

PRUDENTIAL MANAGEMENT OF HYDROCARBON REVENUES IN RESOURCE-RICH ECONOMIES

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Low income and high natural resource dependency

The experience of more than a decade of transition from a Soviet-type economy has demonstrated that macroeconomic stabilization and a supplementation of domestic investment by capital inflow from abroad are necessary, but not sufficient, conditions for economic development. The still changing institutional framework in the three Caspian states selected for analysis in this paper display deficiencies in domestic markets and in microeconomic governance which impose responsibilities on governments to pursue policies embedding the stabilization achieved and guiding the investment-mix towards further sustainable development. Levies of various kinds on the exploitation of natural resources furnish governments of resource-rich countries with substantial means to contribute to, as well as to regulate, capital formation. The three states share two relevant characteristics, a high export dependency on hydrocarbons – Azerbaijan on oil, Kazakhstan on oil and other minerals and Turkmenistan chiefly on natural gas, but also on oil – and a high ratio of investment to GDP. The interdependency is clear: mineral earnings sustain the high rate of capital formation, but that investment is required to sustain the exploitation of natural resources and to diversify the capital stock into other branches of production. Policies on investment which generates sustainable growth have particular salience for low and lower-middle income countries such as these three. The World Bank, whose classification puts Azerbaijan as ‘low income’ and Kazakhstan and Turkmenistan as ‘lower middle’ has recently provided (see World Bank, 2004, p. 264) new estimates of population and gross national income (GNI): the per capita values are shown in Table 1 at purchasing power parity dollars. Kazakhstan is only 6 per cent ahead of Turkmenistan, but generates 83 per cent more than Azerbaijan on GNI so measured; but, as shown below, the addition of the ‘shadow economy’, proportionately greater in Azerbaijan than in Kazakhstan and probably in Turkmenistan, would materially narrow the dispersion. In pace towards a market economy Azerbaijan and Kazakhstan are in step, but are well ahead of Turkmenistan; in emergence from the recession that affected all republics after the break-up of the Soviet Union, Kazakhstan and Turkmenistan have on measured GDP regained the late-Soviet level more quickly than Azerbaijan (which, as just indicated for total economic activity, would exceed it because the ‘shadow economy’ was relatively lower in the late Soviet period). Part of the broad homogeneity in economic fundamentals is price stabilization since at least 2000: The Consumer Price Index (CPI) forecast by the European Bank for Reconstruction and Development (EBRD 2004a) for end-2004 is a rise of 3.6 per cent in Azerbaijan, 4.8 per cent in Kazakhstan and 10 per cent in Turkmenistan. The government of the latter, however, keeps overt inflation low by extensive subsidization of consumer goods and utilities and by an unrealistically overvalued exchange rate: a ‘Strategy for Development to 2020’ promulgated in August 2003 requires pegging the manat until the year 2010 at 5,200 to the US dollar, the rate since 1999 and at variance with the unofficial ‘kerb’ rate (currently some 22,000 manat). The statist structure of Turkmenistan is reflected

in Table 1 as the high proportion of GDP devoted to government consumption and the low participation of the private sector in production; in terms of the latter, Kazakhstan and Azerbaijan are around the average for the rest of the CIS.

TABLE 1

Key economic indicators for Azerbaijan, Kazakhstan and Turkmenistan, 2003

	Azerbaijan	Kazakhstan	Turkmenistan
1. Minerals as % of exports	86.0	64.3	82.6
2. GNI per capita (\$PPP)	3,380	6,170	5,840
3. EBRD Transition indicator	3-	3	1+
4. GDP index (1989=100)	70.2	93.5	106.9
5. Capital formation as % of GDP ^a	34.4	22.7	35.6 ^b
6. Government consumption as % of GDP	6.0	11.4	12.7 ^b
7. Private sector as % of GDP	60	65	25

Source: Rows 1, 5 and 6 Asian Development Bank (2004); row 2 Table 4 below; rows 3 and 7 EBRD (2004a), Table 1.1 (arithmetical average of nine indicators graded 1 to 4+); row 4 ECE (2004), Appendix Table B.1

