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Spatial Inequality and Development in Central Asia

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Abstract

This paper focuses on inequality in living standards across oblasts and regions within Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan. Regional inequality is an important area of research and policy development. Inequality in income and consumption are logical outcomes in a market-based economic system. If inequality within countries exists because of barriers to competition, then inequality can foment internal tension, and economic and social development within countries is negatively affected. We examine Living Standards Measurement data from Tajikistan, Kyrgystan, and Kazakhstan and additional survey data from Uzbekistan. We find that the most important explanations for the variation in expenditures per capita in the region are household location, household composition, and education. We find large variation in per capita expenditure by location within each country, and the differences go beyond the simple rural-urban distinction. Family structure is also important, and in all.../…

Keywords: inequality, expenditures, regional inequality, Central Asia
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countries, having a university educated household head significantly improves household welfare; expenditures are higher in these households than in households with less educated heads. We examine inequality in access to community services and find that provision of public goods reinforces regional inequality patterns in expenditures that we measure among households. The poorest households are likely to live in communities with the lowest access to public services.

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Introduction

The five Central Asian states emerged as new independent countries during the second half of 1991 with the dissolution of the USSR. They were, together with Azerbaijan, the poorest Soviet republics, although human development indicators, such as almost universal literacy and life expectancies of 66-69 years, were high (World Bank 1993). Assessments of economic performance since independence have focused on outcomes at the national level or on the distribution of household expenditures. By the end of the 1990s output had not recovered its 1991 level, and inequality and poverty were substantially higher than in 1991.[1]

This paper focuses on an intermediate unit of analysis, oblasts and regions within Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan.[2] Regional inequality is an important area of research and policy development. Inequality in income and consumption are logical outcomes in a market-based economic system; labor is rewarded for its productivity, and inherent individual differences in ability and skill are associated with variation in income. When investment in human capital is not rewarded, macroeconomic performance suffers. In many cases, however, economic inequality is not primarily the result of differences in skill or performance but is the result of barriers to entry into good jobs or labor markets, unequal access to productive resources, and other constraints on competitive market interaction. If inequality within countries exists because of these barriers to competition, then inequality can foment internal tension, and economic and social development within countries is negatively affected.

Central Asia experienced large changes in its political, social, and economic institutions since independence in the early 1990s. In this paper, we document how these changes affected the distribution of public and private resources across and within countries. We attribute part of these regional adjustments to inequality in human capital and dependency but find that most of the inequality is the result of regional differences. These regional differences within countries are large and growing over time and are not simply due to rural-urban differences. Regional inequality is reinforced by the public sector in the allocation of public services. Our discussion motivates public policy that can redress, to a certain extent, the inequalities we measure. To our knowledge, there is little published information on the spatial dimension of inequality in Central Asia. The Central Asian region is of increasing political importance, and an understanding of its people and the problems they face is essential to the development of regional stability.

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[1] Pomfret and Anderson (2001) review this literature. For general background on the Central Asian countries' economies, see Pomfret (1995) and Islamov (2001).

[2] The oblasts are listed in Appendix 1. Although the official name for these administrative units has been changed in some of the successor states, the Russian term 'oblast' remains in common usage.

The opening section provides background information by describing the main ethnic, sub-ethnic and supranational groups. Section 2 presents evidence on spatial inequality within the five economies. The third section offers explanations of the level of and trends in spatial inequality. Section 4 analyses the consequences of spatial inequality. The final section draws some conclusions.

1 Background

None of the five countries had any previous history as a nation state. Although some have tried to create legitimacy by harking back to past rulers, the link is far from direct and the territory different.[3] The current borders are those of the eponymous Soviet republics which had been established by the delimitation of 1924, and by subsequent revisions which were essentially completed by 1936.

The delimitation by Stalin is a source of controversy. In broad terms, by dividing the Turkestan Autonomous Soviet Republic (established in 1918 as a successor to the Tsarist Governor Generalship) into smaller units, it was a case of divide and rule aimed at discouraging any sense of a unified Turkestan. That policy was successful, insofar as, since the defeat of the *basmachi* movement in the early 1920s, there has been no serious PanTurkic pressure in the region.

Whether the details of republic boundaries were aimed to cause discord is more debatable. Some Central Asian nationalists are convinced in a conspiracy theory. Tajiks see a plot in the separation of their Soviet republic from their chief historical cities of Samarkand and Bukhara. The Khorezm oasis was divided between Uzbekistan and Turkmenistan, leaving a concentrated Uzbek minority in the Dashkoguz oblast of Turkmenistan. The densely populated and ethnically intermingled Ferghana Valley posed the most difficult problem, which was dealt with by convoluted borders separating the Kyrgyz, Tajik and Uzbek republics and by creating three small enclaves as part of the Uzbek republic but surrounded by Kyrgyz territory.[4] Although the outcome was messy, some outside observers conclude that 'the Russian linguists, anthropologists, and politicians had done fairly competent work' in determining republic boundaries (Soucek 2000). The ethnic groups were intermingled, in particular where urban and surrounding rural populations differed and in the Ferghana Valley, so that any solution would be imperfect.[5]

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[3] For Tajikistan the Samanid Empire (874-1005AD) marked the formation of the Tajik nation, with a common language, territory and culture' (UNDP 2000a:41). In Tashkent the main statue of Karl Marx was replaced by one of the Emir Timur (Tamerlaine) in 1993. These forerunners governed territory far beyond the present boundaries of Tajikistan and Uzbekistan.

[4] Most of the Ferghana Valley is in Uzbekistan, but the uplands are in the Kyrgyz Republic, which controls vital water supplies, and the mouth of the valley is in Tajikistan.

[5] Before 1917 the urban population was often divided into European and Sart (or 'native'), a general term for all Central Asian groups. As mentioned, however, Bukhara and Samarkand were considered to be Tajik cities, while Tashkent was an Uzbek (and Russian) city surrounded by Kazakh countryside, and Osh and

During the Soviet era the issue became more complex because the USSR was treated in many respects as a single unit, with republican boundaries having little real significance, and yet there was a growth of identity among the titular nationalities. Several waves of migration increased the ethnic complexity. During the 1930s, many from Central Asian fled from the region in response to forced collectivization and political purges, and many more died. During the 1941-45 war Stalin deported groups whom he considered untrustworthy from regions near the front line to Central Asia, notably Volga Germans and Crimean Tatars from the west and Koreans from the east of the USSR. There was also an ongoing pattern of political prisoners being exiled in Central Asia. During the 1950s Khrushchev organized the Virgin Lands program which brought many new settlers to northern Kazakhstan, reinforcing a pattern that had existed since Tsarist times of Europeans from within the empire moving to fertile land in northern Kyrgyzstan and in Kazakhstan.

Despite the rhetoric of comradeship, ethnic antagonisms existed beneath the Soviet surface. After a soccer game in Tashkent in May 1969, Uzbek and Russian youths fought in the streets following chants from the former 'Russians go home' in reaction to granting of housing privileges to Russians involved in the reconstruction following the 1966 earthquake. The deal made by Brezhnev was to leave the Uzbek First Secretary with a fairly free hand in return for maintenance of political stability. Sharof Rashidov, first secretary during 1959-83, died just before Andropov and Gorbachev launched the anti-corruption campaign in which the Uzbek elite was the prime target. Despite official demonization of Rashidov for corruption, he remained a local hero for channelling billions of rubles surreptitiously into the republic and, after independence, a major street in Tashkent was named after him.[6] Attempts by Gorbachev to establish first secretaries loyal to Moscow failed and in 1989 he appointed a local technocrat, Islam Karimov, who owed nothing to the central government and who appropriated much of the opposition's Uzbek nationalism when he became president of Uzbekistan in 1991.

A similar pattern occurred in the other populous Central Asian republic. The powerful Kazakh leader, Dinmukhamed Kunaev, who had been first secretary since 1960 was dismissed by Gorbachev in 1986 for corruption. After the appointment of a Russian as his replacement, a large demonstration in the Kazakh capital was dispersed by force, leaving two people dead. Subsequently, Gorbachev backed down, and in 1989 he appointed Nursultan Nazarbayev as first secretary, a Kazakh whose career had been promoted by

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Jalalabad were towns with Uzbek majorities surrounded by countrysides of mixed, but dominantly Kyrgyz ethnicity.

6 This popularity appears to be fairly general, despite the awful practices of some of Rashidov's associates in this quasi-feudal regime (Rumer 1989:144-59), and is a sign of the growth of Uzbek national consciousness during the Rashidov era. In their study of the Uzbek city, Koroteyeva and Makarova (1998) provide evidence from Samarkand that during the 1960s, with the satisfaction of basic needs and rise of consumerism, Central Asians began to reassert traditional consumption patterns, notably in connection with major life event ceremonies such as circumcision, marriage or death.

Kunaev and who metamorphosed into president of Kazakhstan.[7] Under Kunaev, Kazakhization of the political and administrative system was substantial and Kazakhs were favoured in access to higher education, so that by 1989 a national identity had been forged and this was promoted by Nazarbayev (Melvin 1995:106). Today a prominent statue in Almaty commemorates the nationalist martyrs of December 1986.

