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The Energy Crises of the 1970s.
Anticipations and Reactions in
the Industrialized World

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Waiting for the Energy Crisis: Europe and the United States on the Eve of the first Oil Shock

Nuno Luis Madureira *

Abstract: »Warten auf die Energiekrise. Europa und die USA am Vorabend des ersten Ölschocks«. A global economic crisis is the most difficult kind of event to predict. This article asks a straightforward question: did anyone come close to anticipating the oil crisis of 1973/74, which represented a new type of historical sequence? Was the likelihood of an oil shock self-evident at the time? To answer this, I examine the degree of awareness in Europe and the United States of the three possible triggering factors: Egypt's disposition to start a war and enlist the support of oil-producers; the Arab interest in oil conservation and long-term income maximization; and the imbalance in the oil market and the delayed adjustment of oil prices. For each of these topics, I set out both what was expected and what was actually in the offing; the information available to Western analysts and that unknown; the communication noises and the flagrant bias. The conclusion pays tribute to three men – James Akins, Pierre Wack, and Ted Newland – who had guessed what was coming ahead, and explains why their predictions almost succeeded, while others failed.

Keywords: Oil crisis, forecasting, oil price, natural resources economics, information asymmetry.

1. Introduction

The 1973 Middle East crisis was a major global event. Everybody was caught by surprise when the Egyptian-Syrian/Israeli conflict erupted throughout the Sinai Peninsula and Golan Heights and when six Gulf oil ministers announced their intention to deploy oil as a weapon at a critical moment in the combat. In the ensuing months, distant consumers felt the consequences of this decision, with queues at gas stations, rising retail prices worldwide, and overall inflation that soared into the double digits in most European countries. Spiraling out from a regional conflict into commodity markets and, thereupon, into the world economy, the string of incidents has been acknowledged by contemporaries as a new type of historical sequence.¹ Henceforth, the “oil shock” concept has

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¹ For the “history sequence concept” in narrative explanation, see Buthe 2002, 481-3; Griffin 1992, 403-27.

stuck as shorthand for unpredictable geo-political twists, with wide ranging impacts on the energy supply curve.

The disturbances spread out in ever-widening circles that rippled through the global economy. In the short run, the sequence of events covered widely by the media provided the basis for a narrative of the oil crisis that was built on a self-explanatory causal sequence: Arab unity, in defense of Arab people and Arab land, led to the deployment of the oil weapon and the price hike. Subsequently, academic research has unraveled new facts and new explanations that went largely unmentioned in the standard “story.” And since the October 1973 crisis brought together different realms of action that were subsumed under a new categorization, its overall interpretation has become dependent on which part of the story has been deemed to play the determinant role. Three distinct views have come to the fore and gathered strength: the first stresses political-military factors, the second economic conditions, and the third the political economy of resource conservation.

According to the political-military literature, the defense of Egyptian and Saudi Arabian interests, as embodied in the interests of their rulers, Anwar al-Sadat and King Faisal bin Al Saud respectively, was the real driving force behind the 1973 military and economic convulsions. These actors, not the Arab nations, triggered the chain of events that resulted in the oil shock. As the Israeli historian Avraham Sela points out, “the Arab war coalition of 1973 underlined the emergence of a core triangle of Arab power, comprising Egypt, Syria, and Saudi Arabia.”² On the other hand, the enlistment of Saudi Arabia as among the active supporters of the Arab coalition meant that the oil embargo was perceived as part of the overall war strategy right from the outset.³

The second view, situated chiefly within economic thinking, holds that market pressures, rather than political or military events, were the real drivers behind the petroleum price increases. Significantly, this view surfaced shortly after the events to allay concerns about additional measures undertaken by the Middle East cartel. In direct response to President Carter’s dramatization of the crisis, Congressman David Stockman declared that “the October 1973 and the subsequent price boost were almost entirely economic events; that they are generated by nearly irresistible global economic forces.”⁴ Neo-classical economists such as Robert Mabro subscribed this thesis later, stressing the predominance of the market environment over political wills:

When the market is tight, as in 1973, in 1979-80, and in August-October 1990, prices are set by the market and not by the fiat of core producers. Hence a par-

² Sela 1999, 63. See also Kumaraswamy 1999, 1-10.

³ Stein 1999, 67; Sadat 1978, 241-4.