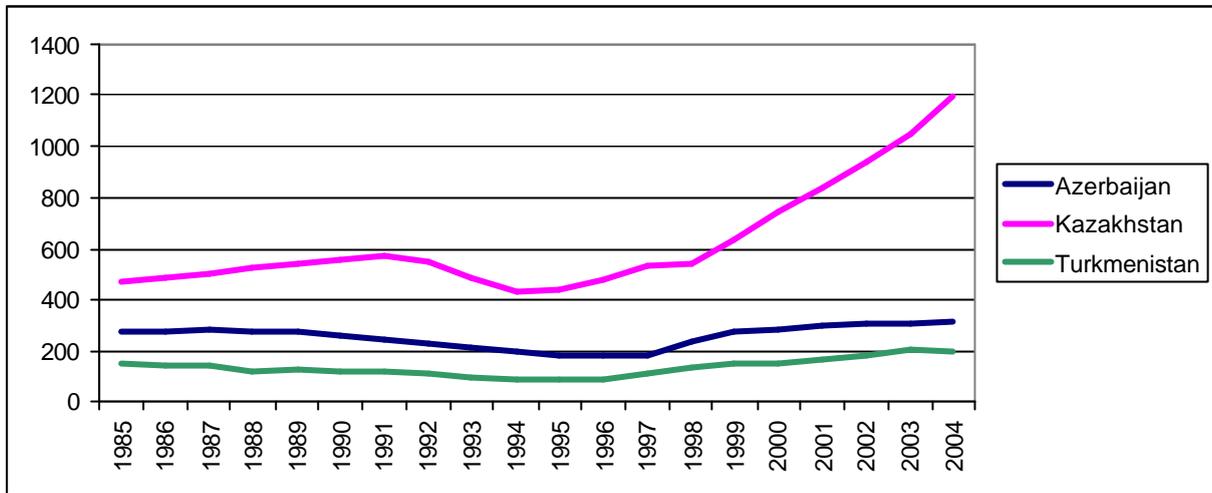
^a 2000-03

^b 2000-02

Although oil and gas extraction declined during the post-Soviet recession (Kazakh gas excepted), due to the decline in consumption in the other CIS states to which the pipeline network largely constrained their exports, normal output levels were soon regained (Charts 1 and 2) and subsequent increases allowed exporters to take advantage of the quintupling of the world price of oil since the nadir of 1998. Turkmen gas exports have been expanded as a consequence of agreements of 2000 with Russia and of 2003 with it and with Ukraine to buy all the gas that could be supplied for the coming 25 years. Deliveries which began in 2004 are priced for the first three years at \$44 per thousand cu. m, \$2 higher than the price Russia and Ukraine had previously been paying; until 2007 half the payment is to be in goods, but then- after it will all be in cash and the price will be stepped up towards the world level. Turkmenistan has the option to terminate unilaterally at the end of each five-year period. Both increased export availabilities and the rise in the world price have intensified the dependence of the three economies and their government revenues on hydrocarbon production. High trade dependence on the other republics of the Union and unfavourable terms of trade – in 1991 the intra-Union price of crude oil was only 13 per cent of the world price and manufactures were at much less of a discount (ECE, 2003, p. 177) – began to be turned round as soon as the Union disintegrated. Azerbaijan effected the biggest change, reducing its trade intensity (share of exports to the region as a ratio of the region's share in world imports) from 22.7 in 1995 to 7.3 in 2001 (ECE, 2003, Table 6.2.6), and Kazakhstan reducing that intensity from 27.8 to 23.2. Industrially-developed countries took up the export share forgone by CIS partners. For all three countries, the improvement of their terms of trade since 2000 has been substantial, due to the rise of the world oil price.

CHART 1

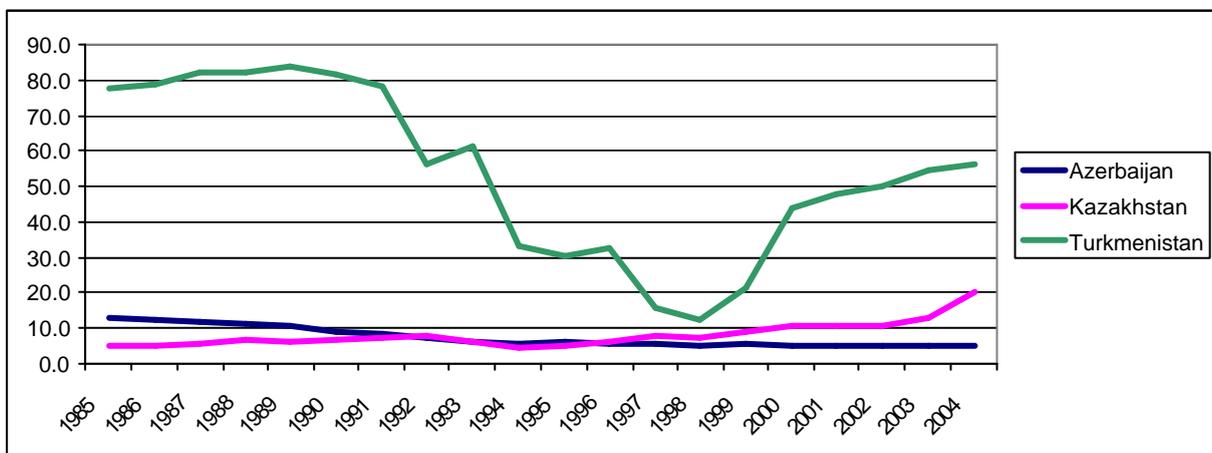
Oil production in Azerbaijan, Kazakhstan and Turkmenistan, 1985-2004
(*Thousand barrels per day*)



Source: BP (2004) and forecast for 2004 by The Centre for Global Energy Studies.

