1. Introduction

1.1 OIL WITHOUT MARKETS

There is something about petroleum that is controversial and intriguing. There is something about Russia that is mystifying and absorbing. When the two merge in a study of Russian petroleum, the result is likely to be tantalising and engrossing. There are so many precedents, similarities, and coincidences in a study of the history of Russian petroleum that discussion of the present generates a sense of deja vu.\textsuperscript{1}

It can be argued that Russia has never been a market economy. While it is true that prior to World War I Czarist Russia's economy had a veneer of capitalism, the economy was just one step out of feudalism. The economy was overwhelmingly agrarian with peasant farmers, at best, one generation removed from serfdom. A small cadre of industrialists and merchants operated in the relatively free market for manufactured goods and imported consumer products but this embryo market system never extended to the development of resources. This does not mean that profit-oriented entrepreneurs were excluded from resource exploitation - on the contrary they were heavily involved. The rights to resources were, however, controlled directly by the Czarist regime. Resource rights were either delegated by royal patronage to the aristocracy or held by the government itself, although it is often difficult to disentangle the two given the large role played by the former in the government. In this system, the ability of entrepreneurs to gain access to resources, including petroleum resources, in which they saw potential depended upon political connections and the ability to curry favour rather than the ability to seize upon a market opportunity. The development of the Russian oil industry prior to the Bolshevik revolution in 1917 reflects this non-market allocation system.

When Lenin and his relatively small clique of Bolsheviks, to their surprise, actually gained control of Russia and had the opportunity to reorient the economy in the name of Karl Marx, they were groping in the
dark. For all his predictions of the revolutionary overthrow of the capitalist system, Marx provided no insights into what would happen afterward. Marx was interested in the evolution of the capitalist system, not in providing road maps for the transition to communism.

While the Marxist intellectuals who formed the core of the new Soviet administration of Russia did not have a positive guide to creating their new ‘workers’ paradise’, they certainly knew what they did not like about capitalism. With the benefit of hindsight and stripped of its optimistic and emotive rhetoric, the basis of the economic model that was to dominate Russia for over 60 years (and a large portion of the rest of the world’s population for shorter periods) was simple. If the capitalist system has it; we will do away with it. If capitalism has profit (meaning workers don’t receive their fair share of the fruits of production); we will abolish it. Capitalism has private property (that gives some rights to more resources than just their labour and, hence, leads to inequality in incomes); we will nationalize it. It has capitalists (who are forced by competition to exploit their workers in desperate attempts to survive); we will replace them with technocratic managers. Prices determine resource allocation (even when it is not in the best interest of society); we will allocate by commands made by altruistic bureaucrats. Markets create business cycles, instability, booms and busts (which impose hardship on the proletariat through unemployment); we will replace them with scientific planning. All of the institutions associated with capitalism were done away with – banks, interest, stock markets, individual initiative, value in human capital accumulation. The model had some appeal in theory, in practice it did not work.

In part, the failure of this negative model can be explained by human nature – the socially altruistic ‘new socialist man’ did not evolve and could not be created. More important, however, in their outrage with the negative aspects of capitalism, they were blinded to the true role and function of capitalist institutions. Over time, those in charge of the Soviet economy were forced to ‘invent’ many institutions that paralleled in function the capitalist ones they had abolished, although always dressed up in socialist rhetoric. To the very end, however, they were true to one central theme – markets would not be used to allocate resources.

Without markets to guide the allocation of resources, however, the Soviets developed an oil industry on a massive scale. From a low of 25 million barrels per year at the end of the Russian Civil War in 1920, production expanded to peak in 1987–88 at 4.5 billion barrels (Reinsch et al., 1992). This is an impressive achievement. How it was achieved,
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however, has a direct bearing on any assessment of the potential of the Russian oil industry today.