⁴ Stockman 2005, 43-53.

adox: despite appearances to the contrary, the price rises of 1973, 1979-80 and 1990 were fundamentally market phenomena.⁵

More recently, Robert B. Barsky and Lutz Kilian resumed this argument, pointing out how the unique institutional features of the Middle Eastern market delayed the oil price adjustments following the 1970s' boom in demand. So the actual prices remained low, even while the global demand for oil and other industrial commodities expanded to unprecedented levels. "With the abandonment of these contractual agreements in late 1973, the real price of oil jumped, but much of that increase represented a correction of the market disequilibrium rather than a response to the geopolitical events."⁶ Moreover, the observed price increases for oil over the 1973-1974 period were not substantially different from those of other industrial commodities for which political considerations can be ruled out, therefore casting doubt on the importance of the oil embargo itself.⁷

The third interpretation holds that price increases resulted from the transfer of property rights from international oil companies to national governments that began perceiving reserves as an exhaustible asset worth conserving in order to maximize their long-term income. In the Middle East, the appropriation of natural resources took the form of a halt in the granting of new concessions, moving later towards equal participation in the existing explorations, which endowed governments with a share of the oil produced, before, lastly, full nationalization (as in the cases of Algeria, Iraq, and Libya). These changes empowered governments with the ownership and management of depletable resources, "turning the belief in scarcity into reality"⁸ and opening the door to oil conservation, lower production, and lower levels of investment. The previous competition between oil producers to steadily increase production and extract more income from the taxes paid by multinational companies was replaced by incentives to restrain production, preserve finite resources, and augment petroleum prices. In the aftermath of the Egyptian-Israeli war, Arab governments seized the opportunity to impose monopoly power through cooperation-in-action and enact production cutbacks. Under this perspective, the oil weapon reflected the new stance of Arab states towards natural resources,⁹ neatly abridged by the motto "the best bank is a hole in the ground."¹⁰

To a large extent, the disagreements between the aforementioned accounts reflect different ways of considering causation and explanation. While the political-military view that Egyptian and Saudi Arabian interests were the

⁵ Mabro 1992, 1-17, quotation on 9.

⁶ Kilian 2009, 130.

⁷ Barsky and Kilian 2004, 115-34.

⁸ Odell and Rosing 1983, 206.

⁹ Johany 1979, 72-80.

¹⁰ Quotation of Venezuela's President Carlos Andrés Perez in: Fallah 1974, 11.

driving forces behind the first oil shock appears grounded in meaning, and intention of actions and processes, the market-led explanation bears down on the concept of a necessary and efficient cause, pinpointing which mechanisms or factors prove more likely to bring about a certain outcome (i.e., a price increase). The former view captures the meaning of action for those involved in a perceived set of circumstances approaching market disequilibrium, interpreted as a favorable background for political usage. The latter focuses on the explanation of outcomes, rather than processes, and counterfactually posits that, without the unique conjecture of excess demand and the disappearance of spare capacity, all endeavors to use the oil weapon would have been doomed to fail (as had happened with the Arab oil embargo of 1967). In this vein, Sadat's decisions and those of the Arab oil ministers in October 1973 were neither sufficient nor necessary to bring about the price hike. The true cause must lay elsewhere. It therefore becomes erroneous to consider market disequilibrium as a background condition – to most economists, market disequilibrium represents the objective cause that prompted the first oil shock.

Finally, the thesis of the transfer of property rights from international oil companies to national governments points towards a cause, or a set of causes, that happens at a particular moment in time, but with enduring effects. Considered a critical-juncture cause,¹¹ the property rights change unleashed a breakthrough in the management of natural resources, as evident in the new approach towards oil as a weapon: while previous Arab measures against the West-Israeli alliance had resorted to the pattern of oil embargos, a new possibility burst onto the scene in 1973 with the immediate cutback in oil production by Arab states, subsequently compounded by further cutbacks per calendar month. Such a policy implied that the leading countries did not mind losing their relative market share due to restrictions on production, because in doing so, they were conserving the oil in the ground. In hindsight, the cuts proved much more effective than the embargo, enhancing the role of the Arab states and OPEC members as price setters in a tight international market. From this perspective, the first oil shock constituted a turning point in the political economy of petroleum, as it transformed not only the rules of the game but also the attitudes of the players.

Alongside these academic interpretations there were also public accusations that US oil companies and/or the US government had, in fact, attempted to uphold the increase in oil prices, even if they did not recognize this intention publicly.¹² The public release of extensive original historical sources from the Nixon era by the State Department in 2011 nonetheless provided few clues for the “conspiracy” thesis. An alternative interpretation, which is much more in

¹¹ Mahoney 2000, 507–48.

¹² Terzian 1985, 194–5; ‘Saudi dove in the oil slick. Interview with Sheikh Yamani’, *The Observer*, 14 January 2001, 7; Robinson 1989, 117–9; Vietor 1984.

tune with published historical records, has been suggested by the former Secretary General of OPEC, Francisco Parra. According to Parra, the long-term economic policy oversight was not so much ingrained in the White House, but rather in the US State Department, whose executives came to agree that higher taxes on oil and higher consumer prices could be beneficial for the United States' long-term interests. The core argument was that higher oil prices would encourage exploration, domestic production, and the development of alternative energy sources, gradually reducing the dependence on imported oil. Historically, the benign position towards oil-producer claims became noticed during the negotiations of Western oil companies with Libya in 1970 and 1971. With the escalation of demands, the State Department recognized that it could no longer control the pace of events in the Middle East, and in the run-up to October 1973 and the Yom Kippur War, most of its endeavors were concentrated on restraining OPEC from excessive price increases.¹³