CHART 2

Natural Gas Production in Azerbaijan, Kazakhstan and Turkmenistan, 1985-2004
(*billions of cubic metres*)



Source: BP (2004) and forecast for 2004 by The Centre for Global Energy Studies.

Countering export-price reliance on natural-resource products

The considerable gains to the terms of trade in recent years underscores the volatility of the prices of minerals and expectations of decline. Both Kazakhstan and Turkmenistan sell non-fuel minerals – in 2000 they were equal to 39 per cent of fuel exports from Turkmenistan and 47 per cent from Kazakhstan (ECE, 2003, Chart 6.2.5) – and it happened that their prices have risen coincidentally with those of fuels, though to a lesser extent. Given both their price volatility and that non-fuel remunerative deposits are also finite, an argument could be made that protection is needed in both those countries from resource-exhaustion and from price variability for all resource tradeables. This is but one aspect of the conjoint relationship of the

'Dutch Disease' impact of exchange-rate appreciation arising from high shares of natural resources in exports and the more rapid growth of productivity in tradeables than that in non-tradeables, interpreted as the Balassa-Samuelson effect. ECE (2001, pp. 227-39) has shown that the effect holds for transition countries after 1990, and for the Central and East European states among them (ECE, 2004, p. 62).

The 'natural resource curse' relates to at least three characteristics examined in the literature for transition economies, on two of which this study concentrates. On the first, Kronenberg (2004) analyses previous work and demonstrates a strong negative correlation between natural-resource abundance and economic growth. The second feature is the volatility of the terms of trade of resource-reliant countries, which may be countered through targeted financial set-asides. The third is proclivities in the choice of government expenditure, on which Kronenberg is also revealing in showing that a 'state capture' index, which measures the extent of corruption in the state bureaucracy, is closely correlated with natural resource abundance' (p. 423). This study examines a fourth feature, the authorities' choice of projects with lower returns than others available to them or to the private sector.

Set-asides from resource-income flows

More generally, as a group of distinguished economists (Arrow et al. 2004, p. 167) point out, 'we find evidence that several nations of the globe are failing to meet a sustainability criterion: their investments in human and manufactured capital are not sufficient to offset the depletion of natural capital. This investment problem seems most acute in some of the poorest countries of the world.' Some resource-rich governments have, on the other hand, respected the sustainability criterion by channelling some of their revenues from resource exploitation into funds protected from immediate use. Thus, Chile since 1985 has run a stabilization fund for copper, and a number of states have opted for such funds derived from oil income, e.g., Algeria, Canada (Alberta), Kuwait, Norway, the United States (Alaska) and Venezuela. In the three countries here under review, 'oil trust funds [are] an effective instrument for oil revenue management' (Kalyuzhnova, 2002, p. 79). Azerbaijan and Kazakhstan have established a fund into which part of oil revenue is channelled, and Turkmenistan a fund into which revenue from both oil and gas are directed. In summary, the funds have three purposes – to shield the domestic economy from the volatility of world prices, to foster investment in branches other than natural-resource exploitation and, in the light of resource exhaustion, to share income more equitably across generations. A combination of saving against resource exhaustion and inter-generational equity is set out as the Permanent Income Hypothesis (PIH) (ECON, 2002; Davis et al., 2001 and 2003; Fasano, 2000; Gelb, 1985; Karl, 1997). The IMF expressly argued the case for an 'oil fund' on the basis of the PIH to the government of Kazakhstan, which with those in Azerbaijan and Turkmenistan are discussed in detail below. The other major hydrocarbon exporter of the CIS, the Russian Federation, established an Oil Fund later (2003) than those three but it had accumulated resources sufficient for a value of \$20.5 billion to be forecast for end-2004. But protracted debate within the administration on its investment rules delayed their promulgation until September 2004: these require the capital to be held in government securities of the United States or of 13 EU states, with cash in dollars, euros or sterling.

The volatility and unpredictability of the world oil price is transmitted through export earnings to government revenue. The implication of this for state budget projections is readily seen in their variation from actual revenue. When the authorities have overestimated the oil price in the budget, the revenue shortfall requires a corresponding expenditure reduction,

increase of other fiscal sources or borrowing more than the budget forecast. The transmission effect on the macroeconomy differs according to which of these paths is followed, and in the case of spending cuts may have political consequences in terms of support for the authorities. Governments in developing economies face a broad range of tasks: strengthening domestic institutions to encourage investment, building human and physical capital and providing adequate and sustainable social protection mechanisms. Where, as in the three CIS states considered, natural resources are a dominant contributor to public revenue, the prudent management of that revenue is decisive for positive development within the maintenance of macroeconomic stability.

The magnitude of public resources derived from resource rents involves two issues of their distribution: the split between the public and private sector and allocation of payments among central, regional and local levels. Government investment can be directed either to the state or to the private sector, with due regard to risk management. That part of the government agenda addressed to poverty reduction is also influenced by these two distributions. Commercial firms complement state action by their own allocation of expenditure by region.

