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The Shadow Economy in Post-Soviet Tajikistan

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Abstract

The existence of a "shadow economy" which is defined here as economic activity which is unrecorded in official statistics and hence not subject to normal taxation and regulation, is a phenomenon which has been much studied in both western industrial countries and in post-Soviet era countries of Eastern Europe and the former USSR. This paper provides rough estimates of the lower bound of the size of the unofficial economy in Tajikistan, the poorest of the former Soviet Republics. Using a household survey, base year estimates for 1999 are obtained. A series from 1991 to 2001 is constructed using a variant of the methodologies contained in Johnson, Kaufman and Zoido-Lobaton (1998) and Eilat & Zinnes (2000). It is found that shadow activities are likely to amount to close to half of all economic activities over the past decade, and that official GDP figures, which themselves contain an arbitrary adjustment for the value of shadow activities, are understated by a wide margin.

The Shadow Economy in Post-Soviet Tajikistan[*]

I. Introduction

The existence of a "shadow economy" which is defined here as economic activity which is unrecorded in official statistics and hence not subject to normal taxation and regulation, is a phenomenon which has been much studied in both western industrial countries and in post-Soviet era countries of Eastern Europe and the former USSR. It is of particular interest in these countries since the process of transition to a market economy involves the growth of private sector activities which may have been illegal in the earlier period but which, even if legal, were pursued entirely outside of the statistical network of the government.

Indeed the mentality of the Five Year Plan, which remains dominant in countries such as Tajikistan, discourages recognition of non-plan activities for two reasons: First, any shortfall from those activity levels forecast by the government (note that Five Year Plans in Tajikistan are now called "Five Year Forecasts" and that "planned outputs" are now "forecast outputs") is regarded as bureaucratically unacceptable to report and so numbers are distorted or fudged however much is necessary to bring them up to the level of the forecast. Overfulfillment of the forecast is equally unacceptable because to admit it would simply mean that the following year's forecast "targets" would be raised to match the higher level, requiring additional effort that can be avoided by simply not reporting the overshooting of forecast levels. This means that "shadow" activities are in many cases literally identical to official ones, differing only in that activity levels beyond those "forecast" are not reported.

This reasoning applies to those activities which were formerly performed by the state or by state companies and which are now at least nominally free of direct government planning (though, of course, the reality is much different). In the newly liberalized environment since 1991 many new activities in trading, commerce, services, and small manufacturing have sprung up which have no relation whatever with government entities, either historical or in the present. There is reason to believe that these are precisely the sectors which have grown the fastest in Tajikistan, since officially reported average income figures are nowhere near values reported in household surveys, as well as the fact that open unemployment is much less obvious in reality than official statistics would make it seem. Eilat and Zinnes (2000) report that official unemployment figures in transition countries are positively associated with levels of activity in the shadow economy, supporting this observation.

At the micro level, it is obvious that shadow economy activities have the potential to contribute substantially to family incomes and welfare. From this point of view, such activities are of clear benefit, and have no obvious downside insofar as they are not inherently illegal or criminal. However, there are several reasons why, from a macroeconomic point of view, knowledge of the size of the shadow economy is important, and attempts to bring it into the official economy are helpful for economic performance.

First, insofar as one of the primary goals of economic policy makers is to promote economic growth, it is important for them to be able to recognize when they are succeeding and when they are failing. If, for example, an economic policy has succeeded in promoting growth, economic managers may not even be aware of it if all or most of the growth has taken place in the unreported unofficial economy. Thus there is no reinforcement, either positive or negative, when the results of policies cannot be observed.

Second, the size of the GDP and its growth rate are important elements of negotiations with international creditors and lending agencies. If, for example, economic targets in IMF letters of intent are expressed in terms of percentages of GDP (as is the case in Tajikistan) a more accurate estimate of the true size of GDP would have an important effect on negotiations and hence on the absolute values of the targets themselves.

Third, activities which are not observed are not taxed. While it is true that a large share of shadow activity is hidden precisely in order to avoid taxation, this de facto tax exemption of a large share of the economy results in a much higher tax burden on officially reported activity than would otherwise be the case. This artificially impedes the growth of such activities, creating a drag on overall economic growth.