Having summarized the main theses about the origins of the first oil shock, let us now turn our attention to the perception of these issues prior to the October 1973 shock. The ensuing pages examine the degree of awareness in Europe and in the United States of the three possible triggering factors: Egypt's disposition to start a war and enlist the support of oil producers, the Arab interest in oil reserve conservation and long-term income maximization, and the imbalance in the oil market and the delayed adjustment of oil prices. For each of these topics, I lay out both what was expected and what was actually in preparation, the information available to Western analysts and that unknown, the communication noises and the flagrant bias. Underlying this research agenda is the concept of asymmetrical knowledge between regional actors and global decision makers, which rendered the ongoing transformations very difficult to grasp. Secrecy, deception, private management, and closed networks amplified the opacity of information. This analysis draws on a collection of authoritative sources, including experts, government officials, and corporate business departments from the Western countries that held footholds in the Middle East oil business (the United States, the United Kingdom, France, Italy), which were thereby well positioned to have access to first-hand information and prospective studies. Within this scope, most forecasts proved wide of the mark.

2. The Rosy Perspective

Confidence in the stability of the Middle Eastern oil markets flickered in the early 1970s. Estimates for future investments, prepared by expert committees from state departments and public corporations, reaffirm that oil prices "will

¹³ Parra 2004, 140-4.

move in line with OECD inflation,” reaching, in some scenarios, a real increase of 1.5 percent per year or, in the worst conceivable circumstances, 5 percent per year.¹⁴ Accordingly, for 1985, one could reasonably expect crude prices within the \$3 to \$4.5 per barrel range (bbl in 1971 prices), even if everybody accepted that predictions were tending to become much more uncertain around that time and with a greater propensity towards higher annual increases.¹⁵ In reality, the average OPEC price after the first and the second oil shock was \$25.7 per barrel (or about \$10 in 1971 prices), more than double that envisioned. Under this keenly optimistic outlook, oil was also expected to remain the primary fuel for energy systems, beating coal in competitiveness throughout the next decade.

Market conditions were changing quickly, however. Though Western experts were wary of the shifts introduced by the new international system forged during the Tehran and Tripoli settlements (1971), in which oil prices became subject to negotiations between major oil companies and national governments, some of them believed that the balance of power could be redressed. More to the point, Europeans and Americans believed that the dynamic cutting edge, which was headed by Mediterranean oil producing states politically labelled as “radical” (i.e., Algeria and Libya, as well as Iraq, which exported some of its crude output through the Syrian oil pipeline to the eastern Mediterranean coast), had its days numbered. The compliance with higher posted prices, higher tax rates, and new operational rules for concessions and exploration would prove to be the end of the line. Under these international arrangements, there would be stability within at least five years. These beliefs were furthermore reinforced by theoretical arguments repeated time and again. On the one hand, “OPEC was a failed cartel whose actions were bound to be ineffectual under the circumstances” since a number of factors would “restrain OPEC members from pushing claims for increased prices to extremes.”¹⁶ On the other hand, the “tax yield of oil producing nations will tend to diminish (at least marginally for the extraction of crude) from the moment at which significant opportunities might be seized by the nuclear industry.”¹⁷ Finally, as “exporting countries, or their national companies,” become the sellers on the world markets “competi-

¹⁴ *Draft paper for Ministers on energy policy*, 17 September 1971, Ministry of Power, National Archives U.K. (NAUK), POWE-14-2500.

¹⁵ F. R. Vinter, *Energy report – Future Trend in Fuel Prices*, 6 December 1971 Ministry of Power, National Archives U.K. (NAUK), POWE-14-2506; *Prix des fuels oils achetés par EDF – Évolution prévisible à longue terme*, 20 April 1972, Direction de L'équipement, Archive Historique d'EDF (AHEDF), Boîte 800624, Dossier 27322.

¹⁶ “The Oil Companies and the OPEC Demands, Memorandum of Conversation”, 2 December 2, 1971, in Qaimmaqami and Keefer 2011, 223-8.

¹⁷ Groupe prospective de la Commission d’Énergie, *L’offre de Pétrole*, Premier Ministre – Commissariat Général du Plan, Archive Nationale de France (ANF), boîte 19910737-1.

tion will break out again and prices will decline.”¹⁸ If Pandora’s Box of Arab claims had been opened, it could still be closed for good.