The establishment of ‘Oil Funds’

Decree No. 240 of 29 December 1999 established the State Oil Fund of the Azerbaijani Republic (SOFAZ) into the account of which at the National Bank the state oil company SOCAR would pay a share of its revenue from its constituent companies. An initial transfer of \$271 million was made, largely revenue from the Chirag field, and by end-September 2004 its assets stood at \$858 million. The Oil Fund is directly accountable to the President, who confirms members of the Supervisory Council and appoints the General Manager. It receives all revenues associated with the ‘new’ oil fields, that is, those specified in the so-called ‘Contract of the Century’ of 1994. It receives proceeds from the state’s share of oil sales, royalties, pipeline fees, rental fees, bonus payments and interest income. Most of the revenues presently come from the first and only operational consortium at the Azeri, Chirag and Guneshli (ACG) oil fields, a source for the Baku-Tbilisi-Ceyhan oil pipeline (SOFAZ, 2003). The Fund is to be wholly used for investment, although, as noted below, some has been used for emergency housing.

The Kazakh oil fund, the National Fund for the Republic of Kazakhstan (NFRK), was established by Presidential Decree No. 402 of 23 August 2000, and had accumulated some \$5 billion (13 per cent of GDP) by the end of 2004; the National Bank held gross reserves of about the same magnitude. The NFRK is run by a Management Council nominated by the President. The Council currently includes the President, the Prime Minister, the heads of the two Chambers of Parliament, the National Bank chairman and the Minister of Finance. The President also chairs an Executive Board, which devolves management to the National Bank. The Fund's operations are transparent, its revenues, expenditures, and the independent audit report are published in the national press. In accord with IMF recommendations, 75 per cent of the Fund is allocated to investment in foreign equities and 25 per cent to the stabilization of government revenue; the Fund’s capital is supplied by shares of government income from the oil sector, viz., corporation tax, VAT, royalties, bonuses and revenue from production sharing agreements (PSAs). State-owned enterprises in the hydrocarbon extraction and pipeline sector were unified in KazMunayGaz in February 2001.

A State Fund for the Development of the Oil and Gas Industry and Mineral Resources (abbreviated SFDOG) of Turkmenistan had already been established in 1996 in parallel to a

larger fund, the Foreign Exchange Reserve Fund (FERF), financed from a range of sources, and since 1997 also by a 50 per cent tax on foreign-exchange receipts from gas exports (IMF, 1999, pp. 14, 28). Both are under the personal control of the President and are not required to publish accounts. Little has been published about either fund but it appears that FERF expenditure is substantially for public projects (discussed below), whereas SFDOG is more industry-oriented, investing in the main five state-owned enterprises in the hydrocarbon sector, but also financing the reconstruction of Ashgabat airport (IMF, 1999, pp. 28-9).

The channels employed for the investment of these funds are of three forms. The most general for the part designated as the investment portfolio is foreign bonds. In Kazakhstan, funds may be used as initial capital endowment for the pension scheme, itself a combination of commercial and state insurance. The pension scheme thus becomes an institutional investor in the capital market. The sale of 5 per cent of the state's shares in the TengizChevroil Joint Venture yielded \$660 million as the first contribution to Kazakhstan's so-called 'generation fund'. The stabilization segment has to be invested in foreign short-term financial instruments that can be quickly accessed to deal with sudden and unexpected shortfalls in the budget.

The stabilization function is exercised in the NFRK through reference prices for gas, oil and four metals (chrome, zinc, lead and copper). Levies are made on the nine largest oil companies and three from the metals sector when the world price exceeds the reference price. In the case of oil, the rate has been set at \$19/barrel. Until ChevronTexaco raised its planning price in December 2004 from a \$15-25 range to one of \$20-30/barrel, \$20 had been generally adopted: BP continues with \$20, as does Shell, but assumes \$25 and above for investment decisions. The NFRK sets a quarterly baseline tax payment target for each company, based on any excess over the relevant reference price, which triggers tax payments to it. On the other hand, if market prices are below the relevant reference price, the Fund provides revenue to the government. The savings portfolio of the NFRK is based on 10 per cent of baseline revenues (at the reference price) of designated resource-exploiting enterprises plus *ad hoc* privatization receipts and bonus payments from the oil sector. Its stabilization portfolio must constitute at least 20 per cent of NFRK assets. Apart from paying administrative expenses, neither SOFAZ nor NFRK were to be accessed for the first five years with an exception in the Azeri case, where some money has been spent on housing for refugees from the Fuzilin and Agdam regions (in Nagorno-Karabakh, occupied by Armenia).