It should be noted that the purpose of this study is <u>not</u> to propose a new methodology for calculation of GDP nor is it recommended that various economic targets negotiated on the basis of a percentage of GDP be revised proportionately to the calculations presented in this paper. In fact, this paper merely presents an educated guess as to what GDP might be if the current methodology could be applied uniformly across the economy. Negotiated economic targets are set with full knowledge that a sizable shadow economy exists and should not be changed substantially as a result of this study. Rather, it is in the interests of all stakeholders in Tajik economic policy to have a better idea of just what the true nature of the economy is, so as to better construct programs and policies designed to improve it.

Many of these observations have been studied in the case of developing countries and western industrial economies. A good survey of this literature can be found in Schneider and Enste (2000). Studies of the phenomenon in transition countries can be found in Kaufman and Kaliberda (1996), Johnson, Kaufman and Schleifer (1997), Johnson, Kaufman and Zoido-Lobaton (1998) and Eilat and Zinnes (2000), This last study provides actual measures of the size of the shadow economy in transition countries, including Tajikistan. Though this study adopts the methodology used by Eilat and Zinnes, it improves upon their study in the case of Tajikistan in several ways.

1. First, it corrects for the fact that official GDP estimates already contain an estimate of the size of the unofficial economy. This estimate is not based on any concrete evidence; rather, it represents what is simply a guess as to the unofficial economy, and not one that is necessarily inclusive of all activities which would ordinarily be included in an estimate of "true" GDP. However, it is important to avoid double counting, hence this must be subtracted from the official figures for GDP that are reported.

2. There are now another three years of data available

3. This study uses household survey data to generate a base year estimate of the size of the unofficial sector, in contrast to previous estimates, which are far more speculative.

4. This study includes non-electricity fuel use in its estimation methodology for changes in the shadow economy over time. Tajikistan, being the lowest income country of all the transition economies at approximately $167 per capita in 2001 (as reported by the Government in its 2002 Poverty Reduction Strategy Paper) is more likely than higher income countries to have non-electrified production. Thus, more decentralized use of combustible fuels is included in the measure to yield a more general estimate of energy use. See below for a discussion of this methodology for estimating changes in the size of the unofficial economy.

The next section provides a discussion of the methodology used to estimate the size and growth of the unofficial economy in Tajikistan. It is important that the following caveats be stated very clearly:

This paper presents some adjustments to officially reported GDP which are indicative of a lower bound of the size of the shadow economy. However, **no comprehensive measure of the total shadow economy was possible or attempted**. Accordingly, no claim to knowing the true size of the shadow economy is made here. Second, the methodology used to estimate changes in the size of the shadow economy cannot by itself provide a measure of its absolute size. Hence all calculations of the changes in the shadow economy over time are dependent upon the initial estimate of the size. A different estimate of the initial size will alter the level, though not the rate of change, of the shadow economy estimates.

II. Methodology

The most obvious way to measure the size of the unofficial economy is to do it by direct survey methods. Unfortunately, this is impossible both because of the implausibility of the accuracy of such an approach ("What money have you made recently that you didn't tell the government about") and because of its expense. Indeed, it is already too late to have surveys for all past years that would allow direct estimation of its evolution through time even if we could believe in the results they generated.

This means that indirect methods are needed. To achieve our goal, a time series of annual estimates of the size of the unofficial economy, it is necessary to divide the problem into two parts: First, indirect survey means can provide us with an idea of the size of the economy in a base year, though it can give no idea of its changes through time. Second, methods which rely on energy use or monetary measures to gauge the growth of the shadow economy can tell us how it has changed through time, but only cannot give us a measure of its absolute size. Combining the two can give as an estimate of both: the absolute size of the shadow economy and how this has changed over the years.