Inasmuch as the events unfolding in 1971, 1972, and 1973 run counter to this view, the defensive stance of Western energy spokesmen gradually became a form of wishful thinking. As matters turned out, the tranquilizing outlook of Western business interests in oil, electricity generation, and transportation conveyed the assurance that all these convulsions would turn out fine. Indeed, the abovementioned quotations draw on hallmark ideas advocated by the most influential energy “gurus” of the time: the academic economist Morris Adelman and the US government adviser and oil consultant Paul Frankel, whose authoritative hints echoed throughout the business community. The bottom line of their message was the prediction of a long-term decline in the price of oil – a view restated in Adelman’s famous book *The World Petroleum Market*, published at the crossroad of 1972.¹⁹ Key developments, such as market disequilibrium, growing demand caused by low oil prices, and the chance that Arab producing countries might pursue their own best interests in the meantime, went unmentioned. Not by accident, some experts in governmental energy agencies criticized the basic lack of understanding underlying this conjecture, dubbing these presumptions the “rosy view” of the future.²⁰ To them, the error lies in buttressing competition in Europe and the United States, when the key market driver had become the producing countries oil policy.²¹

Still, even the rosiest scenarios had to consider the possible outbreak of war. Memories of the 1967 Arab-Israeli conflict were still fresh, and it was taken for granted that any resumption would likely trigger another oil embargo. This was all the more so the case when participants of the Khartoum conference, which was held in the aftermath of the Arab defeat in August of 1967, deliberated a plan to put pressure on Israel by denying oil to Western Europe and the United States. In the ensuing years, this shadow hovered over Western governments, leading to a consideration of the risks of dependence on the Middle East. Overall, the prospects for energy security seemed less rosy and riskier than the scenarios regarding long-term prices.

One of the politicians most concerned over the issue of energy security was conservative UK Prime Minister Edward Heath, who requested a broad-reaching assessment of the scope for displacing oil consumption in the United

¹⁸ Adelman 1973, 261.

¹⁹ Adelman 1973, 260-1.

²⁰ The expression “rosy view” has been mentioned in UK drafts for energy policy and also at OECD meetings. See D. B. Emmet and S. Stewart, *CEGB Fuel security and flexibility*, 12-4 January 1972, Ministry of Power, NAUK, POWE-14-2503; “Highlights of Meeting of High Level Group of OECD Oil Committee, Paris, 13 June 1972”, Qaimmaqami and Keefer 2011, 313-6.

²¹ *Prospettive di lungo termine dell’industria petrolifera*, 1973, Programmazione, Studi economici ed energetici, Archivio Storico Eni (ASENI), box AS.III.5, file; 4251.

Kingdom shortly after taking office. The assessment was assigned to the Working Party on the Security of Oil Supplies, whose conclusions disavowed any permanent displacement in the usages of oil in industry (specifically, cement and steel) and electricity generation, but favored the further expansion of mandatory stocks. By this means, Britain could improve its strategic security without blurring the economic competitiveness ensured by cheap fuels. Permanent displacement, or inter-fuel substitution, would result in only an awkward meddling by the conservative government in the commercial orientations of public enterprises, ushering in the wasteful application of economic resources:

a new coal station might cost about £3-4 a year for every ton of oil displaced, a new nuclear station started now [at] about £2-3. This is about the same as the annual cost of oil storage in tanks (about £3 a ton) but more than the annual cost of oil cavity storage or coal stocks (about £1 a ton).²²

Increasing reserve stocks might finally introduce a deterrent to Arab threats because “the consuming countries should use their own main advantage, which is that most OPEC countries need their revenue. This means holding oil stocks big enough to cause OPEC countries serious financial losses.”²³

But exactly what amount should be stocked? How much was needed to successfully overcome an oil embargo? Ideally, it was said stocks should guarantee as much as one year of consumption. A more realistic assumption was to count on a six month embargo. Nevertheless, given the operational costs, the feasible alternative appeared to be a three month strategic reserve, in line with the OECD’s target recommendations. As matters turned out, the Working Party soon discovered that even this downsized program was difficult to implement due to resistance from the oil companies over its execution, at least at their own expense.²⁴

The same problem loomed at this time in France. With mounting consumption and “the probability of a major crisis occurring between 1975 and 1990,” the Board of the Plan recommended an increase in reserve stocks from the current level of 35 days to the plateau of 60 days and resorting to underground storage. Using cost-benefit reasoning, they also concluded that this policy would increase the costs of the oil stored by 0.80 F/ton.²⁵ Germany went to even greater lengths, aiming to approach a 90-day reserve plateau. The United States set its target at around 45-50 days, and Japan set its at around 45 days,

²² R. G. Skipper, *The case for reducing the dependence on oil*, 17 August 1971, 8, Ministry of Power, NAUK, POWE-14-2500.

²³ *Draft paper for Ministers on energy policy*, 17 September 1971, Ministry of Power, NAUK, POWE-14-2500.

²⁴ C. I. K. Foster, *Fuel Policy work*, June 1974, 39-40, Records of the Department of Energy, NAUK, EG-20-3.

²⁵ Commissariat Général du Plan d’Equipment et de Productivité, *Notes sur les problèmes de sécurité de l’approvisionnement d’énergie*, 2 Décembre 1971, Commissariat Général du Plan, ANF, boîte 19910737-1.

while some countries, such as Italy, showed reluctance toward any increase beyond 45 days.²⁶ Irrespective of the country, the final figures were gross estimates with variable reliability and with the constant updating of demand. The extraordinary increase in consumption around the dawn of the 1970s in particular had an erosive effect upon stocks, due to the continuous expansion in storage capacity required just to keep pace with existing security levels. The overall policy review stemmed in part from this new conjecture.