Issues in the deployment of 'oil funds'

All three economies exhibit a high share of capital formation in GDP (Table 1). In 2003 only Kazakhstan has a high ratio of external debt, 76.8 per cent, with 21.1 per cent in Azerbaijan and 34.8 per cent in Turkmenistan (EBRD, 2004a, Appendix Tables). At that time, the moratorium on disbursements from the 'oil funds' was in force, and hence two countries were not achieving their high investment rates by its use. But the steady fall in the Turkmen ratio for external debt (from 101.7 per cent of GDP in 1999 through 78.6 in 2001 and to 34.8 in 2003) suggests some deployment of its fund in that direction. With the expenditure moratoria lapsing in 2005 and the Turkmen fund under no explicit constraints, the issue is posed whether it is more rational to borrow money from international organizations or capital markets, with the ensuing service costs (which could come from the 'oil funds') or to invest the 'oil money' in domestic development. Governments and the international agencies regard the estimated life of the hydrocarbon deposits as the decisive argument in favour of placing the funds' investment portfolio abroad, whence income will be accrued on the PIH.

In terms of its PIH, the IMF has assumed the year 2045 as the date when the hydrocarbon resources of Kazakhstan will be exhausted. However, these figures do not take account of the as-yet unproven reserves. Recent exploration in Kazakhstan has been much more successful than in Azerbaijan, leading to the discovery of the Kashagan field in the Caspian Sea, which alone is believed to hold nearly 40 billion barrels of probable reserves. Estimates of how long these countries will remain significant producers of oil should take account of expected future discoveries, set against future rates of production, which will of course relate extraction and transport costs to the contemporary/projected world price. Many experts consider that already now Kazakhstan's proven reserves could amount to 18 billion barrels (including Kashagan's proven reserves). In Azerbaijan ACG will be producing for another 30-40 years, although at a far lower level towards the end of the period, as exemplified in BP's production profile showing a rapid decline; the income stream to Azerbaijan will however be higher in that period due to the structure of its PSA. Shah Deniz will most likely be on stream for another 50 years - peaking somewhere around 2015-20 and depending on the evolution of gas markets. Whether the 'oil funds' will continue for as long remains open: some argue that all three countries had used their hydrocarbon revenues for a century without recourse to 'oil funds', and that the United Kingdom government on discovering oil in the North Sea decided against an 'oil fund', but rather to use the revenue for the restructuring necessary to deal with the economic problems of the time that manifested themselves in high inflation and unemployment.

A feature of the Azeri 'oil fund' is the banning of credits (loans) whether to state agencies and enterprises or to private business: such loans, channelling oil profits into the non-oil sector, would support diversification and development. The provision is of course a risk-aversion strategy, but those objectives could be reached if SOFAZ capitalized an economic development bank to provide credits for the development of non-oil goods and services branches.

The choice of project paid for by the Turkmen 'oil fund' may already be examined because it was not subject to any five-year moratorium, but in the absence of published accounts the attribution of its money to any particular capital scheme (and the cost) is conjectural. Three major projects have been completed during the lifetime of the funds – the Presidential Palace and a large statue of President Turkmenbashi (Niyazov) in the capital and a vast Mosque at Kipchak, the President's birthplace; a mosque at Guok Tepe to commemorate the 1881 battle there, in which the Tsarist army killed 14,500 soldiers (mostly of the President's clan), being completed in 1995, would not have been paid for by the fund. Costly also in foreign exchange – for three, the main contractor was the French firm Bouygues – investment in such non-tradeables does not diversify the Turkmen economy towards exports alternative to oil and gas. The lavish stud and horse-racing establishment near Ashgabat is an export earner, from bloodstock sales of the famous Akalteke horse. Due to the absence of accounts, it cannot be affirmed that current expenditure is also involved, but the country displays a substantial share of government consumption in GDP – as Table 1 shows, that share is the highest of the three economies. To put such expenditures in perspective, Table 2 sets out the branches in which capital projects were in progress in 2004.

TABLE 2

Capital projects in progress in Turkmenistan in 2004

	Number of projects	Project value (US \$ mn)
Oil, gas and petrochemicals	27	970
Textiles, trade and finance	19	297
Construction and transport	24	182
Agriculture	18	89
Culture	2	74
Defence and justice	24	32
Projects under regional/ velayat administration	114	1 964
Total	204	3 608

Source: Government of Turkmenistan (2004)

Schneider and Klinglmair (2004, Table 5.1) show the size of government consumption to be negatively correlated to annual GDP growth in 104 developing and transition countries during 1990-2000. It is also one of the variables 'significantly and robustly partially correlated with long-term growth' in an analysis of 38 countries (other than Soviet-type or transition economies) from 1960 to 1996 (Sala-i-Martin, 2004, p. 813). Correlation is not of course of itself causality, but the section below advances some reasons for such a relationship.

Fiscal availabilities and public investment strategies

Shortcomings in implementing both sides of the public accounts pervade most countries: they tend to be fewest in states with a long-established government service and a cohesive civil society, but considerably more in newly-independent states which are engaged in creating their own structures in public administration and finance. Among the latter states political preferences are likely to be weighed against economic cost-benefit analysis in the choice of expenditures, while revenue may be deflected from government use by rent-seeking among those in charge of public institutions and by tax avoidance within the enterprise and household sectors.

