999 and, in comparison to September 1998, Russian industrial production grew by 20% (Economist, 1999.) The devaluation improved incentives for export-oriented producers. The Russian labor market would have started to be more attractive for producers in labor-intensive industries, although this was the other side of the coin to a sharp decline in real wages. The disappearance of the domestic bond market also appears to have helped redirect private investment to the real economy (Zimin and Bradshaw, 1999.)

This paper studies the welfare impacts and social policy responses to the 1998 financial crisis. The paper has two main aims. First it attempts to measure the impact of the crisis on various indicators of the economic well-being of Russian households, and to identify the subgroups that were most affected by the crisis. We compare welfare indicators for households that were interviewed in 1998 with those from two years earlier for the same households, drawing on the Russian Longitudinal Monitoring Survey (RLMS.) We use both objective and subjective (attitudinal) indicators of household and individual welfare. For the objective welfare indicators, we study both consumption expenditures and incomes; given that this was a financial crisis, it is not implausible that there would have been effects on

savings behavior, so incomes and expenditures may suggest different things about the welfare impacts.

The paper's second aim is to assess how well the public safety net performed in protecting living standards during the crisis. Russia's public safety net comprises various forms of cash transfers, including labor pensions, family allowances, unemployment compensation, sickness and maternity benefits, and housing allowances (Foley and Klugman, 1997; World Bank, 1995, 1998.) Past work has suggested that these transfers helped Russia's poor in the 1990s, though most observers agree that they could have helped more (Mroz and Popkin, 1995; Milanovic, 1998b; Braithwaite, 1998.)

Here we focus on the response of the safety net to the crisis. We find appreciable changes to the safety net when comparing 1998 and 1996. We ask how many more people would have been poor in the aftermath of the crisis without these changes. Following the methods proposed in Ravallion, et al. (1995), we assess the safety net's performance in protecting non-poor people from poverty, and promoting poor people from poverty.

The following section discusses the data and main welfare indicators we use. Section 3 provides an overview of the changes observed in both objective and subjective welfare indicators over a period embracing the crisis. Section 4 examines the performance of the public safety net. Section 5 concludes.

2. Data

The Russian Longitudinal Monitoring Survey (RLMS) is a comprehensive socioeconomic survey of a nationally representative sample of the Russian Federation.[3] The

3. The weights and other issues related to the sample design and data collection are explained in the documents that can be found in the home page of the RLMS, where the data can be obtained free: www.cpc.unc.edu/projects/rlms/rlms_home.html. Lokshin and Popkin (1999), and Lokshin, Popkin and Harris (1999) give additional information on the sample and data set.

data for this paper are drawn from the two rounds of RLMS conducted in October 1996 (round VII, total sample size of 3,750 households) and November 1998 (round VIII, total sample size 3,831 households); there was no survey round between these two dates. We use the panel sample of 2,875 households for whom we have complete information on expenditure, income, household composition, and individual characteristics for both rounds of the survey. We can track 6,869 adults over the rounds of 1996 and 1998.

The data are not ideal. While the 1998 survey was shortly after the crisis, it may well have been too soon after it to capture the full impact, as we will see when we come to the results. Also, to assess the welfare impact of the crisis, one would ideally compare results of the 1998 survey with a survey of the same households immediately before the crisis.[4] The fact that the 1996 survey was two years earlier means that the comparison with 1998 will include changes between 1996 and immediately prior to the crisis, as well as changes brought on by the crisis itself. Possibly there was a slight improvement in living standards in the two years prior to the 1998 crisis, for the reasons noted in the introduction. This would mean that our analysis will underestimate the impact of the crisis.

As an objective household welfare indicator, we use the welfare ratios given by total household income, or total household expenditure as a proportion of a household-specific poverty line. Total monthly disposable income includes wages and salaries, social security transfers, private transfers, in-kind income, and income from home production.

In any discussion of wages and cash benefits in Russia during this period it is important to consider the problem of arrears. The value of wage arrears consistently increased between 1992 and 1998. As a percentage of the monthly wage bill, the wage

4. In the terminology of program evaluation, this would be a "reflexive comparison." This cannot isolate the effect of the crisis from other events at the same time—that would require a comparison group sample that did not experience the crisis, which is of course impossible.

arrears in industry rose from 5 percent in 1992 to 111 percent by the end of 1996, and reached 120 percent in November/December of 1998 (Russian Economic Trends, 1999.) Pension arrears increased less, but by 1996 government pensioners still received only about 34 percent of the monthly entitlement (Romanova, 1999.) The situation improved by 1998, by which time the value of pension arrears was about 15 percent of the monthly pension bill. Arrears of similar magnitudes also existed in other (non-pension) government transfers. Such significant transfer arrears would well affect the distribution of income and cash benefits. Even if the system of social protection was perfectly targeted without arrears, the outcome on the ground could be very different.

In this paper we analyze the "realized" (post-arrears) system of government transfers as revealed by the household survey responses. That is appropriate under the assumption that it is the realized transfers that matter to the welfare of the households. We will not be able to distinguish official design changes in cash benefits from realized changes due to arrears; since the payment of arrears is itself a decision of government at some level, the distinction is somewhat artificial.

We use the RLMS poverty lines, which were developed based on the region-specific food prices to cost the age-gender specific food baskets necessary to meet dietary intake levels that approximate WHO/FAO recommended daily allowances (Popkin et al., 1992.) Specific poverty lines have been calculated for each age and gender grouping, and these poverty lines were used to construct a household-specific poverty line according to the size and demographic composition of the household.[5]

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5. An alternative exists to the RLMS poverty lines, namely those estimated by Goskomstat (State Committee on Statistics of Russian Federation.) The methodology of the two sets of poverty lines differs. While the RLMS poverty lines allow for variation of prices within each region, the Goskomstat lines do not cover rural areas. The Goskomstat prices were collected at 200 observation points solely in cities, and mostly in shops. (The weight given to market prices is

We also use individual subjective welfare indicators. All adults in the survey sample were asked a series of Cantril ladder questions about their perceptions of their own welfare. We use the following question: *"Please imagine a 9-step ladder where, on the bottom, the first step, stand the poorest people, and on the highest step, the ninth, the rich. On which step are you today?"* We call this the Economic Ladder Question (ELQ.)[6] The question focuses on a concept of economic welfare without imposing any assumptions about how that is measured; that is left up to the respondent.

In 1998, 77% of the 1996 sample were re-interviewed. To assess the magnitude of the possible attrition bias, we compare the observed characteristics of the households that were re-interviewed in 1998 with the characteristics of all households from the 1996 sample. Table 1 presents the results for some key household characteristics. Households that were re-interviewed in 1998 tended to have slightly higher expenditure per-equivalent-adult in 1996, more household members, and were more likely to reside in rural areas. While the characteristics of the two samples are quite similar, we cannot rule out the possibility of non-random attrition, such that some of the poorest in 1996 dropped out of the second round, and this may well have been due to the crisis. This is another reason why the following results based on the panel sample might well underestimate the welfare impact of the crisis.

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significantly below their actual importance as a channel for purchases.) The RLMS prices were collected ateach population point of the survey, and the prices are registered both in stores and on the markets. Goskomstat estimates of poverty are consistently higher than those based on the RLMS data. For a comparison of poverty measures based on RLMS and the official Russian poverty lines, see Commander, et al., (1999) and Yemtsov, (1999.)

6. Ravallion and Lokshin (1999) discuss this question and alternatives in further detail.

3. Welfare, before and after the crisis

The changes in average income and expenditures suggest a sizable welfare impact of the crisis. Average household income was 20% lower in real terms (relative to the poverty line) at the time of the 1998 financial crisis than two years earlier (Table 2.) The share of wages in total income fell from 41% to 36%. This was accompanied by a higher share of income from government transfers (pensions, child and unemployment benefits, stipends, and other transfers.) However, the average amount of government transfers decreased by 18% in real terms. The share of home production in income increased from 15% to 21%, and the real value of income from this source also rose; this was evidently part of a private coping mechanism. Help from relatives was 40% lower in absolute terms during the crisis, as compared to two years earlier. The covariate nature of this shock (which will be borne out further by our later results) clearly made it hard for the private safety net to help.

Table 3 reports the levels and changes in mean expenditures and expenditure-based poverty rates in 1996 and 1998 for the panel sample. Total household expenditure fell by 25%, while the expenditure per equivalent adult dropped by 23%. The poverty rate increased sharply, from 22% in 1996 to 33% just after the crisis. Results were similar for the non-panel households. Details are contained in a statistical addendum, available from the authors.

The data suggest that households living in urban areas were more seriously affected by the crisis than rural households (Table 3.) The fall in mean expenditure in urban areas was about 27%, while in rural areas it was 21%. The proportionate increase in rural poverty incidence was considerably smaller than for urban areas (Table 3.)

3.1 Joint distributions of income and expenditures

Table 4a gives points on the base-line distributions of incomes normalized by the household-specific poverty lines; Table 4b gives the results using expenditures. The tables also give the joint distributions over the two dates. The cell in row *i* and column *j* gives the percentage of the total population who were in the *i*'th group in 1996, and the *j*'th in 1998. The column and row totals are the marginal welfare-ratio distributions for corresponding years.

The overall income poverty rate was two percentage points higher in 1998 than 1996 (Table 4a.) However, there is not first-order dominance (whereby the 1998 cumulative distribution lies everywhere above that for 1996.) There was actually a decrease in extreme income poverty; while 19% of the population had incomes below half the poverty line in 1996, this fell to 16% in 1998. Considerable churning is indicated (echoing the findings of Commander, et al., 1999, comparing early rounds of the RLMS.) One-third of the 36% of people with incomes below the poverty line in 1996 had incomes above the poverty line in 1998. 17% of the households whose income was three times greater than the poverty line in 1996 became poor in 1998, followed by 25% of the households from the next highest income group.

Turning to expenditures (Table 4b), first-order dominance is indicated (i.e., the 1998 poverty incidence is higher than 1996 for each portion of the poverty line, comparing the cumulative column and row total in Table 4b.) The conclusion that expenditure poverty rose is robust to the poverty line and choice of poverty measure within a broad class (Atkinson, 1987; Ravallion, 1999). There was also considerable churning in expenditures. Of the 22% of households whose expenditures were below the poverty line in 1996, 9% (representing 42% of the poor in 1996) escaped poverty by 1998. At the same time, the proportion of

people living in poor households increased by almost 50%, with 20% of the total population falling below the poverty line at the time of the crisis. The composition of the households that became poor in the crisis was heterogeneous in terms of their welfare levels two years earlier; for example, 14% of the households that belonged to the top expenditure group in 1996 had measured expenditures below the poverty line in 1998.

Tables 4a and 4b also give the percentage changes in mean income and expenditure by groups ranked by their 1996 income or expenditure relative to the poverty line. Both mean income and expenditure rose for the poor and fell for the rich. The Gini index of income inequality fell from 0.48 to 0.42, while for expenditure it fell from 0.44 to 0.42.[7] Of course, this only confirms how deceptive these aggregate statistics can be: given the amount of re-ranking that occurred, these comparisons are deceptive. While there were gains on average amongst the 1996 poor, there were sufficient losses amongst the 1996 non-poor to increase overall poverty.

The difference in the impact on income versus expenditure is notable. Mean expenditures fell more (25%) than incomes (18%.) This could reflect the negative shock to consumer wealth associated with the financial crisis. It is also possible that many households thought things would get even worse; the expected full impact on incomes might not yet have been realized at the time of the 1998 survey. Whether one concludes that expenditures give a better indication of the welfare impact of the crisis depends in part on whether the expectations of worse to come were realized. We will return to this point.

7. Kolenikov and Yudaeva (1999) found that both income and inequality reduced after the crisis, with expenditure inequality dropping from 0.404 in 1996 to 0.399 in 1998. A detailed discussion of the trends in Russian inequality can be found in Commander and Lee (2000.)

3.2 Characterizing the winners and losers

Who suffered most during the crisis? Who gained? Table 5 compares household characteristics for different types of poverty dynamics. For this purpose, we divide our sample into four groups based on their expenditure poverty status, which we call the "poverty dynamics groups." The groups are as follows:

1. Persistently poor households: below the poverty line in both surveys;
2. Households that fell into poverty: above the line in 1996 but below it in 1998;
3. Households that escape poverty: below the line in 1996 and above it in 1998;
4. Persistently non-poor households: above the poverty line in both years.

We implement these definitions using both expenditures and incomes. The differences between these groups tend to be larger using incomes than expenditures (details are in the Addendum available from the authors.) This can be due to the fact that income does not (of course) include initial liquid-wealth balances of the households. Households can use pre-crisis cash, for example, to buffer to some degree their current living standards. Shocks, such as an interruption in work or a cut in wages, can have quite different effects on households that have some reserves than on those without any savings to fall back on. A welfare measure based on household consumption will reflect this difference better than the measure based on household income.

Persistently poor households were larger, had more children, and were more likely to live in rural areas. The heads of such households were younger, less likely to be pensioners and tended to be less well-educated than persistently non-poor households (Table 5.)

Also in comparison to the persistently non-poor, households that fell into poverty in the crisis tended to be younger, less likely to be pensioners, more likely to be male-headed, less likely to live in Moscow and St. Petersburg, and tended to be less well-educated. When

compared to the persistently poor, the households that fell into poverty were not as young (in terms of the age of the head and the demographic composition) and were more likely to be pensioners and to live in Moscow and St. Petersburg.

When compared to the households that escaped poverty in the aftermath of the crisis, those that fell into poverty were more likely to be male–headed, slightly less likely to be pensioners, more likely to live in Moscow and St. Petersburg or other urban areas, and slightly less likely to have had no more than a high school education (Table 5.)

3.3 Subjective economic welfare

The objective measures of welfare used so far are known to have problems. Time varying measurement error may appear as off-diagonal elements in the joint distributions. Even without measurement errors, when interpreted as money metrics of household utility, the objective measures of economic welfare, such as real per equivalent adult income or expenditure, are known to be under-identified from consumer demand behavior (Pollak and Wales, 1979.) So, the assessments of the changes in individual welfare due to the crisis may disagree with peoples' own assessments. Also, these household-level measures do not tell us about the distribution of income within the household; changes in economic circumstances may well have different impacts on women versus men.

To help address these concerns, Table 6 provides data on individual subjective welfare rankings in 1996 and 1998. We combined the highest three rungs of the ELQ due to a small number of respondents who assigned themselves to these rungs.

Changes in welfare perceptions went in both directions. Some individuals who ranked themselves among the richest in 1996 placed themselves in the lower rungs of the ladder at the time of the 1998 crisis. Some people from the lowest rungs in 1996 put themselves at the top of the subjective welfare ladder in 1998. More than 60% of the

respondents who assigned themselves to the lowest two rungs in 1996 upgraded their perceptions in 1998. In general, however, we observe a shift in the subjective perceptions toward lower welfare rankings (continuing a trend in the 1990s; see Rose and McAllister, 1996; and Ravallion and Lokshin, 1999.) The proportion of individuals that reported their subjective welfare rankings in the lowest two rungs of the comparison ladder increased from 30.5% in 1996 to 37.3% in 1998. The number of individuals in the highest two rungs fell from 5.8% in 1996 to 3.1% in 1998. First-order dominance is indicated. It is clear that the subjective welfare question is not just reflecting relative positions, but is capturing changes in absolute levels.

The results based on individual subjective welfare perceptions are broadly similar to the income and expenditure dynamics observed at the household level.

We repeated these calculations separately for males and females (Tables 7a and 7b.) Subjective personal welfare assessments of females were lower than those of males in 1996; for example, 32% of women assigned themselves to the lowest two rungs of the ELQ compared to 28% of men. The proportion of individuals placing themselves on one of the lowest two rungs increased in 1998 for both men and women, but that increase was larger for women, for whom it grew by 26%, while the number of men who ranked themselves this way increased by 18%. However, the percentage of respondents in the top two rungs of the ladder dropped more for males.

4. The response of the public safety net

It is beyond the scope of this paper to evaluate the safety net as a whole; we do not attempt to simulate what would have happened if there had been no government transfers. Nor do we attempt to assess specific features of the existing safety net, such as eligibility

conditions. A more feasible, but still interesting, task is to assess to what extent the changes to the safety net over the two-year period helped buffer the welfare impact of the crisis.

Table 8 gives the amounts received of various cash transfers by expenditure and income. Mean benefits rise with both expenditure and income, though the ratio of total cash benefits to expenditures rises with expenditures, yet the proportion of benefits to incomes tends to fall.

On average, government transfers fell by 18% between 1996 and 1998. Targeting improved, however. Transfers increased by almost 100% for the households with expenditures less than half the poverty line, despite the fact that the number of households in this welfare group doubled. Payments to other poor households also grew appreciably. Roughly speaking, resources were redistributed from the most well-off benefit recipients (the top two welfare groups, say) to those in the lowest two welfare groups; transfers to the middle income households did not change much.

The main increases in the cash benefits of poor households were through pensions. The average pension received by households from the poorest group rose from 28 rubles per month in 1996 to 142 rubles per month in 1998, more than a five-fold increase in real terms. Pensions of the households from the next welfare group also grew by almost 50%. At the same time the amount of family allowances and social aid to poor households declined, though not enough to make up for the gains in pensions.

Clearly, then, the Russian social safety net changed during this period. The total amount of cash benefits declined, and transfers were distributed differently.

How did these changes affect poverty? To answer this we want to simulate the joint distributions of expenditures and incomes, while setting to zero all changes in cash benefits between 1996 and 1998.

4.1 Testing for behavioral responses

Modeling the impact of these changes requires an assumption about the response of pre-transfer incomes and expenditures. A common assumption in benefit incidence studies is that there are no behavioral responses affecting pre-transfer incomes in response to actual changes in transfers. Thus, income net of transfers is assumed to be unaffected. This assumption would not hold if, for example, private transfers increased to compensate for a loss of public transfers.

To test for such behavioral responses, we regressed the change in real income net of government transfers on the change in transfers. There is, of course, heterogeneity in other household characteristics, possibly correlated with transfers received through purposive targeting or behavioral responses. So we included controls for changes in a reasonably wide range of household attributes; the controls included changes in household size and demographic composition, changes in employment status, whether the household head was female or a pensioner, age and age squared of the head, education and occupation of the head, household assets owned, and region of residence (details are in the addendum.) The regression coefficient on the change in cash benefits was –0.183, with a standard error of 0.096. This is almost significantly different from zero at the 5% level (t=1.91, significant at the 6% level.) The negative coefficient is suggestive of some displacement of pre-transfer incomes when transfers rise.

This changed dramatically when we regressed the changes in expenditure on the changes in cash benefits, including the same controls. The regression coefficient on the change in cash benefits was 0.134 with a standard error of 0.147. The fact that this was not significantly different from zero implies that expenditures were unaffected by changes in cash benefits (i.e., the transfer gains were saved, and losses in transfers were made up from past

savings or borrowing). Possibly the changes in transfers from the government were seen by survey respondents as relatively transient, in the presence of more worrying concerns about their longer term incomes.

Purposive targeting of transfers to households with falling pre-transfer income (conditional on the control variables) will create an endogeneity bias in these tests. It is unclear that such targeting would have been informationally feasible for the government, though it might arise from the efforts of households to secure help. This could be responsible for some or all of the negative effect we find of transfer gains on income net of transfers. Also, the negative effect on net incomes is not robust to the choice of deflators.[8]

On the basis of these tests, we decided to simply subtract the gain in transfers from gross incomes to determine what the joint distribution of income would have been without the changes in the safety net. But it is not clear what one should do for expenditures. If one accepts the implication of the regression that expenditures were unaffected (at least in the short term) by the changes in cash benefits, then the answer to the question of what effect the safety net changes had is easy: nothing. That is one extreme. At the other extreme, we simply deduct the gain in transfers, as for incomes. The truth undoubtedly lies somewhere between these extremes, though (as we shall soon see) the range is fairly narrow.

4.2 Policy simulations

Tables 9a and 9b give the simulated joint distributions of incomes and expenditures between 1996 and 1998, corresponding to Tables 4a and 4b respectively. If poverty is higher (lower) in 1998 under the simulated distribution in Table 9 than the actual in Table 4, then we can infer that the actual changes favored the poor (non-poor.)

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8. We also tried using the change in net income normalized by the poverty line as the dependent variable. The coefficient on the change in transfers (similarly normalized) was –0.086 (t=1.37.) However, using expenditure, the effect was robust to the choice of deflators.

Despite the smaller total transfer, the changes to the social safety net did achieve a reduction in the poverty rate, when compared to the counter-factual of no changes in government transfers between 1996 and 1998. Without the response of the safety net, the expenditure poverty rate would have been one percentage point higher (comparing Table 4b and 9b.)We conclude that the changes to the safety net had a total effect of somewhere between zero and one percentage point. Based on expenditures net of transfer gains, the impact was higher amongst the poorest; the simulated poverty rate using half the poverty line is almost four percentage points higher without the changes in cash benefits.

We find that if there had been no changes in transfers, then the proportion of households with income below half the poverty line would have been 19% in the aftermath of the crisis, instead of 16% (Table 4a.) All of the reduction in income poverty (relative to half the poverty line) that we observed in Table 4a can be attributed to the changes in cash benefits. The proportion falling below the poverty line would have been 40% instead of 38%.

We have seen that there was a contraction in the safety net between 1996 and 1998, though somewhat better targeting helped compensate. Suppose instead that aggregate cash benefits had increased in response to the crisis. The impact on poverty will naturally depend on how this was allocated. Consider a pro rata increase, whereby all 1998 benefits increased by the same proportion (with no gain for those not receiving any benefits.) We calculate that a 10% increase in benefits (less than 2% of total household income in 1998) would have returned the income poverty rate to 36%, close to its 1996 level. For expenditure poverty, a much greater increase in benefits would have been required; a 50% increase in all benefits would have been needed to bring the 1998 poverty rate down to its 1996 level of 22%. Suppose that, instead of a constant percentage increase in all cash benefits, the extra spending

was allocated equally across all households, whether or not they were receiving benefits. Then the cost of bringing the income poverty rate back to its 1996 level would only have been slightly higher, at a sum equivalent to 11% of aggregate cash benefits in 1998. For expenditure poverty, the cost would have been slightly lower, at 48% of 1998 aggregate benefits.

So, to avoid the higher poverty rates at the time of the crisis, a uniform lump-sum disbursement would have cost about the same as a pro-rata expansion of the existing system. This illustrates again that, despite some improvements over 1996, the cash benefit system in Russia at the time of the 1998 crisis was not particularly well-targeted.

4.3 Protection versus promotion

The above discussion has focused solely on the effect of changes in the safety net on the aggregate poverty rate. However, the panel data has also allowed us to simulate the change in the joint distributions of incomes and expenditures. Thus we can also address the questions: How much did the response of the safety net help protect non-poor people from falling into poverty? And how much did it help promote poor people from poverty?

To test for differences between the actual and simulated joint distributions, we use the PROT and PROM statistics proposed by Ravallion, et al., (1995.) PROT measures the impact of the simulation on the extent to which people fell into poverty ("protection"), while PROM measures its impact on how many people escaped poverty ("promotion"); the Appendix to this paper provides details.

Comparing the simulated joint distributions in Table 9a with the actual distribution in 4a, we find that the changes to the safety net diminished its performance in protecting non-poor people from falling into poverty in the aftermath of the crisis. Fewer non-poor people would have fallen into income poverty if the safety net had not changed. The actual joint

distribution (Table 4a) indicates that 18% of the sample fell into poverty in the aftermath of the crisis, while 16% escaped. We estimate that if there had been no change in the safety net, then 15% would have fallen below the line, and 11% would have escaped poverty (Table 9a.) The PROT and PROM statistics were –2.4% and 5.0%. For expenditures, more people would have fallen into poverty without the changes to the safety net, but the difference is small; the PROT and PROM statistics for expenditures are –0.5% and 0.2% respectively. However, none of these are significantly different from zero. For incomes, the z-scores on the PROT and PROM statistics are 0.98 and 0.89 respectively. For expenditures, the z-scores are 1.06 and 0.81.

Using half the poverty line instead, the PROT and PROM statistics for income are –0.6% and 4.1%, with z-scores of 0.76 and 7.64. Again there is no significant protection, but now we find significant promotion from poverty. This is not what we find for expenditures using half the poverty line; the PROT and PROM statistics are 3.4% and 0.4% with z-scores of 4.30 and 0.68. For expenditures, there is significant protection from falling below half the poverty line; without the changes to the safety net, 11.5% of Russians would have fallen below half the poverty line (Table 9b), instead of the figure of 8.1% observed (Table 4b.)

We also simulated the effects of replacing the 1998 safety net by equal lump-sum transfers of the same total budget to all households. We did this with and without pensions, and for both incomes and expenditures. The results (analogous to Table 9) are available in the Addendum. A uniform allocation achieved a lower overall poverty rate, though the difference was not large (3.3 percentage points for expenditures and equalizing all cash benefits, and less than this for all other combinations.) The effects on the aggregate headcount index were all quantitatively small, and the PROT and PROM statistics were not significant in any case.

5. Conclusions

The expenditure-poverty rate in Russia rose by almost 50% in the aftermath of the 1998 financial crisis, and there was a sharp attenuation in perceptions of economic well-being. Income poverty rose much less than expenditure poverty, however, and the proportion of Russians with incomes below half the poverty line was actually lower in the aftermath of the crisis than two years earlier. The financial crisis appears to have encouraged even poor households to cut back their spending relative to incomes, probably reflecting current wealth effects of the crisis and expectations of worse times ahead.

The 1996 poor were certainly not the only ones affected; indeed, we find that mean expenditures of the 1996 poor rose, and that 42% of the 1996 poor (9% of the whole sample) had escaped poverty in the aftermath of the crisis. Almost two thirds (61%) of the poor in the aftermath of the crisis had not been poor two years earlier; 20% of the 1996 population fell into poverty.

Nonetheless, there were many losers amongst the 1996 poor. For example, 20% of the 1996 poor who had expenditures of more than half the poverty line saw their 1998 expenditures fall to less than half the poverty line.

One would hope that the safety net responded to such a shock so as to protect people from poverty. The distribution of government transfers around the time of the crisis was quite different to two years earlier; there were <u>lower</u> mean outlays on the public safety net at the time of the crisis, though with better targeting in certain respects. On balance, these changes to the safety net were poverty reducing. This was more marked amongst the poorest; indeed, without the better targeting of the safety net, we would have seen a rise in the

proportion of Russians with incomes less than one half of the poverty line in the aftermath of the crisis.