The first problem, estimating the size of the shadow economy in a base year, is accomplished using the 1999 survey of household income and expenditure performed on 2000 households in a study done by the State Statistics Committee, Goskomstat (Goskomstat 2000) called the Tajikistan Living Standards Survey (TLSS). Information in this survey allows a measure of the expenditure levels of households which can then be compared to those derived from official estimates of GDP and GDP per capita. While not allowing a comprehensive coverage of all aspects of the shadow economy, the coverage of household income and expenditure together with other household characteristics, allows the estimation of a lower bound to the "true" figure for household consumption, which accounts for approximately 2/3 of GDP.

Other information collected in the TLSS, (See Table 1) on ownership of durable goods by Tajik households paints a picture of a population that is much better off than the officially reported per capita GDP of $178.50 would suggest. This level of per capita income is comparable to that in some of the poorest Sub-Saharan African countries, which does not square with a population where almost half own electric or gas stoves, a quarter have a washing machine, more than 40% a refrigerator, and 60% a TV. Even in rural areas, where 73% of the population resides, ownership of these items is quite high, indicating that official statistics are likely to substantially underestimate true values.

For the second problem this study follows a variant of the approach used by Eilat and Zinnes (2000) in using a modified total energy (rather than just electricity) measure and relating this to total economic activity. Given our measure of total economic activity generated in the first step above, total energy use, we estimate changes in the shadow economy in the following way:

First, I follow Eilat and Zinnes by generating a series of changes in energy use that cannot be explained by price induced changes in efficiency or by changes in economic structure. For the first of these I use the E & Z estimated regression coefficient for the effect of energy price changes in transition countries of 0.25*(change in energy price from previous year). For the second of these, rather than using the share of industry in GDP I use the shares represented by the two largest energy users in the country, namely aluminum production and cotton (which uses electricity for irrigation). Again, the E & Z regression coefficient is used (in this case 0.05).

These are then used to generate a "residual" electricity series from which the effects of these factors have been removed:

(1) $\in \text{Elec}^{\text{resid}}(t) = \in \text{Elec}(t) - 0.25* \in \text{Eprice}(t) - 0.05 * \in (\text{alum}+\text{cot})/\text{GDP}(t)$

It should be noted that E & Z also include an adjustment for the share of the private sector in GDP which is intended to represent changes in efficiency resulting from private sector growth. This is excluded here both because of the insignificance of the E & Z results and because the size of this effect, if it exists, is extremely small in the case of Tajikistan.

The next step is to obtain a series on total economic activity (TEA) from the base year estimate of the size of total economic activity derived for 1999 above. To do this, we calculate changes in TEA ($\in$ TEA) by using the following formula:

(2) $\text{TEA}(t)/\text{TEA}(99) = \{\text{TEA}(t-1)/\text{TEA}(99)\} * \{1 + \in \text{Elec}^{\text{resid}}(t)/100\}$

It should be noted that this relationship implicitly assumes a unitary elasticity of energy use with respect to output growth. This is identical to the procedure in Eilat and Zinnes (2000) and consistent with Johnson, Kaufman and Zoido-Lobaton (1998), since we are already adjusting here for the same factors that they are adjusting for with their assumed elasticity of 0.9 via the procedure through which the $\text{Elec}^{\text{resid}}$ variable was derived. A few simple manipulations using the size of official GDP relative to official GDP in 1999 (GDP99) and the size of the shadow economy relative to GDP in 1999 (SHAD(99)) yields the size of the shadow economy in other years by using the following relation:

(3) $\text{SHAD}(t) = [(\text{TEA}(t)/\text{TEA}(99))/\text{GDP99}(t)] * [1 + \text{SHAD}(99)] * 100 - 100$

The value of GDP99 is taken from statistics of the Ministry of Finance as reported in the statistical yearbook issued in 2001 by Goskomstat.

III. Results

A. Estimate of the Size of the Shadow Economy in 1999

According to the Ministry of the Economy, official GDP figures are inflated by 25% to account for the shadow economy. This figure is apparently chosen arbitrarily, and is not based on any actual survey evidence or other direct measurement.[1] It should be noted that this calculation of GDP is done from the production side, i.e. it is based on physical production measurements from Soviet times, but is related methodologically to Value Added measurements from standard national income accounting. Due to the goal of this paper to compare survey derived shadow economy estimates with actual estimates of economic activity, the officially reported figures will be reduced by the 25% arbitrary adjustment that has been added to them. For comparison purposes, the extent to which the "true" size of the economy differs from officially reported figures (which include the government's adjustment for shadow activities) will also be shown.