Inter-ethnic tensions became more open in the final years of the USSR, although never on the scale of events in the Caucasus. The most serious clashes in Central Asia occurred in June 1990 when the border between the Uzbek and Kyrgyz republics had to be closed to prevent an armed mob of about fifteen thousand Uzbeks from crossing into the Kyrgyz republic to assist their co-ethnics involved in land disputes in the neighbourhood of Osh. The political fall-out from the Osh riots was severe enough to lead to the fall of the Kyrgyz first secretary and his replacement by the head of the Kyrgyz Academy of Sciences, Askar Akaev, who became the most liberal president in the region after 1991. The area around Osh, and indeed the whole Ferghana Valley, remains a potential tinderbox of ethnic disputes, exacerbated by the concentration of the most avid Islamic groups in this densely populated area.[8]

The ethnic composition has changed in important respects since the 1989 census. Many non-Central Asian groups emigrated in the early 1990s. People with a claim to German blood 'returned' to Germany, and this group has almost disappeared from Kazakhstan and the Kyrgyz Republic. Slavs had a more difficult choice; many had lived in Central Asia for several generations and felt divided loyalties, but over a million Russians emigrated between 1990 and 1996 (Olcott 1996). Kazakhstan encouraged the return of ethnic Kazakhs who had moved to Mongolia or western China earlier in the twentieth century,[9] but this was on a smaller scale and since 1991 the net effect in Kazakhstan (and to a lesser extent the Kyrgyz Republic) has been substantial emigration, amounting to almost ten percent of the 1989 population (Heleniak 1997). Net emigration has roughly been balanced by natural increase in the Kyrgyz Republic, but in Kazakhstan the population dropped from 17.1 million at independence to 15.4 million in 1999.[10] The selective effect of emigration on the ethnic composition of the remaining population is illustrated by the 1999 census in

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[7] The catalyst for change was in June 1989 with ethnic riots in Novy Uzen in the southwest of the republic, but little is known about the scale of these disturbances. The Kazakh republic was the only Central Asian republic in which major demonstrations against the Soviet Union occurred in 1989-91, but these focused on environmental issues, especially the dumping of nuclear waste in the republic, rather than ethnic issues.

[8] In November 1991 an Islamic Centre was established in Namangan and that oblast (one of three in the Uzbekistan part of the Ferghana Valley) was under Islamic control until suppressed by the Uzbekistan security forces, successors to the Soviet KGB, in March 1992 (Ro'i forthcoming).

[9] The *Human Development Report Kazakhstan 2000* (p.6) estimates repatriates to number 360,000 by the end of the 1990s. This was part of a conscious policy to improve the Kazakh population balance. In 1994 parliament approved transfer of the capital of Kazakhstan and the new capital, Astana, was officially inaugurated in June 1998; one motive for this expensive move was to bring the centre of government closer to the Russian belt.

[10] ESCAP *Population Data Sheet*, August 1992.

the Kyrgyz Republic (Table 1), where the combined share of Russians, Ukrainians and Germans dropped from almost a third in 1979 to a seventh of the total in 1999, and Uzbeks displaced Russians as the largest minority. There has also been economic migration from Central Asia, especially by Tajiks since the late 1990s, although it is unclear how many of these are temporary migrants and how many have left their country permanently.[11]

Table 1: Ethnic composition of the Kyrgyz Republic (in thousands, from 1979, 1989 and 1999 censuses)

	1979		1989		1999	
	Number	Percent	Number	Percent	Number	Percent
Kyrgyz	1,687	47.9	2,230	52.4	3,128	64.9
Uzbeks	426	12.1	550	12.9	665	13.8
Russians	912	25.9	917	21.5	603	12.5
Dungans	27	0.8	37	0.9	52	1.1
Ukrainians	109	3.1	108	2.5	50	1.0
Uigurs	30	0.8	47	0.9	47	1.0
Tatars	72	2.0	70	1.6	45	0.9
Kazakhs	27	0.8	37	0.9	43	0.9
Tajiks	23	0.7	34	0.8	43	0.9
Turks	5	0.1	21	0.5	33	0.7
Germans	101	2.9	101	2.4	21	0.4
Koreans	14	0.4	18	0.4	20	0.4
Others	89	2.5	98	2.3	72	1.5
Total	**3,523**		**4,258**		**4,823**	

Source: National Statistical Committee of the Kyrgyz Republic; main results of the First National Population Census of the Kyrgyz Republic of 1999 (National Statistics Committee 2000:26).

Sub-ethnic divisions are also important in Central Asia, and some observers believe they are more important than the ethnicities defined by Stalin in the 1920s. In Kazakhstan, the Kyrgyz Republic and Turkmenistan, where the titular nationality has a relatively more recent nomadic past, tribal groupings remain strong. Turkmenistan's national flag incorporates five carpet designs belonging to the main tribes (Akhal Teke, Yumot, Salar, Ersari and Kerki), and the country's oblasts approximate tribal boundaries. Although the Akhal Teke, whose territory includes the national capital, have been dominant, President Niyazov styles himself Turkmenbashi (head of all Turkmen) and emphasises the motherland as the prime locus of loyalty (Akbarzadeh 1999), although it is unclear to what extent the Yumot in Balkan and Dashoguz oblasts or Ersari and Kerki in Lebap accept national over tribal allegiance. Kazakhs owe allegiance to the Great Horde (two million in 1989), Middle Horde (three million in 1989) or Little Horde (1.5 million in 1989), and there are tensions between President Nazarbayev as leader of the Great Horde and leaders

[11] There is also a much publicized trafficking in women, which appears to mainly involve Kyrgyz citizens being tempted to the Gulf states.

of the Middle Horde, which had been pre-eminent before the 1960s. Askar Akaev, President of the Kyrgyz Republic, represents the northern region and the Sary Bagysh tribe, while Kyrgyz (as well as Uzbeks) in the south of the country feel excluded. In Tajikistan the civil war that waged through most of the 1990s pitted three Tajik groups (from Leninabad in the north, Gulab in the south, and Garm in the east) against one another, while the Pamiri people in the Gorno Badakhshan autonomous oblast are distinct.[12] In Uzbekistan, which contains the sedentary heart of the region, the elite is divided into geographical factions, identified with Samarkand/Bukhara in the centre/west, Kashkardiya in the south, Tashkent in the north and Ferghana in the east, with the Samarkand group currently dominant.

The present situation consists of overlapping loyalties, which remain fluid. Despite the lack of genuine historical legitimacy, the five Soviet republics created some degree of national consciousness, which has been strengthened since independence in all except Tajikistan. At the same time ethnic and sub-ethnic ties remain strong, and they have a geographical dimension which makes spatial inequalities potentially inflammatory. At the supranational level, concerns about pan-Turkism have proven unfounded, and Tajik links to its co-linguist Iran are even weaker. On the other hand, Islam is the common religion, although here too there are distinctions.

The hold of Islam is much weaker in the northern and traditionally more nomadic or pastoralist parts of Central Asia; i.e., Kazakhstan, Karakalpakstan, Turkmenistan and northern Kyrgyz Republic. In Uzbekistan President Karimov is committed to establishing a secular state accommodating its Islamic heritage. In 1992 he took the oath of office on the Koran, but he has increasingly staked his legitimacy on being a bulwark against religious extremism. In 1997 riots in Namangan left several policemen dead, and the severed head of one of them was displayed by the rebels in the town centre. In February 1999, bombs, ostensibly aimed at the president himself, killed several people in downtown Tashkent. The most serious battles have occurred in the Ferghana Valley where Islamic Movement of Uzbekistan (IMU) incursions in the summers of 1999 and 2000 led to Uzbek planes bombing terrorist targets in Tajikistan and the Kyrgyz Republic and the laying of mines along the border.[13]

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[12] They are the only group in the region which follows the Ishmaeli branch of Islam, recognizing the Aga Khan as their spiritual leader. Within the GBAO, Tajik is the official language, but Shugnan, Rushan, Vahan, Yazgulam, Russian and Kyrgyz are also used as languages of instruction in secondary schools. The civil war initially confronted factions from Gulab and Leninabad, supported by Russia and Uzbekistan, against Garmis and Badakhshanis, but around 1994 the apparent victors fell out as the Gulab group, which had done most of the fighting, and the Leninabad group, which had been dominant in the Soviet era, disagreed over how to share power.

[13] Both Tajikistan and the Kyrgyz Republic protested the 1999 bombings, which killed citizens of both countries. Dozens of people in Tajikistan, mainly children, have died from landmines. According to *The Economist* (27 January 2001) over thirty Kyrgyz and at least two hundred Uzbek soldiers died repelling IMU incursions in 2000.

The protracted civil war in Tajikistan from 1992 until (and by some accounts beyond) the June 1997 peace agreement is generally seen as a regional conflict, driven by competition for resources rather than over beliefs. Nevertheless, the war had a religious component with Islamic groups supporting the United Tajik Opposition (UTO), and the growing poverty reinforced the politicization of Islam.[14] The UTO, and the IMU, are succoured by supporters in Afghanistan, and the governments of Uzbekistan and Tajikistan are involved in supporting co-ethnic groups fighting in the northern alliance in the Afghanistan conflict. Heightened instability in Afghanistan could easily spill over into Tajikistan and Uzbekistan.

The regional, sub-ethnic or tribal, ethnic, national and supranational sources of tension often merge in practice. Kyrgyz and Tajik protests over Uzbek bombing and mining of their territory are partly driven by concerns that Uzbekistan's territorial designs are being hidden behind an anti-terrorist rhetoric. In November 1998, Makhmud Khudoberdyev, an ethnic Uzbek who had been an army colonel in Tajikistan before splitting with President Rakhmanov and fleeing to Uzbekistan, led a military force which occupied Khudjand before being driven out by Tajikistan government forces; President Rakhmanov of Tajikistan initially denounced this as a coup attempt supported by Uzbekistan with the intention of promoting secession by Leninabad oblast, although later both governments downplayed the incident. The first explicit attempt to revise the national borders occurred in the winter of 2000/1, when Uzbekistan started pressing for territory to provide corridors to its enclaves in the Kyrgyz Republic's portion of the Ferghana Valley and supported its claim by cutting off gas supplies to the Kyrgyz Republic.[15]

2 Descriptive evidence

Income levels varied across Soviet republics and also within them. Since independence, intrarepublic differentials appear to have widened. In general, the people in the capital cities were best able to benefit from the opportunities of the market economies or best able to protect themselves from the huge negative shocks. In Kazakhstan, proximity to Russia also seems to have been a positive factor as the northern part of the country did relatively well.

Table 2 presents conceptually comparable measures of GDP per capita at purchasing power parity (PPP) for the oblasts of Kazakhstan, the Kyrgyz Republic and Uzbekistan, as

[14] In this sense it mirrored the situation in Afghanistan, where regional groups fought for the succession after the withdrawal of Soviet troops. There the outcome was an extreme Islamic regime.