The incidence of income poverty would have been two percentage points higher without the changes in the safety net. The reduction in poverty due to changes in cash benefits was not achieved by preventing people who were vulnerable falling into poverty; indeed, without the changes in the safety net, fewer non-poor families would have seen their incomes fall below the poverty line. Rather, the changes in the safety net reduced the impact of the crisis on poverty by helping some previously poor families escape poverty. This finding is not, however, robust to the choice of poverty line and welfare indicator; we find that the changes in the safety net did help protect people from falling below half the poverty line.

A seemingly modest expansion in total outlays on the safety net—less than would have been needed to restore aggregate outlays to their level two years earlier—would have been sufficient to avoid the immediate increase in income poverty. Even without better targeting, a 10% increase in all current cash benefits would have avoided higher income poverty in the aftermath of the crisis, as compared to two years earlier.

Stabilizing the expenditure poverty rate would have been a far more expensive task without much better targeting. To the extent that the proportionately greater contraction in consumer spending correctly anticipated subsequent income contractions, a further (possibly considerable) expansion of the safety net would have been required to prevent rising income poverty. However, it appears unlikely that household incomes fell further in 1999, at least on average. Indeed, there were signs of subsequent macroeconomic recovery in 1999. While we do not, of course, know the extent to which the poor shared in these gains, it would seem quite likely that many did, via the likely stimulus to labor intensive production. So the cut

backs in consumer spending may well have proved unnecessary. Even the modest expansion in the safety net required for stabilizing income poverty in the aftermath of the crisis might then have gone a long way toward ameliorating its welfare impact.

Appendix: Testing the social safety net

This Appendix summarizes the tests proposed in Ravallion, et al. (1995.)

In comparing joint distributions--such as with and without policy changes--we use two tests: how well people are protected from poverty, and how well they are promoted from poverty. To define these, let x denote the welfare indicator, found in the interval $(0, x^{max}.)$ Consider two possible joint distribution functions over dates 1 and 2, namely $F(x_1,x_2)$ and $G(x_1,x_2)$ (i.e., $F(x_1,x_2)$ is the proportion of the population with less than x_1 in period 1, and less than x_2 in period 2, and similarly for $G(x_1,x_2)$.) The corresponding marginal distributions are $F_1(x_1) = F(x_1,x^{max})$ and $F_2(x_2) = F(x^{max},x_2)$, and similarly for G. The poverty line is z, and so the proportion of the population who are poor in period 1 in the F distribution is $F_1(z)$, while a proportion $F_2(z)$ are poor at date 2. By construction, $F_2(z) - F(z,z)$ is the proportion of individuals in the F distribution who are poor in the second period but were not poor in the first. We will say that F protects from poverty better than G if and only if

$$F_2(z) - F(z,z) < G_2(z) - G(z,z)$$

The extent of protection allowed by F relative to G will be measured by

$$PROT(z) = G_2(z) - G(z,z) - F_2(z) + F(z,z)$$

Analogously, $F_1(z) - F(z,z)$ of the population were poor in the first period but not the second. F promotes the poor better than G if and only if

$$F_1(z) - F(z,z) > G_1(z) - G(z,z)$$

And the extent of promotion due to F relative to G will be measured by

$$PROM(z) = F_1(z) - F(z,z) - G_1(z) + G(z,z)$$

In all cases considered in this paper, the marginal distributions in the first period are identical; $F_1(z)=G_1(z)$, which is simply the pre-intervention distribution. It follows that promotion is equivalent to requiring that $F(z,z) < G(z,z)$, i.e., PROM can be interpreted as a test of whether there is less persistent poverty in the F distribution, the persistently poor being

defined as those who were poor in both periods. The residual, $F_2(z) - F(z,z)$, is then interpretable as the amount of transient poverty, which is precisely what PROT tests for. Another implication of identical first-period marginals is that if <u>both</u> PROT and PROM are positive, then $F_2(z) < G_2(z)$ (i.e., the incidence of poverty is lower for the F distribution in period 2), though the converse is not true (lower poverty in period 2 is possible with only one of PROT or PROM holding.)

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Table 1: Characteristics of all households interviewed in 1996 and the households re-interviewed in 1998

Characteristics in 1996	Sample of 1996	Panel sample 1996-1998
Expenditure as a proportion of poverty line	2.73	2.62(*)
Income as a proportion of poverty line	1.91	1.85
Demographics		
Household size	2.85	2.92(**)
Number of children 0-7 years	0.23	0.23
Number of children 7-18 years	0.49	0.52(*)
Number of pensioners	0.61	0.64
Regional characteristics		
Urban	0.68	0.67
Rural	0.32	0.34(**)
Characteristics of the head		
High school	0.52	0.52
Technical or Vocational	0.30	0.31
University diploma	0.17	0.16
Age in years	46.65	46.81
Head unemployed	0.093	0.094

Note: Means based on data collected in 1996; (*) means that the difference between 1996 and 1998 averages is significant at 5% level, (**) is significant at 1% level.

Table 2: Components of total household income in 1996 and 1998

	1. Panel Sample				Non-panel Samples			
	1996		1998		1996		1998	
	Share (%)	Mean	Share (%)	Mean	Share (%)	Mean	Share (%)	Mean
Salary	40.14	3074	35.63	2022	40.92	3225	37.18	2099
Government benefits	27.01	1024	30.82	876	27.14	1025	29.50	835
Income from home production	16.14	657	20.12	874	15.06	637	19.14	829
Help from relatives	9.40	470	7.63	286	9.46	525	8.40	327
Other income	7.28	635	5.78	789	7.40	673	5.76	713
Total	100.0	5881	100.0	4846	100.0	6086	100.0	4804

Note: Means are calculated in 1992 rubles.

Table 3: Household expenditures 1996 and 1998

		Total Household expenditure		Household expenditure per equivalent adult		Poverty rate
		Mean	Std. Dev.	Mean	Std. Dev.	%
All Russia (n=2875)	1996	6996	6610	2.57	2.61	21.9
	1998	5249	5264	1.94	1.94	32.7
	Change (%)	-1747 (-24.9)		-0.63 (-24.5)		10.5 (49.3)
Urban (n=1866)	1996	7442	7143	2.52	2.32	18.6
	1998	5431	5511	1.87	1.68	32.1
	Change (%)	-2011 (-27.0)		-0.65 (-25.8)		13.5 (72.6)
Rural (n=1009)	1996	6269	5561	2.29	1.97	28.1
	1998	4951	4822	1.85	1.73	34.1
	Change (%)	-1317 (-21.0)		-0.43 (-18.8)		6.0 (21.4)

Note: Household expenditure estimates are converted to monthly equivalents in 1992 rubles using the region-specific price indices. Based on the panel sample; see Addendum for corresponding table for non-panel sample.

Table 4a: Joint distribution of incomes as a proportion of poverty line

		Income/poverty line 1998							
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	% change in mean	Total [Cumulative]
Income/poverty line 1996	<0.5	5.57	5.15	3.83	2.47	1.25	0.56	83.1	18.82 [18.82]
	0.5-1	4.10	5.32	3.30	2.02	1.22	0.90	36.1	16.87 [35.69]
		Persistently poor => 20.14			*Escaped poverty => 15.55*				
	1-1.5	2.19	4.35	4.07	2.05	1.77	0.94	11.6	15.37 [51.06]
	1.5-2	1.29	2.40	4.49	3.03	1.98	1.18	-8.7	14.37 [65.43]
	2-3	1.50	3.20	4.21	4.03	3.69	1.63	-43.2	18.26 [83.69]
	3+	1.04	1.63	2.68	2.43	4.03	4.49	-94.0	16.31 [100.00]
		Fall into poverty => 17.60			*Persistently non-poor => 46.71*				
	Total	15.69	22.05	22.57	16.03	13.95	9.70	-18.6	100.00
	[Cumulative]	[15.69]	[37.74]	[60.31]	[76.34]	[90.29]	[100.00]		

Table 4b: Joint distribution of expenditures as a proportion of poverty line

		Expenditure/poverty line 1998							
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	% change in mean	Total [cumulative]
Expenditure/poverty line 1996	<0.5	2.40	2.64	0.97	0.35	0.42	0.45	70.1	7.23 [7.23]
	0.5-1	2.92	4.80	3.23	1.84	0.94	0.94	35.1	14.68 [21.91]
		Persistently poor => 12.76			*Escaped poverty => 9.14*				
	1-1.5	2.02	5.01	3.93	2.50	2.05	1.50	15.9	17.01 [38.92]
	1.5-2	1.15	3.83	3.44	2.30	2.61	1.36	-5.4	14.68 [53.60]
	2-3	1.04	3.41	3.90	3.41	4.42	3.30	-19.2	19.48 [73.08]
	3+	1.01	2.54	3.76	4.42	6.26	8.94	-89.0	26.92 [100.00]
		Fall into poverty => 20.07			*Persistently non-poor => 58.10*				
	Total	10.54	22.23	19.23	14.82	16.70	16.49	-24.5	100.00
	[Cumulative]	[10.54]	[32.77]	[52.00]	[66.82]	[83.52]	[100.00]		

Table 5: Comparison of characteristics of households with different poverty dynamics

	1 Persistently Poor	2 Fell into poverty	3 Escaped Poverty	4 Persistently non-poor
Demographic characteristics				
Household size	3.12 [4]	2.88	2.84	2.79 [1]
Number of children 0-7 years old	0.30 [4]	0.27 [4]	0.26	0.20 [1,2]
Number of children 7-18 years old	0.70 [2,4]	0.49 [1]	0.56	0.47 [1]
Number of pensioners	0.44 [2,3,4]	0.59 [1,4]	0.63 [1]	0.71 [1,2]
Male-headed households	0.70 [3,4]	0.66 [3,4]	0.56 [2]	0.57 [1,2]
Female-headed households	0.17 [2,4]	0.11 [1]	0.13	0.11 [1]
Households headed by pensioners	0.13 [2,3,4]	0.24 [1,3,4]	0.30 [1,2]	0.32 [1,2]
Geographic characteristics				
Moscow & St. Petersburg	0.02 [2,4]	0.06 [1,3,4]	0.02 [2,4]	0.09 [1,2,3]
Other urban areas	0.57	0.60 [3]	0.47 [2,4]	0.59 [3]
Rural areas	0.40 [4]	0.34 [3]	0.51[2,4]	0.32 [1,3]
Characteristics of the head				
Age	42.94 [2,3]	46.97 [1]	47.29 [1]	47.92
Education				
High school diploma or lower	0.62 [4]	0.54 [3,4]	0.62 [2,4]	0.48 [1,2,3]
Technical or vocational	0.29	0.34	0.28	0.30
University degree or higher	0.08 [4]	0.10	0.09 [4]	0.21 [1,3]

Note: [ ] indicate columns where such values are statistically different. Poverty status is calculated based on household expenditure.

Table 6: Comparison of the individual subjective welfare rankings in 1996 and 1998

		Subjective welfare ranking 1998							
		1	2	3	4	5	6	7	Total [Cumulative]
Subjective welfare ranking 1996	1	6.62	3.15	2.04	1.04	0.92	0.09	0.00	13.86 [13.86]
	2	3.91	5.18	4.12	2.04	1.09	0.21	0.11	16.66 [30.52]
	3	3.15	5.09	7.45	4.19	2.80	0.41	0.02	23.10 [53.62]
	4	2.06	3.36	5.53	5.51	3.38	0.51	0.11	20.46 [74.08]
	5	1.66	2.31	4.28	5.07	5.78	0.99	0.05	20.13 [94.21]
	6	0.16	0.48	0.72	1.07	1.27	0.33	0.00	4.03 [98.24]
	7	0.02	0.14	0.41	0.37	0.51	0.19	0.12	1.76 [100.00]
	Total	17.57	19.70	24.55	19.30	15.74	2.73	0.41	100.00
	[Cumulative]	[17.57]	[37.27]	[61.82]	[81.12]	[96.86]	[99.59]	[100.00]	

Table 7a: Comparison of male subjective welfare rankings in 1996 and 1998

		Subjective welfare ranking 1998							
		1	2	3	4	5	6	7	Total [Cumulative]
Subjective welfare ranking 1996	1	5.40	2.83	2.58	1.00	0.87	0.08	0.00	12.75 [12.75]
	2	3.45	3.95	4.15	2.12	1.25	0.17	0.12	15.21 [27.96]
	3	2.91	4.61	7.06	4.20	3.07	0.50	0.04	22.39 [50.35]
	4	2.20	3.49	5.48	6.07	3.78	0.46	0.12	21.60 [71.95]
	5	1.29	2.16	4.69	5.07	6.56	1.04	0.08	20.90 [92.85]
	6	0.17	0.54	0.87	1.41	1.74	0.46	0.00	5.19 [98.04]
	7	0.04	0.08	0.42	0.50	0.54	0.21	0.17	1.95 [100.00]
	Total	15.45	17.66	25.26	20.36	17.82	2.91	0.54	100.00
	[Cumulative]	[15.45]	[33.11]	[58.37]	[78.73]	[96.55]	[99.46]	[100.00]	

Table 7b: Comparison of female subjective welfare rankings in 1996 and 1998

		Subjective welfare ranking 1998							
		1	2	3	4	5	6	7	Total [Cumulative]
Subjective welfare ranking 1996	1	7.52	3.39	1.65	1.07	0.95	0.09	0.00	14.67 [14.67]
	2	4.25	6.08	4.10	1.99	0.98	0.24	0.09	17.73 [32.40]
	3	3.33	5.44	7.73	4.19	2.60	0.34	0.00	23.62 [56.02]
	4	1.96	3.27	5.56	5.10	3.09	0.55	0.09	19.62 [75.64]
	5	1.93	2.41	3.97	5.07	5.20	0.95	0.03	19.56 [95.20]
	6	0.15	0.43	0.61	0.83	0.92	0.24	0.00	3.18 [98.38]
	7	0.00	0.18	0.40	0.28	0.49	0.18	0.09	1.62 [100.00]
	Total	19.13	21.21	24.02	18.52	14.21	2.60	0.31	100.00
	[Cumulative]	[19.13]	[40.34]	[64.36]	[82.88]	[97.09]	[99.69]	[100.00]	

Table 8: Incidence of cash benefits

	1996				1998			
	Pensions	Family allowances	Social aid	Total benefits	Pensions	Family allowances	Social aid	Total benefits
	Ranked by income/poverty line							
<0.5	63.4	48.9	8.7	121.0	165.9	43.2	10.5	219.6
0.5-1	382.3	105.0	35.9	523.2	510.4	61.4	25.1	596.9
1-1.5	776.9	131.6	34.1	942.6	829.7	78.1	13.9	921.7
1.5-2	1148.3	157.8	25.7	1331.8	1054.8	87.9	13.6	1156.3
2-3	1308.3	140.2	30.4	1478.9	1155.4	110.7	26.9	1293.0
3+	1223.7	219.2	65.4	1508.3	1062.5	273.1	19.7	1355.0
	Ranked by expenditure/poverty line							
<0.5	27.6	64.0	2.0	93.6	141.8	24.2	8.3	174.4
0.5-1	287.5	105.6	20.9	414.0	419.9	61.1	14.3	495.4
1-1.5	510.3	135.3	29.5	675.0	621.2	84.2	42.5	747.9
1.5-2	688.2	118.3	37.6	844.0	734.7	74.7	9.9	819.4
2-3	908.2	123.1	61.9	1093.2	894.8	55.1	19.3	969.2
3+	1055.7	134.3	32.5	1222.5	955.3	151.1	10.1	1117.0

Note: "Pensions" include labor pensions paid to the people above the age of retirement and disability pensions; "family allowances" include birth grants and child care allowances; "social aid" includes unemployment benefits, apartment and fuel benefits.

Table 9a: Comparison of the actual and simulated distributions of household income as a proportion of poverty line in 1998 with no change in cash benefits since 1996

		Simulated income (net of transfer gain)/poverty line 1998						
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	Total [Cumulative]
Income /poverty line 1996	<0.5	9.63	5.18	2.09	0.87	0.80	0.24	18.82 [18.82]
	0.5-1	3.93	6.37	3.06	1.74	1.15	0.63	16.87 [35.69]
		Persistently poor => 25.11			*Escaped poverty* => 10.58			
	1-1.5	1.91	4.00	4.63	2.40	1.46	0.97	15.37 [51.06]
	1.5-2	1.18	1.60	3.17	4.00	3.23	1.18	14.37 [65.43]
	2-3	1.32	2.64	3.41	3.23	5.74	1.91	18.26 [83.69]
	3+	1.18	1.32	1.81	2.26	4.07	5.67	16.31 [100.00]
		Fall into poverty =>15.15			*Persistently non-poor* => 49.14			
	Total	19.17 [19.17]	21.11 [40.28]	18.16 [58.44]	14.50 [72.94]	16.45 [89.39]	10.61 [100.00]	100.00

Table 9b: Simulated distributions of household expenditure as a proportion of poverty line in 1998 with no change in cash benefits since 1996

		Simulated expenditure/poverty line 1998						
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	Total [Cumulative]
Expenditure/poverty line 1996	<0.5	2.78	2.40	0.97	0.31	0.42	0.35	7.23 [7.23]
	0.5-1	3.90	3.93	3.13	1.74	1.11	0.87	14.68 [21.91]
		Persistently poor => 13.01			*Escaped poverty* => 8.90			
	1-1.5	2.78	4.38	3.34	2.68	2.33	1.50	17.01 [38.92]
	1.5-2	1.43	3.58	2.78	2.54	2.89	1.46	14.68 [56.60]
	2-3	1.53	2.78	3.37	3.30	4.52	3.97	19.48 [73.08]
	3+	1.88	2.12	3.27	4.17	5.43	10.05	26.92 [100.00]
		Fell into poverty => 20.48			*Persistently non-poor* => 57.60			
	Total	14.30 [14.33]	19.20 [33.50]	16.87 [50.37]	14.75 [65.12]	16.70 [81.82]	18.19 [100.00]	100.00

Statistical Addendum (supplementary tables; not for publication, but available on request)

Table A1: Household expenditures (non-panel samples)

		Total household expenditure		Household expenditure per equivalent adult		Poverty rate
		Mean	Std. Dev.	Mean	Std. Dev.	%
All Russia	1996	7659	8932	2.56	2.36	21.0
	1998	5529	6363	1.92	1.74	32.6
	Change (%)	-2130 (-27.8)		-0.64 (-0.25)		11.6 (55.2)
Urban	1996	7880	8357	2.65	2.34	17.3
	1998	5576	6489	1.92	1.77	31.9
	Change (%)	-2304 (-29.2)		0.73 (27.5)		14.6 (84.4)
Rural	1996	6604	7842	2.38	2.41	28.8
	1998	5384	5964	1.88	1.69	34.1
	Change (%)	-1220 (-18.5)		-0.5 (-21.0)		5.3 (18.4)

Table A2: Comparison of characteristics of the households with different types of poverty dynamics. Poverty status is calculated based on household income

	1 Persistently Poor	2 Fell into poverty	3 Escaped Poverty	4 Persistently non-poor
Demographic characteristics				
Household size	3.25 [3,4]	3.14 [3,4]	2.74 [1,2]	2.63 [1,2]
Number of children 0-7 years old	0.33 [3,4]	0.30 [3,4]	0.20 [1,2]	0.18 [1,2]
Number of children 7-18 years old	0.74 [2,3,4]	0.60 [1,3,4]	0.49 [1,2,4]	0.40 [1,2,3]
Number of pensioners	0.41 [3,4]	0.48 [1,3,4]	0.74 [1,2]	0.78 [1,2]
Male-headed households	0.73 [3,4]	0.73 [3,4]	0.53 [1,2]	0.53 [1,2]
Female-headed households	0.14	0.12	0.11	0.11
Households headed by pensioners	0.12 [3,4]	0.15 [1,3,4]	0.36 [1,2]	0.36 [1,2]
Geographic characteristics				
Moscow & St. Petersburg	0.02 [2,4]	0.06 [1,3,4]	0.03 [2,4]	0.11 [1,2,3]
Other urban areas	0.55 [2,3,4]	0.64 [1,3]	0.49 [1,2,4]	0.60 [1,3]
Rural areas	0.42 [2,4]	0.29 [1,3]	0.49 [2,4]	0.29 [1,3]
Characteristics of the head				
Age	42.73 [3,4]	43.15 [3,4]	49.76 [1,2]	49.46 [1,2]
Education				
High school diploma or lower	0.59 [2,4]	0.50 [1,3]	0.59 [2,4]	0.48 [1,3]
Technical or vocational	0.32 [3,4]	0.33 [3]	0.26 [1,2]	0.30 [1]
University degree or higher	0.07 [2,3,4]	0.16 [1,4]	0.14 [1,4]	0.20 [1,2,3]

Note: [ ] indicate columns where such values are statistically different.

Table A3: Simulated distributions of household expenditure as a proportion of poverty line in 1998 with equal cash benefits in 1998 set at the 1998 mean

		Simulated expenditure/poverty line 1998						
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	Total [Cumulative]
Expenditure/poverty line 1996	<0.5	1.32	2.23	2.23	0.73	0.38	0.35	7.23 [7.23]
	0.5-1	1.74	4.80	3.65	2.26	1.39	0.83	14.68 [21.91]
		Persistently poor =>10.09			*Escaped poverty* =>11.82			
	1-1.5	1.88	3.86	4.21	2.78	2.57	1.70	17.01 [38.92]
	1.5-2	1.39	2.50	3.62	2.71	3.06	1.39	14.68 [53.60]
	2-3	1.91	2.71	3.72	3.41	4.07	3.65	19.48 [73.08]
	3+	2.37	2.71	3.51	3.48	6.47	8.38	26.92 [100.00]
		Fall into poverty =>19.33			*Persistently non-poor* =>58.73			
	Total	10.61	18.82	20.94	15.37	17.95	16.31	100.00
	[Cumulative]	[10.61]	[29.43]	[50.37]	[65.74]	[83.69]	[100.00]	

Table A4: Comparison of actual and simulated distributions of household income as a proportion of poverty line in 1998 with equal cash benefits in 1998 set at the mean

		Income/poverty line 1998						
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	Total [Cumulative]
Income/poverty line 1996	<0.5	3.48	7.37	4.42	1.84	1.22	0.49	18.82 [18.82]
	0.5-1	1.46	5.95	4.73	2.09	1.77	0.87	16.87 [35.69]
		Persistently poor =>18.26			*Escaped poverty* =>17.43			
	1-1.5	1.70	4.56	3.76	2.33	2.12	0.90	15.37 [51.06]
	1.5-2	2.02	3.76	3.23	2.12	1.95	1.29	14.37 [65.43]
	2-3	2.19	3.65	4.56	3.27	3.06	1.53	18.26 [83.69]
	3+	1.08	2.19	2.54	2.54	3.79	4.17	16.31 [100.00]
		Fall into poverty =>21.15			*Persistently non-poor* =>43.16			
	Total	11.93	27.48	23.23	14.19	13.91	9.25	100.00
	[Cumulative]	[11.93]	[39.41]	[62.64]	[76.85]	[90.94]	[100.00]	

Table A5: Comparison of actual and simulated household expenditures as a proportion of poverty line in 1998 with equal non-pension cash benefits in 1998 set at the mean.

		Simulated expenditure/poverty line 1998						
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	Total [Cumulative]
Expenditure/poverty line 1996	<0.5	2.09	2.85	1.04	0.38	0.45	0.42	7.23 [7.23]
	0.5-1	2.47	5.04	3.41	1.70	1.04	1.01	14.68 [21.91]
		Persistently poor =>12.45			*Escaped poverty* =>9.45			
	1-1.5	1.95	4.80	3.83	2.68	2.19	1.57	17.01 [38.92]
	1.5-2	0.94	3.72	3.48	2.43	2.64	1.46	14.68 [53.60]
	2-3	1.08	3.20	3.93	3.41	4.38	3.48	19.48 [73.08]
	3+	1.25	2.37	3.55	4.59	6.37	8.80	26.92 [100.00]
		Fall into poverty =>19.31			*Persistently non-poor* =>58.79			
	Total	9.77	21.98	19.23	15.20	17.08	16.73	100.00
	[Cumulative]	[9.77]	[31.75]	[50.98]	[66.18]	[83.26]	[100.00]	

Table A6: Comparison of actual and simulated household incomes as a proportion of poverty line in 1998 with equal non-pension cash benefits in 1998 set at the mean.