The experience of investment in resource-dependent countries is distinctive because revenue from such resources is not hypothecated, formally or implicitly, to any set of government expenditures. The business or household sectors which pay taxes or duties broadly expect in return benefits in the form of national or personal security or economic, social or cultural services, but such reciprocity is not expected when the government exacts its dues from gifts of nature. It is a universal practice that because the resources available for exploitation are exhaustible, the government imposes a levy on such exploitation. Large sums are hence annually at the disposition of office-holders in national, and in some cases regional, governments without convention on their expenditure. As just described, the three states here under review have established funds in which to deposit such revenue and to pre-arrange their expenditure between current (mainly stabilization) and investment use. It seems, however, to be broadly true, as, e.g. Lal and Myint (1996) have shown, that the average efficiency of total investment in resource-dependent countries is lower than in countries which derive less of their production from natural resources. One reason is a weaker profit-motive among government decision-makers than among corporate executives or entrepreneurs.

Most government services are non-tradeables and it is hence to be expected that governments invest in projects which generate non-tradeable services. Its investments facilitate the collection of revenue (such as offices for taxation and regulation), accord security (the armed and police forces), or provide housing and cultural facilities. These have an indirect return if public infrastructure helps to establish an environment which fosters foreign and domestic private investment or contribute to a more efficient operation of the state apparatus in terms of opportunity costs. The border is fuzzy between the foregoing outlays and those which respond to a government's political priorities. Thus the high cost of removing Kazakhstan's capital from Almaty to Astana, with major administrative, housing and transport investments, responded to a political paradigm for a capital to be geographically central rather than peripheral in location. The projects described above in Turkmenistan serve to demonstrate political achievements. Where prestige projects are envisaged with an explicitly economic return, a government may embrace a more optimistic assessment of it than would a commercial organization. An example is an infrastructure scheme in Turkmenistan expected to cost between \$4.5 and 6 billion, the "Golden Lake of the Desert". Its reservoir of 2,092 sq. km aims to stabilize and increase water availability for cotton-growing, but may eventually lose much of its water by evaporation, induce widespread salination of arable land and accelerate the dessication of the Aral Sea (see SPECA, 2004). Because a government of a resource-rich developing country can mobilize resources for large projects from its own funds, it may disregard imputed interest, as measurable in national or foreign capital markets at government-bond rates or from international organizations on concessional terms (at least before it becomes excess-indebted or defaults). Usui (1997) demonstrates this proclivity from the Mexican government's use of its large projected hydrocarbon revenues, and Sarraf and Jiwani (2001, p. 11) identify numerous cases where "... governments tend to invest in projects with low rates of return compared to the private sector". Such is not always the case, as the example of Botswana's public investment has shown (see Hope, 1998; 1994; Tsie, 1996).

In the three Caspian states under review substantial money sums are at the disposition of political office-holders and civil servants at a time when generalized systemic change has disrupted established regulation and practice. During such a transitional period, strategic misjudgement and only gradual control over rent-seeking would not be unexpected. Examining the related variables of adherence to the rule of law and of trust in the business environment, the EBRD (2003, Charts 2.6 and 2.7) ranks the three states low. Measured on a scale of 0 (poor rule of law) to 1 (good governance), Turkmenistan is second lowest, though above Tajikistan, at 0.21, Azerbaijan is at 0.30 and Kazakhstan better ranked at 0.35, though that is nevertheless lower than sixteen other transition countries. For trust in the business environment, the EBRD makes no estimate for Turkmenistan, but puts Azerbaijan and Kazakhstan in the same low bracket as Russia, with 19 transition countries ranking above them.

The need for productivity growth

Over the next fifteen years the labour force will expand in each of the three states: UN projections of the population aged 15 to 64 on its medium variants (UN Population Division, 2004) show increases from 2005 to 2020 of 33.0 per cent in Turkmenistan and of 23.2 per cent in Azerbaijan, but only of 1.8 per cent in Kazakhstan. These increments are associated with reductions in those economically dependent upon them, that is of those below and above the working-age cohorts as per cent of total population – to a remarkable demographic

similarity, 30.1 per cent in Azerbaijan, 31.1 per cent in Kazakhstan and 32.0 per cent in Turkmenistan. Such prospective evolutions of labour inputs, taken with currently-high investment rates, moderate the requirement for productivity growth, at least by comparison with industrially-more developed countries in the CIS and elsewhere. But any comparison with developed countries must correspondingly take account of the presently-low living standards of the three states and hence of the need to catch up. Tables 3 and 4 indicate the gap in consumption that could partly be filled by enhancing total factor productivity.