[15] The Kyrgyz Republic and Tajikistan note that Uzbekistan seems to be in no hurry to complete demarcation of indeterminate boundary areas with them, but is progressing with demarcation of the border with its larger neighbour, Kazakhstan. Assets such as military equipment or civilian aircraft were taken over by the successor state on whose territory they were to be found when the USSR was dissolved in late 1991, and Uzbekistan inherited the strongest army in the region because Tashkent was the centre of the Soviet Central Asian military command.

Table 2: Real per capita GDP by region

(a) Kazakhstan

Oblys	Real GDP per capita (in PPP $)					
	1994	1995	1996	1997	1998	1999
Akmola (incl. Astana)	3,153	3,420	3,061	3,218	3,710	4,066
Almaty	2,008	2,263	2,919	2,942	2,671	2,437
Almaty City	6,725	5,188	9,369	10,980	10,730	11,935
Aqtöbe	4,804	4,977	4,204	5,311	5,639	5,246
Atyrau	8,031	9,988	11,096	12,155	9,807	14,677
East Kazakhstan	5,224	5,063	4,394	4,826	5,238	4,811
Karaganda	8,950	7,444	5,257	5,836	5,718	6,176
Mangystau	10,623	11,894	13,571	10,461	7,967	10,130
North Kazakhstan	5,928	5,790	6,405	4,986	3,620	4,334
Pavlodar	8,456	8,488	7,376	5,439	10,822	10,235
Qostanay	5,494	4,320	4,019	5,721	5,137	4,603
Qyzylorda	2,174	2,662	3,155	3,206	2,712	2,838
South Kazakhstan	1,336	1,611	2,304	2,333	2,127	2,080
West Kazakhstan	2,897	2,962	2,693	4,100	4,091	5,438
Zhambyl	1,638	1,556	2,501	2,178	1,983	1,952

(b) Kyrgyz Republic 1996-99

Oblast				
	1996	1997	1998	1999
North:				
Bishkek	3,663	3,762	4,231	4,340
Chuy (excl.Bishkek)	3,651	3,927	3,617	3,776
Centre (mountain region):				
Issyk-Kul	1,577	2,734	3,372	3,517
Naryn	1,890	2,200	2,131	2,218
Talas	1,766	1,794	1,656	1,718
South:				
Jalalabad	1,470	1,424	1,380	1,421
Osh	1,117	1,088	997	1,024
Batken			1,010	1,039

(c) Uzbekistan 1999

Oblast	Real GDP per capita (1999	
	(in PPP$)	(as percent of national average)
Uzbekistan	2,994	100
Northern Uzbekistan:		
Karakalpakstan	2,023	85
Khorezm	3,148	105

table continues…

Central Uzbekistan		
Bukhara	3,863	129
Dzhizak	2,278	76
Navoi	3,948	132
Samarkand	2,464	82
Syrdarya	3,100	104
Southern Uzbekistan		
Kashkadarya	2,458	82
Surkhandarya	2,225	74
Eastern Uzbekistan		
Andijan	2,796	93
Fergana	3,106	104
Namangan	1,965	66
Tashkent	3,165	106
Tashkent City	5,543	185

Source: *Human Development Report: Kazakhstan* (UNDP 2000b:56-7). *Human Development Report: Kyrgyzstan* (UNDP 2000c:64-5). *Human Development Report: Uzbekistan* (UNDP 2000d:60).

reported in the various national *Human Development Reports* prepared under the aegis of local UNDP offices. They illustrate the significantly higher income levels in Kazakhstan and more equal spatial distribution in Uzbekistan, as well as bringing out some of the major intracountry variations. As measures of well being, however, these data must be treated with caution. There are substantial data problems, including both the reliability of the raw data and the choice of PPP conversion rates. Moreover, because they are output measures they may not reflect final claims on resources; this is especially true of Kazakhstan where the western oblasts of Atyrau and Mangistau produce most of the oil, but the economic benefits accrue elsewhere, especially in the commercial centre, Almaty. Unfortunately, similar measures are not reported in the national *Human Development Reports* prepared in Tajikistan or Turkmenistan.

The best distributional evidence comes from the Living Standards Measurement Study (LSMS) survey data, which are in the public domain for three of the Central Asian countries. These are high quality household survey data, which can be analysed to estimate the determinants of household expenditure, including the role of location.[16] The data for our analysis are obtained from four Living Standards Measurement Study (LSMS) surveys: the 1993 and 1997 Kyrgyz Republic surveys, the 1996 Kazakhstan LSMS, and the 1999 Tajikistan LSMS. For Uzbekistan, we use data on households collected in the Fergana

16 The data estimation and results are described more fully in Pomfret and Anderson (2001), and in more depth for the Kyrgyz Republic in Anderson and Pomfret (2000). Atkinson and Micklewright (1992) describe the limitations of the household budget surveys designed in the Soviet era, and still used in Central Asia throughout the 1990s. The LSMS surveys conducted under the aegis of the World Bank are far superior, although they still have limitations (Falkingham 1999; Kandiyoti 1999).

oblast in 1999 as a pilot study for redesign of the national Household Budget Survey.[17] The sample sizes are for the Kyrgyz Republic 1926 households in 1993 and 2618 in 1997, Kazakhstan 1890 households, Tajikistan 1983 households, and Uzbekistan 542 households.[18]

Despite the four countries' historical, cultural and geographical similarities, there are differences in the samples. The differences largely reflect the higher incomes and more 'European' culture of Kazakhstan, and the more traditionally Central Asian society in Tajikistan and the Fergana oblast of Uzbekistan. The Kazakhstan sample is the most urban, with 44 percent of households living in rural communities, which is fewer than in the Kyrgyz Republic (57 percent in 1993 and 62 percent in 1997), the Fergana oblast of Uzbekistan (72 percent) or Tajikistan (73 percent). Households in Kazakhstan are less likely to be headed by a man and the head is less likely to be married than households in the Kyrgyz Republic, Tajikistan or the Fergana oblast of Uzbekistan. Finally, household heads in Kazakhstan are older (46 years), on average, than heads in the Kyrgyz Republic (40-41), Tajikistan (40), and Uzbekistan (39).

Households are smaller in Kazakhstan than in Tajikistan, Uzbekistan or the Kyrgyz Republic. In 1996 the average household in Kazakhstan contains 3.6 members, which is less than in the Kyrgyz Republic (4.9 in 1993 and 5.5 in 1997), Uzbekistan (6) and Tajikistan (7). The average number of children in a household in Kazakhstan is 1.3, which is less than in the Kyrgyz Republic (1.8 in 1993 and 2.2 in 1997), Uzbekistan (3.0) or Tajikistan (3.5), while the number of elderly household members is similar in each country (.4-.5). The number of children is substantially higher than in European transition economies or elsewhere in the CIS.

The education variables indicate the high education level, relative to income levels, of these countries. Over two-fifths of household heads in each country have post-secondary education. In Kazakhstan the proportion with university education is slightly higher than in Tajikistan or the Fergana oblast of Uzbekistan. The Kyrgyz surveys, especially that of 1997, report substantially higher proportions of college-educated heads, and fewer heads having other post-secondary education than in the other countries, and there is also a sharp increase in the proportion of household heads completing secondary education and drop in those with incomplete secondary education from 1993 to 1997.[19] The other human capital

[17] The administrative unit, equivalent to counties or provinces, in the USSR was the oblast. After independence the structure was maintained and, although new nomenclatures were adopted, oblast remains a universally recognized term. We use the names and jurisdictions at the time of the surveys and ignore administrative changes which occurred later (such as the relocation of Kazakhstan's capital from Almaty to Astana, the subdivision of the Osh oblast in the Kyrgyz Republic, or the renaming of the Leninabad oblast in Tajikistan).

[18] Summary statistics for each survey are given in Appendix 2, Table A2.

[19] This last change is implausibly large, even allowing for the change in sample composition. The 1997 numbers for incomplete/complete secondary schooling appear more plausible than those for 1993, when

variable, reported health of the household head, also has implausible variations with much worse reported health in Kazakhstan and much better in the Kyrgyz Republic.

Comparison of the samples' characteristics suggests that, in many respects, households in the Kyrgyz Republic and Kazakhstan are more similar to each other than to households in Tajikistan and the Fergana oblast of Uzbekistan. In the Kyrgyz Republic and Kazakhstan, compared to the other two countries, households are more likely to be headed by women or by an unmarried head, heads are younger and better educated, and households are less likely to be in rural areas. In addition, households are smaller and contain fewer dependents in Kazakhstan and the Kyrgyz Republic than in Tajikistan or the Fergana oblast of Uzbekistan.

In the next section of the paper, we examine whether differences in these characteristics explain the variation in living standards that we observe within and across countries in Central Asia. Our measure of well being is household per capita expenditure. We examine regional differences in expenditures that cannot be accounted for by differences in the measurable characteristics of households in our samples. Residual regional inequality is related to the ethnic, cultural, religious, and social differences described in Section 2.

3 Model and variables

We estimate a human capital model in which the per capita expenditure of households is affected by the level of human capital, the number of household members and other demographic characteristics of the household, and the location of the household—see Anderson and Pomfret (2000) for a more detailed discussion of the expenditure model. The dependent variable is household expenditures per capita, based on a headcount of household members and reported expenditures on goods (excluding vehicles), food, health, education and other services, housing, utilities, communication, and transportation.[20] Because the log of expenditure more closely follows a normal distribution, we estimate semi-logarithmic regressions of the log of per capita expenditure on the household characteristics.

To capture household human capital, we include measures of the education and health of the household head. For all countries we use dummy variables for college education, other post-secondary training, and completed secondary education, with incomplete secondary schooling as the omitted education category. For Kazakhstan, we include two non-college

compared to the shares in the neighbouring Fergana oblast. In the econometric estimation the coefficient for completed secondary education is not statistically significant apart from in the Kyrgyz Republic.