		Income/poverty line 1998						
		<0.5	0.5-1	1-1.5	1.5-2	2-3	3+	Total [Cumulative]
Income/poverty line 1996	<0.5	5.22	5.29	4.10	2.30	1.32	0.59	18.82 [18.82]
	0.5-1	3.51	5.46	3.62	2.09	1.25	0.94	16.87 [35.69]
		Persistently poor =>19.48			*Escaped poverty* =>16.21			
	1-1.5	2.26	4.10	3.83	2.54	1.70	0.94	15.37 [51.06]
	1.5-2	1.36	2.37	4.21	3.23	2.02	1.18	14.37 [65.43]
	2-3	1.57	2.78	4.87	3.83	3.48	1.74	18.26 [83.69]
	3+	1.01	1.63	2.75	2.43	4.14	4.35	16.31 [100.00]
		Fall into poverty =>17.08			*Persistently non-poor* =>47.24			
	Total	14.92	21.63	23.37	16.42	13.91	9.74	100.00
	[Cumulative]	[14.92]	[36.55]	[59.92]	[76.34]	[90.25]	[100.00]	

Table A7a: Regression of changes in real income and expenditure net of transfers on change in transfers and characteristics of households

	Income/poverty line		Expenditure/poverty line	
	Coefficient	Standard Error	Coefficient	Standard Error
Change in government benefits	-0.09	0.06	-0.82	0.1
Demographic characteristics of the household				
Household size	-0.04	0.04	-0.05	0.07
Change in household size	-0.09	0.05	-0.25	0.09
Share of young children (0-7)	-0.39	0.45	1.74	0.75
Share of older children (7-18)	0.71	0.29	1.33	0.49
Share pensioners	0.09	0.25	0.44	0.43
Change in share of young children	-1.08	0.54	0.67	0.9
Change in share of older children	0.03	0.38	-0.72	0.64
Change in share pensioners	0.28	0.32	0.72	0.55
Households headed by male		*Reference*		
Households headed by female	0.05	0.13	0.1	0.22
Household headed by pensioner	-0.36	0.24	-0.42	0.4
Household assets				
Household owns VCR	0.1	0.09	-0.01	0.15
Household owns a summer house	0.1	0.11	0.15	0.19
Household owns a car	0.02	0.09	-0.19	0.16
Geographical characteristics				
Moscow and St. Petersburg		*Reference*		
Northern & North-Western	0.47	0.19	0.55	0.33
Central & Central Chernozem	0.48	0.16	0.17	0.27
Volgo-Vyatskiy	0.64	0.16	0.36	0.27
North Caucasian	0.72	0.18	0.55	0.3
Ural	0.56	0.16	0.5	0.28
Western Siberian	0.58	0.18	0.65	0.3
Eastern Siberian	1.01	0.19	0.8	0.31
Urban		*Reference*		
Rural	0.26	0.08	-0.01	0.14
Characteristics of the head				
Age of the household headx100	0.14	0.15	0.2	0.25
Age squared of household headx1000	0.06	0.16	0.02	0.27
Education				
High school	-0.08	0.12	0.11	0.2
Technical or vocational education	-0.09	0.12	0.05	0.21
University degree		*Reference*		
Occupation				
Officials or managers	-0.54	0.43	3.52	0.72
Professionals	-0.27	0.18	0.34	0.3
Technicians	-0.6	0.19	0.03	0.32
Clerks	-0.54	0.27	0.25	0.46
Services	-0.62	0.23	-0.41	0.4
Agriculture or fishery workers	0.28	0.43	0.66	0.74
Craft workers	-0.3	0.14	0.17	0.24
Plant machine operators	-0.22	0.14	0.25	0.24
Elementary workers	0.01	0.17	-0.01	0.28
Armed forces	0.15	0.37	0.25	0.63
Change in employment status				
Unemployed to Employed	0.04	0.23	0.71	0.39
Employed to Unemployed	-0.27	0.15	0	0.24
Unemployed in 1996	0.09	0.2	-0.17	0.33
Intercept	-1.23	0.49	-1.46	0.82

Table A7b: Regression of changes in real income and expenditure net of transfers on change in transfers and characteristics of households

	Total household income		Total household expenditure	
	Coefficient	Standard Error	Coefficient	Standard Error
Change in government benefits	-0.18	0.1	-0.87	0.15
Demographic characteristics of the household				
Household size	-465.62	135.5	-625.95	214.1
Change in household size	727.74	172.63	762.92	272.63
Share of young children (0-7)	-877.9	1505.92	6921.5	2355.05
Share of older children (7-18)	1580.4	962.92	3236.38	1525.15
Share pensioners	361.09	845.21	1953.42	1338.18
Change in share of young children	-5529.7	1790.75	911.91	2817.06
Change in share of older children	-606.11	1257.03	-3650.8	1996.13
Change in share pensioners	-1124.65	1078.02	-1221.18	1697.92
Households headed by male		*Reference*		
Households headed by female	-489.9	432.53	-202.2	681.66
Household headed by pensioner	-681.4	796.19	-872.48	1266.29
Household Assets				
Household owns VCR	495.54	297.03	288.79	470.85
Household owns a summer house	512.77	373.59	395.3	597.13
Household owns a car	158.99	305.21	-577.3	485.74
Geographical characteristics				
Moscow and St. Petersburg		*Reference*		
Northern & North-Western	1146.41	647.08	1182.85	1027.57
Central & Central Chernozem	1980.34	525.56	769.66	834.55
Volgo-Vyatskiy	2382.14	531.94	1408.67	844.94
North Caucasian	2688.96	593.26	1807.83	936.33
Ural	1933.56	549.96	1211.03	871.57
Western Siberian	1367.09	601.23	894.12	947.42
Eastern Siberian	3698.44	623.07	1969.65	983.12
Urban		*Reference*		
Rural	961.6	273.03	-74.5	428.73
Characteristics of the head				
Age of the household headx100	56.49	50.51	38.12	79.19
Age squared of household headx1000	-0.42	0.54	-0.26	0.84
Education				
High school	-81.63	405.97	361.44	639.74
Technical or vocational education	-65.56	411.75	520.87	651.49
University degree		*Reference*		
Occupation				
Officials or managers	-2478.06	1441.59	12326	2263.91
Professionals	12.99	585.92	1137.59	927.02
Technicians	-674.65	640.61	104.75	1009.05
Clerks	-685.59	888.58	1026.11	1424.6
Services	-538.47	780.91	-976.06	1236.64
Agriculture or fishery workers	1687.08	1433.53	2190.46	2302.42
Craft workers	-729.21	469.72	311.36	741.85
Plant machine operators	-398.95	470.72	679.49	742.06
Elementary workers 2.	606.7	554.59	-336.86	876.47
Armed forces	1588.39	1251.72	1027.59	1975.26
Change in employment status				
Unemployed to Employed	-88.72	776.01	2761.2	1217.7
Employed to Unemployed	-539.32	486.18	268.8	756.5
Unemployed in 1996	1099.06	661.42	-846.01	1035.22
Intercept	-5648.45	1630.87	-4323.92	2584.52

Short-Lived Shocks with Long-Lived Impacts?
Household Income Dynamics in a Transition Economy

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Abstract: Is the persistent poverty that has emerged in many transition economies due to underlying nonconvexities in the dynamics of household incomes, such that a vulnerable household will never recover from a sufficiently large but short-lived shock to its income? One can readily construct a theoretical model with this feature. To test the theory we estimate a dynamic panel data model of household incomes by semi-parametric FIML controlling for attrition. Our estimates on data for Hungary in the 1990s exhibit nonlinearity in the income dynamics. But we do not find evidence of nonconvexities. In general, households bounce back from shocks. The persistent poverty that has emerged appears to reflect repeated, transient shocks, or permanent ones.

Keywords: Income dynamics, poverty, multiple equilibria, Hungary

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1. Introduction

Consider a household that suffers a transient income shock, by which we mean an unexpected but short-lived drop in income. With limited access to credit, or other forms of (formal or informal) insurance, such a shock will cause a spell of hardship. For example, a family that was not poor before suddenly finds that it cannot secure its basic consumption needs. But could such a shock also cause a previously non-poor family to become poor, and stay poor, indefinitely? Or could it cause a moderately poor family to fall into persistent destitution?

If the answer is "yes" to these questions then there will be large long-term benefits from institutions and policies that effectively protect people from transient shocks. If the answer is "no," then the (still potentially important) gains from such social protection will also be transient; lack of a safety net may well cause hardship, but it would not be a cause of persistent poverty.

The answer depends on properties of the dynamic process determining incomes at household level. And they are properties of income dynamics about which we currently know very little. If the process by which household incomes evolve over time can be represented well by the simplest type of linear (first-order) autoregression, then a household that experiences a transient shock will still see its income bounce back in due course. The family may well stay poor for a longer period than the duration of the shock. This can happen because incomes do not adjust instantaneously, but do have some serial dependence; low current income may reduce future income such as by eroding a family's physical and human asset base. But the household will recover from just one draw from a distribution of serially independent income shocks. (The

same is true of a broad class of commonly assumed stationary linear autoregressive and moving average dynamic processes.)

However, there is no obvious *a priori* reason why incomes would behave this way. It has been argued that economies as a whole have a "corridor of instability," meaning that they are stable with respect to small shocks, but not large ones (Leijonhufvud, 1973). Nonlinear dynamic models with multiple equilibria have been widely used in explaining why seemingly similar aggregate shocks can have dissimilar outcomes. In macroeconomics, examples can be found in models of the business cycle (Chang and Smyth, 1971; Varian, 1979) and certain growth models (Day, 1992; Azariades, 1996). Similar ideas have been employed in modeling micro poverty traps (Dasgupta and Ray, 1986; Banerjee and Newman, 1994; Dasgupta, 1997) and in understanding famines (Carraro, 1996; Ravallion, 1997).

It is not difficult to construct theoretical models that generate a type of nonlinear dynamics at individual level whereby short-lived shocks have long-lived effects. We give examples later. However, while it is theoretically possible that transient shocks have persistent effects, whether they do or not remains an empirical question. And it is a difficult question. We clearly need to observe incomes of the same households over time; panel data appear to be essential. There is a concern about whether we will be able to observe an unstable equilibrium, as this will depend on the speed of adjustment relative to the survey data frequency. Possibly the households that receive large negative shocks will drop out of the panel; one clearly needs to

allow for endogenous attrition. There are also econometric issues about estimated dynamic effects in panels of relatively short duration.[2]

This paper tests for the existence of low-income nonconvexities, such that persistent poverty can arise from sufficiently large shocks at household level. Our choice of setting for this study was dictated in part by the fact that we require household panel data. Of course, this would be of little use for our purpose if there had not been (unfortunately) large income shocks at household level. One also needs household panel data spanning a period of large income shocks identifiable at household level.

We used data for Hungary, for which we have a six-year panel spanning a period of sizable income shocks. The collapse of central planning and replacement in a market economy resulted in a rapid increase in poverty during the 1990s in Hungary, as well as other transition economies of Central and Eastern Europe and Central Asia (Milanovic, 1995). A crucial question for policy in this setting is whether the income losses are really transient, or will have long-lasting consequences. A further reason for choosing Hungary is that there exists a sizable safety net; we will test how much impact this might have had on the income dynamics.

As in micro studies for other settings, past work for Hungary has shown differences in the long-term characteristics of households (such as asset holdings and human capital) and certain events interpretable as shocks (such as illness) can increase the risk of poverty. (We review this

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[2] Tests exist in the literature for determining whether a time series with white-noise properties is stochastic (i.i.d.) or deterministic (chaotic) (Brock and Potter, 1993; Liu, Granger and Heller, 1992). However, these call for large samples over time; 600 would be considered adequate, but not six! Furthermore, our interest here is not so much in whether or not the economic dynamic is complex, but rather whether it exhibits a low-income nonconvexity.

literature later.) While agreeing to the importance of such factors in determining household incomes, in this paper we focus on the different question of whether transient income shocks might be a cause of persistent poverty. Do households bounce back from such shocks? What are the reasons for differences in household income dynamics? Are there any household characteristics that contribute to the vulnerability of the family to income shocks? Why does it take much longer for some households to recover from a transient shock? These questions require a rather different approach to that found in the literature on poverty and income dynamics.

The following section gives examples of models that can yield the type of nonlinear income dynamics whereby short-lived shocks can have permanent consequences. Section 3 then discusses the literature on income dynamics in Hungary and elsewhere. Our data are described in section 4. We present our econometric model in section 5. (A more detailed exposition of our estimation method can be found in the Appendix.) Section 6 presents our results, and our conclusions are summarized in Section 7.

2. Nonlinear dynamics in household incomes

Probably the simplest model that can generate the type of nonlinear income dynamics we are interested in testing for assumes that a family cannot borrow or save and derive income solely from labor earnings, but with a nonconvexity at low earnings. We can suppose that the worker's expected productivity and (hence) wage rate depends on consumption, as in the classic Efficiency Wage Hypothesis (Mirrlees, 1975; Stiglitz, 1976). This assumes that labor productivity and earnings are zero at a low, but positive, level of consumption; only if

consumption rises above some critical level, $Y^{min}>0$, will the worker be productive. In the efficiency wage literature, Y^{min} is usually interpreted as the nutritional requirements for basal metabolism, which represents two-thirds or more of normal nutritional requirements (Dasgupta, 1993). Higher consumption raises wages, but at a declining rate, until after some point the productivity effect of consumption vanishes. Nonlinear dynamics can be introduced into this model by simply assuming that the wage rate in any period is contracted at the beginning of the period. Finally, we assume that this dynamic process of income determination has at least one date for which incomes have risen.

Combining these assumptions, the process generating current income (Y_t) can be written as the nonlinear difference equation: $Y_t=f(Y_{t-1})$, where the function f is continuous with $f(Y)=0$ for $Y<Y^{min}$ and the function is increasing and concave for all $Y>Y^{min}$. An equilibrium of this model is a steady-state solution such that $Y=f(Y)$. It is evident that the model must have at least one such equilibrium, and if there are two, the one with lower income will be unstable.[3]

Alternatively, we can think of a liquidity constrained household that faces the choice of investing in (physical or human) capital accumulation or consuming all income in a given period. Suppose that the household is only willing to forgo current consumption in order to invest if its income exceeds a critical level, Y^{min}. The investment yields an income at time t of $f(Y_{t-1})$ where this function has the same properties as above.

The recursion diagram in Figure 1 illustrates the case of two equilibria. The equilibrium at Y^{**} ($>Y^{min}$) is stable, but Y^{*} is not. Consider a household at Y^{**}. With any shock exceeding

[3] Note that the assumption that $Y_t>Y_{t-1}$ for some t assures that there is at least one unstable equilibrium (by the intermediate value theorem, given continuity of f and the assumption that $Y^{min}>0$).

Y^{**}-Y^{*}, the household will be driven beyond the unstable equilibrium, and will then see its income decline steadily (even precipitously). Persistent poverty will be the inevitable result.

One can propose more complicated models than this one. For example, one can allow for some positive lower bound to incomes. Assuming that this lower bound is below Y^{**} in Figure 1, there will now be three equilibria, with the extra (stable) equilibrium at the lower bound. Again, with a sufficient negative income shock, a household at its high (stable) income will see its income then decline until it reaches the lower bound.

This type of model has a powerful policy implication. A transfer payment $T \geq Y^{**}$ will eliminate the low-income unstable equilibrium. The family will be fully protected from the possibility of a transient shock having an adverse long-term effect. The transfer will not only help protect current living standards, but will also generate a stream of future income gains. The safety net could be a long-term investment, and with a high return.[4]

3. The setting and literature

The last decade has seen a sharp decline in Hungary's GNP (by nearly one-fifth of its 1989 value in the first four years of transition), large scale unemployment, declining real wages and household incomes, and a sharp increase in income poverty. Between 1990 and 1994, the number of employed people decreased by 1.4 million, and by 1995 formal employment had dropped by more than a quarter of its pre-transitional level. Unemployment increased by approximately 500,000 people for that period (Galasi, 1998; Forster, M., Toth, I., 1998). The

[4] A similar point is made by Keyzer (1995) in his analysis of a generalized version of the Dasgupta and Ray (1986) model.

proportion of the population living below the subsistence minimum was about 50 percent higher in 1996 than in 1992 (Speder, 1998).

Under these conditions, maintaining a social safety net has become an important concern of the Hungarian government. Both Hungarian and international scholars have been involved in the debate about the reforms of the social support system to avoid the emergence of massive poverty and to make the current system of social protection fiscally sustainable.

While there is a large amount of recent literature on poverty in Hungary,[5] here we focus on panel data studies. Dynamic aspects of poverty in Hungary were studied by Ravallion et al. (1995) based on two rounds of data from the Household Budget Survey conducted by the Central Statistical Office for 1987 and 1989. They constructed the joint distribution of household welfare over time, in which the panel structure is exploited to show how households moved between welfare groups. The results showed considerable transient poverty over the period of the survey. The safety net did help protect vulnerable households from falling into poverty.

The Hungarian Household Panel Survey (HHPS) was begun in 1991 with the purpose of providing researchers with data for further investigating household income dynamics. Several recent papers have used the HHPS to analyze the dynamic aspects of poverty in Hungary (Galasi 1998; Speder 1998; Forster, Toth 1998). Using income transition matrices, Galasi (1998) studied the dynamics of poverty incidence, the chances of escaping from and reentering poverty, and the characteristics that distinguish households that stay in poverty from those that escape. The results suggest considerable income mobility from one year to the next among Hungarian households.

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[5] The composition of absolute poverty was examined by Kolosi et al., (1995). Relative poverty was studied by Andorka (1992) and Andorka and Speder (1993a, b). Work by Toth et al., (1994) and Andorka et al., (1995) looked at the composition of poverty using various measures.

Most of the initially poor escaped poverty within two years, but a high proportion of the households that escaped poverty were found to be poor again within three years. However, the majority of households move to neighboring quintiles, and households in the middle of the income distribution experience the most income mobility. The income level of households in the top and bottom quintiles tends to be more stable.

Applying a similar method, Speder (1998) examined the effects of certain life-cycle events on the long-term income status of Hungarian households. Changes in household composition and size were found to have an impact on the income and welfare of the household. Childbirth, dissolution of the household (divorce and widowhood), as well as change in economic-activity status were found to increase the risk of being poor. The results of the analysis of the household income components indicate that wages and joint incomes of the household members were mainly responsible for the dynamics of poverty in Hungary.

Forster and Toth (1998) found that the duration of poverty spells in Hungary depend on characteristics of the individual and the household. Persons with lower education were less likely to escape poverty than persons with higher levels of education. Persistent poverty is rare among persons with a university degree. Children and the elderly have fewer chances to escape poverty.

None of this past work has tested whether the dynamic process determining incomes is such that transient income shocks can create persistent, long-term poverty. Indeed, we know of no tests for any other setting. Although much has been learned about the processes determining poverty in the present setting, past work cannot answer the question in our title. The following sections propose and implement a method of testing for nonlinearity in the income dynamics consistent with the existence of multiple equilibria.

4. Data and descriptive results

We used six waves (1992-1997) of the Household Panel Survey conducted by Hungary's Social Research Informatics Center (Tarki).[6] The first wave of the survey was designed to include a nationally representative sample of Hungarian households. The aim was for all persons living in households selected for the first wave to be re-interviewed at one-year intervals.

Originally (in 1992) the panel included 2,668 households. The household response has been around 85 percent at each round of the survey, so that by the sixth wave (1997) only 52 percent (1,385) of the initially selected households remained in the sample.

The questionnaire includes detailed questions about the incomes of every adult member of the household. Income components that cannot be directly allocated to any individual household member are registered separately in the household questionnaire. Total household income is calculated as a sum of wages and salaries of individual members of the household, social security transfers, private transfers, in-kind income, and income from home production, with imputed values when necessary.

Table 1 provides some descriptive results on household recovery times following a negative income shock. We selected all households that experienced a decline in their real total income between 1992 and 1993 and categorized these households according to the time it took them to get back to at least 98 percent of their income in 1992. More than one third (37.5 percent) of households that had a negative income shock recovered their income loss within one

[6] Information on the sample design, sample weights and representability can be found in Toth (1994) and Sik and Toth (1993, 1996, 1997).

year. However, 47 percent of Hungarian households had not recovered within five years after a shock.

The time it takes for a household to recover after a decline in income clearly depends on the size of the shock. Among households that experienced a decline in real income of less than 10 percent between 1992 and 1993, 47 percent recovered within the first year after the shock. Among the households that lost more than 30 percent of their income between 1992 and 1993, only 15 percent recovered in the first year, and 73 percent had not recovered after five years.

These calculations might be interpreted as indicating that two types of income dynamics exist amongst Hungarian families. For the first type, an initial income shock leads to only a temporary drop in household income. However, it seems that for almost half of the households in Hungary, the income shock was more devastating, and appears to have put them on a declining income path leading to chronic poverty.

That interpretation is questionable however. There are other ways one might explain Table 1. Possibly the households that had not recovered within five years experienced other shocks in the intervening period. Or possibly the first shock was not transient, and lasted for many years. Or the shock may have been transient, but the recursion process is linear with a slow speed of adjustment due to sizable lagged effects of past incomes on current incomes. One cannot conclude from Table 1 that the answer to the question in our title is "yes."

It is instructive to examine some graphs of the relationship between income changes and initial incomes. Figure 2 shows a smoothed plot (a Lowess running-line smoother) based on the pooled sample of observations for all six years of the survey. On the vertical axis we graph the difference between current and last-year's income. The horizontal axis gives last-year's income.

The intersections with the horizontal axis represent equilibria at mean values of all other factors influencing incomes. There is only one stable equilibrium Y^* in the positive quadrant. For all households that had last-year's income less than Y^*, the difference $Y_{(t)} - Y_{(t-1)}$ is positive. Over time, the income of such households will increase until it reaches Y^*. Households with income in the previous year greater than Y^* will experience a decline in income over time, and their income will stabilize at Y^*.

These are means. More generally, each household has its own stable equilibrium income Y^*. This is a function of household characteristics. The time it takes for the household to reach its equilibrium state depends on the size of the income shock, the level of pre-shock income, and the characteristics of the household.

We repeat Figure 2 for various household types. Figure 3 shows a non-parametric estimation of income dynamics for male and female headed households. While income trajectories for these two types of households look similar, the point of a stable equilibrium for the households headed by females is associated with the lower level of household income.

Figure 4 presents a non-parametric estimation of income dynamics stratified by the educational level of the household head. Again, there is only one point of stable equilibrium in the positive quadrant of $(Y_{(t)}, Y_{(t-1)})$ space for all three types of households. The equilibrium level of income almost coincides with the median income for households whose head has only a high-school level of education. For such households, one would expect to observe both downward and upward income mobility. For households with higher levels of education, the equilibrium levels of income exceed the median incomes, and this difference is larger for the households where the

head holds a university degree. More than half of these households experience upward income mobility in the absence of income shocks.

5. Econometric model

To further investigate household income trajectories with a broader set of controls, and to allow for attrition, we use an econometric model. Total household income $Y_{(t)}$ at time t is assumed to be a smooth, nonlinear function $f(Y_{(t-1)}, X_t)$ of income $Y_{(t-1)}$ at time t-1 and the set of household characteristics (X_t), both permanent and time-variant, at period t. The simplest form of the nonlinear relationship between $Y_{(t)}$ and $Y_{(t-1)}$ that can allow two equilibria in a positive quadrant, as a general case, is a third-degree polynomial. That is what we assume.

Numerous consistent estimators for dynamic panel data models have been proposed in the literature, including IV type estimators (Balestra and Nerlove, 1966; Sevestre and Trognon, 1992; Anderson and Hsiao, 1982), FIML estimators (Bhargava and Sargan, 1983), and GMM estimators (Arellano and Bond, 1991; Arellano and Bover, 1995). However, none of these methods controls for panel attrition. We estimate a dynamic panel data model of income dynamics with a control for panel attrition bias, treating lagged income as endogenous.

The system of equations for the six-year (1992-1997) panel of Hungarian data consists of five simultaneous equations of income dynamics for the years after the first, namely:

$$Y_{i(t)} = \gamma_0 + \sum_{m=1}^{3} \alpha_m Y_{i(t-1)}^m + X_{i(t)}\beta + \varepsilon_{i(t)} \quad (t = 1,\ldots,5) \tag{1}$$

where Y_{it} is the total income of household I in year t, $Y_{i(t-1)}$ is total income of household I in year t-1, X_t is a vector of exogenous variables, and the α's and β's are unknown parameters. The error

terms are allowed to be serially dependent and correlated with lagged incomes. Following Bhargava and Sargan (1983), we also have an instrumenting equation that determines initial income (1992) as a function of the exogenous variables for all six years of the survey:

$$Y_{i0} = \xi_0 + \sum_{k=0}^{6} X_{k(i)} b_k + \varepsilon_{i0}, \tag{2}$$

where the b_k's are the vectors of coefficients on all exogenous variables.

To control for attrition bias, we estimate equations (1-2) simultaneously with the equation that determines whether the households that were selected in the sample in the first wave of the survey stayed in the panel until the end. The equation that controls for attrition has the form:

$$\begin{aligned} Z_i &= X_{1i}\pi + \vartheta_i \qquad & D_i &= 1 \ if \ Z_i > 0 \\ & & D_i &= 0 \ otherwise \\ \Pr(D_i = 1) &= \Pr(\vartheta_i > -X_{1i}\pi) = \Psi(X_{1i}\pi) & & \end{aligned} \tag{3}$$

where Z_i is a continuous latent variable that determines whether the household was in the sample in rounds 1 through 6, D_i is an indicator variable that has value 1 if the household stayed in the sample all six years and has the value 0 otherwise, X_{1i} is the vector of explanatory variables from the first wave of the data, and Ψ is the cumulative normal distribution function.

To estimate the system of simultaneous equations (1)-(3) we use a Semi-Parametric Full Information Maximum Likelihood method (Heckman and Singer, 1984; Mroz and Guilkey, 1992; Mroz, 1999). The Appendix describes the estimation method in detail.

The set of exogenous variables includes: household size, number of children younger than seven years old, number of children 7-16 years of age, number of elderly people in the household, type of locality where the household resides, gender and educational level of the

household head, and some household asset indicators. Endogenous variables consist of the polynomial of lagged income. Values of the exogenous and endogenous variables are normalized to be in the [0,1] range.

For comparison, we also estimate (1)-(2) without the correction for attrition. The econometric specification is then a simplification of the model described above (see Appendix).

6. Results

Our estimates of equation (1) are shown in Table 2. Household composition, characteristics of the locality, and individual characteristics of the household members affect the total income. The estimated parameters on the X variables have the signs one would expect. Larger families tend to have higher incomes, households with children are significantly poorer than households with no children, households from Budapest are better off than households in other rural and urban areas of Hungary. Households in which the head has a university degree have higher incomes, families with access to land and households that own a car are better off. The presence of people aged 60-69 has a negative impact on the level of total household income.

Table 3 gives the equation for attrition. There some significant demographic, life-cycle, and geographic effects. Households with a middle-aged head were less likely to drop out, as were smaller households, and those not living in Budapest. However, the most notable feature is that initial income is not a significant predictor of attrition. We also tried adding squared and cubed terms in initial income, but these were individually and jointly insignificant.

We also tested whether negative income shocks lead to households dropping out of the panel. To test this we used the second year as the base, namely 1993, and added a variable for

the change in income between 1992 and 1993. The coefficient on this variable was allowed to vary according to whether income increased or decreased between 1992 and 1993. There was no significant effect of an income change in either direction on the probability of staying in the panel; for an income decline, the z-score was 0.27, while for an income increase it was 1.77, which is not significant at the 5 percent level (though it does make it at the 8 percent level).

Turning now to the income dynamics, Figure 5 gives the simulated recursion diagram with all exogenous variables set at mean points.[7] Given the values of the estimated coefficients, the cubic polynomial equation has three real roots.[8] However, we find that in the positive quadrant there is only one point of equilibrium. This equilibrium is stable.

The income paths are different for households with different characteristics. Figure 6 presents the simulated income dynamics for the households categorized by educational level of the head, interacted with whether the household lives in Budapest or not. For each household category there is only one point of stable equilibrium in the positive quadrant. (This was true for other combinations of characteristics.) The equilibrium level of income for the households where the head holds a university degree and lives in Budapest is the highest. It is almost five times higher than the income level of households for which the head has no more than a high school diploma and does not live in Budapest.

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[7] The variables are scaled to be between 0 and 1 to minimize the likelihood of overflow and underflow and to improve convergence properties of the optimization algorithm (see for example Judd, 1998).