The extensive empirical literature on total factor productivity (accounting for the positive or negative growth associated with changes other than the incremental application of capital and labour) is, nevertheless, sparse for the three economies under review. Kaser (2005) has collected estimates for these and for other states in the region. The work of Easterly and Fischer (1995) is important for the late Soviet period: they show negative TFP during 1970-1990 for Kazakhstan and Turkmenistan (annually 1.1 and 2.0 per cent respectively), but a positive 1.4 per cent for Azerbaijan. De Broeck and Koen (2000, Tables 6 and A1) also report negative TFP growth for Kazakhstan between 1981 and 1990, but the World Bank (1997) calculates for that decade a positive TFP growth of 1.5 per cent. For the period after the Soviet break-up only one country seems to have been specifically studied – Kalyuzhnova, Pemberton and Mukhamedieyev (2004, p. 352) give a TPF growth estimate for Kazakhstan of –5.57 per cent annually between 1991 and 1996, but a remarkable turn-round to +5.58 per cent annually between 1996 and 2001. As living standards (see Table 3) remain relatively modest and significant increments in the numbers gainfully occupied cannot be expected in the coming decade, growth through TFP is a factor in enhancing those standards.

TABLE 3

Indicators of living standards in Azerbaijan, Kazakhstan and Turkmenistan around 2000

Country	Human Development Index ^a , 1999	of which index of			Income concentration index (Gini index) ^c	Population daily nutrition calorie content, kcal per capita, 1997 ^d
		life expectancy	education level	GDP ^b		
Azerbaijan	0.738	0.77	0.88	0.56	...	2236
Kazakhstan	0.742	0.66	0.92	0.65	34.8	3085
Turkmenistan	0.73	0.68	0.92	0.59	40.8	2306

^a UNDP estimates.

^b Real GDP index per capita in US dollars according to purchasing power parity. The UNDP calculations are based on data of the International Comparisons Programme.

^c Latest available between 1990 and 2001.

^d FAO estimations.

Source: Statistical Yearbook of Kazakhstan, 2003.

TABLE 4

GNI per capita 2003, Atlas method and PPP*US dollars*

World rank	Country	At actual exchange rates (Atlas methodology)	World rank	Country	At purchasing power parity
119	Kazakhstan	1,780	101	Kazakhstan	6,170
131	Turkmenistan	1,120	106	Turkmenistan	5,840
146	Azerbaijan	810	138	Azerbaijan	3,380

Source: World Development Indicators database, World Bank

If research and development (R & D) adds 0.3 to 0.5 per cent to total factor productivity growth, as Comin (2004) has shown for the United States, the three states under consideration may be forgoing gains by being among the countries of the ECE region which spend the lowest shares of their GDP on R & D and which have reduced that share since independence. ECE (2002, Table 4.4.1) shows all CIS states save Russia and Ukraine spending less than one per cent of GDP on R & D in 2000, but Turkmenistan spending 0.10 per cent, Kazakhstan 0.17 per cent and Azerbaijan 0.35 per cent; the corresponding values for 1991 being 0.48, 0.56 and 0.75. Factor-productivity enhancement through a previous provision of secondary and tertiary education is likely to remain constant in Azerbaijan, where enrolments in 2002 were about the same as at independence and 4.2 per cent of GDP was spent on education, and in Kazakhstan, where the percentage of GDP spent on education rose from 3.2 in 1990 to 3.7 in 2001; but may slacken in Turkmenistan, where the percentage of GDP spent on education declined from 4.3 in 1990 to 3.7 in 1997 (UNDP, 2003, Indicator Table 9; CIS, 2003, pp. 54, 178, 370, 628). Cuts in education spending began in Turkmenistan in 1993 when schooling was curtailed from ten to nine years and university education from four to two years; 12,000 teachers were made redundant (of a mid-1990s staffing of 69,000 teachers) and the academic content of curricula was reduced. By contrast the number of teachers rose between 1991 and 2003 in Azerbaijan (from 124,000 to 169,000) and in Kazakhstan (from 242,000 to 262,000) (CIS, 2004, pp.202 and 400). The prospective deterioration in the quality of Turkmen human capital may be indicated by the higher-education enrolment in 2001 (as share of population aged 19-24) which was only 2.7 per cent, well below the 31 per cent average of transition countries (EBRD, 2004b, p. 11). In the longer run, human-resource quality may be affected by all three governments' slimming of health-care services: cuts in Turkmenistan in 2004 involved the dismissal of 15,000 medical workers (from 113,000 physicians and nurses in the mid-1990s); there were also downward trends in the corresponding numbers in Azerbaijan, from 98,000 in 1991 to 89,200 in 2003, and in Kazakhstan, from 263,000 in 1991 to 169,000 (CIS, 2004, pp. 206 and 404).

Growth in measured GDP, and hence derivatives from growth accounting such as TFP, understates the expansion of economic activity during the period since 1991 because of the increase in a 'shadow' economy. On one set of estimates over both Soviet and post-Soviet periods, Alexeev and Pyle (2003) show a decline during the later years of the USSR,

but a significant expansion after independence. Again, Turkmenistan escapes scrutiny, but in Azerbaijan and Kazakhstan the share of the 'hidden' economy in all economic activities was 50 per cent in 1979, but down to 33 per cent in 1989. After the break-up of the USSR, the share increased to 70 per cent in Azerbaijan and to 50 per cent in Kazakhstan. Schneider (2003, Table 3) plots growth in the 'shadow economy' from 1990-1993 to 2000-2001 as 45 to 60 per cent of all activities in Azerbaijan and from 32 to 42 in Kazakhstan and compares (in Schneider and Kinglmair, 2004, Table 7.1) the percentages in 2000 (61 in Azerbaijan and 43 in Kazakhstan) with 107 other countries: only lower than Azerbaijan were Bolivia, Georgia and Panama and just above it was Zimbabwe.