The workings of a command economy are not widely understood in modern market economies. It is not often taught in modern economics curricula in universities. In part, this is because since the fall of the Berlin wall and the collapse of the Soviet Empire at the end of the 1980s it has not been needed. It is an economic system that only survives as an anachronism in a few unreformed communist countries such as Cuba and North Korea. As a result, there is half a generation of university graduates who have no knowledge of the workings of a command economy. Even at the apex of the Cold War when communism and capitalism were (apparently) vying for the position as the globe’s pre-eminent economic system, few students in the West bothered to study communist economies. This was because non-market economies were relatively closed and did not interact with market economies to any great degree. There was, for the most part, no need to know. With the fall of communism, these economies began their slow and painful integration (or re-integration) into the international economy. Understanding the workings of the previous system had little relevance for transition.

This is not the case, however, in a few sectors including the petroleum industry where the impact of previous investments is long-lived. In market economies, well managed oil fields have very long productive lives – West Texas and Pruhoe Bay come immediately to mind. In contrast, the vast 1948 Romashkino oil field, the flagship of the post World War II Soviet industry, was all but exhausted in 30 years. The Samotlor field discovered in the 1960s in West Siberia was depleted in 20 years (Reinsch et al., 1992). Thus, any current assessment of Russian oil reserves depends upon an understanding of the nature of the investments made in the Soviet era and how oilfields were managed. Further, given the relative chaos and high risks associated with the post-Soviet era in Russia, much of the infrastructure that currently exists is a holdover from investments made by the previous regime.

In theory, the non-market economy established by Lenin and subsequently refined over the years was based on two institutions. The first was ‘scientific planning’ whereby supply and demand were matched under broad priorities established by the Communist Party. The second was execution of the plans through orders (commands) given by bureaucrats. The problem with the theory was that the planners never had sufficient resources to collect and process the information they required in order to develop sufficiently comprehensive plans. It is not even clear if it is
possible to collect sufficient information to develop an operational plan. As a result, the much-vaunted ‘Five-Year Plans’ were crude instruments at best.\(^2\) They resulted in chronic mismatches between supply and demand. In particular, the shortages wreaked havoc along supply chains as too little output at one level meant too few inputs at the next level leading, in turn, to lower than planned output (Hobbs et al., 1997).

While ‘scientific planning’ was a monumental failure, there is little doubt that ‘command’ could accomplish much if a particular objective was considered a priority. Bureaucrats given the authority to garner and allocate resources to particular tasks could achieve results. The Soviet space programme is probably the best example but there is a wide range of examples: electrical power generation capacity, steel production and, at times, petroleum exploration. On the other hand, non-priority areas tended to languish starved of resources. Of course, the ability to command resources for priority projects disrupted the resource balances detailed in the plans, further contributing to the creation of shortages in other areas. Thus, while command could achieve specific results, the cost of achieving the results could be horrendous both in human terms and in inefficient resource use.

Beyond the problems created by the chronic mismatching of supply and demand, there was a more fundamental problem with economic allocation by command. The inability of central planning to choose rationally among allocation alternatives was central to the command economies’ failure to provide for sustained improvements in living standards. This was the ‘calculation problem’ identified by Ludwig von Mises in 1922,\(^3\) early in the Soviet era. Understanding the calculation problem is particularly germane to gaining insights into the development of the Soviet petroleum industry.

The essence of von Mises’ argument is that once government intervenes in the economy to set prices by fiat, it is no longer possible to use prices as a means of allocation. Further, it is not possible to make allocation decisions based on an objective efficiency criterion. This is because the set of relative prices promulgated by the state does not reflect the relative value (based on opportunity cost) placed on goods and services by their users whether they be producers of goods or final consumers. According to von Mises (1981, p. 103):

> Each commodity produced will pass through a whole series of such establishments before it is ready for consumption. Yet in the incessant press of all these processes the economic administration will have no real sense of direction. It will have no means of ascertaining whether a given piece of work is
really necessary, whether labour or materials are not being wasted in completing it. How would it discover which of two processes was the most satisfactory?

Planners in command economies realised that their official prices could not be used for the purposes of allocating resources. Instead, they attempted to use a ‘material balances’ approach whereby technical input coefficients were used to determine the ratio of resources in production. While this could theoretically be used as a static allocation rule, it is not useful for dynamic decision-making processes that characterize a modern economy, particularly one with a preference for development such as that of Soviet Russia. Questions relating to when an industry should decline or expand as resource scarcity changes or consumer preferences evolve cannot be answered. The value of new products and the efficacy of new processes cannot be assessed objectively.