[20] Expenditure is preferred to income because the arrears problem in former Soviet republics during the 1990s meant that income often came in lumps and many households reported zero income during the two-week survey period. We also expected under-reporting to avoid tax or other impositions to be less prevalent for expenditure. Non-purchased items, such as food grown on household plots, are valued and included in expenditure.

post-secondary training variables, differentiating between PTU training and Tecnikum education.[21] Health is measured by a subjective assessment of the head's health status; the dummy variable is equal to one if the head reports good or very good health and equal to zero if health is average, poor, or very poor.

Household composition is measured by three variables describing the number of children under the age of 18, the number of elderly, and the number of non-elderly adults in the household. An adult is defined as elderly if he or she is eligible for a state pension, normally at age 60 for a man and age 55 for a woman. The other demographic characteristics include the age, measured in years, gender, and marital status of the head of the household. Gender and marital status are captured by dummy variables, respectively equal to one if the head is a man and zero if the head is a woman, and equal to one if the head is married or cohabiting with a partner and equal to zero otherwise.

Location of the household is measured by the interaction of a rural-urban residence dummy variable (1=rural, 0=urban) with region-specific variables for the Kyrgyz Republic, Kazakhstan, and Tajikistan. In the Kyrgyz Republic, we classify households into four groups: resident of Bishkek and other urban areas of Chuy oblast, resident of rural Chuy, resident in the rural or urban areas of the southern oblasts of Osh or Djalalabad, and resident in the rural or urban areas of the mountain oblasts of Issuk-kul, Narun, or Talas. We divide Kazakhstan into six regions: Almaty, rural and urban areas of the southern oblasts other than Almaty, and rural and urban residence in the northern, central, western, and eastern oblasts.[22] We divide Tajikistan into five regions: Gorna-Badakhshan in the east, Leninabad in the northwest, Khatlon in the southwest and Dushanbe and the Rayons of Republican Subordination (RRS) in the central western area and differentiate between the rural and urban areas of all regions with the exception of the capital, Dushanbe.[23] In each of these three countries, the omitted category for regional location is the largest city

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21 Tecnikum education is more academic, providing generic skills related to say computer science, rather than the narrower vocational training provided by PTUs. It includes artistic, music, medical, and technical education. PTU education is less general or professional and is linked to secondary education.

22 Almaty was the capital at the time of the LSMS survey, and is the manufacturing and financial centre of Kazakhstan. The south is the poorest part of Kazakhstan; it is an agricultural, cotton-growing region, and a manufacturing area producing intermediate goods. The north is the main wheat-producing area of the country, and also specializes in metallurgy and heavy industry such as steel. The Central region produces heavy metals such as chrome, lead and zinc, has coalmines, and grows wheat and other grains. In the east, hydroelectric power is important as well as the mining of light metals and the production of heavy equipment. The west is an oil-producing region.

23 The Gorna-Badakhshan region is sparsely populated and separated from the rest of the country by rugged mountains; it is the poorest region, and also culturally distinct. The Leninabad oblast, renamed Sughd in 2000, is the centre of much of Tajikistan's manufacturing, as well as lake areas for recreation. Khatlon is the centre of cotton production, and a transit point for the illegal drug trade from bordering Afghanistan. In Dushanbe and the surrounding RRS agricultural production is depressed, many state enterprises (cement, refrigerators, for example) have shut down or significantly reduced their production, and unemployment remains high in both the agricultural and non-agricultural regions, although the region is less poor than Khatlon or Leninabad.

(Bishkek and other urban areas of Chuy oblast, Almaty, and Dushanbe). In Uzbekistan, we only include the rural-urban variable because a single oblast was sampled.

In addition to the national level analysis, we compare the Fergana oblast of Uzbekistan in 1999 to the parts of the Kyrgyz Republic in 1997 and Tajikistan in 1999 also located in the Ferghana Valley.[24] The Ferghana region of the Kyrgyz Republic is defined as the Osh and Djalalabad oblasts, while the Ferghana region of Tajikistan is the Leninabad oblast.

4 Results

The results of the ordinary least squares regressions are presented in Tables 3a (Kazakhstan), 3b (the Kyrgyz Republic, 1993-97), and 3c (Tajikistan). The pooled model for the Kyrgyz Republic regresses the log of real per capita expenditures on the explanatory variables, with 1993 as the base year (price index = 100) and a 1997 price index equal to 369. In Table 4, we present results from expenditure models for the Fergana oblast of Uzbekistan and for the Ferghana Valley regions of the Kyrgyz Republic and Tajikistan.[25] The explanatory power of the models for the Kyrgyz Republic and Kazakhstan are reasonable with R-square of about 0.3. The Tajikistan and Uzbekistan models are weaker with an R-square for each country of about 0.18.

4.1 Household location

The locational variables in Tables 3a–c and 4 are dummies, and the omitted category is the capital city with the exception of Uzbekistan. In both the Kyrgyz Republic and Tajikistan a household in the capital had significantly higher per capita expenditure, ceteris paribus, than a household elsewhere in the country. In Tajikistan (Table 3c) the difference is not significant between the capital Dushanbe and the surrounding Rayons of Republican Subordination (RRS), but on average a household in the north or the south is about a third poorer and one in the Gorna-Badakhshan autonomous region is almost sixty percent poorer than an equivalent household in Dushanbe. Rural-urban differences in expenditures are small within RRS, Leninabad, and Khatlon.

The results from the Kyrgyz Republic (Table 3b) are even starker, and of special interest because this is the only country for which we have more than one survey set. In 1993, before the transition to a market economy was far under way, locational differences were already significant, with a household in rural Chuy (the province surrounding the capital, Bishkek) 27 percent poorer, households in the south 24 percent (urban) and 69 percent

[24] The Ferghana Valley is the most fertile and most densely populated area of Central Asia. In the 1920s and 1930s, the Ferghana Valley was divided between the Kyrgyz, Tajik and Uzbek republics of the USSR with economically meaningless borders.

[25] The Uzbekistan pilot and the Ferghana samples are too small for meaningful quantile regression analysis. The Tajikistan national survey is also ill-suited to quantile regression, because a large proportion of households is in bad financial shape.

Table 3a: Expenditure model: Kazakhstan, 1996

	Ln Expenditures	
Variables	Coefficient	t-statistic
Intercept	**8.570**	93.19
Demographic Traits		
head is male	0.040	1.15
age of head	-0.001	-1.04
head is married	0.043	1.07
Education/health of head		
college graduate	**0.213**	4.99
tecnikum	**0.112**	2.78
PTU	0.076	1.49
Completed secondary	-0.009	-0.23
Head in good health	-0.026	-0.86
Location of household		
rural*central	0.100	1.64
urban*central	-0.037	-0.67
rural*south	**-0.357**	-5.72
urban*south	**-0.431**	-7.29
rural*west	0.024	0.30
urban*west	**0.222**	3.10
rural*north	**0.437**	7.62
urban*north	**0.289**	5.06
rural*east	**0.200**	3.47
urban*east	0.002	0.03
Household composition		
number of children	**-0.169**	-13.47
number of elderly	**-0.114**	-3.74
number of non-elderly adults	**-0.055**	-3.91
R-square	0.303	
F-statistic	**38.69**	
sample size	1890	

Note: Bold numbers if significant at the 5% level.

Source: Data obtained from the 1996 LSMS.

(rural) poorer, and households in the mountain region across the middle of the country 18 percent (urban) and 85 percent (rural) poorer than a household with the same characteristics in Bishkek. In 1997, when the transition to a market economy was well established, these locational differences had widened to 27 percent (rural Chuy), 65 percent (urban south), 83 percent (rural south), 80 percent (urban mountain), and 105 percent (rural mountain) relative to Bishkek and the urban north. In all regions and in both 1993 and 1997, rural households were worse off than urban households.

Table 3b: Expenditure model: Kyrgyz Republic, 1993-97

	Ln Expenditure		Ln Expenditure, 1993		Ln Expenditure,1997	
Variables	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	**5.195**	61.21	**4.863**	30.48	**7.547**	93.82
Demographic traits						
head is male	-0.017	-0.39	0.104	1.31	**-0.179**	-4.16
age of head	0.00007	0.07	-0.0006	-0.28	0.001	0.76
head is married	0.036	0.93	0.083	1.12	0.062	1.74
Education/health of head						
college graduate	**0.187**	4.96	**0.221**	3.29	**0.135**	3.51
post-secondary	0.067	1.58	0.110	1.54	-0.073	-1.55
completed secondary	-0.077	-1.93	-0.149	-1.88	-0.071	-1.87
head in good health	0.032	0.71	0.111	1.22	-0.002	-0.06
Household location						
rural chuy	**-0.288**	-6.63	**-0.272**	-3.49	**-0.317**	-7.44
rural south	**-0.744**	-18.28	**-0.694**	-8.72	**-0.839**	-22.91
urban south	**-0.417**	-9.11	**-0.237**	-2.79	**-0.648**	-15.07
rural mountain	**-0.940**	-23.10	**-0.853**	-9.80	**-1.048**	-29.99
urban mountain	**-0.553**	-10.61	-0.185	-1.69	**-0.804**	-18.08
Household composition						
number of children	**-0.128**	-15.01	**-0.123**	-7.03	**-0.125**	-16.61
number of elderly	**-0.052**	-2.96	**-0.085**	-2.37	0.020	1.16
number of non-elderly	**-0.028**	-3.35	0.002	0.10	**-0.085**	-9.69
Year						
1997	**0.666**	24.62				
R-square	0.319		0.15		0.537	
F-statistic	**131.57**		**22.34**		**201.45**	
sample size	4515		1913		2618	

Note: Boldface if significant at the 5% level.

Source: Data obtained from Living Standards Measurement Surveys for 1993 and 1997.