Potential instability in the Middle East, OPEC, the swelling dependence upon Arab oil, the disappearance of surplus capacity in the United States, and the ever-increasing share of petroleum in the energy balance arrived to haunt Western capitals. However, in spite of worrisome signals, there was no threat in sight, no enemy to fear, and no impeding deadline. While concern mounted in some circles within the US Department of State, in Japan, and in Germany, politicians and businessmen elsewhere continued to view the situation through the lens of the past. In so doing, they posited that all the uncertainty was transitory and, furthermore, manageable – transitory because OPEC had exhausted its bargaining power, and market competition could restore the trend toward lower oil prices; manageable because precautionary measures could defend developed nations and strike a blow at “Arab blackmailing sheiks.”²⁷ Such was the core message of the “rosy view” associated with the wishful thinking of business and with the governmental view that upgraded reserve stocks had deterrent power. Even while the world was changing at breakneck speed, for some the crux of the matter was still just the likelihood of an oil embargo. What was lacking was any awareness of how Arab nations or OPEC member states might otherwise pursue their own best interests and wield market power to reap the full benefits of the market imbalance.

In the meantime, while some of these ideas were under discussion, planning for war was getting underway. Under Egypt’s leadership, the crucial preparatory steps for war took place between April and October 1972, avoiding Western attention and Israeli intelligence. The deception fostered a split between surface events and veiled facts. The fuzzy perception of Middle East disturbances by Western analysts continued to map four probable triggers for an eventual oil crisis: the resurgence of Arab-Israel conflict, a Palestinian uprising, a Libyan

²⁶ National Intelligence Estimate, “Security of oil supply to Nato and Japan”, 14 November 1970. Qaimmaqami and Keefer 2011, 136–51; “Memorandum From Philip A. Odeen of the National Security Council Staff to the President’s Assistant for National Security Affairs (Kissinger)”, 6 June 1973, Qaimmaqami and Keefer 2011, 489–94.

²⁷ The expression belongs to the Federal Reserve Chairman Arthur Burns. Arthur Burns, 2010, *Inside the Nixon Administration: The Secret Diary of Arthur Burns, 1969–1974*, 112. Lawrence: University Press of Kansas.

embargo, and the escalation of Iran-Iraq skirmishes.²⁸ The course of events, however, was already being driven by an overlooked actor: Egypt.

3. War, Secrecy, and the Oil Weapon

One of the consequences of the first oil shock was the rise of a wave of interest in the Arabs, mainly visible in the “sheik-mania” spotlighted by popular press. Before that, the Palestinian issue and the first outburst of terrorism received the most attention. The ensuing pages show why the preparation for the Egyptian-Israeli war was completely overlooked in the West, by both governments and non-governmental institutions. Ultimately, there was no way to keep pace with what was going on because concealment was the foremost condition for launching the offensive.

After Nasser’s glaring defeat in the 1967 War, the vision of an all-embracing pan-Arabic nation that bound together people from the Mediterranean to the Persian Gulf was robbed of its impact and content. The quest for a continued struggle against Israel remained deeply rooted in Arab feelings, but the wounds of defeat discredited the former objectives. Commitment to the unified Arab cause was henceforward replaced by patriotism, local nationalism, the resurgence of Islam, and anti-Western pronouncements.

As several authors have noted, this move away from the revolutionary pan-Arab regime of Gamal Abdel Nasser prompted a breakthrough in Middle Eastern geopolitics. Nasser’s death in September 1970 opened the way for the appointment of his vice president, Anwar el-Sadat, to the presidency. What appeared to be a political transition of continuity, even if from a strong charismatic leader to a weaker one, soon evolved into a far-reaching overturn of Egypt’s pan-Arab “socialist” foundation. As of 1971, Sadat gave signs of a more liberal approach and opened up the economy to foreign trade and investment, promoting the return of private assets sequestered by the state to their former private owners and, with the arrest of left-wing Nasserist followers, setting off a crosswise purge of the government and central institutions. One year later, Soviet advisers were expelled from Egypt, after a strident press campaign punctuated by scandals. By this point, it had already become clear that Sadat had consolidated his power.