Fostering prudence in the private sector

The command over resources retained in the private sector of the three economies is proportionately largest in Kazakhstan, with Azerbaijan close behind, but low in Turkmenistan (Table 1, above), but it is incumbent on all governments of transition countries to establish or promote institutions which spread or minimize avoidable risk of wasting resources, protect the interests of economic agents against criminality or malpractice and encourage competitiveness and the rewards that flow there from. Because much is published on the topic, it is not the aim of this study to specify the further steps in institutional and regulatory reforms which remain to be undertaken, especially in the field of financial services. The three states considered here differ little on the protection of competition – the EBRD's transition indicator for 2003 is 2 (on a scale 1 to 4+) for Azerbaijan and Kazakhstan, but only 1 for Turkmenistan – but more markedly in reform of financial institutions, for which the EBRD distinguishes banking reform and interest-rate liberalization from reform in the securities market and non-bank financial institutions. Kazakhstan had pursued most reform, the indicators being 3 and 2+, Turkmenistan the least – 1 on each indicator – with Azerbaijan scoring 2+ and 2. The EBRD (2004b, p. 16) reports that in Turkmenistan '95 per cent of all [bank] loans continue to go to state-owned enterprises at the direction of the Government'.

Some reflection of the business climate achieved after a decade of independence is to be found in the net inflow of foreign direct investment (FDI). A study of 3,225 firms in Russia and European transition countries (EBRD, 2003, Table 5.1) demonstrated positive correlations between the above indicators and FDI inflow and between FDI and enterprise performance (EBRD, 2003, Table 5.2). In the case of the three resource-rich states in the present analysis, foreign corporations enter the hydrocarbon sector and tolerate weaker reforms in these spheres because that sector can be partially partitioned from the rest of the economy; they can effect their exports with less interface with the domestic institutional environment. Nevertheless, as Tengiz Chevroil's tax dispute with the regional authorities of Atyrau in 2002-2003 showed (when the local authority levied a \$71 million environmental-damage fines on stored sulphur stocks), no enterprise is immune from the national institutional environment. Azerbaijan and Kazakhstan have received by far the most FDI of the CIS on a per capita basis (EBRD, 2004a, Table A8) - \$873 and \$1,110 during 1989-2003; Turkmenistan, having received \$236 in that period ranks fifth in the CIS. But as wealth is accumulated, especially from the hydrocarbon sector and from rent-seeking in the government sector, a reverse flow is manifesting itself. The UNECE (2004a, Table 4.5.8 and its database) estimates of FDI outflow from the Caucasus and Central Asian CIS states as substantially expanding in 2002 to \$756 million and to \$816 million in 2003.

Prospects for sustainable development

The record rise in the world price of oil (touching quintuple its 1998 level in 2004) and of gas, and the likelihood supported by world growth projections that all the three states considered in this study will not be constrained by demand for their exports in the medium term, leads to the conclusion that their resource reliance and consequential earning power will continue for the rest of the current decade. But that is not to say that volatility of price and of export receipts and government revenue are matters of the past. The practice of siphoning some of that revenue into 'oil funds' and applying them to stabilization and long-term investment remains desirable for all three states.

As their economies and societies become more integrated with the rest of the world, in contrast to their isolation until 1991 within the Soviet system, the political status of those funds and of policies associated with them will doubtless come under increasing scrutiny based on comparison with practices elsewhere. Wider political consensus and international investment rating is correlated with regular auditing and public reporting of financial and management performance not only of the 'oil funds' but of public-sector institutions generally. The IMF has long recommended the 'Treasury system' whereby self-financing state institutions are restricted to a few defined spheres and the bulk of central government revenue and expenditure pass through the state budget. Following also IMF guidelines, the investment portfolio of the 'oil funds' is best placed abroad. In sum, both the domestic electorate and the international community should have confidence that the funds are well-managed, transparent, and used for the purposes set out by law. What is valid for the funds, is relevant also for the set of reforms in financial services, and for the provision of an environment and infrastructure which facilitates both the inflow of external resources and technologies and the intermediation which attracts domestic savings into productive investment. The broad economic environment, with respect to both macro and micro indicators and variables, will conduce to, or detract from, incentives to invest and to add to productivity. The three states have a largely-shared historical and cultural heritage to which institutions shaped under other conditions may not readily be appropriate. But given the forces of globalization and integration under which economic development is everywhere shaped, convergence to generalized norms, including those for financial management, is more to be desired than divergence.

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