[8] Define $q = \frac{1}{3}\beta - \frac{1}{9}\alpha^2$; $r = \frac{1}{6}(\alpha\beta - 3\gamma) - \frac{1}{27}\alpha^2$ where $Z + \alpha Z^2 + \beta Z + \gamma = 0$. Then, if $q^3+r^2>0$ there will be one real root and two complex conjugate roots, if $q^3+r^2>0$ all roots are equal and at least two will be equal, and $q^3+r^2<0$ the equation will have three real roots.

Would there have been a low-level, unstable equilibrium without the safety net? We repeated this set of calculations setting all government transfers to zero. This ignores behavioral responses to the safety net, though if anything one would expect that they would make it even less likely that there is a nonconvexity at low levels, because pre-intervention incomes will probably not be as low as simply subtracting transfers would suggest. Again, only one root was found in the range of the data.

7. Conclusions

Economic theory offers little support for the common assumption of linear income dynamics, whereby households bounce back in time from a transient shock. Indeed, one can readily construct theoretical models that exhibit nonlinear income dynamics, with low-level nonconvexities, such that a short-lived shock can have lasting consequences. Whether this exists in reality, and so might explain the seemingly persistent poverty that has emerged in many transition economies, is an open empirical question.

We have offered what we believe to be the first test, using panel data for Hungary in the 1990s. While we do find evidence of nonlinearity in the dynamics of household incomes, we find no evidence in these data of nonconvexities. The data are not consistent with the existence of an unstable equilibrium, such that short-lived negative shocks of sufficient size create persistent poverty. In general, households bounce back from transient shocks. The indications of chronic poverty emerging in the wake of income shocks do not, as a rule, reflect existence of a low-level, unstable equilibrium. Rather, it appears to result from more persistent income declines.

Appendix: SPFIML estimation of equations (1)-(3)

Let the error terms of equations (1)-(3) have the form:

$$\varepsilon_{i(t)} = \mu_{i(t)} + \sum_{l=1}^{4} \rho_{(1t)} v^{l}_{(1i)} + \rho_{(2i)} v_{(2i)} \qquad (4.1)$$

$$\vartheta_i = \lambda_i + \rho_{(2i)} v_{(2i)} \qquad (4.2)$$

where $\mu_{i(t)}$ is a normal IID random variable, $v^{m}_{(1i)}$ are components (common factors) of the error term, which are uncorrelated with the observed exogenous variables of the model and uncorrelated with $\mu_{i(t)}$ but can be correlated with the lagged incomes in equations (1-2), and $v_{(2i)}$ is a common factor that is responsible for the correlation between $\epsilon_{(it)}$ and ϑ_i. We introduce five-factor specification to be able to approximate an unrestricted error structure for equations (1)-(3)[9]. Conditional on the value taken by the factors v_1 and v_2, the joint distribution of $\epsilon_{(0)},\ldots,\epsilon_{(5)}$ and ϑ can be written as:

$$f(\varepsilon_{(0)},\ldots,\varepsilon_{(5)},\vartheta \mid v_1^1 \ldots v_1^4, v_2) = \Psi\left(\vartheta - \rho_2 v_2\right) \cdot \prod_{m=0}^{5} \frac{1}{\sigma_m} \varphi\left(\frac{\varepsilon_{(m)} - \sum_{k=1}^{K} \rho_1^k v_1^k - \rho_2 v_2}{\sigma_m} \right) \qquad (5)$$

where σ_m's are square roots of the variances of the error terms in equation (2) and ϕ is the probability density function of a standard normal distribution. If the cumulative distribution functions of v_1's are $F_1(v_1)$'s and the cumulative distribution function of v_2 is $F_2(v_2)$, then the unconditional distribution of $\epsilon_{(0)},\ldots,\epsilon_{(5)}$ and ϑ is:

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[9] For a discussion of the choice of the optimal number of factors, see Anderson and Rubin (1956).

$$f(\varepsilon_{(0)},\ldots,\varepsilon_{(5)},\vartheta)=\int\int\int\int\int f(\varepsilon_{(0)},\ldots,\varepsilon_{(5)},\vartheta|\,v_1^1\ldots v_1^4,v_2)\,dF_1^1(v_1^1)\ldots dF_1^4(v_1^4)\,dF_1(v_2) \qquad (6)$$

The cumulative distributions of the common factors v_1 and v_2 can be approximated by a step function. Suppose that the distributions of v_1 and v_2 are given by:

$$\Pr(v_1^k=\eta_l)=p_l\geq 0;\ \sum_{l=1}^{L}p_l=1\ \ (l=1,\ldots,L;\ k=1,\ldots 4) \qquad (7.1)$$

$$\Pr(v_2=\gamma_l)=\pi_l\geq 0;\sum_{l=1}^{L}\pi_l=1(l=1,\ldots,L) \qquad (7.2)$$

where η_k and γ_l are points of support of the approximated distributions, and k and l are the numbers of points of support. Then the unconditional distribution functions become:

$$f(\varepsilon_{(0)},\ldots,\varepsilon_{(5)},\vartheta)=\sum_{l=1}^{L}\pi_l\sum_{a=1}^{A}p_a\sum_{b=1}^{B}p_b\sum_{c=1}^{C}p_c\sum_{d=1}^{D}p_d\left[\frac{1}{\sigma_d}\psi\left(\frac{\vartheta-\rho_2\gamma_l}{\sigma_d}\right)\cdot\prod_{m=0}^{5}\frac{1}{\sigma_m}\varphi\left(\frac{\varepsilon_{(m)}-\rho_{1m}^1\eta_a-\rho_{1m}^2\eta_b-\rho_{1m}^3\eta_c-\rho_{1m}^4\eta_d-\rho_2\gamma_l}{\sigma_m}\right)\right] \qquad (8)$$

and the corresponding log-likelihood function for the system of simultaneous equations is:

$$\Im=\sum_{i=1}^{N}\ln\left(\sum_{l=1}^{L}\pi_l\sum_{a=1}^{A}p_a\sum_{b=1}^{B}p_b\sum_{c=1}^{C}p_c\sum_{d=1}^{D}p_d\left[\frac{1}{\sigma_d}\psi\left(\frac{\vartheta-\rho_2\gamma_l}{\sigma_d}\right)\cdot\prod_{m=0}^{5}\frac{1}{\sigma_m}\varphi\left(\frac{\varepsilon_{(m)}-\rho_{1m}^1\eta_a-\rho_{1m}^2\eta_b-\rho_{1m}^3\eta_c-\rho_{1m}^4\eta_d-\rho_2\gamma_l}{\sigma_m}\right)\right]\right) \qquad (9)$$

Choosing a priory a number of points of support, the log-likelihood is maximized w.r.t. the α's, β's, p's, ρ's, and v's. For identification, the two points of support of both factors are normalized to equal 0 and 1. The number of points of support is increased until the difference in the log-likelihoods of consequent maximization satisfies the convergence criteria. Standard errors for the estimated coefficients can be calculated by inverting the Hessian matrix of the second derivatives of the log-likelihood function $\Im$.

In estimating (1)-(2) without the correction for attrition (for comparison purposes), the econometric specification is then a simplification of the model developed above such that only one common factor, v_1,is used for the approximation of the joint distribution of $\epsilon_{(0)},\ldots,\epsilon_{(5)}$.

The following functional forms were assumed in estimating the probability weights and the points of support:

$$\pi_{mn} = \frac{\exp(b_{mn})}{1 + \sum_{1}^{N-1} \exp(b_{mn})} \quad n = 1, \ldots, N-1; \;\; m = 1,2 \qquad \pi_{mN} = \frac{1}{1 + \sum_{1}^{N-1} \exp(b_{mn})}$$

$$v_{mn} = \frac{\exp(a_{mn})}{1 + \exp(a_{mn})} \quad n = 2, \ldots, N-1; \;\; m = 1,2 \qquad v_{m1} = 0; \;\; v_{mN} = 1$$

where a_{mn} and b_{mn} are the actual parameters estimates by the optimization routine.

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Table 1: Recovery times after a negative income shock

Recovery time	Any shock	Small shock[1]	Medium shock[2]	Large shock[3]
	Percentage of households			
1 year	37.8	46.7	37.0	16.7
2 years	8.5	10.2	5.5	5.1
3 years	3.3	3.6	3.5	1.9
4 years	3.1	4.1	3.5	3.2
Not recovered after 5 years	47.3	35.5	50.5	73.1
Total	100.0	100.0	100.0	100.0

[1] Small shock: 10 percent or lower decline in total household income
[2] Medium shock: 10-30 percent decline in total household income
[3] Large shock: 30 percent or larger decline in total household income

Table 2: SPFIML estimate of the household income equation

	Estimation without the correction for attrition bias		Estimation with the correction for attrition bias	
	Coefficients	Std. Error	Coefficients	Std. Error
Previous income coefficients				
Constant	0.015	*0.707*	0.052	*3.421*
$Y_{(t-1)}$	0.569***	*0.041*	0.806***	*0.051*
$Y^2_{(t-1)}$	0.033*	*0.022*	0.234***	*0.019*
$Y^3_{(t-1)}$	-0.014***	*0.003*	-0.016***	*0.003*
Household size	0.963***	*0.061*	1.101	*0.082*
Number of males 60+	-0.045	*0.073*	-0.143*	*0.061*
Number of females 55+	-0.262*	*0.119*	-0.209*	*0.150*
Number of small children	-0.478***	*0.074*	-0.572***	*0.080*
Number of big children	-0.441***	*0.068*	-0.510***	*0.043*
Single parent household	0.009	*0.025*	0.017	*0.025*
Other types of households	*Reference*			
Type of locality				
Budapest	*Reference*			
Other urban	-0.087***	*0.012*	-0.102***	*0.008*
Rural	-0.102***	*0.013*	-0.243***	*0.010*
Education of household head				
Highschool	-0.096***	*0.015*	-0.095***	*0.022*
Technical/Vocational	-0.077***	*0.014*	-0.090***	*0.022*
University degree	*Reference*			
Gender of household head				
Male	0.001	*0.016*	-0.001	*0.022*
Female	*Reference*			
Age of household head				
Age	0.481**	*0.160*	0.232	*0.209*
Age squared	-0.451**	*0.151*	-0.201	*0.200*
Own land	0.042**	*0.013*	0.044***	*0.020*

Note: * is significant at 10% level; ** at 5% level; *** at 1% level.

Table 3: Probability of panel attrition

	Coefficients	Std. Error
Constant	-2.153***	0.333
Total household income in 1992	-0.018	0.022
Household size	-0.085**	0.033
Number of males 60+	0.124**	0.050
Number of females 60+	0.128	0.092
Number of small children	0.209***	0.044
Number of big children	0.021	0.038
Single parent household	0.178	0.148
Other types of households	*Reference*	
Type of locality		
Budapest	*Reference*	
Other urban	0.255***	0.066
Rural	0.299***	0.073
Education of household head		
Highschool	-0.081	0.071
Technical/Vocational	-0.080	0.072
University degree	*Reference*	
Gender of household head		
Male	0.100	0.100
Female	*Reference*	
Age of household head		
Age	0.07***	0.010
Age_2/100	-0.06***	0.01
Own land	0.15**	0.08

Number of observations = 2356
LR $\chi^2(15)$ = 88.75 Prob > χ^2 = 0.0000
Log likelihood = -1515.032 Pseudo R^2 = 0.0285

Note: * is significant at 10% level; ** at 5% level; *** at 1% level.

Figure 1: Income dynamics with a nonconvexity at low income

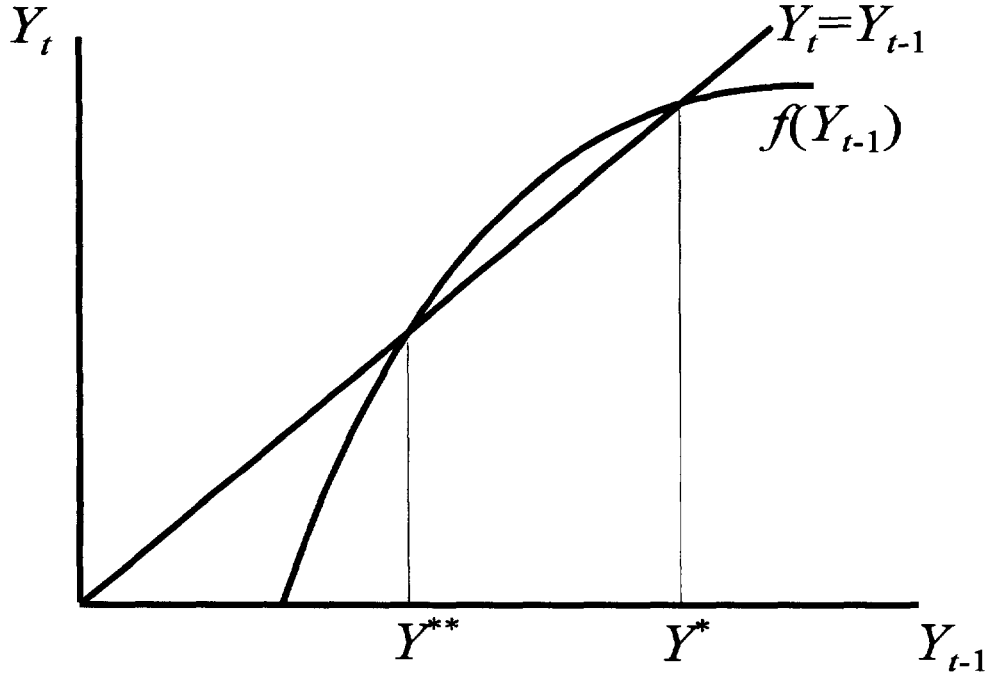


Figure 2: Non-parametric estimation of income dynamics in Hungary

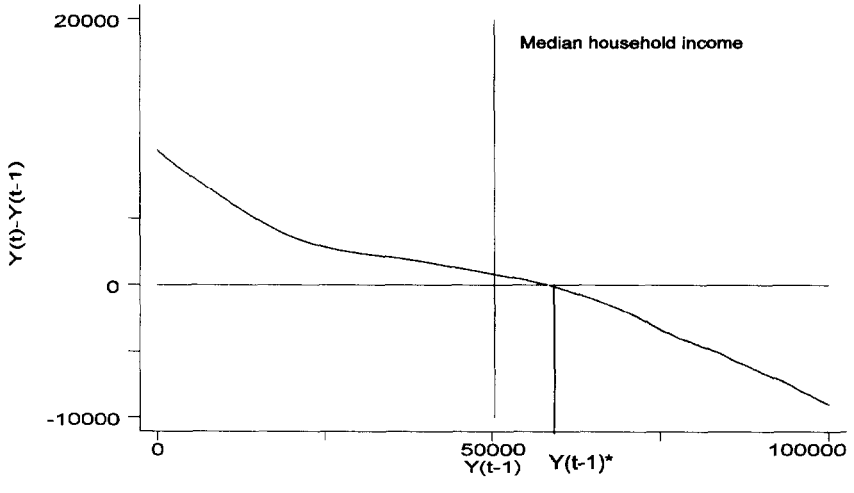


Figure 3: Non-parametric estimation of income dynamics by the gender of the household head

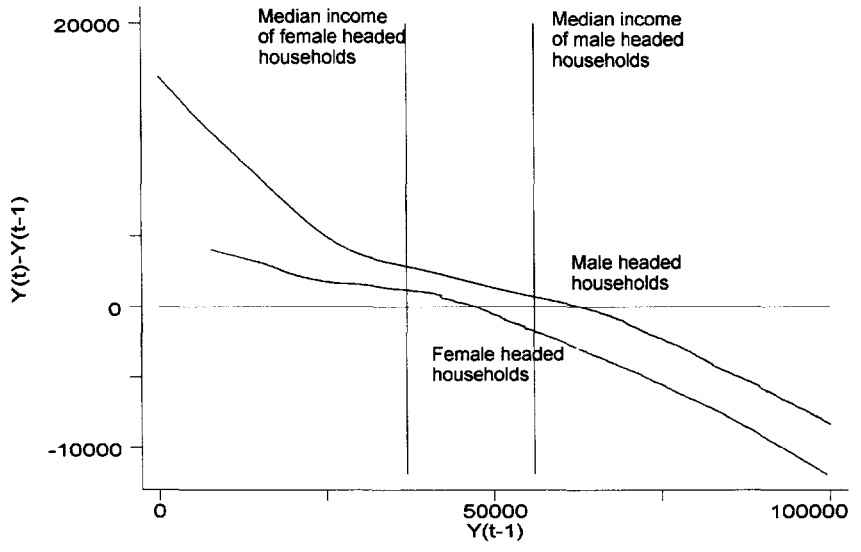


Figure 4: Non-parametric estimation of income dynamics by the education level of the household head

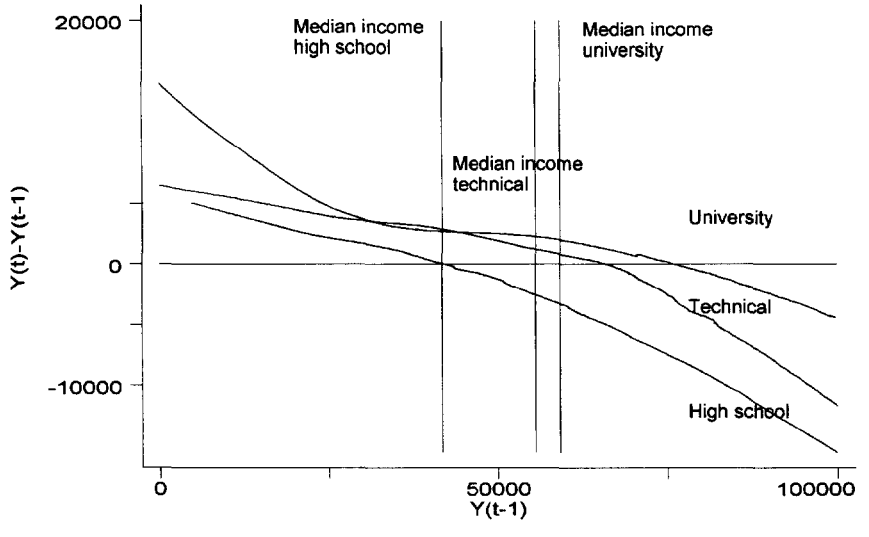


Figure 5: Income dynamics at mean household characteristics

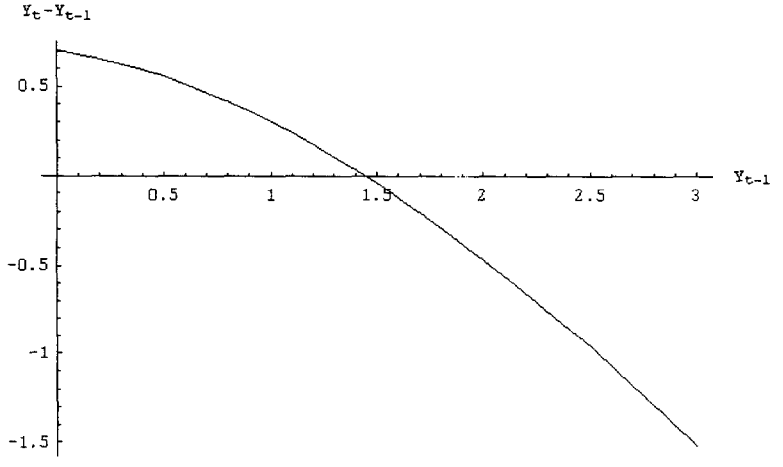
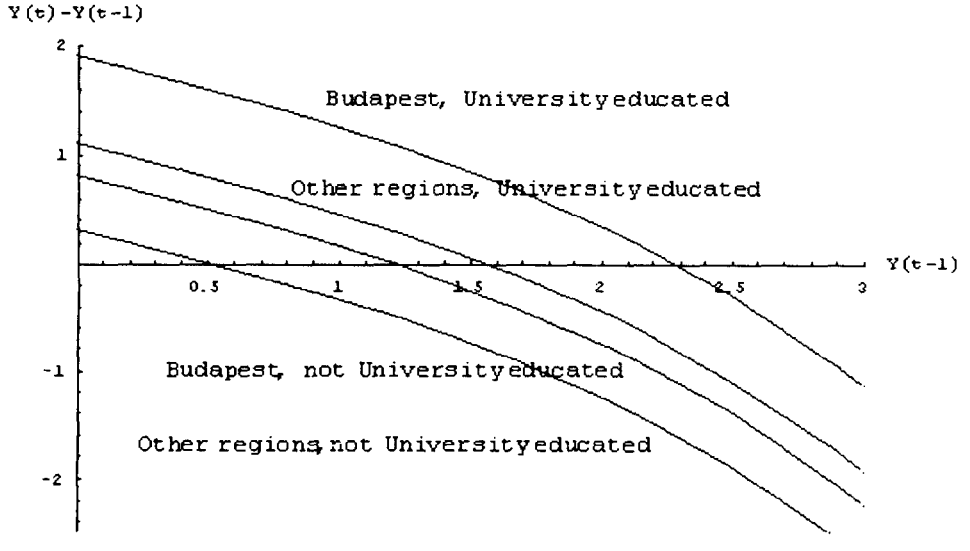


Figure 6: Income dynamics for households with different levels of education and in Budapest versus other regions



Inequality and Poverty Dynamics in Transition Economies: Disentangling Real Events from Noisy Data

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Abstract

This paper examines the inequality and poverty dynamics in transition countries using panel data for Russia and Poland in the mid-1990s. The paper presents three main findings. First, accounting for noise in the data substantially reduces inequality measures. Since this reduction is most pronounced in Russia, underlying inequality in these two countries is more similar than the uncorrected inequality measures would suggest. Second, individuals in both countries face much economic insecurity – the median absolute annual change in income or expenditure is around 50% in Russia and around 20% in Poland. However, around half of these fluctuations reflect measurement error or transitory shocks. Hence, underlying income or expenditure levels are much more stable. Third, the apparent high levels of economic mobility are largely driven by transitory events and noisy data. After accounting for transitory shocks, around 80% of the poor in Russia and Poland remain in poverty for at least one year.

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1. Introduction

The transition from centrally planned economies to market economies has proven to be a difficult process that has profoundly affected the lives of many. Communism proclaimed to strive for egalitarian income distribution, and the available data indeed indicates that the income distributions in the communist countries were among the most equal in the world (Milanovic, 1998). During the transition, inequality and poverty rates have risen, but the increases have been more dramatic in some transition countries than others (Milanovic, 1998; Rutkowski, 1998, Commander et al. 1999; Keane and Prasad 1999).

Some have argued that the process of transition leads to short-term economic dislocations that are inherent to the restructuring of the economy. This has lead to the belief that poverty is shallow, and that while many individuals might experience a short poverty spell, few face chronic poverty. There are important differences for a country facing mostly transitory poverty (many people experiencing short poverty spells) than for a country facing mostly persistent poverty (a few experiencing long poverty spells). First, life-time inequality is lower in an economy where most poverty is transitory, which may make the inequality at a given point in time more socially acceptable. Second, these two types of poverty call for different policies. Transitory poverty can be alleviated by mechanisms that help families smooth their consumption over time, such as formal or informal insurance or loans. The long-run policy response to persistent poverty is to improve the capacity of the poor to earn income, for example through schooling or by increasing opportunities for the poor in the economy (Lipton and Ravallion, 1995). In the shorter run, persistent poverty can be alleviated through social transfers. Given these important differences between persistent and transitory poverty, empirical evidence on the nature of poverty in transition economies will help inform the policy response.

This paper uses micro data to look at the persistence of income, expenditure and poverty. Because only a few of the countries in the Europe and Central Asia region have the required household panel data, the empirical analysis of this paper will focus mainly on Russia and Poland. We believe that the findings for Russia are likely to be relevant for other countries in the Former Soviet Union while the findings for Poland are probably relevant for other Central and Eastern European countries.[1]

[1] We performed the same calculations for Hungary 1994-1997 (not reported), and those findings are indeed qualitatively similar to the findings for Poland.

While we are interested in the material well-being of individuals, survey data provides their measured expenditure in a month, their measured income in a month and their subjective assessment of living conditions. As is well known, each of these variables is only an imperfect measure of the true, underlying, material well-being of an individual. First, these variables may reflect transitory events – a bonus, the purchase of a consumer durable – that actually happened but that have only little impact on the underlying material well-being of the individual. Suppose a family buys clothing twice a year, and that only during those months its expenditure exceeds the poverty line. Would we want to claim that this family escapes poverty twice a year for one month? Similarly, expenditure on food might rise above the poverty threshold for a month, for example because of a celebration. Does this mean the family escaped poverty for a month? Second, they are subject to measurement error – for example, respondents may forget certain expenditures or income components or include ones that should be excluded; errors may occur in data entry; or the equivalence scale does not capture the true economies of scale for this household. While in many applications random error in the measurement of material well-being will average out in a large sample (e.g. when calculating means), this is not the case when estimating inequality or poverty transitions. As Baulch and Hoddinott (2000) phrase it, ".. some of the observed movements in and out of poverty will be a statistical artifact." Measurement error tends to become especially pernicious when examining changes (Deaton 1997). In other words, measurement error has the potential to hugely overstate the variation in income or expenditure movements, falsely showing many movements in and out of poverty.

This paper uses three methods to adjust estimates of inequality and mobility for the effects of transitory shocks and measurement error. First, this paper distinguishes between persistent shocks to income or consumption and transitory ones (Friedman, 1957). For this purpose, persistent shocks are ones that remain for at least one year, while transitory ones die out within a year. Since many of the transitory shocks are likely to reflect measurement error or to have relatively small effects on one's underlying material well-being (compared to persistent shocks), it is interesting to consider the inequality and poverty dynamics after income or consumption has been purged of these transitory shocks.[2] Second, we try to estimate the variance of measurement error by using instrumental variables. With these estimates of the importance of

[2] To be sure, transitory shocks can have profound effects on welfare too, especially when families lack formal or informal mechanisms to smooth consumption. In general, however, transitory shocks have less profound effects than permanent ones.

measurement error, one can then estimate the inequality in underlying material well-being. Finally, we time-average income or consumption for families. By taking an average over a period of time, measurement error and transitory shocks will be partially averaged out (Shorrocks, 1978). This too, allows us to get a better estimate of underlying inequality.