This paper uses a measure of household expenditure based on the Tajikistan Living Standards Survey (TLSS) performed in 1999 by the State Statistics Committee (See Goskomstat 1999). This measure (See Table 2) is a per capita measure of the same portion of GDP accounted for by the category "Household Consumption" in the official figures which, according to the government, accounts for two thirds of the total. After adjusting the per capita figures from the TLSS for the size of the total population, we find that the TLSS figures imply consumption that is on average 43% higher than those implied by official GDP. Even if this

adjustment is applied only to the consumption portion of GDP (two thirds of the total) this implies that "true" GDP is 28% higher than that officially reported. Table 3 reports these figures together with the results for other adjustments discussed below.

It is likely that a substantial portion of the unobserved household expenditure noted here is funded through unreported worker remittances from outside the country. Anecdotal evidence indicates that a substantial number of Tajiks work outside the country, particularly in Russia and neighboring countries, and that they send a large share of their earnings back home to their families. One corollary of this observation is that there is a large unreported credit item in the Balance of Payments corresponding to these unreported remittances.

However, there are several other reasons to think that even the TLSS reported consumption figures are under reported. The first of these derives from a direct estimate of food consumption contained in the TLSS (See Table 4). These figures make it clear that per capita food consumption in rural areas is in fact more than twice that in urban areas. In contrast, food expenditures as shown in the TLSS (See Table 5) show rural consumers spending <u>less</u> on food than their urban counterparts. The reason for this is clear and is relatively well known: rural inhabitants have better food supplies because they are able to grow much of what they eat. These amounts of own-consumption do not show up in expenditure surveys because they are not associated with any expenditure, but should be included in a measure of "true" GDP.

In order to adjust for this problem, the food expenditures for rural households are assumed to be double those actually reported. This figure is in fact somewhat conservative given the fact that this leaves rural inhabitants with assumed food expenditures that are still lower than those of their urban counterparts, and also because it neglects any food consumption on the part of urbanites that may have derived from relatives or friends in the countryside. As can be seen in Table 3, when this adjustment is added to the TLSS estimates, the resulting household consumption estimates are more than double those in the official figures. When applied to the two thirds of GDP which accounts for consumption, we can see that GDP itself is 78% larger than that officially reported.

An additional consideration relates to payment in-kind of workers in collective farms. Survey evidence from Birkenes (1997) estimates that 23.3% of rural workers are not paid in cash but rather receive in-kind payments of food, housing, clothing, etc. Another 27.5% of collective farm workers receive partial in-kind payments while 30% received no payment at all. In order to adjust for this problem, it is assumed that the 23.3% of workers who receive in-kind payments are consuming approximately the same as the rural average, while in the interests of making a conservative estimate, those workers who are partially paid in-kind and those who were not paid at all are ignored though it is likely that they also are responsible for some degree of shadow activity not elsewhere accounted for. As can be seen in Table 3, this additional adjustment to the TLSS figures results in consumption that is 61% greater than that officially reported, while the implication for GDP is that it is 41% greater.

If both of these adjustments are added to the TLSS figures, it can be seen that the resulting consumption levels are more than twice those officially reported, or put another way, "shadow" household consumption is larger than officially recorded household consumption. The

implication for GDP is that it is 91% higher or that "shadow" GDP is almost as large as officially recorded GDP. It should be noted that, as stated above, all of the "official" GDP figures here have been reduced by 25% from those published to exclude the government's own arbitrary adjustment for the size of the shadow economy. If we compare the estimated size of the shadow economy to the reported government figures which include their own 25% adjustment, it can be calculated that the true size of total economic activity is 43% larger than the government's estimate.