The Kazakhstan results (Table 3a) differ insofar as the largest city (and capital at the time) Almaty was not the richest region. Thus, the locational coefficients are positive for the north and west and negative for the south and centre, and only the north and south coefficients are significantly different from zero. If the poorest region had been the base the regional differences would appear at least as strong as those in the Kyrgyz Republic. In addition, we find that rural households are better off than urban households in the east, the north and the south, but rural households are worse off than urban households in the west. There is no difference in the well being of rural and urban households in the central oblasts.

The pattern of regional inequality in Kazakhstan is clear from both tables and from anecdotal evidence. The oil-producing oblasts by the Caspian Sea (Atyrau and Mangistau)

Table 3c: Expenditure model: Tajikistan, 1999

	Ln Expenditure	
Variables	Coefficient	t-statistic
Intercept	**9.911**	113.64
Demographic traits		
head is male	0.017	0.30
age of head	-0.001	-0.87
head is married	0.069	1.49
Education/health of head		
college graduate	**0.339**	7.15
post-secondary	**0.166**	4.08
completed secondary	0.043	1.06
head in good health	-0.009	-0.32
Household location		
rural RRS	-0.066	-1.25
urban RRS	0.048	0.54
rural Leninabad	**-0.315**	-6.21
urban Leninabad	**-0.327**	-5.55
rural Khatlon	**-0.324**	-6.51
urban Khatlon	**-0.366**	-5.65
Gorna-Badakhshan	**-0.585**	-7.82
Household composition		
number of children	**-0.087**	-12.73
number of elderly	**-0.048**	-2.74
number of nonelderly	-0.005	-0.59
R-square	0.177	
F-statistic	**24.93**	
sample size	1983	

Note: Bold numbers if significant at the 5% level.

Source: Data were obtained from the 1999 LSMS.

have relatively high, but volatile, per capita GDP—a phenomenon shared by Almaty City, which is believed to be the major beneficiary of petrodollars. The other high GDP oblast is Pavlodar in the north, which together with its neighbours, East and North Kazakhstan, is the centre of Russian settlement and separatist tendencies. In contrast the four southern oblasts, Zhambyl, South Kazakhstan, Qyzlorda and Almaty, are the poorest, and by quite a large margin. The gap between north and south is substantial in the raw output data of Table 2 and, if anything, even stronger in the locational effects reported in Tables 3a-3c when adjustment is made for demographic and human capital attributes. Although primarily Kyrgyz, the south contains the Uzbek minority; whether the latter is driven to secessionist thoughts by economic inequality may, however, depend upon comparison with neighbouring regions of Uzbekistan (Tashkent, Syrdarya and Dzhizak) rather than with distant parts of Kazakhstan. In the Kyrgyz Republic, per capita GDP differences have

widened, with Bishkek and the surrounding Chuy oblast enjoying an increase in 1996-99 while the poor oblasts of the south became poorer. The relatively sparsely populated mountain oblasts had mixed fortunes, driven in part by minerals (especially the Kumtor gold project, which accounted for four fifths of national GDP by the end of the 1990s), and as in Kazakhstan the benefits from the higher output accrued in part in the capital and commercial centre (Bishkek). This phenomenon is reflected in the household expenditure analysis for 1993 and 1997, which show households everywhere becoming worse off than identical households in Bishkek and the mountain region has the largest locational disadvantage.

Table 4: Expenditure model: Ferghana Region of Uzbekistan, Kyrgyz Republic and Tajikistan

	Uzbekistan		Kyrgyz Republic		Tajikistan	
Variables	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	**8.067**	32.56	**6.890**	53.95	**9.732**	67.90
Demographic traits						
head is male	0.0005	0.00	-0.012	-0.172	-0.108	-0.98
age of head	**0.010**	2.60	0.0005	0.33	0.001	0.65
head is married	0.049	0.33	-0.060	-1.03	-0.011	-0.12
Education of head						
college graduate	**0.439**	3.12	0.110	1.73	**0.237**	2.63
post-secondary	0.169	1.31	**-0.175**	-2.33	**0.180**	2.44
completed secondary	0.127	1.01	-0.075	-1.19	0.044	0.60
head in good health			-0.076	-1.11	0.064	1.28
Hh location						
rural community	**-0.530**	-6.63	**-0.234**	-6.26	0.047	0.89
Hh composition						
number of children	**-0.105**	-4.27	**-0.114**	11.43	**-0.106**	-7.31
number of elderly	**0.106**	2.24	**0.057**	2.08	-0.056	-1.85
number of non-elderly adults	-0.026	-0.91	**-0.071**	-5.63	**-0.030**	-1.96
R-square	0.187		0.342		0.14	
F-statistic	**12.16**		**42.73**		**8.760**	
sample size	541		915		603	

Note: Bold numbers if significant at the 5% level.

Source: Data were obtained from LSMSs for the Kyrgyz Republic 1997 and Tajikistan 1999 and the 1999 pilot study for the redesigned Household Budget Survey in Uzbekistan.

The data from the other three countries are less rich, but they appear to have less spatial inequality than the relatively rapidly reforming Kazakhstan and the Kyrgyz Republic. In Tajikistan incomes fell substantially during the 1992-97 civil war, and although they have recovered on average since then, poverty rates remain very high and it is clearly the poorest country in Central Asia. The sparsely populated and mountainous Gorno-Badakhshan autonomous oblast has long been the poorest part of the country and that is reflected in Table 3b. The similarity of the coefficients for Leninabad and Khatlon is a

little surprising, but this may reflect the higher human capital and other more favourable demographic variables in the northern oblast, which is generally viewed as the most developed part of the country. Khatlon is more rural and the centre of cotton cultivation in Tajikistan, and has suffered relative decline as a result of the droughts which hurt cotton harvests in 2000 and 2001. The central region has benefited from the main raw material and industrial complex built around the aluminium smelter of Tursunzade, whose output has been much reduced since independence but which remains the major foreign exchange earner.

Spatial inequality appears to have been least in Uzbekistan. In Table 2, the high-end outliers are as elsewhere the capital city (Tashkent) and a mineral-rich underpopulated region (Navoi). Otherwise, although the southern oblasts near the Afghanistan border (Kashkardaya and Surkhandarya) and the autonomous republic of Karakalpakstan are poorer and Bukhara richer, the gaps are not extreme. The relative equity is reinforced by a government which has maintained public revenue collection and apparently targeted its social expenditures effectively (Pomfret 2000a,b).

Turkmenistan is the most difficult country to analyse due to the tight control exerted by the government, including controlled access to data.[26] The government has an active program to create a national road and rail network and has invested in large industrial plant in Lebap and Balkan oblasts, but observation suggests that most of the wealth in the country is concentrated in the capital, Ashgabat. Social indicators, are as in most of the region, worse for rural areas, and the northern oblast of Dashoguz appears to be particularly badly off.[27]

4.2 Household composition

In all four countries, household composition is an important determinant of per capita household expenditures. The costs of large households are substantial. A recurring result is that additional children lower per capita household expenditure (9 percent in Tajikistan, 12 percent in Kyrgyzstan, 17 percent in Kazakhstan) by a larger amount than additional elderly or non-elderly adults (5 percent and 3 percent in Tajikistan and Kyrgyzstan, 12 percent and 6 percent in Kazakhstan).[28] Unsurprisingly, the costs of additional children, in

[26] Turkmenistan has held an LSMS survey, but refuses to release results or make the raw data available to researchers. Its economic data are the most questionable in the region (Pomfret 2001).

[27] Dashkoguz, like Karakalpakstan, Qyzylorda and, to a slightly lesser extent, Khorezm, suffers from the ecological disaster of the desiccation of the Aral Sea which has been associated with increased morbidity and mortality. In this paper we say little about environmental issues, but they impinge strongly on feelings of regional well being. They are especially important in oblasts affected by the Aral Sea disaster and in areas like East Kazakhstan, where radiation from Soviet tests is high and where radioactive waste has been dumped since independence.

[28] Use of an equivalence scale (such as $E^* = E/n^{\theta}$ where E is household expenditure and n is family size), allowing for lower consumption by children, would soften the main conclusion, but it is uncertain which equivalence scale would be appropriate. The numerical results are sensitive to the implicit assumption of no scale economies in the provision of household services, but similar studies have found that the qualitative results are not sensitive to this assumption, e.g. Jovanovic (2001:253) reports that varying θ within a plausible range did not alter his results 'in any significant way'.

terms of the negative impact on per capita household expenditure, are larger in the urban areas.

When we compare the Ferghana regions of Uzbekistan, Tajikistan and the Kyrgyz Republic, we find similarities and differences. In all three countries, an additional child lowers per capita household expenditure by about 11 percent. The presence of a pensioner has no effect on per capita household expenditure in the Ferghana region of Tajikistan, but in the Ferghana region of the Kyrgyz Republic and in the Fergana oblast of Uzbekistan the presence of a pensioner increases per capita household expenditure by 6 percent in the former and by 11 percent in the latter.[29] In contrast, non-elderly adults have no impact on per capita household expenditures in the Fergana oblast of Uzbekistan, but reduce expenditures in the Ferghana regions of Tajikistan and the Kyrgyz Republic in 1997. This suggests that in the Ferghana Valley, the labour market provides enough income to cover the average expenditures of adults in Uzbekistan, but cannot cover expenditure needs of adults in the poorer countries of Tajikistan and the Kyrgyz Republic.

4.3 Education and health of household head

In all four countries, having a college-educated head positively affects household living standards. In Kazakhstan and in the Kyrgyz Republic in 1993, per capita expenditure is 22 percent higher in households with a college-educated head than in households whose heads failed to complete secondary school.[30] In the Kyrgyz Republic, the effect of college education drops significantly during the transition period, to 14 percent in 1997. The effect of a college-educated head is larger in Tajikistan (34 percent higher per capita household expenditure than in households whose head failed to complete secondary education), and larger still in the Fergana oblast of Uzbekistan (44 percent).[31] Overall, general high-skilled training has substantially helped household heads improve their families' standard of living.

4.4 Demographic traits

The demographic traits in our model—age, gender, and marital status of the head—are generally not significant determinants of household expenditures.