The paper presents three main findings. First, accounting for noise in the data substantially reduces inequality measures. Since this reduction is most pronounced in Russia, underlying inequality in these two countries is more similar than the uncorrected inequality measures would suggest. Second, individuals in both countries face much economic insecurity – the median absolute annual change in income or expenditure is around 50% in Russia and around 20% in Poland. However, around half of these fluctuations reflect measurement error or transitory shocks. Hence, underlying income or expenditure levels are much more stable. Third, the apparent high levels of economic mobility are largely driven by transitory events and noisy data. After accounting for transitory shocks, around 80% of the poor in Russia and Poland remain in poverty for at least one year. Demographic characteristics cannot predict very well who of the underlying poor will escape poverty.

2. A Fashion Metaphor

Perhaps the following metaphor can illustrate the distinction between underlying well-being and transitory effects on well-being. Imagine that everyone has a wardrobe with seven outfits and we are interested in "fashion" inequality. In the morning, individuals would randomly choose an item from their wardrobe. On a given day, we go out and (perfectly) measure the inequality in the quality of clothes that people are wearing that day. The inequality could result from two sources. It could reflect underlying inequality – some people have wardrobes with only nice clothes while others have wardrobes with only old worn-out clothes. Alternatively, the measured inequality could reflect idiosyncrasies of individuals' choices of what to wear that particular day – everybody might have exactly the same wardrobe at home, but some happen to wear a fancy suit that day while others selected their ragged jeans. In practice, we would expect the fashion inequality we found that day to partly reflect underlying inequality and to partly reflect idiosyncratic events of that day. The methodology section explains in detail how these two sources of inequality can be distinguished empirically.

In the metaphor above, we assumed perfect measurement with regard to the quality of people's clothes. In practice, however, the interviewers who rate the quality of clothes may make

errors. The interviewers may make mistakes recording the ratings or may have different or changing tastes. Hence, two people wearing exactly the same outfit may get different fashion ratings, or the same person wearing the same outfit on two different days might get two different ratings. Assume that the interviewers do not make systematic mistakes and that their mistakes are unrelated over time (alternatively, in each period, a person's fashion quality gets rated by a randomly chosen interviewer). In this case, the mistakes will lead to an overestimate of the true amount of inequality. Even if everyone had exactly the same wardrobe, we would still find measured equality because of the variation in the interviewers' ratings.

Suppose we find someone who got a good fashion rating today but had always received poor fashion ratings previously. What happened? Three things could have happened. First, this person could have upgraded his wardrobe. This would correspond to a true increase in underlying well-being. Second, the wardrobe remained the same, but the individual happened to wear a particularly nice outfit today. This would correspond to a transitory shock. Third, the individual wore the same clothes today as he had always worn, but the interviewer happened to be in a good mood and gave him an extraordinarily nice rating. How can we distinguish these three events?

First, by looking at future ratings, it is possible to distinguish between a change in underlying well-being (the quality of the wardrobe) on the one hand, and transitory events and measurement error on the other hand. If the wardrobe had been upgraded, we would expect future ratings on average to be as nice as today's. However, if today's nice rating was caused by an idiosyncrasy or measurement error, we would expect future ratings to revert to the old, lower levels. Hence, both transitory events and measurement error would show up as many movements up and down the fashion hierarchy but all these movements would tend to be undone in the next period. This intuition underlies the procedure that distinguishes persistent and transitory shocks. This procedure is presented formally in the next section.

Second, one might obtain three independent measures of the quality of a person's outfit; for example the outfit's price, age and the interviewer's rating. If there were no measurement error, all three measures would always move in the same direction. We can then find the measurement error in one measure by seeing how often that measure moves in a different direction than the other two. Once we know the amount of measurement error in the interviewer's ratings, we can calculate the likelihood that an increase in the ratings was due to the

person wearing a nicer outfit. One can interpret two of the measures of fashion quality as instruments for the third measure. This instrumental variables procedure is developed formally in the next section.

3. Data and Methodology

Data

The data for Russia come from the Russian Longitudinal Monitoring Survey (RLMS), which is a nationally-representative socioeconomic survey of the Russian Federation. We use the panel component of waves 5 through 8 which were fielded in the fall of 1994, 1995, 1996 and 1998. This yields a sample of 7,382 individuals in 2,256 households with complete demographic, income and expenditure information. More details about this dataset can be found on the website of the University of North Carolina at Chapel Hill (www.cpc.unc/projects/rlms/project.html) and in Lokshin and Popkin, 1998.

The Polish data consists of the 1993-1996 panel component of the Household Budget Survey conducted by the Polish Central Statistical Office. The survey is fielded throughout the year. We used a balanced panel with 16,552 individuals in 4,919 households with complete demographic, income and expenditure information. More details of this dataset can be found in Okrasa (1999a,b).

Non-random attrition is a potentially serious problem. The University of North Carolina's website and Okrasa (1999a) analyze attrition in each of the data sets. They find that households with better economic positions and households in urban areas are more likely to drop out of the sample. It is hard to infer whether and how this pattern of attrition affects the results.

The main measures of economic well being used in this paper are the logarithm of monthly consumption expenditure and the logarithm of monthly income. Both measures are adjusted for household size using an equivalence scale.[3] The analysis below is performed on the whole sample as well as on subsamples conditioned on demographic characteristics. For the measurement of shocks, we take the second period of the 4 period panel as the base period. Hence, the base period is the fall of 1995 in Russia and 1994 in Poland. Unless otherwise noted, demographic characteristics are measured in the base period.

A Model of Income and Expenditure Dynamics

Atkinson, Bourguignon and Morrisson (1992) and Birdsall and Graham (2000) provide excellent overviews of the multitude of techniques used to examine mobility and their interpretations. Many popular mobility measures, such as transition matrices, compare mobility across two periods in time. Empirical examinations of mobility, however, reveal that current income movements tend to be related to past movements; in other words, the mobility process is not first-order Markov (Shorrocks, 1976). For example, a positive transitory shock first generates upward mobility followed immediately by downward mobility. In order to distinguish between movements that persist and those that are undone in the following period, we first estimate a simple model of the income or expenditure process. Next, we use this model to calculate traditional mobility measures on the underlying component, which is the component after transitory shocks have been removed.

A random walk plus noise is a simple and popular way of characterizing an expenditure of income pattern that recognizes both transitory and persistent shocks (Friedman, 1957, or Gottschalk and Moffitt, 1993). The model is phrased in terms of log consumption expenditure but it is also applied to log income. Log consumption expenditure of individual i in period t, C_{it}, consists of an underlying level, C_{it}^*, and a transitory shock (possibly including measurement error), ε_{it}:

(1) $$C_{it} = C_{it}^* + \varepsilon_{it}$$

Conditional on the underlying level of consumption, the transitory shocks, ε_{it}, have mean zero and variance $\sigma^2_{\varepsilon,t}$. Because transition economies are undergoing a process of structural change, the variance of the shocks is allowed to vary over time. The ε-shocks are transitory in the sense that they will die out within one period. This means they must be uncorrelated with past shocks:

(2) $$E[\varepsilon_{it}, \varepsilon_{i,t-j}] = 0 \quad \text{for } j \neq 0$$

[3] We use an equivalence parameter θ of 0.75, i.e., equivalent size = (number of household members)^{75}.

The underlying component of consumption evolves subject to a common trend, α_t , and a persistent shock, η_{it}:

(3) $C_{it}^* = C_{i,t-1}^* + \alpha_t + \eta_{it}$

The trend, α_t, may vary over time but is the same for all individuals. The persistent shocks, η_{it}, have an unconditional mean of zero and variance of $\sigma^2_{\eta,t}$. They are persistent in the sense that they persist for at least 2 periods. This means that they must be uncorrelated with last period's persistent shocks:

(4) $E[\eta_{it}, \eta_{it-1}] = 0$

They must also be uncorrelated with the temporary shocks:

(5) $E[\eta_{it}, \varepsilon_{i,t-j}] = 0$ for all j

The underlying component of consumption reflects past persistent shocks. Since we allow mean reversion of persistent shocks over periods beyond 2 years, persistent shocks may be correlated with underlying consumption.

Estimation

The model is estimated on a four period panel using the methods of moments. The moment conditions for the variances of the transitory shocks are identified only for the second and third period. To derive them, it is useful to first take first differences of log consumption expenditure:

(6) $\Delta C_{it} \equiv C_{it} - C_{i,t-1} = \alpha_t + \eta_{it} + \varepsilon_{it} - \varepsilon_{i,t-1}$

Since all shocks have mean zero, the expectation of ΔC_{it} equals α_t. Hence, the covariance between two consecutive first differences is:

(7) $Cov[\Delta C_{i,t+1}, \Delta C_{i,t}] = E[(\eta_{i,t+1} + \varepsilon_{i,t+1} - \varepsilon_{i,t})(\eta_{it} + \varepsilon_{it} - \varepsilon_{i,t-1})] = E[-\varepsilon^2_{it}] = -\sigma^2_{\varepsilon,t}$,

where the second equal sign makes use of restrictions (2), (4), and (5) above. The intuition is relatively simple: the only shock that two consecutive first differences have in common is the transitory shock of the period in which the first differences overlap.

In a four period panel, only the permanent shock that occurs between periods 2 and 3 is identified. Again the moment condition involves a covariance of 2 first differences:

$$(8) \qquad Cov[(C_{i4} - C_{i1}), (C_{i3} - C_{i2})] = E[(\eta_{i4} + \eta_{i3} + \eta_{i2} + \varepsilon_{i4} - \varepsilon_{i1})(\eta_{i3} + \varepsilon_{i3} - \varepsilon_{i2})] = E[\eta^2_3] = \sigma^2_{\eta 3},$$

where the second equal sign makes use of restrictions (2), (4), and (5) above. The intuition is quite straightforward: the permanent shock between periods 3 and 2 is the only thing that the shock between period 4 and 1 and the shock between period 3 and 2 have in common, because they are subject to different transitory shocks (which are uncorrelated).

With estimates of $\sigma^2_{\varepsilon 2}$, $\sigma^2_{\varepsilon 3}$ and $\sigma^2_{\eta 3}$, the other main parameters can be estimated easily. The variance of underlying consumption in periods 2 and 3 is:

$$(9) \qquad Var[C_{i2}^*] \equiv \sigma^2_{C2*} = \sigma^2_{C2} - \sigma^2_{\varepsilon 2}$$

$$(10) \qquad Var[C_{i3}^*] \equiv \sigma^2_{C3*} = \sigma^2_{C3} - \sigma^2_{\varepsilon 3}$$

where the variance of C_{it} is by σ^2_{Ct}. The correlation between the persistent shock, η_3, and the underlying level of consumption, C_{i2}^*, is:

$$(11) \qquad \rho = (\sigma^2_{C3*} - \sigma^2_{C2*} - \sigma^2_{\eta 3})/(2\, \sigma_{\eta 3}\, \sigma_{C2*})$$

Finally, the mean C_{it} is denoted by μ_{Ct}. All standard error are computed by bootstrapping the sample 100 times.

Table 1 contains the estimates of this model for log consumption and log income in Russia and Poland. These parameter estimates will be used in the next section to simulate the model. The main substantive findings will be discussed in later sections using the simulations. Nevertheless, Table 1 gives a nice preview of the findings. First, the variance of log consumption or income is

about 3 to 4 times higher in Russia than in Poland, indicating a more unequal distribution in Russia. Second, the variance of income and consumption shocks is considerable in both countries, suggesting high levels of economic insecurity. Third, the variance of the transitory shocks ($\sigma^2_{\varepsilon 3}$) is much larger than the variance of persistent shocks ($\sigma^2_{\eta 3}$), indicating that most of the shocks will be undone within 12 months. Because the variance of the transitory shocks is a substantial fraction of the cross-sectional variance, disregarding the transitory component of income or consumption substantially reduce sour estimate of inequality. Disregarding the transitory component may be reasonable since many of the transitory shocks likely reflect measurement error.

Table 1: Parameter Estimates

		Russia 1994-1998				Poland 1993-1998			
Parameter	Symbol	Consumption		Income		Consumption		Income	
Means of logs									
Period 1	μ_{C1}	8.129	(0.018)	7.834	(0.022)	6.231	(0.007)	6.218	(0.008)
Period 2	μ_{C2}	7.940	(0.017)	7.530	(0.024)	6.173	(0.008)	6.210	(0.010)
Period 3	μ_{C3}	7.777	(0.020)	7.325	(0.031)	6.204	(0.007)	6.271	(0.009)
Period 4	μ_{C4}	7.506	(0.020)	7.230	(0.022)	6.240	(0.007)	6.322	(0.010)
Variances of logs									
Period 1	σ^2_{C1}	0.678	(0.038)	0.736	(0.045)	0.227	(0.007)	0.335	(0.016)
Period 2	σ^2_{C2}	0.623	(0.023)	0.970	(0.058)	0.239	(0.007)	0.355	(0.016)
Period 3	σ^2_{C3}	0.769	(0.038)	1.699	(0.090)	0.240	(0.007)	0.338	(0.018)
Period 4	σ^2_{C4}	0.698	(0.029)	1.110	(0.065)	0.248	(0.007)	0.319	(0.014)
Variances of first differences of logs									
Period 2-1	$\sigma^2_{\Delta C2}$	0.678	(0.029)	1.138	(0.072)	0.174	(0.006)	0.321	(0.017)
Period 3-2	$\sigma^2_{\Delta C3}$	0.686	(0.026)	1.801	(0.112)	0.154	(0.006)	0.294	(0.022)
Period 4-3	$\sigma^2_{\Delta C4}$	0.785	(0.033)	1.950	(0.117)	0.161	(0.007)	0.293	(0.023)
Decomposition of shocks									
Var[persistent shock]	$\sigma^2_{\eta 3}$	0.059	(0.022)	0.130	(0.041)	0.022	(0.003)	0.028	(0.013)
Var[transitory shock 2]	$\sigma^2_{\varepsilon 2}$	0.256	(0.022)	0.560	(0.066)	0.065	(0.004)	0.135	(0.012)
Var[transitory shock 3]	$\sigma^2_{\varepsilon 3}$	0.371	(0.025)	1.111	(0.092)	0.067	(0.004)	0.131	(0.019)
Derived estimates									
Var[underlying level 2]	σ^2_{C2*}	0.367	(0.030)	0.409	(0.048)	0.174	(0.005)	0.220	(0.015)
Var[underlying level 3]	σ^2_{C3*}	0.398	(0.031)	0.588	(0.056)	0.172	(0.006)	0.207	(0.015)
Correlation[C^*_2, η_3]	ρ	-0.094	(0.145)	0.106	(0.116)	-0.188	(0.047)	-0.265	(0.126)
Fraction persistent		0.137	(0.047)	0.105	(0.034)	0.244	(0.029)	0.178	(0.075)

Note: All measures are for equivalent adults. The equivalence scale is household size to the power of 0.75 (θ=0.75). Data consist of balanced panels, 1993-1996 for Poland and 1994-1998 for Russia. Fraction persistent is the fraction of the shock between period 2 and 3 that is persistent. This fraction is defined by the ration of the variance of the persistent shock to the variance of the total shock between period 2 and 3.

Simulations

Because the variances of the transitory shocks for the first and last periods are not identified, the paths of persistent and transitory income can only be simulated for periods 2 and 3. While the estimation of the variances of the various shocks did not rely on any distributional assumptions, the simulations assume log normal distributions of shocks, income and expenditure.

The log of persistent consumption for period 2 is simulated by:

$$(12) \qquad \tilde{C}_2^* \sim N(\hat{\mu}_{C_2}, \hat{\sigma}_{C_2}^2 - \hat{\sigma}_{\varepsilon_2}^2)$$

where the tilde indicates a simulated variable and the carets indicate estimated parameters. The transitory shock for period 2 is simulated by:

$$(13) \qquad \tilde{\varepsilon}_2 \sim N(0, \hat{\sigma}_{\varepsilon_2}^2)$$

and used to simulate the log of total period 2 consumption:

$$(14) \qquad \tilde{C}_2 = \tilde{C}_2^* + \tilde{\varepsilon}_2$$

To allow for correlation with the level of persistent consumption, the persistent shock is simulated by:

$$(15) \qquad \tilde{\mu}_2 = \hat{\rho}\frac{\hat{\sigma}_{\eta_3}}{\hat{\sigma}_{C_2^*}}\left(\tilde{C}_2^* - \mu_{C_2^*}\right) + \tilde{\xi}$$

where

$$(16) \qquad \tilde{\xi} \sim N(0, (1-\hat{\rho}^2)\hat{\sigma}_{\eta_3}^2)$$

Persistent consumption in period 3 is found by adding the persistent shock and the time-trend to persistent consumption in the previous period:

(17) $\tilde{C}_3^* = \tilde{C}_2^* + \hat{\alpha}_3 + \tilde{\mu}_3$

where $\hat{\alpha}_3 = \hat{\mu}_{C_3} - \hat{\mu}_{C_2}$. Finally, total consumption is found by adding the transitory shock for period 3:

(18) $\tilde{C}_3 = \tilde{C}_3^* + \tilde{\varepsilon}_3$

where the transitory shock is simulated by:

(19) $\tilde{\varepsilon}_3 \sim N(0, \hat{\sigma}^2_{\varepsilon_3})$

The results of the simulated model are used in the next sections to present the main findings.

Measurement Error and Instruments

Most researchers recognize that measured equivalent consumption expenditure is only a rough proxy for the standard of living of a household. This raises the question of whether the differences in equivalent expenditure reflect true differences in the living standards of households or whether these differences merely reflect inaccuracies of the proxy. In principle, this question can be answered if we can find two instruments (see also McCulloch and Baulch, 2000). These instruments need to be correlated with underlying living standards, but also need to be uncorrelated with the measurement error in measured equivalent expenditure. The intuition is simple: common movements of all three proxies indicate changes in the underlying living standards while the deviations of one proxy from the other two indicates measurement error in this proxy. This information can then be used to calculate movements in the true living standards as well as the amount of measurement error in each of the proxies.

More formally, let the true, but unobserved, living standards of household i be denoted by H_i (say, for happiness). Consumption expenditure, C_i is a noisy proxy for living standards:

(20) $C_i = H_i + u_i$

where u_i is an error term that is uncorrelated with H_i and that has a mean of zero and a variance of σ^2_u. At this point, we cannot tell whether movements in C_i are due to movements in true living standards, H_i, or simply due to movements in the error term u_i.

Let the two additional proxies for living standards be denoted by X_i and Y_i, where,

(21) $X_i = \alpha_0 + \alpha_1 H_i + v_i$

(22) $Y_i = \beta_0 + \beta_1 H_i + w_i$

Both errors terms, v_i and w_i, must be uncorrelated with H_i. Their means are zero and their variances denoted by σ^2_v and σ^2_w. Moreover, all three proxies must be unrelated in the sense that their error terms are statistically independent: $E[u_i\, v_i.] = 0$, $E[u_i\, w_i.] = 0$ and $E[v_i\, w_i] = 0$.

To find the variance of underlying living standards, σ^2_H, we first need to calculate the covariances between the proxies:

(23) $\mathrm{Cov}[C_i, X_i] \equiv \sigma_{cx} = \alpha_1\, \sigma^2_H$

(24) $\mathrm{Cov}[C_i, Y_i] \equiv \sigma_{cy} = \beta_1\, \sigma^2_H$

(25) $\mathrm{Cov}[X_i, Y_i] \equiv \sigma_{xy} = \alpha_1\, \beta_1\, \sigma^2_H$

These three equations are solved for σ^2_H:

(26) $\sigma^2_H = \sigma_{CX}\, \sigma_{CY} / \sigma_{XY}$

Finally, the fraction of the variance in measured equivalent consumption that is due to measurement error is calculated as:

(27) *Fraction measurement error in C* $= (\sigma^2_C - \sigma^2_H) / \sigma^2_C$

The methodology to estimate the variance of changes in underlying living standards is analogous:

(28) $\sigma^2_{\Delta H} = \sigma_{\Delta C,\Delta X}\, \sigma_{\Delta C,\Delta Y} / \sigma_{\Delta X,\Delta Y}$

where $\sigma_{A,B}$ denotes the covariance between *A* and *B*.

The first instrument used is a measure of subjective living standards. In the Russian data, subjective living standards are measured by the question: *Please imagine a 9-step ladder where on the bottom,(the first step), stand the poorest people, and on the highest step, (the ninth), stand the rich. On which step are you* today? Lokshin and Ravallion (1999) show that total household income is a significant predictor of the answer to the subjective welfare question, although its explanatory power is low. In the Polish data, living standards are measured by the question: *How would you rate the general material situation of your household? Very good, good, average, rather bad or bad.* These answers are converted into a 5 point linear scale. By definition, this instrument should be related to underlying living standards. It seems unlikely that it is correlated with measurement error in equivalent consumption.

The second instrument is equivalent household income. While this instrument is related to underlying living standards, one may worry whether measurement error in equivalent income is independent of measurement error in equivalent consumption. For example, a misspecified equivalence scale would cause a correlation between these error terms. Similarly, households who willingly underreport income (e.g. due to forgetfulness or for fear of taxation), might also underreport consumption. Hence, this second instrument is chosen by lack of a better alternative.

Fortunately, it is possible to deduce how a correlation between measurement error in income and consumption would affect the results. Such a correlation would lead to an upward bias in σ_{CY} (and the analogous expression for first differences). This would lead us to overestimate the fraction of the variance that can be explained by movements in underlying living standards and to underestimate the part due to measurement error. Hence, all the estimates for fractions of measurement error should probably be treated as lower bounds.

Table 2 presents the IV estimates of the fraction of the variance that is due to measurement error. These results will be discussed in more detail in the subsequent sections. Nevertheless, the table already shows that measurement error is responsible for a large fraction, typically 30%-60%, of cross-sectional variance. Measurement error accounts for an even larger share, generally around

55%-80%, of the variance of income and expenditure shocks. Measurement error seems to be about as important for consumption as for income and is generally higher in Russia than in Poland

Table 2: Instrumental Variable Estimates of the Fraction Measurement Error

	Russia 1994-1998				Poland 1993-1996		
Fraction measurement error in:	Consumption		Income		Consumption		Income
Logs, Period 1	0.447	(0.073)	0.564	(0.064)	0.346	(0.023)	0.402(0.035)
Logs, Period 2	0.531	(0.055)	0.676	(0.055)	0.386	(0.024)	0.363(0.036)
Logs, Period 3	0.517	(0.049)	0.561	(0.057)	0.401	(0.022)	0.332(0.039)
Logs, Period 4	0.320	(0.056)	0.618	(0.043)	0.381	(0.021)	0.285(0.033)
Log difference, period 2-1	0.751	(0.098)	0.797	(0.094)	0.682	(0.051)	0.534(0.084)
Log difference, period 3-2	0.746	(0.413)	0.869	(0.181)	0.710	(0.039)	0.546(0.073)
Log difference, period 4-3	0.779	(0.111)	0.699	(0.190)	0.728	(0.046)	0.472(0.094)

Note: All measures are for equivalent adults. The equivalence scale is household size to the power of 0.75 (θ=0.75). Data consist of balanced panels, 1993-1996 for Poland and 1994-1998 for Russia.

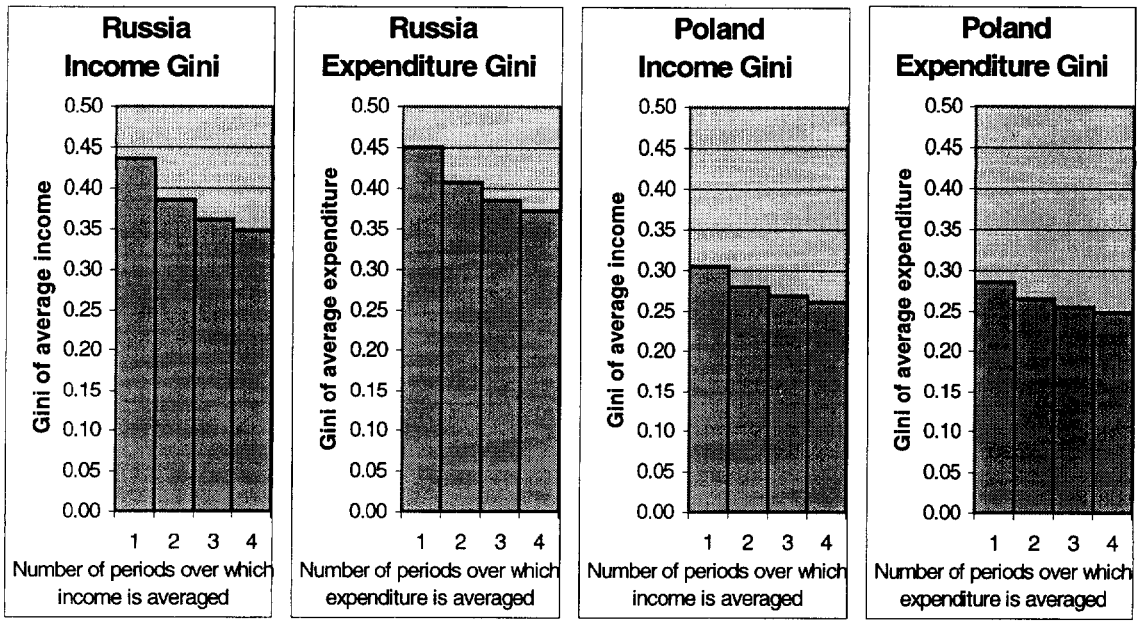
4. Underlying Inequality

It is common to measure inequality in living standards by inequality in income or expenditure across individuals in a given month. However, income or expenditure in a given month is only an imprecise measure of the living standard of a household. Income or expenditure could be misreported or could reflect transitory events. Whenever measured income (or expenditure) is an imperfect indicator of true living standards, the inequality in measured incomes or expenditures will exceed the inequality in underlying living standards.