It is worth emphasizing some important caveats which apply to these estimates. They are:

1. Applied only to household consumption, which represents 2/3 of GDP and not all of it.

2. Only two of many possible adjustments were considered since these were the only ones for which any concrete information was available.

Accordingly, the estimates above should be regarded as <u>lower bounds</u> to the true size of the shadow economy in Tajikistan.

B. Estimating Changes in the Size of the Shadow Economy 1996-2001

As discussed above in the methodology section, given a base year estimate in the size of the shadow economy, changes in this activity can be inferred from changes in electricity and other fuel consumption. For this study, electricity consumption figures and prices were obtained from the Planning Directorate of Barkitajik, the state electricity production holding company. (See Table 6) Included in these figures were estimates of the percentage of total consumption accounted for by aluminum production and by irrigation. Table 7 shows these percentages, which totaled approximately half of all electricity usage in the country over the years from 1990 to 2001, while the aluminum plant alone accounted for about a third of total usage.

If the formula for generating $\in \text{Elec}^{\text{resid}}$ (t) is applied to these figures, and this is then used in equations (2) and (3) together with officially reported GDP figures and the 1999 estimate of the size of the shadow economy reported above, a series of values for the size of the shadow economy can be derived for the period from 1991-2001. These estimates are shown in Table 8.

The first column of Table 8 reports the results of this calculation as compared to government figures from which the government's arbitrary 25% estimate of the size of the shadow economy has been removed. Accordingly, this column is labeled as the size of total economic activity (shadow plus official) compared to officially recorded economy activity. It can be seen that this figure has a generally decreasing trend over time, ranging from more than twice recorded activity early in the period to 59% greater in the latest year for which information is available, 2001. As might be expected, the share of total economic activity which is captured by the official statistics has increased since the end of the civil war in 1997.

The second column of Table 8 reports the extent to which published government GDP figures (which include their own 25% adjustment for shadow activities) must be inflated to reflect the true size of total economic activity. It can be seen that the official GDP figures are uniformly understated, by a margin ranging from 16% to 56%. Of necessity, given the methodology used, the pattern of change in these figures is identical to that in the first column.

The next two columns are analogous to the first two, except that they follow the original methodology used by Johnson, Kaufman and Zoido-Lobaton (1998) in applying a 0.9 elasticity to generate adjusted $\in$ Elec(t) estimates rather than filtering the raw percentage changes through adjustments for changes in prices and share of electricity to aluminum and irrigation as was done for the first two columns. It can be seen that these estimates are quite similar to the first methodology for the years since 1998 but that there are substantial differences prior to that time. In particular, estimates for the first year shown, 1991 seem implausibly low, perhaps due to the fact that the chain multiplication method used in generating these figures has the effect of cumulating errors through time the further away one gets from the base year of 1999.

The final two columns of Table 8 show calculations analogous to those for the first four columns using estimates of total energy use rather than just electricity. Information on consumption of oil and oil derivatives, gas, and coal were obtained from the Ministry of Energy, though data were only available for the years 1996-2000, which limited the years for which estimates could be generated to the years 1997-2000.[2] (See Tables 9 and 10) It can be seen that using total energy rather than electricity alone generates figures that are slightly higher prior to the based year of 1999 and slightly lower thereafter. However, no major changes resulted from the use of total energy.

IV. Conclusion

It is clear that the shadow economy is a major portion of economic activity in Tajikistan. Even the estimates presented here, which represent a **lower bound** on the true size of the shadow economy, indicate that it is likely that unrecorded activity is likely to be nearly as large, or perhaps even larger, than recorded economic activity.

Even when shadow economy estimates are compared to government figures, which already contain an arbitrary 25% adjustment for shadow economy activity, it is clear that the true size of total economic activity is much larger. Accordingly, estimates of such economic values as per capita GDP, which place Tajikistan in a rank comparable to some of the poorest countries of Sub-Saharan Africa, must be treated with caution since it is likely that they are understated by a large margin. Similarly, economic targets or values which are expressed as a percentage of GDP are likely to be quite low when true figures for total economic activity are used.