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[29] This is consistent with the evidence that Uzbekistan has been relatively successful in maintaining its social policies during the transition from central planning (Pomfret 2000b) and that public service provision broke down in Tajikistan.

[30] The independent impact of having a college-educated head is lower in the capital cities than in the country as a whole. The difference is small in Kazakhstan, but for Bishkek and Dushanbe the coefficient on the college graduate variable, although positive, is not significant at the 5 percent level.

[31] The Uzbekistan estimate is especially striking in light of the smaller than the national average impact in the Ferghana region of Tajikistan and the absence of any significant effect of college education on household expenditure in the Ferghana region of the Kyrgyz Republic.

4.5 Year

Table 3b presents estimation of the pooled expenditure regression for the Kyrgyz Republic, 1993-97. We find that real per capita expenditure is 66 percent higher in 1997 than in 1993, holding other determinants of household expenditure constant. Households are better off in the later transition period than in the early period after independence once we control for changes in education, region, household composition, and the demographic characteristics of the household. The hyperinflation ended, production in mining and agriculture increased, and the economy experienced an increase in income after the turbulent early transition years.

4.6 Summary

In summary, the most important explanations for the variation in expenditures per capita in the region are household location, household composition, and education. We find large variation in per capita expenditure by location within each country, and the differences go beyond the simple rural-urban distinction. Family structure is also important; an increase in the number of children in a household reduces household expenditure, and the cost of a child to the household exceeds the cost of an extra working or non-working adult.[32] The human capital variables yield one strong conclusion. In all countries, having a university educated household head significantly improves household welfare; expenditures are higher in these households than in households with less educated heads. Other levels of education, relative to the benchmark of incomplete secondary schooling, do not consistently have a positive impact on material well being. The effects of education dominate the effects of health on household consumption, but this may be due to the limited nature of the subjective measure of health that we use.

5 Distribution of public services

Inequality in income and expenditures by households within a country can be mediated by government intervention and the provision of public services. Governments could, for example, provide more public services to the lowest income communities in which households are less able to purchase these goods on their own. In this case, we would expect to find more equality in the provision of schools, health clinics, and other public goods than in the distribution of income or expenditures.

In this section, we use data on availability of public services at the local community level in the Kyrgyz Republic 1997, Kazakhstan 1996, and Tajikistan 1999 to determine whether the provision of public goods reinforces or offsets the regional inequality in expenditures

[32] In the Kyrgyz Republic in 1997 and in the Ferghana regions of the Kyrgyz Republic and Tajikistan, pensioners cost the household less than working age adults, and in the Fergana oblast of Uzbekistan the presence of an extra elderly adult significantly increases per capita household expenditure.

Table 5a: Public service regressions: regional inequality, Kazakhstan 1996

Service	Rural east	Urban north	Rural north	Urban central	Rural central	Urban south	Rural south	Urban west	Rural west
Education									
kindergarten	**-0.357**	0.060	-0.135	-0.000	0.032	-0.049		-0.079	-0.057
secondary[a]									
books	**-0.405**	0.012	0.040	-0.143	-0.238	-0.071	-0.259	-0.016	-0.271
% in school, age 6-10	-0.638	0.300	-0.075	0.069	-0.200	-0.271	-0.033	0.157	-0.367
% in school, 11-14	-1.167	0.100	0.044	-0.438	-0.4	0.100	0.100	0.100	0.100
% in school, 15-18	-1.078	-4.586	-4.149	-0.364	-1.078	-0.221	-3.864	-8.078	0.636
Healthcare									
hospital	**-0.492**	0.036	**-0.437**	0.071	**-0.714**	0.186	**-0.464**	-0.241	
clinic	-0.206	-0.095	-0.095	-0.146		-0.082		**-0.484**	-0.229
ob.gyn.	**-0.294**	-0.155	**-0.516**	-0.071	**-0.460**	0.329	**-0.384**	-0.016	**-0.371**
pediatrician	**-0.373**	-0.195		-0.124		0.271	**-0.366**	-0.218	
pharmacy	-0.325	0.119	-0.214	0.068		-0.022		0.063	**-0.514**
lack inst.	0.127	**-0.295**		-0.214	0.016	-0.229	-0.116	-0.095	-0.029
lack drugs	**0.302**	0.190	0.246	**0.314**		0.257	**0.295**	0.246	0.157
low knowledge		0.052	0.080	0.040	0.080	0.046		**0.232**	
bad care	**-0.302**	0.226	-0.079	0.000	0.024	-0.057	-0.045	0.198	**-0.357**
poor organization	0.198	0.143	0.143	0.000	-0.024	-0.157	0.018	0.087	0.143
inadequate primary care	-0.095	-0.012	0.071	0.071	-0.095	-0.229	-0.179	0.016	-0.029
Other services									
hard roads		-0.008		-0.005		0.010		0.020	
water		-0.079		0.057		-0.120		-0.128	
sewer	**-0.349**	-0.271		**0.217**	**-0.460**	-0.264		**-0.361**	

Note: Bold numbers if significant at the 5% level. Blank cell indicates no estimable rural-urban difference in the region. [a]Insufficient regional variation to estimate a model.

Source: Data were obtained from the 1996 LSMS.

that we described in Section 4. The public services we examine are classified into three groups: education, health care, and other services. The education indicators are: good schools (good teachers in the Kyrgyzstan survey), adequate school supplies, adequate heating in the schools, adequate books, adequate furniture, sufficient buildings, access to secondary school, access to gymnasiums, access to kindergarten, and percent of eligible children enrolled in school in the community. The health care indicators are: location of hospital, clinic, obstetrician/gynecologist, pediatrician, or pharmacy in the community and percent of residents who have been vaccinated. The other services are: post office, hard roads, public water service, sewer service, garbage collection, and percent of households with telephone service. We have 121 communities in Tajikistan, 230 in Kyrgyzstan, and 130 in Kazakhstan. The Kazakhstan survey does not include information on all of the services listed above but does include more inquiry on the health care of the community.

Table 5b: Public service regressions: regional inequality, Kyrgyzstan 1997

Service	Rural Chuy	Urban Chuy	Rural Mountain	Urban Mountain	Rural South	Urban South
Education:						
kindergarten	**-.287**	0.141	**-.432**	-0.070	**-0.473**	0.071
secondary	**0.072**	0.020	0.037	-0.075	**0.072**	0.047
gymnasium	-0.029	**0.445**	0.007	**0.177**	0.013	**0.202**
good quality teachers	**-0.336**	-0.101	**-0.291**	**-0.409**	**-0.390**	-0.120
adequate buildings			-0.104		**-0.153**	-0.093
adequate supplies	0.112	0.010	-0.198	-0.062	-0.163	**-0.196**
adequate furniture	-0.052	-0.038	**-0.170**	**-0.133**	-0.106	-0.086
adequate books	**0.316**	**0.394**	-0.003	0.047	0.063	**0.258**
adequate heat	-0.020	0.050	**-0.401**	**-0.216**	-0.207	-0.116
% in school	**-8.913**	-4.176	**-6.949**	**-9.207**	**-9.513**	**-5.788**
Health care:						
hospital	0.000	**0.667**	0.060	**0.461**	-0.013	**0.385**
clinic	-0.129	**0.418**	-0.137	**0.235**	**-0.369**	**0.214**
ob.gyn.	-0.020	**0.474**	-0.063	**0.256**	-0.100	0.144
pediatrician	0.165	**0.460**	0.065	**0.271**	0.045	**0.309**
pharmacy	**-0.290**	-0.009	**-0.385**	-0.104	**-0.437**	**-0.136**
% vaccinated	-0.209	0.005	0.022	**-0.336**	-0.022	**-0.192**
Other services:						
post office	0.032	0.127	-0.019	-0.150	-0.008	-0.007
hard roads	**-0.380**	0.034	**-0.721**	**-0.325**	**-0.793**	-0.008
water			**-0.195**	**-0.157**	**-0.380**	-0.030
sewer	**-0.353**	-0.040	**-0.584**	0.028		
garbage collection	**-0.565**	0.049	**-0.791**	**-0.310**	**-0.819**	-0.099

Note: Bold numbers if significant at the 5% level; blank cell indicates no estimable rural-urban difference in the region.

Source: Data were obtained from the 1997 LSMS.

We tabulated by region the proportion of communities in these countries that have these services. We tested whether the region and service availability are independent events for each service in each country, and rejected the null hypothesis of independence. To determine where the regional differences are largest, we estimated robust linear probability regression models of service availability in the community and regression models of school enrolment and vaccination rate in which the independent variables are the regional dummy variables. We control for rural-urban regional differences where possible. In some cases, there was no variation in service availability within a region or between the rural and urban areas of a region; in those cases the regions were dropped from the analysis. The regression results are given in Tables 5a (Kazakhstan), 5b (Kyrgyzstan), and 5c (Tajikistan).

We find considerable regional variation in the availability of services within each country but less inequality in service distribution in Kazakhstan than in the other countries. In Kazakhstan (Table 5a), there is no measured inequality in education services with one exception; the rural east region is less likely to report kindergartens and adequate school books than other regions. We also find little variation in access to other public services with the exception of sewer services which are less available in the central, urban west, and rural east regions of the country. In contrast, there is significant regional inequality in the distribution of health care services, and we find fewer health care services in rural areas of each region than in the urban areas. Specifically, the rural areas report fewer hospitals and physicians than other areas of the country.