Vested with renewed authority following the suppression of domestic dissent, the Egyptian president had to cope with the Israeli question and the legacy

²⁸ For the Palestinian case as the trigger of events, see “Stima delle potenzialità produttive di greggio dei paesi dell’OPEC”, 21 September 1973, Incharichi speziale (Renzo Cola), ASENI, box O.III.4, file 2E35; for the Iran-Iraq, Lybian and Palestinian case see: Intelligence Agency, “Probability of Events Resulting in a Reduction of Middle East Oil Supplies to the United States”, September 1973, Qaimmaqami and Keefer 2011, 563-5.

of continued occupation of the large areas of Arab territory taken in the Six-Day War in June 1967, including the West Bank, Jerusalem, the Golan Heights, and the Sinai Peninsula down to the Suez Canal. Beyond the continued political pressure on university campuses, in the media, and at demonstrations for retrieving the land that Israel had captured, Egypt faced the economic consequences of defeat, as evident in the closure of the Suez Canal and the deadlock over transit fees charged to ships, the loss of Sinai's oil fields, and the drop in tourism revenues. The curtailment of foreign currency inflows worsened the internal situation, characterized by very slow growth in agriculture and industry, the long-term decline in new investments, and mounting budgetary constraints.²⁹ By all accounts, the standoff "neither war nor peace" was untenable and constricted the very future of Egypt.

Although Sadat strove to avoid a reckless entry into war, it soon became clear that diplomatic routes would lead to dead ends. Impaired by Israel's inflexibility, the more urgent international priorities of the United States, and the precautionary and skeptical Soviet outlook towards the Jewish-Arab conflict, Egyptian diplomacy found little room to maneuver. What ensued was a double-track policy grounded in the pursuit of an international peace settlement but also in the threat of war. Over time, the awareness that Egypt could not negotiate with the Israelis until it demonstrated that it could fight militarily became broadly and deeply rooted within some sectors of the army,³⁰ pushing Sadat into preparation for the offensive. This maturing process took place between April and October 1972. At this point, the diplomatic wavering was reshuffled to serve the purpose of strategic deception.

Not surprisingly, the theme of military deception and secrecy has been among the most thoroughly studied in recent decades, a fact to which is not strange, since there was the need to understand just why Israeli intelligence "failed" and the Egyptians were able to cross the Suez Canal on October 6, 1973. Despite some divergences between Egyptian and Israeli sources regarding the role played by deception at the stages of conceptualization and planning, and regarding its effectiveness, there is common agreement that the Egyptian strategy and tactics succeeded quite well.³¹ Coupled with the deployment of new antitank weapons, this was a key factor that affected the promptness of Israeli Defense Forces (IDF).

Among the actions that, deliberately or unintentionally, concealed the offensive plan and, most importantly, the decision to attack,³² the following are considered the most relevant: international endeavors and national pledges

²⁹ Owen and Pamuk 1999, 133-8.

³⁰ Parker 2001, 61-2.

³¹ For Egyptian sources, see El Shazly 1986; el-Gamasy 1993; for Israeli sources: Bar-Joseph and Kruglanski 2003, 75-99; Bar-Joseph 2005.

³² Sheffy 2006, 809-28.

restating Egypt's continuing commitment to a political solution; shifting goals that resulted in successive deadlines for the Arab attack, spreading the "cry wolf" syndrome among the enemy; the spreading of rumors of inadequate maintenance and a lack of spare parts for Egyptian military equipment, with leaks to the foreign press; the probable usage of wireless networks for deception purposes; planting of a cover story inside Egypt stating that the vast military preparations and activities were but part of a large-scale all-arms exercise, named *Tahrir* (Liberation) 41; serene policy declarations by Egyptian leaders on the eve of the attack; choreographed groups of Egyptian soldiers leisurely fishing along the Suez Canal just before the outbreak of war; and deploying smoke screens to camouflage the bridging operations and the forces engaged in crossing the canal.³³

All artifices were designed to load the dice against Israel. Surprise and deception played such an important part in the Egyptian planning mostly because they had highlighted vulnerability in the "impregnable shield of steel" of the Israel Security Doctrine, which had been studied intensively since the 1967 defeat.³⁴ The vulnerability consisted of the dependence of military defense on early warning – if the Israelis were to have learned in advance the Egyptian decision to start an offensive and its timing, this would have allowed the mobilization of the IDF reserve formations in time, deploying them to reinforce the "Bar-Lev Line" fortifications. Thanks to the strategic surprise effect, the key principle of the Israel Security Doctrine – rapid transference of the war into enemy territory – could be torn down.

Along with deception, Sadat further envisaged a new Arab objective aimed at political rather than military victory over Israel, which he called the "strategy of phases."³⁵ The concept behind the capture of enemy territory by "stages" pointed not to an all-out offensive across the Sinai Peninsula, but to limited territorial objectives located closer to the eastern bank and jump-off bases, inflicting heavy losses of life and arms on the enemy in the time intervening, so as to establish optimal conditions for political negotiations. Then, in the ensuing stage, diplomacy and international intermediation could terminate what had been initiated by force of arms, seizing still greater territorial gains for Egypt. It is important to note that both "deception" and the "strategy of phases" stemmed from acknowledgement of Israel's military superiority in technology, armament, and maneuverability. By implementing a three-stage operation – a crossing, an immediate shift to the defense, and banking on international political

³³ Asher 2009, 73–97; Kahana 2002, 83–104.