The first way of reducing the role of transitory events and measurement error is to examine inequality in average incomes (Shorrocks, 1978). For each family, we calculate 4 measures of their living standards: (i) their income in the current month, (ii) the average of their incomes in the current month and 12 months ago, (iii) the average of their incomes in the current month, 12 months ago, and 24 months ago, and (iv) the average of their incomes in the current month, 12, 24 and 36 months ago. More idiosyncratic components of income and measurement error will be averaged out as we average over more periods, but method also averages out some

true mobility – movements in the underlying level of material well-being. Nevertheless, the inequality of average income over four periods is likely to be a better approximation of underlying inequality than the one based on income in a single month. Figure 1 shows how inequality, as measured by the Gini coefficient, declines as we average income or expenditure

Figure 1: Gini Drops when Income or Expenditure is Averaged over Time



Note: All measures are for equivalent adults where the equivalent scale equals household size to the power of 0.75. Ginis are calculated such that the difference between 1 period Ginis and multi-period Ginis is solely due to the averaging and not due to any changes in inequality during the years for which the Ginis are calculated. Data consist of balanced panels, 1993-1996 for Poland and 1994-1998 for Russia. Standard errors on the Ginis are less than 0.010 and standard errors on the differences in Ginis are less than 0.005.

over more periods. In Russia the Gini drops by about 20% to 25% when income or expenditure is averaged over 4 periods. The relative drop in Poland is smaller, about 15%. Hence, the difference between inequality in Russia and Poland becomes smaller when we average incomes or expenditure over 4 periods rather than looking at a single period. Whether the Gini in Russia drops more because Russians are more mobile or because incomes and expenditures are measured with more noise is explored below.

The OECD (1997) examined by how much the Gini of earnings inequality dropped in 6 OECD countries when weekly or monthly earnings of full-time workers are averaged over a 4 year period.[4] While earnings of full-time workers are not strictly comparable to equivalent income or expenditure, it is nevertheless remarkable that in these OECD countries the Gini

[4] The countries examined are Denmark, France, Germany, Italy, the United Kingdom and the United States, and the data covers the period 1986-1989.

coefficient only dropped by 3 to 5 percent. Rutkowski (1999) performed the a similar calculation for Hungary and found that the Gini dropped by 8.2% when monthly earnings are averaged over a 5 year period. In contrast, Galasi (1998) finds the Gini of annual per capita household income in Hungary dropped by 11.7% when incomes are averaged over a 5 year period.[5] This suggests that the relatively low reductions in the Ginis in the calculations using earnings may in part be related to the focus on a sample of continuously employed full-time workers. Gibson, Huang and Rozelle (1999) calculated Gini coefficients for a sample of 232 Chinese urban households using both monthly and annual household expenditure. They find the Gini based on monthly expenditure is about 50% to 80% higher than the one based on annual expenditure, indicating that monthly expenditures are subject to many shocks that get averaged out over the year.

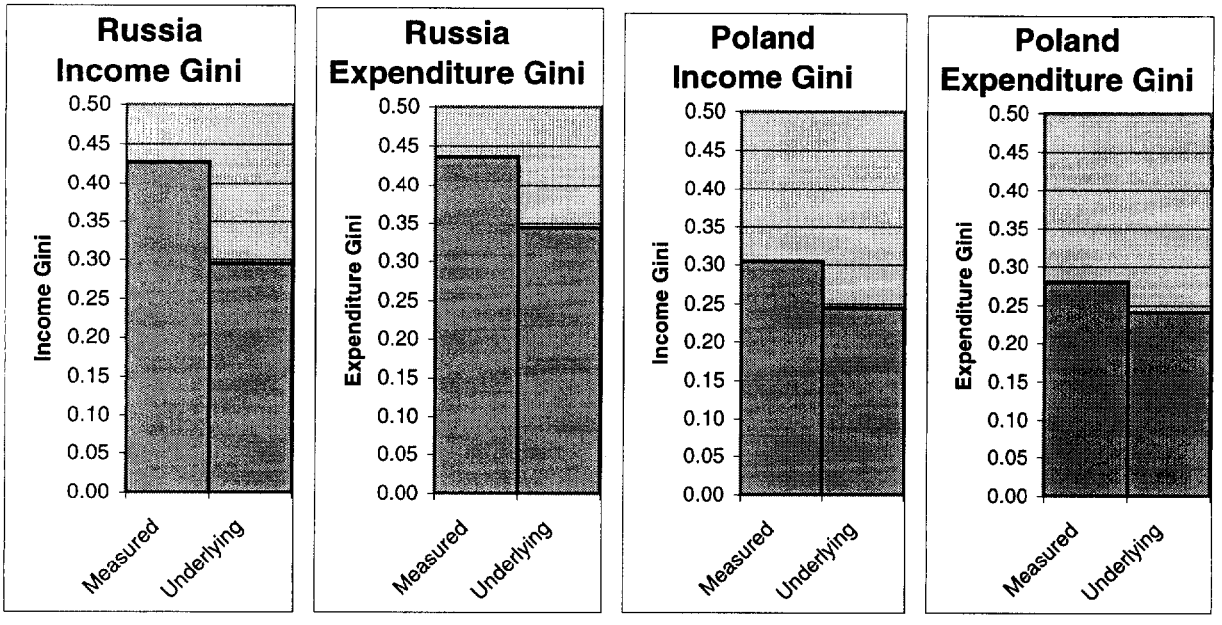
The second approach removes any transitory component (including measurement error) in income using the methodology described formally in the previous section. The main assumption of this methodology is that the income or expenditure distribution can be approximated well by a log normal distribution. The intuition, however, can be explained easily with the fashion metaphor. We measure the variety in each person's wardrobe by examining how much the quality of this person's clothes vary from day to day. When this day-to-day variation is higher, the quality of the outfit worn on any particular day more likely reflects an idiosyncratic choice rather than the underlying quality of that person's wardrobe. Once we have measured how much variety there is (on average) in each person's wardrobe, we assume that everybody has exactly the same wardrobe and predict how much inequality we would find solely due to idiosyncratic choices. To the extent that measured inequality is greater than this predicted amount of inequality, it must be the case that not everybody's wardrobe is equal. Moreover, one can calculate the amount of inequality that must exist in the quality of wardrobes.

We apply this methodology to the income and expenditure distribution in Russia and Poland. For the purpose of living standards, we define any component of income or expenditure that is expected to disappear within 12 months as transitory. These transitory components are the economic equivalent of the idiosyncratic choice of what to wear on any given day. The underlying component is the component of income or expenditure that is expected to last at least 12 months (perhaps longer, but this cannot be inferred from the data). One can interpret this component as the income or expenditure that you can expect to get in 12 months from now. This

[5] Our own calculations, using the Tarki Panel for 1994-1997, yielded a 11.3% drop in Hungary's Gini for income per equivalent adult when income was averaged over 4 years. The equivalence scale equals household size raised to the power of 0.75.

is equivalent to the quality of one's wardrobe, because the expected quality of an outfit randomly chosen from your wardrobe is equal to the average quality of outfits in your wardrobe. Figure 2 shows measured and underlying income and expenditure inequality in Russia and Poland.

Figure 2: Measured versus Underlying Gini Coefficients

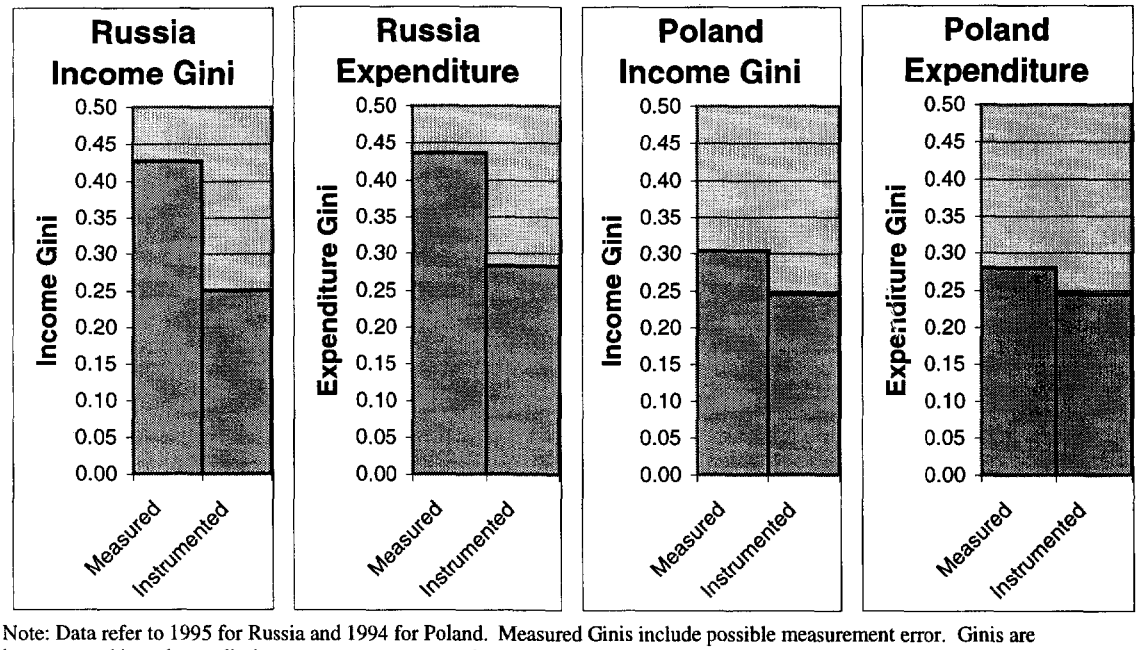


Note: Data refer to 1995 for Russia and 1994 for Poland. Measured Ginis include transitory variation including possible measurement error while underlying Ginis are purged of any transitory variation. Standard errors on the measured and underlying Ginis are 0.02 or less for Russia and 0.01 or less for Poland. Differences between measured and underlying Ginis are highly statistically significant in all cases.

In Russia underlying income inequality is about 30% lower than income inequality in a given month. This means that much of the income inequality in a given month is due to transitory events and measurement error that increase or decrease a family's income for that month. In Russia, underlying expenditure inequality is about 20% lower than expenditure inequality in a given month. In Poland, the differences between underlying and monthly inequality are somewhat smaller – about 20% for income inequality and about 15% for expenditure inequality. Because the role of transitory events and measurement error is larger in Russia than in Poland, the differences in inequality between Russia and Poland become smaller when we consider underlying inequality rather than measured inequality.

Finally, we try to remove measurement error from income and expenditure by instrumenting them. Instrumenting differs from the previous method in two ways. First, instrumenting does not remove transitory shocks to living conditions. Second, while the previous method only removed transitory measurement error, instrumenting will remove measurement error whether it is transitory or not. The methodology of instrumenting is described in detail in the previous section, but two important assumptions need to be emphasized. First, the methodology assumes lognormality of the expenditure and income distribution. Second, it

Figure 3. Instrumenting Ginis to Eliminate Measurement Error



Note: Data refer to 1995 for Russia and 1994 for Poland. Measured Ginis include possible measurement error. Ginis are instrumented in order to eliminate measurement error. Instruments for log income are a measure of subjective living conditions and log expenditure. Instruments for log expenditure are a measure of subjective living conditions and log income. The calculations assume log normal income and expenditure distributions and assume that measurement error in income, expenditure and subjective living conditions are independent. To the extend measurement error is correlated, the instrumented Ginis are biased upwards. Standard errors are less than 0.02 for both measured and instrumented Ginis. Differences between measured and instrumented Ginis are highly statistically significant in all cases.

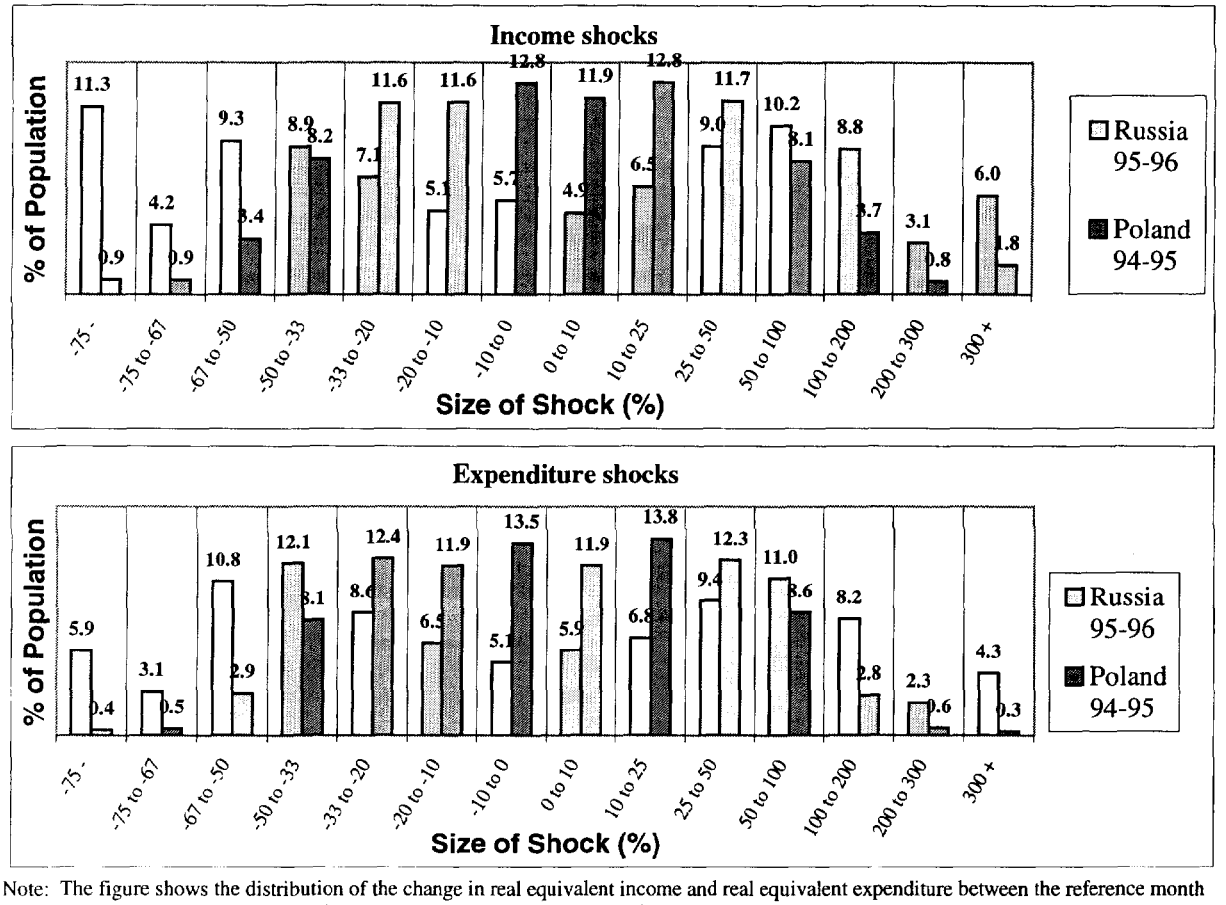
assumes that measurement error in income, expenditure and subjective living conditions are uncorrelated. To the extent that measurement error in expenditure and income are correlated, it will bias the instrumented Gini upwards.

As figure 3 shows, instrumenting indicates that measurement error contributes substantially to the Gini coefficients, especially in Russia. After instrumenting, the Ginis for Russia and Poland become quite similar – around 0.25. Taken at face value, this result implies

that the difference in the measured inequality between Russia and Poland is purely driven by differences in the data quality between those countries.

However, the instrumenting relies on a number of seemingly reasonable but untestable assumptions, most notably that the errors in the instruments are uncorrelated with each other. Hence, this result should probably be taken as indication that differences in data quality are largely, but probably not entirely, responsible for all of difference in inequality between Russia and Poland.

Figure 4: Distribution of Shocks



Note: The figure shows the distribution of the change in real equivalent income and real equivalent expenditure between the reference month and the same month one year later. The reference month is the month in which the household was observed in wave 2 of the survey. In Russia, wave 2 was fielded in November and December of 1995 while in Poland wave 2 was fielded between January and December of 1994. Income and expenditure shocks are in deviation of the national mean. The mean income shock was –4.0% in Russia and 1.8% in Poland while the mean expenditure shock was –8.3% in Russia and 4.1% in Poland. Since categories have different sizes, these plots do *not* show distribution functions.

5. Economic Security

Following families over time also allows us to examine the stability, or security, of their economic situation. Figure 4 shows for Russia and for Poland the distribution of income and expenditure shocks, measured as percentage changes between the reference month and the same month one year later.[6] These percentage changes are reported in deviation of the national mean. The figure shows that families experience huge fluctuations in their incomes, as reported in the household surveys. For example, over 40% of the population in Russia either sees their income increase to more than double, or fall to less than half, while in Poland this fluctuation happens to slightly more than 10% of the population. Fluctuations in reported expenditures are only slightly smaller than those in incomes.

At first blush, these fluctuations in economic fortunes appear to be huge, but many of these changes might reflect transitory events that have a relatively small effect on underlying well-being of the population. In terms of our fashion metaphor, suppose we observe an individual who usually wears cheap clothes but who today wears expensive ones. This could be a persistent change that affects her underlying fashion quality – she got rid of her old cheap wardrobe and bought all new expensive clothes. Or it could reflect a transitory effect – the wardrobe stayed the same, and she merely happened to wear today her only expensive item. Moreover, many of the fluctuations might not reflect real events but simply measurement error in the data. Below, we investigate the role of transitory shocks and measurement error more thoroughly.

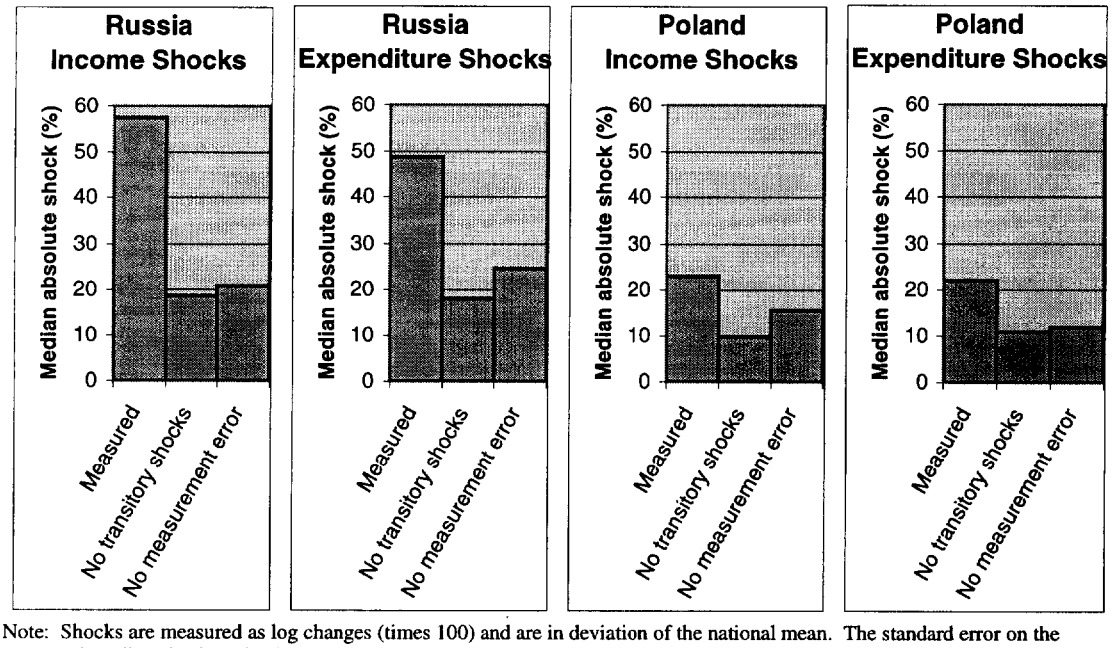
Suppose we observe someone whose income was steady until last year, but who experiences a change in this year's income (as compared to last year). The persistent component of the change is the fraction of the change that will last at least until next year, while the remainder is transitory. We estimate that 90% of the variance of income shocks is transitory while 82% is transitory in Poland. The figures for expenditure shocks are 86% and 76%. This means that shocks are largely transitory, i.e. their effect will die out within a year. For example, a Russian family who used to be earning 2000 Rubles per month and whose income increased to 3000 Rubles in the current month, should expect their income to fall back to 2100 Rubles in the

[6] The reference month is the month in which the household was observed in wave 2 of the survey. In Russia, wave 2 was fielded in November and December of 1995 while in Poland wave 2 was fielded between January and December of 1994.

same month one year from now. In other words, only 10% of the positive income shock of 1000 Rubles will persist for at least a year while the remaining 90% will disappear before that.

Using the instrumental variable approach to find out what fraction of the variance of the shocks is caused by measurement error, we find that in Poland about 55% of the variance of income shocks and 70% of the variance of expenditure shocks can be traced to measurement error. For Russia, we estimate that about 80% of the shocks is due to measurement error, but this estimate is very imprecise.

Figure 5: Median absolute shocks after correction for transitory component and measurement error.



Note: Shocks are measured as log changes (times 100) and are in deviation of the national mean. The standard error on the measured median absolute shock is less than 2 percentage points in all cases. The standard errors on the median absolute shock without the transitory component are about 10 for income and expenditure shocks in Russia and about 5 for shocks in Poland. The standard errors of the median absolute shock without measurement error are about 30 and 5 respectively.

Since our estimates indicate that a substantial fraction of the shocks are transitory or are due to measurement error, Figure 5 shows the size of shocks with and without the transitory component and measurement error. We measure the size of shocks by the median absolute deviation. In other words, we first calculate the absolute size of the shock (in percentage terms), and then find the median. Figure 5 shows that if we take the data at face value, the median Russian faced an income shock of about 57% (up or down). However, if we only consider the permanent component, the median absolute shock drops to about 19%, while if we remove measurement error, it drops to about 21%. The pattern for expenditure shocks in Russia is

similar. Measured income and expenditure shocks are smaller in Poland, but there too, removing the transitory component or measurement error leads to substantial drops. Hence, the figure indicates that in both Russia and in Poland, the living standards are more stable than the measured data would indicate. Nevertheless, even after correcting for measurement error or transitory shocks, individuals in Poland and especially in Russia face considerable fluctuations in living standards.

Table A1 in the appendix shows the size of expenditure shocks as well as their breakdown in transitory and permanent components for different demographic groups in Poland. Table A2 shows the same information for Russia. The tables show that for most demographic groups, neither the size nor the composition of the shocks is significantly different from the overall mean. However, there are a few notable exceptions. Both in Russia and in Poland, individuals with access to land face larger shocks that tend to be less permanent, but these differences are only statistically significant in Poland. In Poland, the size of the shock (as a fraction of expenditure) increases with income, while it displays a U-shaped pattern in Russia. In both countries, households with household heads aged 51-64 with higher education face the smallest shocks, but this difference is only significant in Poland.

6. Mobility and Underlying Poverty

In face of the sizeable income and expenditure shocks, one might wonder how long-lasting economic positions are. Do the rich generally remain rich and the poor remain poor, or do individuals frequently switch positions? The degree to which individuals keep their position in the income distribution can be measured by the correlation between this period's income and the next period's. Table 3 shows these correlations for income and expenditures in Russia and Poland.

Panel A of Table 3 shows the correlation between current log income or log expenditure, and its value in future periods. The correlation between a family's current economic situation and that 12 months from now is slightly less than 50% in Russia and somewhat more than 50% in Poland. This would suggest a lot of churning. However, these correlations fall only very little if we move out one, two or three extra years. Does this mean that the churning has largely ceased after the first year? The explanation for this pattern of correlations is that the correlation between any two years is less than unity for two reasons: (i) the transitory shocks that occur in each of the

two years, and (ii) the underlying amount of churning – the persistent shocks between the two years. Whether we compare the correlation between incomes that lie one, two or three years apart, the amount by which the correlation is reduced below unity due to transitory shocks is about the same. Hence, the amount by which these correlations fall as we compare incomes that lie one year apart to incomes that lie 2 years apart provides a measure of the amount of underlying or persistent churning that takes place. This idea can be formalized to calculate the correlation between the underlying incomes in two adjacent years. As panel B of Table 3 shows, this correlation ranges from 88% for incomes in Russia to 94% percent for expenditure in Poland, suggesting that there is relatively little switching of underlying economic fortunes. As the table indicates, mobility in expenditure shows, by and large, the same picture.

Table 3. Correlations in Income and Expenditure

	Russia		Poland	
	Income	Expenditure	Income	Expenditure
A. Traditional correlations				
Current month and 12 months later	0.335	0.479	0.535	0.627
Current month and 24 months later	0.254	0.431	0.549	0.626
Current month and 36 months later	..	..	0.457	0.569
Current month and 48 months later	0.266	0.380	..	..
B. Persistent correlations				
Correlation between *persistent* income/expenditure in current month and 12 months later	0.884	0.924	0.934	0.937
Memo: "traditional" correlation over the same time period.	0.338	0.510	0.575	0.678

Notes: Equivalent income and equivalent expenditure are measured in logarithmic form. In panel A, the current month is taken from the first of the 4 waves of the data. The first wave of the Russian data was collected in November/December of 1994 and the first wave of the Polish data was collected between January and December of 1993. Correlations between persistent income/expenditure can only be calculated for waves 2 and 3 of the data. In both countries, wave 2 was collected 1 year after the first wave, and wave 3 was collected 2 years after the first wave. Standard error for these correlations are generally around 0.02 to 0.03.

Perhaps the fashion metaphor can further illustrate the mobility pattern. The traditional correlations measure to what extent people who wear nice clothes today also wear nice clothes on a given day one year from now. Here we see relatively low correlations because one day people may wear a nice outfit from their wardrobe while the next day they might wear some old clothes from the same wardrobe. While the traditional correlations measure people's positions on the fashion hierarchy by the clothes they wear on a given day, the persistent correlations measure their fashion position by the average quality of their wardrobe. Hence, high persistent correlations indicate that people who had a nice wardrobe one year ago, still, by and large, have nice wardrobes this year. By this measure, few people switch ranks on the fashion hierarchy.

An especially important form of mobility is the extent to which the poor can escape poverty. To facilitate comparisons of mobility in and out of poverty in Russia and Poland, we chose a poverty line such that in each year 20% of the population in each country is considered poor. We present results for poverty based on equivalent household expenditures, but the findings for income based poverty are qualitatively the same. We can classify someone as poor based on their measured expenditure in a given month ("traditionally measured" poverty) or based on the underlying component of their expenditure in that month ("underlying" poverty). This is analogous to determining someone's fashion deprivation by the clothes he wears that day or by the clothes in his wardrobe. Table 4 shows the flows into and out of poverty for measured and underlying poverty for Russia and Poland.