Table 5c: Public service regressions: regional inequality, Tajikistan 1999

Service	Gorna	Rural RRS	Urban RRS	Rural Leninabad	Urban Leninabad	Rural Khatlon	Urban Khatlon
Education							
kindergarten	-0.418	**-0.434**		-0.049		**-0.455**	
secondary		**0.072**	0.020	0.037	-0.075	**0.072**	0.047
gymnasium		-0.256		-0.119	**0.485**	-0.304	0.095
good quality schools		-0.290		-0.226	0.121	-0.310	
adequate buildings	**0.509**	**0.524**		**0.373**	**0.818**	**0.538**	**0.784**
adequate supplies		-0.229	0.061	-0.201	0.000	-0.225	
adequate furniture		**-0.523**		**-0.164**		-0.437	
adequate books		**0.316**	**0.394**	-0.003	0.047	0.063	**0.258**
adequate heat		0.055	0.214	0.024	**0.517**		
% in school		**-8.913**	-4.176	**-6.949**	**-9.207**	**-9.513**	**-5.788**
Healthcare							
hospital	0.350	**0.404**		**0.494**		**0.517**	
clinic	0.150	0.288		**0.468**		0.215	
ob.gyn.	0.350	0.519		0.519		0.415	
pediatrician	-0.036	0.171		**0.338**		0.068	
pharmacy	-0.225	0.183		0.298		0.096	
% vaccinated		-0.209	0.005	0.022	**-0.336**	-0.022	**-0.192**
Other services							
post office		0.084		**0.494**		0.000	
hard roads	**-0.55**	-0.173		-0.16		-0.076	
water	-0.408			**-0.038**		**-0.103**	
sewer	**-0.578**	**-0.647**	-0.111	**-0.393**		**-0.692**	-0.153
garbage collection	-0.425	**-0.538**	0.042	**-0.411**	0.284	**-0.454**	0.125

Note: Bold numbers if significant at the 5% level; blank cell indicates no estimable rural-urban difference in the region.

Source: Data were obtained from the 1999 Living Standards Measurement Survey.

In Kyrgyzstan (Table 5b), significant regional differences exist in education services, healthcare, and other services. Among the education services, we find that the mountain

and southern areas of the country have fewer kindergartens, lower quality teachers, inadequate facilities, and lower enrolment in school than the northern areas of Chuy and Bishkek. Within each region, the rural areas tend to have fewer services than the urban areas. Among the health care indicators, we find that the urban areas of Chuy, the south, and the mountain regions are more likely to report a hospital, clinic, or physician than the rural areas or Bishkek, and pharmacies are less available in rural areas. Finally, among the other services, hard roads, and water, sewer, and garbage services are unequally distributed. The mountain oblasts have fewer other services than the other regions, and, within each region, rural areas are less likely to have services than urban areas. In all cases, services are more available in the north (Chuy and Bishkek) than in the mountainous regions or the southern agricultural area.

In Tajikistan (Table 5c), education, health, and other services differ significantly across regions, but the distributional pattern is less obvious than in Kyrgyzstan. Among education services, kindergartens are less likely but secondary schools are more likely in rural areas than urban. School enrolment in rural and urban areas of Leninabad, RRS, and Khatlon is lower than in Dushanbe, but Dushanbe has inadequate school buildings and an inadequate supply of school books in comparison to other regions. Leninabad seems to have more availability of healthcare facilities (hospitals, clinics, and pediatricians) than other regions, and vaccination rates are high in all regions but lowest in urban areas of Leninabad and Khatlon. Among other services, we find greater access to hard roads, water, sewer, and garbage collection in Dushanbe than in other regions, and the rural regions have less access to these services than the urban areas.

This evaluation of the distribution of public services in the three countries suggests that provision of public goods reinforces regional inequality patterns in expenditures that we measured among households. The poorest households are likely to live in communities with the lowest access to public services. We try to determine why these regional differences exist by looking at the effect of community characteristics on the availability of these services. The community characteristics measure the employment base of the community, income, population, ethnicity, and regional isolation. In general, the most important determinant of service location is rural-urban residence; rural communities are less likely to have services than urban communities, and, within rural and urban areas, large population areas seem to have greater access to many public services. We also find some evidence that the ethnic composition of the community does influence service location, generally in favour of Slavic communities in each country. The results from this analysis of community characteristics are available from the authors on request.

6 Conclusions

In Central Asia, although international migration took place on a large scale, internal migration did not. In the Kyrgyz Republic, which probably has the most liberal labour and housing markets in the region, there has been internal migration but it has been primarily

within regions, from rural areas in the northern oblasts of Chuy, Talas, Naryn and Issyk-kul to urban centres, especially Bishkek, with little migration from the poorer south to the richer north. The LSMS evidence establishes that, even in what are the three least-regulated economies there is not a national labour market. Given the tighter control over the economy and over internal mobility in Uzbekistan and Turkmenistan, it is safe to conclude that labour mobility is not reducing spatial inequality to any great extent in the Central Asian countries. This is somewhat surprising insofar as we might have expected the move to a market economy to be followed by establishment of national labour markets with people relocating in response to economic incentives. Two main sets of explanations can be offered for why this did not happen: the economies are not physically integrated, and social factors discourage mobility. The infrastructure prevents a national economy being established.[33] The Soviet transport network ignored republic boundaries and many regions were better connected to the Tashkent rail hub or, in the case of northern Kazakhstan, to Russian cities, than to their republic's capital. In the southeast, physical boundaries are formidable, with the Ferghana Valley blocked from the rest of Uzbekistan, northern and southern Kyrgyz Republic separated, and many parts of Tajikistan cut off by snow in winter.[34] Since independence, all five countries have aimed to create national transport networks, with Turkmenistan devoting most resources to the specific task and impoverished Tajikistan and the Kyrgyz Republic suffering from acute resource constraints.

The extended family is very strong in Central Asia. Buckley (1998:72) has argued that these ties are so strong that people will prefer to remain in their place of birth within the family than to move elsewhere for higher economic returns. The international migration has largely concerned non-Central Asian groups such as Germans and Slavs, while Central Asian groups have not relocated. Central Asian groups have not tended to migrate across borders, in particular there have not been cross-migrations of people to their 'ethnic homeland' (e.g., Turkmen to Turkmenistan and Uzbeks to Uzbekistan in the Khorezm/Dashoguz region) as happened between Azerbaijan and Armenia in the early 1990s.

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[33] In the product market context, Aghion and Schankerman (1999) emphasize the role of improved infrastructure in reducing transactions costs and hence increasing competition, and their argument is supported by the convergence of infrastructure in Poland, Hungary and the Czech Republic towards West European standards; in all three countries the degree of competition appears to have been increasing. Similar causality works in labour markets; an oft-cited example is the impact of US road-building in eastern Thailand during the 1960s in creating a national labour market and contributing to the rapid economic growth in Thailand during the final quarter of the twentieth century.

[34] Tajikistan's main north-south road from Dushanbe to Khujand (Leninabad) is riddled with potholes and key passes are controlled by local warlords such as Rahmon Sanginov, whose *nom de guerre* is Hitler and who is treated as a Robin Hood figure by his admirers and as a terrorist by the government. The highest pass on this road is closed form October to May, but tunnels begun in the Soviet era remain unfinished. In July 2001 the approach road to the tunnel, which was off-limits to foreigners, showed no sign of construction activity.

There are limits to non-mobility. In the dire economic conditions of Tajikistan in the late 1990s migration did increase, although this consisted mainly of males moving to Russia in search of work (and sending remittances to their families), rather than internal migration. Tajiks and Uzbeks (and others) have fled from Afghanistan and live as refugees in border areas of Tajikistan and Uzbekistan, although the economic impact of these movements is secondary.

The lack of price integration in the national labour markets implies economic inefficiency, in the sense that moving labour from low to high-wage locations could increase national output. However, the welfare implications of the two explanations of the spatial differentials matter. In the first case infrastructural improvements yield a clear benefit in terms of allocative improvement. On the other hand, if people chose not to move due to non-pecuniary benefits of staying put, then improved infrastructure will have less welfare benefit. How does spatial inequality align with ethnic or other divisions? In our econometric work on the LSMS data, ethnicity has very little independent impact as a determinant of per capita household expenditure. Nevertheless, ethnicity is likely to become associated with spatial inequalities given the regional clustering of ethnic minorities.

The Slavs and other Europeans tend to be concentrated in the largest cities, apart from in Kazakhstan and the Kyrgyz Republic where there are also large rural communities, in the north of each country. In general, the Slavs and Europeans are located in the more economically flourishing regions. In the Kyrgyz Republic, however, there is an implicit communality of interest between the Slavs and the Kyrgyz in the north, and the major divide is north-south. Moreover, many of the Slavs and Europeans emigrated during the 1990s, and they presumably included the most discontented and most dynamic members of those ethnic groups. Given the relatively high human capital endowment of these groups and an age distribution of migrants, which tended to be relatively concentrated in working age adults, this emigration was a serious economic cost to the countries concerned, although it contributed to political stability by increasing ethnic homogeneity. The only real remaining source of tension is in northern Kazakhstan where Russian communities are still large and concentrated in areas contiguous to the Russian Federation, and their relative wealth may make them fearful of what they might perceive as a rapaciously redistributing central government dominated by Kazakhs.

Perhaps of more concern are potential tensions among native Central Asian ethnic groups, especially where these tensions could fuel irredentist claims. The Uzbek minorities, for example, are concentrated near to the borders of Uzbekistan in South Kazakhstan, in southern parts of the Kyrgyz Republic, in the Dashoguz oblast of Turkmenistan, and in the Leninabad oblast (and small pockets in the western parts of RRS) in Tajikistan. The first three of these locations are among the poorest parts of the countries concerned. If they feel disadvantaged within their current country the Uzbek minorities might yearn for secession, although this is more likely if they live in poorer countries (Tajikistan and the Kyrgyz

Republic) than if they live in Kazakhstan. Regional differentiation can also fuel other conflicts. The densely populated Ferghana Valley oblasts of Uzbekistan (Fergana, Namangan and Andijan) and the neighbouring regions of Kyrgyz Republic (Jalalabad, Osh and Batken) are fertile grounds for Islamic extremists and will become more so if these regions continue to lag economically.[35]

This paper measures the existence and persistence of regional inequality in household resources and public goods. It does not offer a policy solution to the inequality we observe in the 1990s in Central Asia. A high degree of persistent inequality can exacerbate internal political and social problems and promote regional instability; economic growth and performance can be negatively affected by inequality. The government has a responsibility to address the concerns of all citizens and can use its resources to balance, to a certain extent, regional differences in resource availability. The governments of these countries have not as yet equalized access to schools, hospitals, and other services that are vital to growth. Policy should focus more resources on correcting these imbalances; regional stability may hinge on the success of redistributive policy actions.