³⁴ "Directive from President Sadat to the command-in-chief of the armed forces on October 1 1973", in Sadat 1978, 325–7.

³⁵ This strategic approach to the war is probably not a novel creation of Sadat and his military staff, but a hypothesis that was already under discussion in Egyptian ruling circles by 1969. See Parker 2001, 112.

pressures – Egypt avoided advancing its ground forces too deeply into the Sinai Peninsula, minimizing its relative feebleness in the domain of air combat and long-range missiles. On the other hand, for these limited territorial objectives, the SAM batteries supplied by the Soviet Union could be deployed close to the troops and thus provide the necessary air cover.³⁶

As expected, the outbreak of war arrayed all Arab states against Israel, conveying the notion that the Arab-Jewish clash had once again resumed. Yet, as stressed by most scholars, this was not just another edition in the long-running Middle East conflict. With this new strategy of phases, secrecy, and deception, Sadat did not attempt to destroy Israel, involve the Soviet Union, and mobilize a wider Middle Eastern military colligation. Instead, he attempted to destroy the Israeli defense concept, demonstrate Egypt's independence from Soviet centers of decision making, and appeal to Syria and Jordan for a concerted attack across the Golan Heights, while concealing his intentions from most Arab leaders. This pattern of single-state initiative, single-state goals, and single-state alliances distinguished the nationalist drive from previous pan-Arab intents in the war against Israel. For instance, Yom Kippur's strategy entailed the likely acceptance of coexistence with the Jewish state in its pre-1967 borders and the relinquishment of the Palestinian issue.

The expression “oil weapon” became meaningful as never before. Under the new strategy, there was no distinction between military and political means, and no distinction between regional and global factors. Everything that could be used to turn the tide in favor of the Arabs should be deployed at the proper stage of the conflict and take advantage of the surprise effect. Sadat already sensed that the oil weapon trump card might ease the passage from the military to the diplomatic stage. And his message to the troops was crystal clear in this respect: “With the exacerbation of the energy crisis – and the currency crisis –, Arab pressure exerted in propitious circumstances could be a factor to be reckoned with.”³⁷

The Egyptian determination to pool economic and military weapons on the battlefield is therefore clear, even when taking into account that Sadat was not absolutely sure about Saudi Arabia's willingness to comply with its promises (Sadat's suspicions proved partially true, since King Faisal's ultimate engagement was conditional upon a US decision to support Israel). From the Arab perspective, the economic situation held a reciprocal effect upon the political-military options.

³⁶ Asher 2009, 126-30; Kumaraswamy 1999, 1-10.

³⁷ “Directive from President Sadat”, Sadat 1978, 326.

4. Production Cuts and Oil Conservation

When the Egyptian and Syrian troops attacked Israeli forces across the Sinai and the Golan Heights on October 6, 1973, the uproar in the Arab world immediately followed suit. Kuwait, the Palestinian Liberation Organization, and Iraq were among the most vocal in calling for bold, resolute, and unyielding action. The reaction of Saudi Arabia was nonetheless different: the Wahhabi monarchy had financially backed the Egyptian war effort and had been informed of the exact timing of the attack. By distancing themselves from the diehards, the Saudis drew the red line on the lopsided American engagement in the ongoing war. Any misstep made by the United States, such as resupplying the Israeli armed forces, would only meet a reply of unforeseen consequences. The beginning of the American airlift to Israel on October 13 removed any remaining doubts. Thus, the Conference of Arab Oil Ministers, held in Kuwait on 16-17 October, approved an immediate oil price increase (the first ever unilaterally set by production countries), a cut in production levels, and the imposition of an oil embargo on “enemy” nations until all Israeli forces had fully completed their withdrawal from the occupied territories.

It is still difficult to trace the exact origin of the “production cuts” proposal, which constituted the major political innovation from the Kuwait Conference. We do however know that the plans for implementing this idea were well defined beforehand by the Saudi Oil Minister Yamani,³⁸ that its design was discussed by the Gulf governments and also prior to the Kuwait Conference itself,³⁹ and that the proposal was submitted as an initiative backed by Saudi Arabia and the Egyptian government.⁴⁰ According to Pierre Terzian, the concept of downsizing oil extraction was grounded in a study commissioned by the Egyptian Ministry of Petroleum from the engineer Mahmoud Ruchdi and was designed to identify the best ways in which to deploy oil as a political weapon. After its completion in 1973, the study was submitted to Yamani, and it framed subsequent Arab decisions.⁴¹

For all intents and purposes, production cuts represented additional pressure upon developed nations, tightening up the oil market still further, and enhancing the marginal scarcity of world demand. On top of that, the other weapon, the selective oil embargo, did not bear the expected fruits, as it proved to be easily circumvented by reshuffling suppliers to non-Arab countries or by re-

³⁸ U.S. Department of State, Middle East Task Force, Situation Report #18, *Situation report in the Middle East as of 1800 EDT, October 10, 1973*, The National Security Archive, The October War and U.S. Policy, 2 <<http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB98>> (accessed November 1, 2013); Terzian 1985, 170.