The problem of determining relative value, as identified by von Mises in 1922, was never solved by communist intellectuals or planners. The absence of a means by which to make informed allocation decisions meant that the targets set by policy makers in the Party were striven for with no thought to efficiency or management over the long run. With no means to value energy in the Soviet Union, there was no constraint on demand and the economy became energy intensive. The rapid and forced growth required ever increasing quantities of energy. The result was an industry fixated on the short run. According to Reinsch et al. (1992, p. 17)

Since . . . the only constraints placed on Soviet industrial production were lack of investment funds and physical supplies, the Soviet Union developed a very particular type of development strategy, sometimes referred to as a shortage management strategy; that is, to get as much as possible, as quickly as possible, before competing demands drained off the available resources.

This emphasis on the short run can have considerable impact on both the management of existing reserves and exploration strategies. The effect is outlined by Reinsch et al. (1992, p. 13):

Unfortunately, the focus on rapid oil recovery carried a heavy price. Forcing production beyond the Maximum Efficient Rate (MER) resulted in early and rapid decline in production volumes from existing fields. Technological deficiencies and general organisational decay forced the industry to move prematurely to new, less favourable producing regions.

The cumulative effect of a petroleum sector plagued with the ‘calculation problem’ for over 50 years means that it is inappropriate to apply Western
interpretative norms to any Russian data; that is, wells drilled, reported reserves, depletion rates and so on. The Soviet record must be examined in detail. Thus, while the command economy built a petroleum industry without the use of markets, the configuration of that industry is a far cry from those that evolved in modern market economies.

The third period when the oil industry operated largely without markets is in the post-Soviet era. While 'scientific planning' has been abandoned and, at least officially, so has allocation by command, the Russian economy has not yet made the transition to being a modern market economy. As suggested above, the problem of determining relative value, as defined by von Mises in 1922, was never solved by communist intellectuals or planners. As a result, the former command economies were all faced with a dilemma. The existing set of prices conferred benefits to some members of society. For example, low energy prices provided a degree of energy security for those on fixed incomes such as pensioners. If they did not free prices, however, correct signals would not be conveyed upon which to base resource allocation decisions.

Freeing prices without the institutions necessary to support markets was, unfortunately, not likely to produce the set of prices which reflect relative values as was envisioned by those who put their faith in the process of allocation though market forces. The rapid rates of inflation that followed the freeing of prices further reduced the ability of individuals to discern relative value from available prices. Where markets are not developed, as in Russia, the ability to use prices as a decision criterion is severely limited.

The problem of resource allocation in the Russian energy sector is further complicated by the conversion of state monopolies into private monopolies. In market economies, the role of prices as a guide to resource allocation is based on the premise that they represent, for the goods in question, a convergence of the value of the opportunities foregone in the goods' production and the value placed on the goods by consumers. In other words, price is set where the marginal (resource) cost of producing a good equals the marginal valuation which consumers put on that good. This is the familiar intersection of supply and demand curves. Disequilibrium in a market sets economic forces in motion to reallocate resources. For example, when excess demand exists, rising prices provide an incentive for increased resource allocations to the goods supplied to that market. Falling prices suggest a reduction in the resources committed to the production of goods supplied to markets exhibiting excess supply. This basic tenet of market economies bears repeating in the case of liberalizing command economies.
In market economies it is recognized that monopolies lead to inefficient levels of output because price (and hence, valuation of consumers) exceeds the marginal cost of producing the good or service. The observed monopoly price does provide a signal for more resources to be transferred to the production of the good but barriers to entry prevent that transfer from taking place. Prices are not allowed to play their role as a guide to resource allocation.