Table 4. Flows Into and Out of Poverty

A. Movements in "Traditionally Measured" Poverty

Russia (95-96)			Poland (94-95)		
Poverty status 12 months ago	This month's poverty status		Poverty status 12 months ago	This month's poverty status	
	Poor	Non-poor		Poor	Non-poor
Poor	44.7%	55.3%	Poor	55.3%	44.7%
Non-poor	13.8%	86.2%	Non-poor	11.2%	88.8%

B. Movements in "Underlying" Poverty

Russia (95-96)			Poland (94-95)		
Poverty status 12 months ago	This month's poverty status		Poverty status 12 months ago	This month's poverty status	
	Poor	Non-poor		Poor	Non-poor
Poor	79.4%	20.6%	Poor	80.2%	19.8%
Non-poor	5.2%	94.8%	Non-poor	4.9%	95.1%

Note: Underlying poverty measures are based on simulations assuming log normality of expenditure distributions. Poverty is measured by equivalent expenditure where the equivalence scale is household size raised to the power of 0.75. The poverty line is such that the poverty rate is 20% in all years. Measured poor are those whose equivalent expenditure in the current year falls below the poverty line. Underlying poor are those whose equivalent expenditure purged of transitory shocks falls below the poverty line. Standard errors are never larger than one fifth of the transition probabilities.

Panel A of Table 4 shows movements in and out of poverty as measured by expenditures in the current month while panel B shows movements based on individuals' underlying poverty status. Both panels show that mobility in and out of poverty is markedly higher in Russia than in Poland. The contrast between traditionally measured poverty flows and underlying poverty flows is even stronger. According to the traditional measure, 55.3% of the Russian poor can expect to escape poverty by the next year, while only 20.6% of those in underlying poverty can expect to

escape poverty. In Poland, these figures are 44.7% and 19.8% respectively. Hence, a large fraction of the movements in and out of poverty are not related to persistent changes in economic fortunes, but merely reflect one-time transitional shocks affecting either expenditure this month or expenditure 12 months ago. When poverty is defined by the lowest quintile in the per capita income distribution, Galasi (1998) finds that in Hungary 40.5% of the poor in 1994 (according to the traditional measure) can expect to escape poverty by the next year, which is similar to the figure found for Poland.

In Poland, for example, 44% of those who escape poverty according to the traditional measure, are individuals whose persistent expenditure remained above the poverty line, but who experienced a transitional negative shock in the previous period.[7] They are like people who have a perfectly nice wardrobe at home, but just happened to wear old clothes yesterday. Similarly, 33% of those who escape poverty according to the traditional measure are individuals whose persistent expenditure remained below the poverty line, but who experience a transitional positive shock in the current month. The fact that their persistent expenditure lies below the poverty line means that they would expect to be poor again in the following period. They are like people who have very old clothes in their wardrobe, but happened to wear their only presentable item today. Only 18% of those who escape poverty according to the traditional measure also saw their underlying poverty status rise above the poverty line.[8]

These findings also hold up if we examine extreme poverty, defined as the poorest 10%, rather than poverty defined as the lowest 20%. According to the traditional measure, 66.8% of extremely poor Russians escape extreme poverty within 12 months. However, only 28.9 of those who are poor according to their underlying consumption level escape extreme poverty within a year. For Poland, these figures are 53.7% and 24.5% (see appendix Table A4 for details). Hence, while many of those in extreme poverty may seem to escape extreme poverty, many of these escapes reflect measurement error or transitory shocks. Less than a third of the extreme poor will find their underlying consumption level rise above the poverty line within a year.

[7] The 4x4 joint probability distributions of underlying and measured poverty in the current period (4 possibilities), and underlying and measured poverty 12 months ago (4 possibilities) are presented in Table A3 in the appendix. The probabilities reported in the text are derived from this table.
[8] The remaining 5% consist of those whose underlying poverty status fell below the poverty line but whose traditionally measured status rose above it

7. Underclass

Has an underclass of people living for prolonged periods in poverty emerged? A common way of addressing this question is by finding the fraction of the population that is poor in all periods of the survey. Panel A of Table 5 shows these fractions for income and expenditure poverty in Russia and Poland. As the table shows, around 3% of the population is poor in all 4 periods in Russia while the comparable figure lies around 5.5% in Poland. Based on these figures, the underclass seems small in both countries. Galasi (1998) finds that 6.5% of Hungarians have per capita incomes in the lowest quintile in all 5 years, indicating that persistent poverty in Hungary may be slightly higher than in Poland.

Table 5. Poverty and Underclass

	Russia		Poland	
	Income	Expenditure	Income	Expenditure
A. Fractions based on measured poverty				
"Always" poor (4 out of 4)	2.2%	3.4%	5.3%	5.9%
"Sometimes" poor (1, 2 or 3 times out of 4)	45.4%	41.9%	33.5%	31.6%
"Never" poor (0 times out of 4)	52.4%	54.7%	61.2%	62.5%
B. Fraction based on simulation using underlying poverty transition probabilities				
"Always" poor (4 out of 4)	7.4%	10.0%	9.9%	10.3%
"Sometimes" poor (1, 2 or 3 times out of 4)	28.2%	21.8%	22.0%	21.0%
"Never" poor (0 times out of 4)	64.3%	68.2%	68.1%	68.7%
C. Memo Items				
Probability of remaining in underlying poverty	0.720	0.794	0.791	0.802
Probability of remaining out of underlying poverty	0.930	0.948	0.948	0.951
Mean absolute deviation of transitory shock (in %)	54.3%	45.3%	20.9%	19.2%

Notes: Income and expenditure are adjusted for household size using an equivalence scale that equals household size raised to the power of 0.75. The poverty line is set such that in each year 20 percent of the population is poor.

Care needs to be taken, however, in interpreting such figures (see Jalan and Ravallion, 1998, and Baulch and Hoddinott, 2000). First, by construction, the underclass will shrink as the number of periods in the dataset increases. Second, this measure of underclass is very sensitive to transitory shocks and measurement error. A person whose underlying measure of well-being is consistently below the poverty line may occasionally appear as non-poor due to a transitory shock or measurement error. Hence, in countries with more transitory shocks and measurement error, the size of the underclass, as traditionally measured, will appear to be smaller than it really is. To

illustrate this point, we simulate the fraction of the population whose underlying consumption or income measure is below the poverty line in all four periods using the transition probabilities of underlying poverty. These results are shown in panel B of Table 5. According to this simulation, the underclass in Russia is 7% to 10% of the population or about 3 times the size of the underclass based on measured poverty. The simulation shows that about 10% of the Polish population is in underlying poverty in all 4 periods. It is especially instructive to compare the size of the underclass based on expenditure in Russia to the one based in income in Poland (columns 2 and 3). According to traditionally measured poverty, the underclass is much smaller in Russia (3.4%) than in Poland (5.3%), while according to underlying poverty, the sizes are almost identical (10.0% in Russia and 9.9% in Poland). This difference is explained by the difference in the size of the transitory shocks, which averages 45.3% for expenditure in Russia but only 20.9% for income in Poland.

Since the size of the underclass as defined by living in poverty for 4 consecutive years is sensitive to transitory shocks and measurement error, we define the underclass as those whose average expenditure over 4 years falls below a given threshold. This corresponds to Jalan and Ravallion's (1998) definition of the Chronic poor. Tables 6 and 7 show the poverty rates by demographic characteristics for three types of poverty: (i) a "traditional poverty" measure – the lowest quintile of equivalent expenditures in the base period; (ii) the "broad underclass" – the lowest quintile of average equivalent expenditures over 4 years; and (iii) the "severe underclass" – the lowest decile of average equivalent expenditure over 4 years. Table 6 shows the comparison for Poland. It shows that for most demographic subgroups, the probability of traditional poverty is not significantly different from the probability of belonging to the broad underclass (see the t-statistics in column 7). When there is a significant difference, the probability of belonging to the broad underclass is higher than the probability of traditional poverty if and only if the probability of traditional poverty for that group was higher than average. In other words, differences in poverty rates across subgroups become somewhat more pronounced. Comparing the extreme underclass to the broad underclass, we find differences in poverty rates again become more pronounced. Demographic groups who are overrepresented in the broad underclass are even more overrepresented in the extreme underclass (see t-statistics in column 11). The pattern for Russia, reported in Table 7, is similar except that fewer differences are statistically significant. Hence, it seems that a poverty profile based on cross-sectional data can serve as a reasonable guide to a poverty profile of chronically poor: generally speaking,

demographic subgroups that are overrepresented among the poor as measured in a cross-section are likely to be even more strongly overrepresented among the Chronic poor.

8. Winners and Losers

Do individuals have characteristics that predispose them to fall into poverty or to remain in poverty? One might answer this question by calculating the transition rates into and out of measured poverty for different demographic groups. However, this may paint a somewhat misleading picture. Expenditure of an individual from a group that is unlikely to be poor (e.g. those with higher education levels) hardly ever falls below the poverty line except in cases of a negative transitory shock or measurement error. Hence, if we find such an individual below the poverty line, this individual is likely to escape poverty in the next period when the effects of the negative transitory shock or measurement error are no longer felt. Hence, it will seem as if those who are the least likely to be poor to begin with are most likely to escape poverty. To avoid this artifact, we examine the probability of remaining in *underlying* poverty as well as the probability of falling into *underlying* poverty for different demographic groups.

Table 8 presents the results for Poland. The table shows that only for few demographic groups, the probability of remaining in underlying poverty differs significantly from the national average. Those with access to land and single elderly males are more likely to remain in underlying poverty, while non-elderly families without children are more likely to escape underlying poverty. Not surprisingly, those who said that their living conditions had improved were more likely to have escaped underlying poverty. Finally, we find that individuals in families that increased in size are more likely to remain in underlying poverty, while those in shrinking families were more likely to escape it. However, this result is almost mechanical – if total expenditure is relatively constant (which it may not be) equivalent expenditure is inversely related to family size. Table 9 contains the results for Russia, where no demographic group is significantly more or less likely than to escape underlying poverty than the national average.

As column 4 of Table 8 shows, the probability of falling into underlying poverty is greatest for the relatively poorer demographic groups because for these groups a relatively small negative expenditure shock will already place them below the poverty line (Table 6 shows which groups are relatively poor). This pattern is similar in Russia.

Column 7 of Table 8 examines average expenditure growth over the sample period for different demographic groups in Poland. While differences are generally not statistically significant, a few noteworthy exceptions appear. Non-elderly families without children and families with high *average* expenditures saw significant increases in their expenditures, while families with children, single elderly females, families with a young uneducated household head and those with low *average* expenditures saw significant decreases in equivalent expenditure between 1993 and 1996. Column 7 for Table 9 shows the analogous results for Russia. The decline in expenditure from fall 1994 to fall 1998 is remarkable, on average 64.6 log points which corresponds to 46.7%. This decline affected all demographic groups, but those between the ages of 31 and 50 and those living in households with a less educated head in this age range seem to be affected least. Perhaps since the latter groups were already overrepresented among the poor, the scope for their expenditure to fall even further was more limited than for other groups.

9. Discussion

This paper tried to distinguish underlying inequality and mobility in two transition countries for inequality and mobility driven by transitory shocks or measurement error. This approach yielded three main findings: First, accounting for noise in the data substantially reduces inequality measures. Since this reduction is most pronounced in Russia, underlying inequality in these two countries is more similar than the uncorrected inequality measures would suggest. Second, individuals in both countries face much economic insecurity – the median absolute annual change in income or expenditure is around 50% in Russia and around 20% in Poland. However, around half of these fluctuations reflect measurement error or transitory shocks. Hence, underlying income or expenditure levels are much more stable. Third, the apparent high levels of economic mobility are largely driven by transitory events and noisy data. After accounting for transitory shocks, around 80% of the poor in Russia and Poland remain in poverty for at least one year. Demographic characteristics cannot predict very well who of the underlying poor will escape poverty.

This paper limited its attention to income and expenditure dynamics using 4-year panel data, and did not address several other important aspects of mobility and income dynamics. First, it did not address mobility over longer horizons, in particular intergenerational mobility. Clearly, this is an important topic, that has important implications for perceptions of long-term fairness in society (Birdsall and Graham, 2000). Second, this paper did not examine duration dependence or

hysteresis. Does poverty by itself cause a reduction of an individual's ability to escape it, or can a temporary negative shock have permanent effects? These questions are extremely difficult to answer convincingly empirically. Lokshin and Ravallion (2000a) examined income dynamics in Hungary to determine whether transitory shocks have permanent effects. They do not find evidence of this form of hysteresis, but it can not be ruled out that their finding is linked to the intrinsic difficulty of empirically identifying hysteresis effects. Finally, this paper focused on household-specific shocks rather than national or other covariant shocks. These two types of shocks have different implications – for example, households can often smooth out household-specific shocks by drawing on social networks, whereas this is much harder for covariate shocks, which affect many. Lokshin and Ravallion (2000b) provide a detailed analysis of the impact of a covariate shock, examining the impact of the 1998 Russian financial crisis on welfare.

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Table 6. Poverty and Underclass in Poland

	Traditional poverty (20 % poorest based on expenditure in 1994)			Broad underclass (20 % poorest based on average expenditure in 1993-96)				Severe underclass (10 % poorest based on average expenditure in 1993-96)			
	Poverty Rate	SE	t-stat. (1)	Poverty Rate	SE	t-stat. (4)	t-stat. (4)-(1)	Poverty Rate	SE	t-stat. (8)	t-stat. (8)-(4)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Whole sample	0.200	0.001	n/a	0.200	0.001	n/a	n/a	0.100	0.001	n/a	n/a
Age Groups											
0-15	0.287	0.006	13.7	0.293	0.006	15.0	1.2	0.160	0.004	15.2	4.7
16-30	0.206	0.007	0.8	0.204	0.007	0.7	-0.2	0.094	0.005	-1.0	-2.0
31-50	0.191	0.004	-2.3	0.191	0.005	-2.0	0.0	0.099	0.003	-0.4	1.5
51-64	0.101	0.008	-12.7	0.090	0.007	-15.7	-1.8	0.034	0.004	-16.0	-3.4
65+	0.133	0.011	-6.1	0.129	0.011	-6.7	-0.5	0.047	0.007	-7.3	-3.4
Access to land											
No	0.176	0.007	-3.5	0.175	0.007	-3.6	-0.2	0.088	0.006	-2.0	0.2
Yes	0.215	0.004	3.5	0.215	0.004	3.7	-0.1	0.107	0.003	2.0	-0.2
Own Automobile											
No	0.265	0.006	11.0	0.273	0.006	11.6	1.8	0.145	0.004	10.6	2.9
Yes	0.121	0.007	-11.5	0.110	0.007	-12.1	-2.1	0.044	0.005	-11.4	-2.9
Household typology											
Single parent with child(ren)	0.302	0.041	2.4	0.290	0.042	2.2	-0.3	0.138	0.029	1.3	-0.3
Other family with child(ren)	0.258	0.007	8.6	0.270	0.007	10.0	2.0	0.147	0.005	8.8	2.8
Single elderly male	0.102	0.063	-1.6	0.088	0.073	-1.5	-0.2	0.081	0.067	-0.3	1.0
Single elderly female	0.133	0.032	-2.1	0.098	0.026	-4.0	-1.2	0.022	0.013	-5.9	-2.1
Multiple elderly	0.101	0.029	-3.4	0.114	0.031	-2.7	0.6	0.040	0.018	-3.3	-1.3
Other family without children	0.139	0.007	-9.0	0.126	0.007	-10.5	-2.1	0.052	0.005	-9.2	-2.6
Number of Children under 15											
Zero	0.097	0.007	-14.3	0.085	0.007	-17.1	-2.1	0.032	0.004	-17.1	-3.2
One	0.167	0.011	-3.0	0.172	0.014	-2.1	0.5	0.068	0.008	-3.9	-2.9
Two	0.231	0.013	2.4	0.238	0.013	2.9	0.6	0.118	0.009	2.0	-0.1
Three or more	0.419	0.019	11.5	0.424	0.019	11.8	0.3	0.258	0.015	10.6	4.5
Number of income earners											
Zero	0.207	0.006	1.0	0.199	0.006	0.0	-1.3	0.102	0.005	0.4	0.5
One	0.248	0.011	4.5	0.263	0.012	5.5	1.5	0.138	0.009	4.3	0.9
Two	0.118	0.012	-6.8	0.113	0.012	-7.0	-0.5	0.042	0.008	-7.2	-2.3
Three or more	0.150	0.042	-1.2	0.152	0.044	-1.1	0.1	0.073	0.029	-0.9	-0.1
Gender of household head											
Male	0.196	0.004	-0.9	0.195	0.004	-1.1	-0.4	0.099	0.003	0.0	0.9
Female	0.211	0.012	0.9	0.212	0.011	1.1	0.1	0.100	0.009	0.0	-0.9
Labor market status of household head											
Employed	0.199	0.004	-0.4	0.198	0.004	-0.3	-0.2	0.098	0.003	-0.7	-0.6
Unemployed	0.609	0.045	9.1	0.546	0.047	7.4	-1.5	0.344	0.046	5.3	2.0
Retired	0.154	0.012	-4.0	0.162	0.011	-3.3	1.0	0.075	0.009	-2.7	-1.0
Other	0.578	0.100	3.8	0.470	0.104	2.6	-1.0	0.368	0.098	2.7	1.8
Age & education of household head											
16-30 Primary	0.405	0.088	2.3	0.326	0.072	1.8	-1.0	0.142	0.060	0.7	-0.4
16-30 Basic Vocational	0.296	0.029	3.4	0.291	0.029	3.2	-0.2	0.138	0.024	1.6	-0.4
16-30 Secondary	0.122	0.037	-2.1	0.127	0.032	-2.3	0.1	0.025	0.014	-5.4	-2.5
16-30 Higher	0.103	0.065	-1.5	0.058	0.057	-2.5	-1.0	0.000	0.000	n/a	n/a
31-50 Primary	0.370	0.024	7.2	0.389	0.022	8.7	1.0	0.232	0.019	6.8	2.9
31-50 Basic Vocational	0.258	0.012	4.8	0.260	0.011	5.5	0.2	0.135	0.009	3.8	0.9
31-50 Secondary	0.136	0.013	-4.8	0.134	0.012	-5.4	-0.2	0.068	0.009	-3.4	0.2
31-50 Higher	0.048	0.015	-10.2	0.032	0.010	-16.8	-1.1	0.007	0.006	-15.2	-1.4
51-64 Primary	0.155	0.017	-2.7	0.159	0.018	-2.3	0.3	0.056	0.012	-3.7	-2.2
51-64 Basic Vocational	0.109	0.030	-3.0	0.097	0.028	-3.7	-0.7	0.048	0.022	-2.3	0.0
51-64 Secondary	0.050	0.016	-9.6	0.054	0.017	-8.5	0.2	0.010	0.006	-14.6	-2.0
51-64 Higher	0.018	0.015	-11.9	0.020	0.014	-12.7	0.3	0.014	0.013	-6.3	0.5
65+ Primary	0.195	0.025	-0.2	0.191	0.026	-0.3	-0.2	0.074	0.018	-1.5	-1.6
65+ More than primary	0.058	0.020	-7.0	0.033	0.013	-12.4	-1.6	0.021	0.013	-6.1	0.5
Subjective living condition											
Very bad	0.500	0.030	10.1	0.504	0.030	10.2	0.2	0.347	0.028	8.7	4.3
Bad	0.300	0.010	9.9	0.299	0.011	8.8	-0.1	0.150	0.009	5.4	0.1
Average	0.127	0.006	-11.4	0.124	0.006	-12.1	-0.5	0.050	0.004	-11.4	-3.3
Good or very good	0.046	0.012	-13.1	0.055	0.012	-12.2	1.0	0.014	0.006	-13.3	-2.2
Quintile in average expenditure ('93-'96)											
Bottom	0.740	0.015	35.8	1.000	n/a	n/a	n/a	0.500	n/a	n/a	n/a
Second	0.181	0.016	-1.2	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a
Third	0.062	0.010	-13.4	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a
Fourth	0.019	0.005	-35.5	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a
Top	0.006	0.003	-75.5	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a

Notes: Demographic characteristics are measured in the base period, which is 1994 for Poland. Expenditure is adjusted for family size using the baseline equivalence scale. The t-statistics in columns (3), (6) and (10) show whether the poverty rate for the demographic group is significantly different from the national average. The t-statistic in column (7) tests the difference between columns (4) and (1) while the t-statistic in column (11) tests the difference between columns (8) and (4).

Table 7. Poverty and Underclass in Russia

	Traditional poverty (20 % poorest based on expenditure in 1995)			Broad underclass (20 % poorest based on average expenditure in 1994-98)				Severe underclass (10 % poorest based on average expenditure in 1994-98)			
	Poverty Rate	SE	t-stat. (1)	Poverty Rate	SE	t-stat. (4)	t-stat. (4)-(1)	Poverty Rate	SE	t-stat. (8)	t-stat. (8)-(4)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Whole sample	0.200	0.001	n/a	0.200	0.001	n/a	n/a	0.100	0.000	n/a	n/a
Age Groups											
0-15	0.243	0.011	3.8	0.245	0.010	4.4	0.3	0.130	0.008	3.9	1.3
16-30	0.178	0.011	-2.1	0.167	0.011	-3.0	-1.0	0.081	0.009	-2.1	-0.3
31-50	0.183	0.008	-2.2	0.178	0.008	-2.6	-0.5	0.087	0.006	-2.1	-0.6
51-64	0.169	0.015	-2.1	0.159	0.015	-2.8	-0.8	0.073	0.011	-2.4	-0.8
65+	0.237	0.017	2.1	0.262	0.017	3.6	1.4	0.134	0.014	2.5	0.3
Access to land											
No	0.217	0.016	1.0	0.245	0.016	2.9	1.9	0.127	0.014	2.0	0.5
Yes	0.195	0.005	-1.0	0.185	0.005	-2.8	-2.2	0.091	0.005	-2.0	-0.5
Own Automobile											
No	0.238	0.005	8.2	0.240	0.005	8.4	0.3	0.123	0.003	8.0	1.2
Yes	0.081	0.014	-8.3	0.072	0.013	-10.0	-0.6	0.027	0.008	-8.9	-1.2
Household typology											
Single parent with child(ren)	0.222	0.034	0.6	0.221	0.032	0.7	0.0	0.110	0.024	0.4	0.0
Other family with child(ren)	0.216	0.007	2.0	0.211	0.007	1.7	-0.6	0.108	0.005	1.6	0.7
Single elderly male	0.156	0.065	-0.7	0.144	0.061	-0.9	-0.3	0.041	0.032	-1.8	-0.9
Single elderly female	0.266	0.032	2.1	0.333	0.032	4.2	2.1	0.193	0.026	3.5	1.6
Multiple elderly	0.157	0.022	-2.0	0.155	0.023	-2.0	-0.1	0.075	0.017	-1.4	-0.2
Other family without children	0.152	0.018	-2.8	0.142	0.014	-4.0	-0.6	0.057	0.010	-4.2	-1.8
Number of Children under 15											
Zero	0.166	0.011	-3.2	0.172	0.010	-2.8	0.6	0.083	0.008	-2.1	-0.5
One	0.195	0.016	-0.4	0.156	0.015	-2.9	-2.6	0.071	0.010	-2.9	-0.9
Two	0.211	0.017	0.6	0.229	0.020	1.5	1.1	0.111	0.014	0.9	-0.3
Three or more	0.346	0.046	3.2	0.373	0.045	3.9	0.7	0.226	0.035	3.6	1.6
Number of income earners											
Zero	0.377	0.058	3.1	0.365	0.064	2.6	-0.2	0.184	0.046	1.8	0.1
One	0.219	0.019	1.0	0.253	0.018	3.0	2.4	0.160	0.016	3.7	2.8
Two	0.197	0.012	-0.3	0.189	0.012	-0.9	-0.8	0.080	0.007	-2.7	-2.6
Three or more	0.176	0.015	-1.6	0.162	0.014	-2.7	-1.1	0.078	0.010	-2.1	-0.4
Gender of household head											
Male	0.188	0.004	-3.0	0.188	0.004	-3.0	0.1	0.092	0.003	-2.6	-1.0
Female	0.267	0.021	3.2	0.258	0.019	3.1	-0.4	0.141	0.016	2.6	1.0
Labor market status of household head											
Employed	0.188	0.006	-2.1	0.179	0.006	-3.5	-1.3	0.086	0.005	-2.8	-1.1
Unemployed	0.267	0.033	2.0	0.310	0.039	2.8	1.1	0.174	0.030	2.5	1.0
Retired	0.207	0.020	0.3	0.235	0.019	1.8	1.7	0.127	0.015	1.8	1.0
Other	0.247	0.042	1.1	0.207	0.038	0.2	-1.1	0.097	0.028	-0.1	-0.3
Age & education of household head											
16-30 High school or less	0.189	0.033	-0.3	0.234	0.039	0.9	1.2	0.102	0.026	0.1	-0.7
16-30 Technical/vocational	0.224	0.044	0.5	0.180	0.043	-0.5	-1.0	0.086	0.025	-0.6	-0.2
16-30 Higher	0.100	0.066	-1.5	0.015	0.017	-11.0	-1.3	0.000	0.000	n/a	n/a
31-50 High school or less	0.233	0.018	1.8	0.252	0.016	3.3	1.1	0.138	0.012	3.2	1.3
31-50 Technical/vocational	0.202	0.021	0.1	0.201	0.021	0.0	-0.1	0.102	0.016	0.2	0.2
31-50 Higher	0.137	0.024	-2.7	0.085	0.021	-5.6	-2.3	0.020	0.009	-8.8	-2.1
51-64 High school or less	0.199	0.029	-0.1	0.181	0.025	-0.8	-0.8	0.075	0.017	-1.4	-1.0
51-64 Technical/vocational	0.200	0.050	0.0	0.181	0.045	-0.4	-0.5	0.116	0.037	0.4	1.2
51-64 Higher	0.089	0.031	-3.6	0.067	0.029	-4.5	-0.9	0.041	0.018	-3.2	0.6
65+ High school or less	0.278	0.028	2.8	0.334	0.027	4.9	2.2	0.172	0.024	3.0	0.3
65+ More than high school	0.071	0.033	-3.9	0.050	0.024	-6.3	-0.8	0.035	0.022	-2.9	0.7
Subjective living condition											
Very bad	0.319	0.023	5.2	0.317	0.024	4.8	-0.1	0.154	0.017	3.2	-0.3
Bad	0.215	0.010	1.6	0.212	0.010	1.2	-0.4	0.111	0.008	1.5	1.0
Average	0.131	0.009	-7.5	0.127	0.009	-8.5	-0.5	0.055	0.006	-7.4	-1.8
Good or very good	0.074	0.017	-7.6	0.069	0.017	-7.8	-0.3	0.036	0.012	-5.2	0.2
Unreported	0.245	0.012	3.8	0.253	0.011	4.9	0.8	0.133	0.007	4.6	1.1
Quintile in average expenditure ('94-'98)											
Bottom	0.646	0.023	19.5	1.000	n/a	n/a	n/a	0.500	n/a	n/a	n/a
Second	0.191	0.021	-0.4	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a
Third	0.085	0.017	-6.9	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a
Fourth	0.050	0.010	-14.8	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a
Top	0.028	0.008	-22.8	0.000	n/a	n/a	n/a	0.000	n/a	n/a	n/a

Notes: Demographic characteristics are measured in the base period, which is 1995 for Russia. Expenditure is adjusted for family size using the baseline equivalence scale. The t-statistics in columns (3), (6) and (10) show whether the poverty rate for the demographic group is significantly different from the national average. The t-statistic in column (7) tests the difference between columns (4) and (1) while the t-statistic in column (11) tests the difference between columns (8) and (4).