Nevertheless, it should be noted that cross country comparisons based on these calculations can be very misleading. The main reason for this is that these other countries may well have large shadow economies themselves, and so comparisons cannot be made directly between adjusted figures for Tajikistan and unadjusted figures for other countries. In terms of

poverty measures, the direct consumption evidence contained in the 1999 survey used in this paper confirms that objective conditions are quite poor for much of the population, and even if adjustments are made to aggregate figures, it is important not to lose sight of the important needs of the poorest segments of the population.

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Table 1
Provision of Households with Durable Goods
in the Republic of Tajikistan

	In Percent		
	Total	**Urban**	**Rural**
Carpets, rugs	90.9	94.6	89.4
Gas or electric stove	48.0	70.6	39.5
Refrigerator	43.2	68.6	33.7
Vacuum cleaner	4.9	15.1	1.1
Washing machine	24.0	37.5	18.9
Sewing machine	59.8	58.0	60.4
Air conditioner	6.9	16.2	3.4
Stereo or mono record player/ tape recorder	28.1	39.0	24.0
Radio	21.6	19.9	22.3
Black and white TV	60.0	52.4	62.8
Coloured TV	18.6	38.4	11.2
Video recorder	6.6	13.6	4.0
Camera	1.5	2.8	1.0
Bicycle	14.3	12.7	14.8
Motorcycle	6.2	2.2	7.7
Car	12.2	12.3	12.2

Source: *Living Standard of the Population*, Republic of Tajikistan, State Statistical Agency under the Government of the Republic of Tajikistan, Dushanbe, 1999.

Table 2

Household Expenditures in the Republic of Tajikistan

	Average per Household (per month, in rubles)			Average per Capita (per month, in rubles)			In Per Cent		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
Total including:	914488	87773	92879	12938	15383	12252	100	100	100
Food expenditure	67375	60042	70115	9529	10523	9249	73.7	68.4	75.5
Alcohol	234	317	203	33	56	27	0.3	0.4	0.2
Tobacco	631	672	615	89	118	81	0.7	0.8	0.7
Non-food:									
Goods	9232	10419	8788	1306	1826	1159	10.1	11.9	9.5
Petrol	868	1303	706	123	228	93	0.9	1.5	0.8
Medicine	1752	1512	1843	248	265	243	1.9	1.7	2.0
Services including:									
Social	81	127	64	11	22	8	0.1	0.1	0.1
Communication	66	184	22	9	32	3	0.1	0.2	0.0
Transport	1325	1463	1274	187	257	168	1.4	1.7	1.4
Housing and public utilities	3686	4429	3408	521	776	450	4.0	5.0	3.6
Education	215	513	107	30	90	14	0.2	0.6	0.1
Health services	297	305	294	42	53	39	0.3	0.3	0.3
Other expenditures	5726	6487	5440	810	1137	718	6.3	7.4	5.8

Source: *Living Standard of the Population*, Republic of Tajikistan, State Statistical Agency under the Government of the Republic of Tajikistan, Dushanbe, 1999.

Table 3

Size of Shadow Economy as Percent of Official GDP in 1999

	Size of Household Consumption Relative to Official Figures	Size of GDP Relative to Official Figures after Consumption Adjustment
Ratio of TLSS to Official GDP	1.43	1.28
With "Rural Own Consumption" Adjustment	2.17	1.78
With "In Kind" Adjustment	1.61	1.41
With Both Adjustments	2.36	1.91