In modern market economies, monopoly inefficiencies are often tolerated because the effect of their perceived distortions is small (or the gains from regulating such monopolies do not justify the resource costs associated with the regulator process). Where the inefficiencies or price distortions created by a monopoly (or potential monopoly) are considered to be unacceptable, government policy has generally been: (1) to prevent monopolies arising – anti-merger provisions in anti-trust or competitions legislation; (2) to break up existing monopolies; or (3) to regulate the output and price of monopolies. The intent, in each case, is to keep or move the observed price nearer to the price that would arise in a competitive market. It is recognized, however, that a price established through a regulatory process will only be an approximation to the theoretically based price. This is because acquiring the information to determine the regulated price is not costless. The problem of setting a regulated price is especially difficult when the firm whose price is being regulated has an incentive not to provide information.

In liberalizing economies such as Russia, monopolies are far more prevalent than in market economies. There are three reasons for this: (1) the former command system stressed large-scale production/distribution facilities; (2) the ability of firms to identify and conclude transactions with alternative suppliers/customers is limited by the lack of institutions to support the process of broadening markets; that is, the costs of broadening markets is very high; and (3) the government will not, or cannot, act to limit monopolies. In the energy industry, facilities were of a particularly large scale; for example, there were only 17 refineries serving an economy of 200 million people in the old Soviet energy system (Considine and Kerr, 1993). Further, the large-scale energy systems were kept largely intact in their Soviet form whether or not they have been privatized. These large monopolies have provided those who control them with the ability to become extremely wealthy – and to use that wealth to influence governments. They have been able to use that influence to strengthen their monopolies and limit competition. Further, rights to energy resources has, in part, been delegated to lower levels of government. The regional
governments in the Russian Federation are notoriously corrupt, meaning that their resource allocations are unlikely to reflect market conditions.

The creation of monopolies, whether through privatization or reorganization of state firms, and their ability to maintain their monopoly position, means that prices are not able to carry out their resource allocating role to the same degree as is the case in market economies.

What does it mean when the 'planner's conscious hand' has been lifted but the 'invisible hand' does not yet exist? Fundamentally, it means that the prices which do exist will often give false signals. In the short run, they will give false signals about what to produce, in the intermediate run they will give false signals about where to invest. If producers and investors are unaware that existing prices are giving false signals, and do not learn, the market clearing price is not likely to represent a stable equilibrium and there will be considerable wasted investment. Little is understood about the actions of oil producers and investors when they are aware that prices give false signals. If they are risk averse, they are likely to under-produce and under-invest when they cannot believe the price signals they receive. Further, given the absence of secure property rights and the propensity of bureaucrats in Russia to use the tax system opportunistically to confiscate profits if they arise, doing business in Russia's energy sector has been extremely risky in the post-Soviet period. Not surprisingly, the industry was characterized by chronic under-investment during the 1990s.

Transition has not been smooth and, as yet, is a long way from completion. Some even doubt that the economy is transforming into a market economy but rather into a 'licensing' economy (Hobbs et al., 1997). Kerr and MacKay (1997) define a licensing economy as one characterized by an absence of secure property rights, endemic corruption and bureaucratic licenses required to engage in economic activity. If the income of officials with the ability to grant licenses comes largely from the ability to create and sell licenses, this leads to a vested interest in retaining the system of licenses. As a result, they will work to ensure that property rights remain poorly defined and enforced. The outcome is an economy trapped in a low investment/high cost of doing business equilibrium. Of all the Russian industries, the oil industry fits this characterization, particularly given the access to hard currency that sales to world markets have provided.

It seems clear that the Russian petroleum industry has never been guided by market forces as they are understood in the West. This means that the Russian industry cannot be approached from a market economy perspective and that, above all, history matters.
1.2 RUSSIAN OIL IN THE GLOBAL ECONOMY

While the Russian petroleum industry has never operated in a market system, it has still become a major player in the international energy industry. At the end of the Soviet era it was the largest oil producer in the world. While a combination of reserve depletion and the economic disruptions of the 1990s led to a decline in production, Russia remains the third largest crude oil producer, surpassed only by Saudi Arabia and the US. The industry’s interaction with the international oil market has often destabilized prices. The latest example was in the fall of 2001 when Russia played the spoiler in OPEC’s carefully constructed output reductions, leading to a dramatic decline in prices.