Table 8. Winners and Losers in Poland

	Remaining in Poverty between '94 and '95			Falling into Poverty between '94 and '95			Expenditure Growth between '93 and '96		
	Probability	SE	t-stat.	Probability	SE	t-stat.	Δ log	SE	t-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Whole sample	0.802	0.014	n/a	0.049	0.003	n/a	0.023	0.014	n/a
Age Groups									
0-15	0.826	0.018	1.4	0.066	0.008	2.4	0.005	0.026	-1.1
16-30	0.763	0.024	-1.9	0.055	0.008	0.8	0.042	0.026	1.0
31-50	0.803	0.021	-0.1	0.047	0.005	-0.5	0.029	0.016	0.5
51-64	0.755	0.041	-1.3	0.028	0.006	-3.1	0.024	0.023	0.1
65+	0.836	0.046	0.7	0.041	0.010	-0.8	0.008	0.027	-0.6
Location									
Warsaw	0.690	0.089	-1.3	0.028	0.012	-1.7	-0.008	0.049	-0.7
Urban	0.785	0.025	-0.7	0.039	0.006	-1.6	0.042	0.019	1.7
Rural	0.814	0.026	0.5	0.066	0.010	2.1	-0.002	0.020	-1.6
Access to land									
No	0.748	0.022	-2.6	0.045	0.006	-0.7	0.027	0.024	0.3
Yes	0.836	0.023	1.9	0.051	0.006	0.4	0.020	0.017	-0.3
Household typology									
Single parent with child(ren)	0.825	0.124	0.2	0.033	0.033	-0.5	0.073	0.053	0.9
Other family with child(ren)	0.828	0.020	1.3	0.075	0.009	3.2	-0.025	0.022	-3.1
Single elderly male	0.961	0.066	2.3	0.148	0.093	1.1	0.094	0.182	0.4
Single elderly female	0.759	0.124	-0.4	0.020	0.015	-1.9	-0.083	0.039	-2.7
Multiple elderly	0.757	0.095	-0.5	0.053	0.019	0.2	-0.070	0.075	-1.3
Other family without children	0.744	0.032	-2.1	0.027	0.006	-3.9	0.067	0.019	3.4
Number of income earners									
Zero	0.819	0.023	0.8	0.046	0.007	-0.6	0.038	0.023	1.1
One	0.802	0.029	-0.1	0.074	0.010	2.7	0.006	0.018	-0.8
Two	0.737	0.061	-1.1	0.023	0.008	-3.3	0.000	0.026	-1.0
Three or more	0.746	0.152	-0.4	0.056	0.026	0.3	0.055	0.057	0.6
Labor market status of household head									
Employed	0.797	0.019	-0.4	0.052	0.005	0.7	0.013	0.018	-1.7
Unemployed	0.705	0.080	-1.3	0.131	0.054	1.5	0.032	0.059	0.2
Retired	0.851	0.050	1.0	0.035	0.011	-1.3	0.054	0.018	1.7
Other	0.844	0.101	0.4	0.136	0.082	1.1	-0.041	0.090	-0.7
Age & education of household head									
16-30 Primary	0.764	0.141	-0.3	0.117	0.076	0.9	-0.250	0.078	-3.5
16-30 Basic Vocational	0.792	0.067	-0.2	0.096	0.032	1.5	-0.121	0.120	-1.3
16-30 Secondary	0.795	0.127	-0.1	0.040	0.025	-0.4	-0.077	0.083	-1.2
16-30 Higher	0.533	0.272	-1.0	0.010	0.019	-2.0	0.181	0.106	1.5
31-50 Primary	0.830	0.035	0.8	0.105	0.022	2.5	0.029	0.043	0.2
31-50 Basic Vocational	0.834	0.037	0.8	0.056	0.013	0.6	0.012	0.020	-0.5
31-50 Secondary	0.720	0.063	-1.3	0.031	0.012	-1.5	0.052	0.031	1.0
31-50 Higher	0.637	0.106	-1.6	0.019	0.007	-4.3	0.093	0.058	1.3
51-64 Primary	0.744	0.065	-0.9	0.044	0.019	-0.2	-0.011	0.044	-0.8
51-64 Basic Vocational	0.746	0.154	-0.4	0.044	0.023	-0.2	0.118	0.039	2.5
51-64 Secondary	0.703	0.133	-0.8	0.010	0.008	-4.7	0.113	0.079	1.2
51-64 Higher	0.742	0.166	-0.4	0.006	0.005	-6.6	-0.070	0.062	-1.6
65+ Primary	0.844	0.060	0.7	0.072	0.021	1.1	0.006	0.033	-0.5
65+ More than primary	0.812	0.146	0.1	0.006	0.006	-6.1	0.066	0.043	1.0
Change in subjective living conditions (94-95)									
Worsened	0.909	0.030	3.2	0.083	0.017	2.0	0.012	0.041	-0.3
Same	0.822	0.022	0.9	0.052	0.006	0.7	0.010	0.019	-1.2
Improved	0.684	0.037	-3.5	0.023	0.008	-3.1	0.067	0.023	2.0
Change in number of income earners (94-95)									
Decreased	0.839	0.059	0.6	0.080	0.019	1.6	-0.053	0.033	-2.2
Same	0.817	0.021	0.7	0.056	0.006	1.3	0.008	0.020	-1.6
Increased	0.758	0.038	-1.2	0.020	0.010	-3.2	0.084	0.022	2.9
Change in family size (94-95)									
Down by 2 or more	0.229	0.118	-4.8	0.007	0.009	-4.6	0.110	0.059	1.5
Down by 1	0.779	0.059	-0.4	0.044	0.017	-0.3	0.088	0.046	1.4
Same	0.828	0.021	1.4	0.047	0.006	-0.5	0.014	0.017	-1.2
Up by 1	0.797	0.062	-0.1	0.078	0.028	1.1	-0.021	0.042	-1.1
Up by 2 or more	0.964	0.052	3.1	0.229	0.065	2.7	0.027	0.134	0.0
Quintile in average expenditure ('93-'96)									
Bottom	0.938	0.018	6.2	0.369	0.110	2.9	-0.018	0.015	-2.3
Second	0.029	0.051	-15.0	0.099	0.070	0.7	-0.021	0.016	-2.1
Third	0.000	n/a	n/a	0.039	0.070	-0.1	-0.011	0.017	-1.7
Fourth	0.000	n/a	n/a	0.014	0.045	-0.8	0.019	0.015	-0.2
Top	0.000	n/a	n/a	0.000	0.000	-14.4	0.072	0.037	2.0

Notes: Demographic characteristics are measured in the base period, which is 1994 for Poland. Expenditure is adjusted for family size using the baseline equivalence scale. Poverty transitions are based on *underlying* poverty. The t-statistics in columns (3), (6) and (9) indicate the significance of the difference with the national average. Expenditure growth is measured as a log difference.

Table 9. Winners and Losers in Russia

	Remaining in Poverty between '95 and '96			Falling into Poverty between '95 and '96			Expenditure Growth between '94 and '98		
	Probability	SE	t-stat.	Probability	SE	t-stat.	Δ log	SE	t-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Whole sample	0.794	0.044	n/a	0.052	0.011	n/a	-0.646	0.047	n/a
Age Groups									
0-15	0.838	0.065	0.9	0.029	0.022	-1.3	-0.609	0.083	0.8
16-30	0.780	0.063	-0.2	0.053	0.018	0.1	-0.694	0.054	-1.2
31-50	0.824	0.077	0.5	0.042	0.015	-0.8	-0.551	0.038	2.1
51-64	0.691	0.110	-1.2	0.061	0.016	0.6	-0.739	0.081	-1.7
65+	0.870	0.103	0.7	0.061	0.036	0.3	-0.724	0.091	-1.2
Locations									
Moscow / St. Petersburg	0.404	0.369	-1.0	0.004	0.008	-3.3	-0.472	0.093	1.7
Urban	0.726	0.065	-1.3	0.052	0.013	0.0	-0.684	0.072	-1.2
Semi-urban	0.955	0.092	1.6	0.117	0.075	0.9	-0.750	0.162	-0.7
Rural	0.838	0.078	0.6	0.076	0.025	1.1	-0.574	0.042	1.4
Access to land									
No	0.750	0.098	-0.6	0.039	0.022	-0.7	-0.704	0.142	-0.5
Yes	0.828	0.058	0.6	0.056	0.013	0.6	-0.622	0.040	0.6
Household typology									
Single parent with child(ren)	0.797	0.101	0.0	0.073	0.042	0.5	-0.589	0.086	0.6
Other family with child(ren)	0.836	0.086	0.7	0.033	0.019	-1.4	-0.584	0.077	1.5
Single elderly male	0.734	0.321	-0.2	0.037	0.066	-0.2	-0.672	0.223	-0.1
Single elderly female	0.888	0.097	0.9	0.124	0.054	1.3	-0.729	0.105	-0.8
Multiple elderly	0.607	0.125	-1.4	0.046	0.029	-0.2	-0.762	0.052	-1.8
Other family without children	0.749	0.127	-0.4	0.060	0.019	0.4	-0.765	0.086	-1.4
Number of income earners									
Zero	0.729	0.125	-0.5	0.058	0.058	0.1	-0.540	0.251	0.4
One	0.799	0.070	0.1	0.070	0.019	0.8	-0.654	0.070	-0.1
Two	0.883	0.085	1.0	0.019	0.016	-2.2	-0.698	0.092	-0.9
Three or more	0.738	0.125	-0.6	0.073	0.018	1.2	-0.584	0.060	1.0
Labor market status of household head									
Employed	0.802	0.071	0.2	0.045	0.014	-0.8	-0.576	0.037	1.6
Unemployed	0.898	0.117	0.9	0.131	0.066	1.2	-0.791	0.204	-0.7
Retired	0.798	0.092	0.0	0.059	0.032	0.2	-0.948	0.223	-1.6
Other	0.606	0.155	-1.2	0.016	0.022	-1.4	-0.571	0.138	0.6
Age & education of household head									
16-30 High school or less	0.847	0.135	0.4	0.033	0.030	-0.6	-0.847	0.113	-1.7
16-30 Technical/vocational	0.771	0.175	-0.1	0.049	0.061	0.0	-0.607	0.098	0.3
16-30 Higher	0.839	0.184	0.3	0.064	0.040	0.3	-0.639	0.517	0.0
31-50 High school or less	0.709	0.078	-1.4	0.087	0.022	1.8	-0.445	0.068	2.8
31-50 Technical/vocational	0.871	0.110	0.7	0.055	0.034	0.1	-0.591	0.069	0.8
31-50 Higher	0.759	0.206	-0.2	0.015	0.017	-1.7	-0.604	0.068	0.5
51-64 High school or less	0.748	0.141	-0.3	0.044	0.029	-0.2	-0.740	0.097	-1.0
51-64 Technical/vocational	0.967	0.082	1.8	0.130	0.071	1.1	-0.807	0.099	-1.5
51-64 Higher	0.870	0.150	0.5	0.044	0.029	-0.3	-0.381	0.190	1.4
65+ High school or less	0.896	0.109	0.9	0.063	0.055	0.2	-0.628	0.059	0.3
65+ More than high school	0.763	0.311	-0.1	0.077	0.079	0.3	-1.584	0.584	-1.7
Change in subjective living conditions (95-96)									
Worsened	0.800	0.104	0.1	0.090	0.021	1.8	-0.699	0.093	-0.6
Same	0.764	0.070	-0.6	0.064	0.013	1.3	-0.682	0.062	-1.2
Improved	0.747	0.140	-0.3	0.014	0.015	-2.5	-0.522	0.069	1.9
Unreported	0.862	0.064	1.3	0.030	0.019	-1.5	-0.623	0.061	0.7
Change in number of income earners (95-96)									
Decreased	0.870	0.094	0.8	0.065	0.031	0.4	-0.564	0.072	1.0
Same	0.803	0.085	0.2	0.051	0.017	-0.1	-0.710	0.063	-2.4
Increased	0.724	0.101	-0.6	0.037	0.023	-0.7	-0.462	0.087	2.3
Change in family size (95-96)									
Down by 2 or more	0.813	0.203	0.1	0.045	0.050	-0.1	-0.671	0.184	-0.1
Down by 1	0.644	0.150	-1.0	0.026	0.026	-1.0	-0.536	0.076	1.3
Same	0.855	0.060	1.0	0.041	0.013	-1.0	-0.663	0.058	-0.8
Up by 1	0.677	0.164	-0.8	0.142	0.033	2.8	-0.490	0.159	1.0
Up by 2 or more	0.790	0.201	0.0	0.097	0.088	0.5	-0.826	0.118	-1.6
Quintile in average expenditure ('94-'98)									
Bottom	0.951	0.044	2.9	0.629	0.329	1.8	-0.555	0.042	1.5
Second	0.006	0.039	-13.5	0.044	0.091	-0.1	-0.549	0.040	1.6
Third	0.000	n/a	n/a	0.039	0.066	-0.2	-0.552	0.032	1.6
Fourth	0.000	n/a	n/a	0.014	0.056	-0.7	-0.564	0.043	1.4
Top	0.000	n/a	n/a	0.000	0.001	-4.7	-0.758	0.103	-1.9

Notes: Demographic characteristics are measured in the base period, which is 1994 for Poland. Expenditure is adjusted for family size using the baseline equivalence scale. Poverty transitions are based on *underlying* poverty. The t-statistics in columns (3), (6) and (9) indicate the significance of the difference with the national average. Expenditure growth is measured as a log difference. A drop in expenditure of 64.6 log points corresponds to a 46.7% decline (using initial expenditure as the base).

Appendix

Table A1. Size and Composition of Expenditure Shocks by Demographics in Poland

	Size of shock in Poland (median absolute log deviation)			Composition of shock in Poland (Fraction of variance of log expenditure from permanent shock)		
	Estimate	Std. Err.	t-statistic on difference with mean	Estimate	Std. Err.	t-statistic on difference with mean
Whole sample	0.221	0.004	N/A	0.243	0.029	N/A
Age Groups						
0-15	0.225	0.006	1.0	0.226	0.042	-0.6
16-30	0.223	0.006	0.4	0.307	0.050	1.7
31-50	0.225	0.005	1.3	0.228	0.036	-0.7
51-64	0.211	0.006	-1.6	0.239	0.049	-0.1
65+	0.213	0.010	-0.9	0.205	0.064	-0.7
Location						
Warsaw	0.208	0.026	-0.5	0.355	0.128	0.9
Urban	0.208	0.005	-3.1	0.245	0.038	0.1
Rural	0.242	0.008	3.1	0.232	0.050	-0.3
Access to land						
No	0.208	0.005	-2.8	0.331	0.040	2.4
Yes	0.232	0.006	2.7	0.189	0.039	-2.6
Household typology						
Single parent with child(ren)	0.251	0.023	1.3	0.068	0.345	-0.5
Other family with child(ren)	0.232	0.007	2.2	0.252	0.042	0.3
Single elderly male	0.164	0.030	-1.9	-0.198	9.527	0.0
Single elderly female	0.208	0.022	-0.6	0.139	0.120	-0.9
Multiple elderly	0.220	0.023	0.0	0.471	0.127	1.8
Other family without children	0.211	0.005	-2.2	0.231	0.050	-0.3
Number of income earners						
Zero	0.219	0.006	-0.6	0.213	0.044	-1.1
One	0.230	0.009	1.1	0.308	0.053	1.4
Two	0.212	0.010	-0.9	0.207	0.061	-0.6
Three or more	0.245	0.035	0.7	0.367	0.238	0.5
Gender of household head						
Male	0.220	0.005	-0.3	0.243	0.039	0.0
Female	0.224	0.007	0.4	0.244	0.056	0.0
Labor market status of household head						
Employed	0.225	0.004	1.6	0.251	0.034	0.5
Unemployed	0.270	0.054	0.9	0.498	0.174	1.5
Retired	0.202	0.009	-2.4	0.160	0.066	-1.4
Other	0.279	0.068	0.9	0.701	0.532	0.9
Age & education of household head						
16-30 Primary	0.256	0.044	0.8	0.288	0.229	0.2
16-30 Basic Vocational	0.224	0.020	0.2	0.329	0.131	0.7
16-30 Secondary	0.227	0.029	0.2	0.223	0.312	-0.1
16-30 Higher	0.280	0.083	0.7	0.003	0.615	-0.4
31-50 Primary	0.250	0.014	2.2	0.302	0.089	0.7
31-50 Basic Vocational	0.210	0.008	-1.7	0.205	0.066	-0.6
31-50 Secondary	0.225	0.010	0.4	0.195	0.072	-0.7
31-50 Higher	0.249	0.014	2.0	0.315	0.142	0.6
51-64 Primary	0.220	0.016	-0.1	0.260	0.112	0.2
51-64 Basic Vocational	0.250	0.025	1.1	0.284	0.143	0.3
51-64 Secondary	0.197	0.015	-1.5	0.180	0.116	-0.6
51-64 Higher	0.150	0.018	-3.8	0.186	0.246	-0.2
65+ Primary	0.202	0.014	-1.4	0.270	0.113	0.2
65+ More than primary	0.225	0.024	0.2	-0.001	0.194	-1.3
Subjective living condition						
Very bad	0.236	0.020	0.8	0.432	0.083	2.3
Bad	0.202	0.007	-2.7	0.244	0.062	0.0
Average	0.228	0.006	1.6	0.185	0.041	-1.9
Good or very good	0.237	0.014	1.1	0.330	0.106	0.9
Change in subjective living conditions						
Worsened	0.230	0.012	0.8	0.213	0.067	-0.4
Same	0.218	0.005	-0.9	0.243	0.038	0.0
Improved	0.224	0.009	0.3	0.229	0.077	-0.2
Quintile in average expenditure ('93-'96)						
Bottom	0.198	0.010	-2.8	0.223	0.071	-0.3
Second	0.195	0.009	-3.0	0.299	0.058	0.9
Third	0.217	0.008	-0.5	0.314	0.064	1.1
Fourth	0.247	0.011	2.5	0.227	0.060	-0.3
Top	0.266	0.011	4.4	0.199	0.079	-0.7

Note: For small cell sizes the estimate of the fraction of the shock that is permanent may fall outside the (0,1) range. This only happens when standard errors are large, indicating that that sample is too small to reliably estimate the fraction of the shock that is permanent. Note that the estimate is never significantly smaller than zero or significantly larger than one.

Table A2. Size and Composition of Expenditure Shocks by Demographics in Russia

	Size of shock in Russia (median absolute log deviation)			Composition of shock in Russia (Fraction of variance of log expenditure from permanent shock)		
	Estimate	Std. Err.	t-statistic on difference with mean	Estimate	Std. Err.	t-statistic on difference with mean
Whole sample	0.487	0.015	N/A	0.131	0.047	N/A
Age Groups						
0-15	0.460	0.024	-1.8	0.071	0.070	-1.2
16-30	0.502	0.020	1.0	0.186	0.074	0.8
31-50	0.466	0.021	-1.6	0.108	0.063	-0.6
51-64	0.498	0.022	0.5	0.234	0.107	1.3
65+	0.538	0.023	2.2	0.052	0.080	-1.0
Access to land						
No	0.469	0.029	-0.7	0.190	0.136	0.5
Yes	0.493	0.017	0.8	0.111	0.045	-0.6
Household typology						
Single parent with child(ren)	0.530	0.052	0.8	0.210	0.175	0.5
Other family with child(ren)	0.472	0.022	-1.3	0.083	0.077	-1.1
Single elderly male	0.454	0.068	-0.5	-1.707	7.745	-0.2
Single elderly female	0.583	0.048	2.0	0.096	0.110	-0.3
Multiple elderly	0.503	0.037	0.4	0.187	0.100	0.5
Other family without children	0.489	0.029	0.0	0.205	0.096	0.9
Number of income earners						
Zero	0.567	0.092	0.9	0.203	0.298	0.2
One	0.487	0.032	0.0	0.154	0.063	0.3
Two	0.462	0.023	-1.5	0.022	0.064	-1.7
Three or more	0.506	0.025	0.9	0.224	0.118	1.1
Gender of household head						
Male	0.476	0.016	-1.6	0.131	0.057	0.0
Female	0.556	0.036	2.0	0.130	0.090	0.0
Labor market status of household head						
Employed	0.478	0.016	-1.1	0.141	0.070	0.3
Unemployed	0.550	0.078	0.8	0.087	0.130	-0.3
Retired	0.493	0.034	0.2	0.106	0.072	-0.3
Other	0.529	0.061	0.7	0.079	0.148	-0.4
Age & education of household head						
16-30 High school or less	0.545	0.048	1.2	0.032	0.121	-0.8
16-30 Technical/vocational	0.479	0.065	-0.1	1.231	12.977	0.1
16-30 Higher	0.563	0.097	0.8	4.892	48.351	0.1
31-50 High school or less	0.506	0.034	0.7	0.263	0.093	1.9
31-50 Technical/vocational	0.456	0.032	-1.1	0.078	0.112	-0.5
31-50 Higher	0.441	0.034	-1.4	-0.065	0.388	-0.5
51-64 High school or less	0.502	0.031	0.5	0.111	0.112	-0.2
51-64 Technical/vocational	0.455	0.049	-0.7	0.063	0.145	-0.5
51-64 Higher	0.389	0.072	-1.4	0.109	0.342	-0.1
65+ High school or less	0.565	0.041	1.9	0.014	0.103	-1.1
65+ More than high school	0.463	0.059	-0.4	-0.187	0.425	-0.7
Subjective living condition						
Very bad	0.534	0.053	1.0	0.317	0.144	1.5
Bad	0.508	0.018	1.4	0.102	0.061	-0.5
Average	0.475	0.021	-0.9	0.064	0.079	-1.0
Good or very good	0.471	0.035	-0.5	0.305	0.095	1.9
Unreported	0.465	0.024	-1.4	0.053	0.064	-1.6
Change in subjective living conditions						
Worsened	0.495	0.038	0.2	0.189	0.090	0.7
Same	0.484	0.017	-0.3	0.179	0.068	1.2
Improved	0.520	0.029	1.2	0.023	0.108	-1.1
Unreported	0.479	0.023	-0.6	0.062	0.060	-1.5
Quintile in average expenditure ('94-'98)						
Bottom	0.524	0.035	1.2	0.136	0.135	0.0
Second	0.444	0.027	-1.7	-0.062	0.080	-2.2
Third	0.441	0.027	-2.0	0.178	0.093	0.5
Fourth	0.489	0.033	0.0	0.240	0.078	1.4
Top	0.558	0.031	2.4	0.149	0.112	0.2

Note: For small cell sizes the estimate of the fraction of the shock that is permanent may fall outside the (0,1) range. This only happens when standard errors are large, indicating that that sample is too small to reliably estimate the fraction of the shock that is permanent. Note that the estimate is never significantly smaller than zero or significantly larger than one.

Table A3. Joint Distribution by Current and Past Poverty Status

Population Fractions in Russia 1995-1996 by Current and Past Poverty Status

		Current Poverty Status				
		Underlying poor		Underlying non-poor		
Poverty Status 12 months ago		Measured poor	Measured non-poor	Measured poor	Measured non-poor	Row Sum
Underlying poor	Measured poor	**0.067**	0.038	0.006	**0.015**	0.125
	Measured non-poor	0.031	0.024	0.005	0.016	0.075
Underlying non-poor	Measured poor	0.006	0.007	0.011	0.051	0.075
	Measured non-poor	**0.012**	0.017	0.063	**0.634**	0.725
	Column Sum:	0.115	0.085	0.085	0.715	1.000

Population Fractions in Poland 1994-1995 by Current and Past Poverty Status

		Current Poverty Status				
		Underlying poor		Underlying non-poor		
Poverty Status 12 months ago		Measured poor	Measured non-poor	Measured poor	Measured non-poor	Row Sum
Underlying poor	Measured poor	**0.090**	0.030	0.006	**0.016**	0.141
	Measured non-poor	0.028	0.014	0.005	0.013	0.059
Underlying non-poor	Measured poor	0.008	0.004	0.007	0.040	0.059
	Measured non-poor	**0.015**	0.013	0.042	**0.671**	0.741
	Column Sum:	0.140	0.060	0.060	0.740	1.000

Note: Underlying poverty measures assume log normality of expenditure distributions. Poverty is measured by equivalent expenditure where the equivalence scale is household size raised to the power of 0.75. The poverty line is such that the poverty rate is 20% in all years. Measured poor are those whose equivalent expenditure in the current year falls below the poverty line. Underlying poor are those whose equivalent expenditure purged of transitory shocks falls below the poverty line.

Table A4. Flows Into and Out of Poverty at 10% Poverty Line

A. Movements in "Traditionally Measured" Poverty

Russia

Poverty status 12 months ago	This month's poverty status	
	Poor	Non-poor
Poor	33.2%	66.8%
Non-poor	7.4%	92.6%

Poland

Poverty status 12 months ago	This month's poverty status	
	Poor	Non-poor
Poor	46.3%	53.7%
Non-poor	6.0%	94.0%

B. Movements in "Underlying" Poverty

Russia

Poverty status 12 months ago	This month's poverty status	
	Poor	Non-poor
Poor	71.1	28.9
Non-poor	3.2	96.8

Poland

Poverty status 12 months ago	This month's poverty status	
	Poor	Non-poor
Poor	75.5%	24.5%
Non-poor	2.7%	97.3%

Note: Underlying poverty measures assume log normality of expenditure distributions. Poverty is measured by equivalent expenditure where the equivalence scale is household size raised to the power of 0.75. The poverty line is such that the poverty rate is 10% in all years. Measured poor are those whose equivalent expenditure in the current year falls below the poverty line. Underlying poor are those whose equivalent expenditure purged of transitory shocks falls below the poverty line. Standard error are never larger than one fifth of the transition probabilities.

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