Table 4

Food Security of Households in the Republic of Tajikistan

	Flour	Vegetables	Beans	Rice	Wheat	Average household, in kg	
						Plant Oil and Fat	Sugar and Jam
Republic of Tajikistan	23.4	12.6	1.7	4.4	17.4	2.2	0.8
Urban households	14.3	4.3	0.9	2.9	7.9	2.1	1.1
Rural households	26.9	15.7	2.0	5.0	20.9	9.3	0.6
Dushanbe	13.2	4.5	1.0	3.5	0.6	2.5	1.7
GBAO	18.3	5.9	0.0	0.3	1.3	0.5	0.0
Urban households	17.5	2.0	0.1	0.5	0.1	0.8	0.2
Rural households	18.5	6.9	0.0	0.3	1.5	0.5	0.0
Leninabad oblast	21.8	16.7	1.0	3.9	11.7	2.5	0.6
Urban households	12.5	4.9	0.6	2.9	5.1	2.3	0.8
Rural households	25.6	21.5	1.1	4.3	14.4	2.6	0.5
Khaatlon oblast	25.0	11.9	1.8	4.3	32.9	2.1	0.5
Urban households	17.7	3.9	1.3	2.3	24.4	1.7	0.9
Rural households	26.6	13.7	1.9	4.7	34.7	2.2	0.5
Rayons of Republican Subordination	28.5	12.4	3.2	6.7	9.0	2.2	1.1
Urban households	14.3	3.1	0.6	3.4	3.3	1.2	0.7
Rural households	30.3	13.6	3.5	7.1	10.7	2.3	1.1

Source: *Living Standard of the Population*, Republic of Tajikistan, State Statistical Agency under the Government of the Republic of Tajikistan, Dushanbe, 1999.

Table 5

Food Expenditures in the Republic of Tajikistan

	Average per Household (per month, in rubles)			Average per Member of Household (per month, in rubles)			In Per Cent		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
Total including:	67375	60042	70115	9529	10523	9249	100.0	100.0	100.0
Bread and bread products	28628	22255	31015	4050	3900	4091	42.5	37.1	44.2
Rice	5223	4652	5436	739	815	717	7.8	7.7	7.8
Beans	1022	810	1101	144	142	145	1.5	1.3	1.6
Potatoes	3602	3444	3661	509	604	483	5.3	5.7	5.2
Vegetables	4718	4338	4862	667	760	642	7.0	7.2	6.9
Fruits	911	1302	765	129	228	101	1.4	2.2	1.1
Preserved vegetables and fruit	169	326	109	24	57	14	0.3	0.5	0.2
Meat and meat products	5705	6971	5231	807	1222	690	8.5	11.6	7.5
Fish	126	216	91	18	38	12	0.2	0.4	0.1
Eggs	1395	1830	1231	197	321	162	2.0	3.1	1.8
Milk and dairy products	4195	2998	4640	593	525	612	6.2	5.0	6.6
Plant oil	6203	5354	6521	877	938	860	9.2	8.9	9.3
Sugar. Including confectionery	2987	3439	2818	422	603	372	4.4	5.7	4.0
Tea	2210	1898	2326	313	333	307	3.3	3.2	3.3
Salt	281	209	308	40	37	41	0.4	0.4	0.4

Source: *Living Standard of the Population*, Republic of Tajikistan, State Statistical Agency under the Government of the Republic of Tajikistan, Dushanbe, 1999.

Table 6
Electricity Production and Consumption
in Tajikistan, 1991 – 2001

Year	Generation Millions of Kwh	Consumption Millions of Kwh	T & D Loss %	Average Price US cents
1991	17537	19088	9.4	3.93
1992	16805	17637	10.7	0.20
1993	17733	16560	12.5	0.43
1994	16978	17150	12.6	0.42
1995	14759	15410	11.7	0.51
1996	14972	14059	14.6	0.68
1997	14005	14103	14.6	0.61
1998	14418	14663	14.3	0.35
1999	15797	15607	14.1	0.36
2000	14247	15580	13.9	0.35
2001	14336	15686	14.0	0.31