From a high of almost 590 million metric tons of crude oil production in 1988, Russian output declined to just over 300 million metric tons in 1996 and then remained stable for the rest of the decade. Strong oil prices in the first years of the new century have led to some modest increases in production. The break-up of the Soviet Union has meant that some oil producing areas are now independent countries. Kazakhstan, in particular, is a major producer of oil but Azerbaijan, Turkmenistan and Uzbekistan are also important producers that are no longer directly part of the Russian energy system. As a result, Russia’s main oil fields are now located in Siberia. Approximately two thirds of Russia’s output originates in the Tyumen region. Russian production is derived from approximately 135 000 wells of which over 35 000 are idle. Drilling activity has, however, declined considerably since the Soviet era, from 38 million metres in 1988 to just under 6 million metres in 1999. The number of wells drilled has declined to an even greater extent from 15 643 completed wells to assist in exploitation of reserves in 1988 to 2179 in 1999. Exploration wells drilled fell from 816 in 1988 to less than 300 at the end of the 1990s. Two thirds of Russian reserves require that secondary and tertiary recovery methods be used. Thus, even with the recovery of international oil prices in the early years of the 21st century, the sustainability of Russia’s production is questionable.

While some of the reduction in exploration and recovery drilling reflects the beginnings of market discipline being applied to the industry, far more important is the general malaise of the post-liberalization Russian economy and, in particular, the absence of clear property rights, poor predictability in the taxation system and government restrictions on foreign participation that kept the industry starved for capital, particularly foreign capital. The lack of investment funds has left the industry saddled with a large stock of
ageing and technologically obsolete equipment and infrastructure. Thus, keeping production levels stable, even at the lower levels of the mid-1990s, has proved a considerable challenge. In 2000 and 2001, rising international oil prices removed this constraint to some extent but increased government taxes and the need to maintain existing infrastructure have siphoned off most of the windfall gains so that there has only been a limited expansion in activities aimed at locating new reserves.

Russian reserves, however, remain large. Although estimates differ, it has been estimated that Russia's original oil endowment was 262 billion barrels, second only to Saudi Arabia (377 bbl). Russia is followed by the US (260 bbl) and Iran (152 bbl). While the US and Russia are estimated to have similar endowments, the US has used up a far greater proportion of its endowment. The remaining US endowment is estimated at 92 billion barrels while Russia's is 196 billion barrels. Saudi Arabia has the largest remaining endowment at 302 billion barrels. In terms of proven reserves, however, Russia has approximately 49 billion barrels compared to 23 billion barrels for the US. In proven reserves, Russia lags behind Saudi Arabia (160 bbl), Iraq (91 bbl), Kuwait (86 bbl), Iran (69 bbl) Venezuela (64 bbl) and the United Arab Emirates (61 bbl). While the US is expected to be able to maintain current levels of oil production for less than ten years, Russia will be able to sustain production in excess of 50 years assuming no major technological changes and that sufficient capital is available to finance exploration, recovery and infrastructure expansion and refurbishment.

Russian oil consumption is considerably less than production, leading to considerable oil being available for export. In 2000, daily production in Russia was approximately 6.62 million barrels per day while domestic consumption was only 2.34 million barrels per day. Russian consumption has declined from over 2 million barrels per day since 1992. As a result, even though production has declined, from 7.86 million barrels per day to 6.62 million barrels per day, more oil is available for export. Consumption has declined for two reasons. First, the decline in industrial production and economic activity in general that followed the end of the communist era led to a decrease in demand for petroleum products. Further, while domestic prices have not risen to world levels, they have increased considerably. As a result, individuals, firms and government institutions have had to find ways to curb their energy consumption.

Since 1991, Russian oil exports have been increasingly shifted from the New Independent States of the former Soviet Union (NIS) and the Central and Eastern European Countries (CEEC), which used to fall within the Soviet Union's sphere of influence, to western markets. This largely reflects
the economic reality that the NIS and CEEC countries have had difficulty paying for their energy imports. As a result, Russia's exports have been targeted toward western Europe where demand is strong, domestic production is limited and payment made at world prices in cash. The majority of Russian oil exports are being sold to the United Kingdom, France, Italy, Germany and Spain. The share of net exports to countries outside the former Soviet Union increased from approximately 50 per cent in 1992 to 90 per cent by the end of the century.