[35] In March 2001 a Batken schoolteacher commented, 'It's the same everywhere. The villages are empty of young men—either they have gone to Russia to look for work or they join Namangani [leader of the IMU fighters] because at least he pays them' (Rashid 2001:29).

Appendix 1: Administrative divisions

Table A1: Administrative divisions

(a) Kazakhstan[1]

Oblast	Capital	Population (1999)
Almaty	Almaty (Alma-Ata)	1,560
Almaty City		1,129
Akmola	Astana (Akmolinsk/Tselinograd)	837
Astana		318
Aqtöbe	Aqtöbe (Aktiubinsk)	683
Atyrau	Atyrau (Gurev)	439
East Kazakhstan	Öskemen (Ust-Kamenogorsk)	1,533
Karaganda	Karaganda	1,414
Mangystau (Mangyshlak)	Aqtau (Shevchenko)	316
North Kazakhstan	Petropavl (Petropavlovsk)	727
Pavlodar	Pavlodar	807
Qostanay	Qostanay (Kustanai)	1,022
Qyzylorda	Qyzylorda (Kzyl-Orda)	596
South Kazakhstan	Shymkent (Chimkent)	1,974
West Kazakhstan	Oral (Uralsk)	618
Zhambyl	Zhambyl (Dzhambul)	984

(b) Kyrgyz Republic[2]

Oblast	Capital	Population (1999)	
		(thousands)	(people/km^2)
Chuy	Bishkek (Frunze)	771	38
Issyk-Kul	Karakol (Przhevalsk)	413	10
Jalalabad	Jalalabad	869	26
Naryn	Naryn	249	6
Osh	Osh	1,176	34
Talas	Talas	200	17
Batken	Batken	382	
Bishkek City		762	6215

(c) Tajikistan[3]

Viloyat	Capital	Population (2000) (thousands)	Population (2000) (people/km^2)
Khatlon	Gulab	2,151	87
Leninabad (Sughd)	Khujand	1,870	72
RRS	Dushanbe	1,338	47
Dushanbe (Stalinabad)		562	4390
Viloyati avtonomi Gorno-Badakhshan	Khorugh (Khorog)	206	3

(d) Turkmenistan[4]

Velayat	Capital
Akhal	Ashgabat (Ashkhabad)
Balkan	Nebitdag
Dashoguz	Dashoguz (Tashauz)
Lebap	Turkmenabat (Charjew/Chardzhou)
Mary	Mary

(e) Uzbekistan[5]

Oblast	Capital	Population (2000) (thousands)	Population (2000) (people/km^2)
Andijan	Andijan (Andizhan)	2,195	522
Bukhara	Bukhara	1,424	35
Dzhizak	Dzhizak	979	46
Fergana	Fergana	2,672	399
Kashkadarya	Qarshi (Karshi)	2,179	76
Khorezm	Urgench	1,330	217
Namangan	Namangan	1,933	261
Navoi	Navoi	786	7
Samarkand	Samarkand	2,680	160
Syrdarya	Gulistan	644	150
Surkhandarya	Termez	1,746	87
Toshkent	Toshkent (Tashkent)	2,356	290
Tashkent City		2,142	
Autonomous Republic Karakalpakstan	Nukus	1,510	9

Notes: Names in parentheses are former names or alternative spellings.

[1]In 1994 the Parliament approved transfer of the capital from Almaty to Akmola, which was subsequently renamed Astana. After a preliminary inauguration in November 1997, the new capital was officially inaugurated in June 1998.

[2]Bishkek is the national capital as well as capital of Chuy oblast. In 2000 Osh oblast was sub-divided into two, and a new oblast created with its capital at Batken.

[3]Dushanbe, the national capital, is located in the Regions of Republican Subordination (RRS), but is the only one whose executive is directly subordinate to the national government. Khatlon viloyat was formed in early 1993 by amalgamating Gulab and Kurgan-Teppe oblasts.

[4]Ashgabat is the national capital as well as capital of Ahal velayat.

[5]Tashkent is the national capital as well as capital of Tashkent oblast.

Source: Kazakhstan: population data are from *Human Development Report Kazakhstan 2000*. Kyrgystan: population data from 1999 census; density data are preliminary estimates from United Nations *Kyrgyzstan Common Country Assessment* (UN 1999:38). Tajikistan: population data are from *Tajikistan Human Development Report 2000* (pp.17, 107). Uzbekistan: population data from *Uzbekistan Economic Trends*, January-March 2001.

In Table 3, household location is measured by a region-specific dummy variable interacted with a rural-urban residence variable. In each of these three countries, the omitted category for regional location is the largest city (Almaty, Bishkek, and Dushanbe). Kazakhstan is divided into six regions:

- Almaty, the capital at the time of the LSMS survey, and the manufacturing and financial center of the country.
- Southern oblasts other than Almaty—the south is the poorest part of Kazakhstan; it is an agricultural, cotton-growing region, and a manufacturing area producing intermediate goods.
- Central oblasts—the central region produces heavy metals such as chrome, lead and zinc, has coalmines, and grows wheat and other grains.
- Northern oblasts—the north is the main wheat-producing area of the country, and also specializes in metallurgy and heavy industry such as steel.
- Western oblasts—the west is the oil-producing region.
- Eastern oblasts—in the east, hydroelectric power is important as well as the mining of light metals and the production of heavy equipment.

In the Kyrgyz Republic, we classify households into four regions:

- Bishkek.
- Chuy, but not Bishkek—rural Chuy is a primarily agricultural region, but proximity to Bishkek makes it relatively affluent and one of the higher growth areas of the country.
- The southern oblasts of Osh and Djalalabad—the south is the main cotton-growing region but also contains Osh, which is the second largest city in the country and a manufacturing center. The south is the most deeply Islamic part of the country.
- The mountain oblasts of Issuk-kul, Narun, and Talas—the mountain region was known for pastoral farming during the early transition period, but agriculture has developed into more vegetable production and less sheep production during the later transition years in this region.

We divide Tajikistan into five regions:

- Dushanbe.
- Rayons of Republican Subordination (RRS) in the central western area—although the region is less poor than Khatlon or Leninabad, in Dushanbe and the surrounding RRS agricultural production is depressed, many state enterprises (cement, refrigerators, for example) have shut down or significantly reduced their production, and unemployment remains high in both the agricultural and non-agricultural regions.
- Leninabad in the northwest—the Leninabad oblast is the centre of much of Tajikistan's manufacturing, as well as lake areas for recreation.
- Khatlon in the southwest—a heterogeneous province, with conflicts between more established groups and groups arriving from central and eastern Tajikistan during the cotton expansion of the 1950s and 1960s. The western part (Qurghon Teppa) is the centre of cotton production, while the eastern part (Gulab) is poorer. Khatlon also has to deal with the illegal drug trade from bordering Afghanistan.
- Gorno-Badakhshan in the east—the Gorno-Badakhshan region is sparsely populated and separated from the rest of the country by rugged mountains; it is the poorest region, and also culturally distinct.

Appendix 2

Table A2: Summary statistics

Variables	Kazakhstan (1996)	Kyrgyz Rep (1993)	Kyrgyz Rep (1997)	Tajikistan (1999)	Fergana (Uzbekistan)
Per capita expenditure	4863.76	144.61	782.00	15,636	4099.36
(national currency units)	(3515.27)	(140.26)	(921.11)	(13,095)	(3869.45)
Demographic traits					
male head (%)	61.6	81.8	86.9	91.3	93.9
head is married (%)	72.1	77.5	77.3	85.5	90.8
age of head (years)	46.326	41.337	39.751	39.850	38.760
	(14.218)	(13.722)	(12.642)	(11.047)	(10.444)
Education of head					
college graduate (%)	18.2	25.1	32.7	14.8	14.4
post-secondary (%)	23.2	24.5	10.8	34.6	29.4
post-secondary – contd.	10.6				
completed secondary (%)	25.5	16.9	43.8	36.0	45.3
incomplete secondary (%)	22.5	33.5	12.7	14.6	10.9
Health of head					
head in good health (%)	28.9	90.7	90.5	69.3	
location of household:					
rural community (%)	43.6	57.1	62.6	72.8	71.5
capital city (%)	9.4	18.4	15.1	8.9	
region 1 (%)	20.7	22.7	13.9	4.0	
region 2 (%)	18.1	39.1	35.0	21.5	
region 3 (%)	8.5	19.8	36.0	30.4	
region 4 (%)	22.3			35.2	
region 5 (%)	21.0				
Household composition:					
number of children	1.263	1.822	2.239	3.515	2.850
	(1.228)	(1.690)	(1.740)	(2.071)	(1.601)
number of elderly	0.414	0.511	0.507	0.492	0.492
	(0.676)	(0.731)	(0.732)	(0.733)	(0.742)
number of non-elderly adults	1.914	2.603	2.846	3.065	2.643
	(1.119)	(1.800)	(1.472)	(1.812)	(1.395)
sample size (households)	1890	1926	2618	1983	541

Notes: Standard deviations of continuous variables are in parentheses. For Kazakhstan post-secondary education is divided between Tecnikum and PTU. The regions are: Kazakhstan 1 = Central, 2 = South, 3 = West, 4 = North, 5 = East (excluding Almaty); Kyrgyz Republic 1 = Chuy, 2 = South, 3 = Mountain; Tajikistan 1 = Gorna Badakhshan, 2 = RSS, 3 = Leninabad, 4 = Khatlon.

Source: Data were obtained from 1993 and 1997 Kyrgyz Republic, 1996 Kazakhstan, and 1999 Tajikistan Living Standards Measurement Surveys and the 1999 pilot study for the redesign of the Household Budget Survey in Uzbekistan.

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