Source: Deputy Chief of Planning of Barki-Tajikistan

Table 7

Electricity End Use Shares of Consumption
in Tajikistan, 1991 – 2001

Year	Consumption by Aluminum Plant	Price to Aluminum Plant	Consumption of General Population	Price to Population	Consumption by Irrigation	Price to Irrigation	Consumption by Budget Organizations	Price to Budget Organizations
	Per cent of Total	U.S. cents	Per cent of Total	U.S. cents	Per cent of Total	U.S. cents	Per cent of Total	U.S. cents
1991	38.9			6.89	15.7			
1992	40.0			0.07	15.7			
1993	33.0		15.3	0.1	15.7			
1994	31.1		20.1	0.23	15.7			
1995	31.1	0.012	23.2	0.17	14.9	0.1		
1996	28.6	0.85	27.0	0.07	17.0	0.1	0.5	0.14
1997	28.0		31.5	0.09	17.0	0.09	3.9	0.09
1998	32.5	1.35	34.8	0.06	14.0	0.06	4.2	0.06
1999	34.2	0.63	35.4	0.09	13.2	0.17	4.0	0.17
2000	30.1	0.65	37.3	0.12	18.0	0.14	4.0	0.14
2001	32.2	0.58	34.0	0.16	16.0	0.11	4.2	0.11

Source: Deputy Chief of Planning of Barki-Tajikistan

Table 8
Tajikistan
Relative Size of Shadow Economy

Year	Electricity Method with Adjustments for Prices and Shares of Aluminum and Irrigation		Electricity Method Using Uniform Elasticity of 0.9		Total Energy Method		Electricity and Oil Only	
	Total Economy Activity / Officially Recorded Activity	Total Economic Activity / Published GDP	Total Economy Activity / Officially Recorded Activity	Total Economic Activity / Published GDP	Total Economy Activity / Officially Recorded Activity	Total Economic Activity / Published GDP	Total Economy Activity / Officially Recorded Activity	Total Economic Activity / Published GDP
1992	2.08	1.56	1.37	1.03				
1993	1.55	1.16	1.52	1.14				
1994	2.00	1.50	1.81	1.36				
1995	1.88	1.41	1.64	1.23				
1996	1.81	1.36	1.82	1.37				
1997	1.80	1.35	1.95	1.46	1.99	1.99	1.87	1.40
1998	1.92	1.44	1.87	1.40	1.98	1.48	1.93	1.45
1999	1.91	1.43	1.91	1.43	1.91	1.43	1.91	1.43
2000	1.73	1.30	1.76	1.32	1.69	1.26	1.62	1.22
2001	1.59	1.19	1.58	1.19				

Table 9

Tajikistan: Natural Gas Consumption

Year	Gas		
	From Uzbekistan	Domestic	Total
	-- Millions of m3 --		
1991	1757.1	16.2	1773.3
1992	1570.0	53.0	1623.0
1993	1374.0.	20.0	1394.0
1994	984.0	11.0	995.0
1995	735.9	16.2	752.1
1996	531.0	27.1	558.1
1997	582.0	8.84	590.84
1998	521.4	11.2	532.6
1999	464.7	22.1	486.8
2000	501.6	32.8	534.4
2001	560.0	39.1	599.1

Conversion factor: 0.0346 GJ/m3

Table 10

Tajikistan: Fuel Consumption Estimates

Year	Oil Products							Coal	
	Petrol	Diesel	Lubricant	Black Min.	Oil Pitch	Oil	Oiling Material	Brown Coal	Coke Coal
	-- metric tons --							-- 1000 metric tons --	
1991								275.1	38.0
1992								183.0	28.0
1993								162.9	13.0
1994								103.4	3.0
1995								27.1	6.8
1996	249,015	291,264	14,068	39,189	1,972	815	69	6.5	13.5
1997	87,650	2,151,797	11,983	7,257	93	1,505	113	7.7	6.7
1998	143,523	255,075	15,042	1,918	8,315	234	13	8.0	8.1
1999	112,981	251,675	5,538	3,742	4,222	0	55	8.0	8.5
2000	66,372	148,769	8,600	331	4,223	0	256	11.5	9.1
GJ/MT	35.85	37.29	41.40	39.56	45.29	39.76	45.29	15.0	33.48

Source: Tajikistan Ministry of Energy

Notes

1. Interview with Mr. I. Bahronov, Deputy Minister of the Economy

2. All data for fuels and electricity were converted to Gigajoules (10^9 joules) using conversion factors from the Energy Information Administration Monthly Energy Review May 2002 for petroleum derivatives and the Oak Ridge National Laboratory Bioenergy Feedstock Development Program for other fuels.

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