Oil exports are extremely important for the Russian economy. Prior to the oil price rise in 2000 and 2001, oil accounted for approximately 30 per cent of Russian hard currency export revenues. Tax revenues from oil and natural gas account for more than half of the Federation government’s tax revenues. Given that oil production and exports are relatively easy to monitor, it is a relatively easy sector to tax. Hence, the government is unlikely to reduce the tax burden borne by the industry. The administration of President Vladimir Putin has kept a tight rein on the sector by insisting that it pay all its taxes in cash. The oil export tax was increased as international oil prices rose in 2000. The government’s reliance on the oil industry for revenue means that the oil industry is financing those areas of the economy where it is hard to tax. As a result, the industry is short of retained earning with which to finance the replacement of its ageing capital stock and to expand production.

Further, given that foreign hard currency markets are more lucrative than domestic sales, the government has had to implement domestic delivery quotas to prevent oil companies from starving the domestic market of crude oil. While the domestic delivery quotas are a contentious issue given the hard currency foregone, no Russian administration has been able to seriously consider raising the domestic price to international prices. As a result, domestic consumers will have to continue to fight for crude, and industrial expansion will be constrained by the absence of secure sources of additional supplies. The majority of Russian oil is exported by tanker. The major export ports are on the Baltic sea and at Novorossiisk on the Black Sea. Black Sea exports must pass through the Bosporous Straits where there is considerable worry about the potential environmental damage of an oil spill. Black Sea facilities are being used near capacity while those on the Baltic are not, particularly since a new terminal was opened in Kaliningrad Oblast, a Russian enclave on the Baltic Sea, in late 2000.

The major overland route to Western Europe is the 1.2 million bbl/day capacity Druzhba pipeline. This pipeline has yet to be utilized to capacity. Russian export routes are far from secure, running, in some cases, through
NIS countries that suffer from political instability, lack of funds for maintenance or a predilection for practising hold up on transit fees. As a result, Russia is attempting to diversify its export routes though new pipelines.

In 1993, Russia initiated a privatization process for the oil industry. The first stage involved the organization of state owned joint stock companies and led to the establishment of a small number of vertically integrated oil companies. Since then, there has been some further consolidation through mergers. The second stage of privatization has been the selling off of government shares in companies.

The principal vertically integrated companies include LUKOIL, Surgutneftegas, Slavneft, ONAKO, Eastern Oil Company, Tyumen Oil Company and Rosneft, which is the only remaining firm owned solely by the state. In January 1998 two of the large vertically integrated companies, YUKOS and Sibneft merged to form YUKSI. It is one of the largest oil firms in the world. It has the most reserves under its control and follows only Exxon and Shell in extraction. These large companies are important in the Russian political process and are enmeshed in it. This makes reform difficult, particularly given the government’s dependence on the sector for revenue.

The hold of the domestic industry over the regulatory process has made it difficult for foreign oil companies to prosper in Russia. The need for technology and capital, however, has led to some reforms that have improved the appeal of Russia for foreign firms. They also feel it is important to maintain a presence so as not to be shut out in the long run. Major foreign oil companies include BP Amoco, Chevron, Conoco, Exxon, Shell, Texaco, Mitsubishi and Mitsui among others.

While the Russian oil companies cannot yet compete effectively on a technological or managerial level with the other major firms, they operate relatively effectively in Russia. The future of the Russian industry will be determined partly by the Russian industry’s ability to modernize both technologically and managerially. It will also depend upon what it has to work with – what it has inherited from what has gone before. For a considerable time to come, the latter will be as important as the former. It is to the determinants of that inheritance that we now turn our attention.
NOTES

2. For an accessible and readable account of how this is largely avoided in modern market economies see Friedman and Friedman's (1980) discussion of the parable of the pencil, pp. 11–13.
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