³⁹ Chalabi 2010, 107.

⁴⁰ Terzian 1985, 170-3.

⁴¹ Terzian 1985, 170.

shuffling cargoes at high sea, off the Arab radar. All eyes therefore turned to the gross cut in 5 million barrels/day of supply to the market, which became the landmark of Arab power. After 17 October 1973, the oil price skyrocketed quickly and loosely, with every company scrambling to secure supplies.

The singular possibility of forsaking production increases proved central to this breakthrough. In the petroleum community, this represented a change equaled only by the production controls set in the 1930s by the As-Is cartel and by the Texas Railroad Commission. However, those were times of glut and excess oil supply. Now, thanks to the prospects of the appropriation of underground resources and to excess demand, a stream of opinion surfaced in the Arab world opposing any increases in production.

Imbued sometimes with an anti-Western discourse, the conservationist view considered the former policy a “waste of the national asset” and a blank check handed to the United States and its pro-Israel policies.⁴² On other occasions, wrapped in language “unheard outside journals of ecology,” oil conservation became a fashionable piece of rhetoric put forward by senior ranking Arab executives to justify further price increases, particularly Iranian representatives.⁴³ In this context, it becomes difficult to single out what was a real policy shift and what was occasional speech making. Ideas and interests need to be ascertained by historical practices. On present information, it would seem cautious to suggest that oil conservation entered the political agenda of Arab countries when the appropriation of those natural resources coincided with startling technical problems within the framework of resource management. In other words, ownership associated with depletion awareness prompted the shift towards conservation. Three cases do fall within this qualified profile, which is distinct from the rhetorical call for conservation:

Libya

Libya was the first Middle Eastern state to pursue a policy of forthright production cutbacks. The change happened after the coup that brought the revolutionary Muammar Qaddafi and his Free Officers movement to power in 1969. From the outset, the new regime embarked on a complete overhaul of the oil policy, beginning with the commissioning of a geological engineering study of Libyan reserves. Carried out by a prestigious team of Venezuelan experts, the final report recommended slowing down the rates of production to spare the oil fields from quickly losing gas pressure and the consequent troubles in oil flowing up to the casing head. From May 1970 onwards, a special Ministerial Committee ordered a series of reduction cutbacks by different companies, which curtailed Libyan production from the peak of 3.7 million barrels per day

⁴² Robinson 1989, 78.

⁴³ Chalabi 2010, 111-2.

(MBD) attained in April 1970 to 2.9 MBD five months later. Although the American government and American companies regarded all such changes as tactics that put pressure on foreign enterprises to demand higher taxes and higher prices, it was also recognized that “the Libyans may be partially motivated by the desire for more detailed oil field data. It has been a longstanding Libyan goal to get such data from the companies...so that authorities can accurately judge whether in fact a field is being produced too fast or not.”⁴⁴ A search for information, alongside basic uncertainties regarding reserves estimation, appeared, thereby, to be a key driver in Libyan oil policy.

Kuwait

Quite significantly, the changeover in Kuwait’s oil policy commenced in a democratic manner through a parliamentary debate that was subsequently magnified by the press, trade unions, political parties, and public opinion. On February 1972, two deputies blamed the foreign interests present in the Kuwait Oil Company of misreporting the assessment of oil reserves by releasing the figure of 66 billion barrels (66×10^9) when the real stock was 24 billion.⁴⁵ The alarm that followed sent shock waves throughout the country, as it threatened its main source of income. The government was thereby forced to order an independent assessment from a US firm, set a monetary reserve fund for future generations, and enact a conservation law that froze production at 2 million barrels per day (MBD).

Saudi Arabia

The huge increase in Saudi Arabia’s production from 3.2 MBD in January 1970 to 8.3 MBD in September 1973 brought in its wake unexpected technical problems. To manage the country’s giant and super-giant oilfields, the national oil company, Aramco, began injecting water at early production stages, instead of the then-usual practice of resorting to secondary recovery technologies only when a field had entered its declining phases. Through this procedure, engineers sought not only to maintain reservoir pressures and their capacities to push oil to the surface, but also to displace oil from the outer edges of the fields toward the central regions, in order to eliminate the formation of a gas cap and thereby keep up high well flow rates. With production skyrocketing, Aramco’s plans for water injection nonetheless fell behind schedule (with problems in

⁴⁴ Action Memorandum from the Deputy Assistant Secretary of State for International Resources and Food Policy (Katz), “Oil Problems in Libya and the Middle East”, 28 July 1970. Qaimmaqami and Keefer 2011, 117–22.

⁴⁵ Sarkis 1975, 118–9. An official reserves estimation undertaken at the close of the 1970s confirmed the figure of 66 billion barrels as a suitable assessment of proven reserves, given the technology of the time. “Oil proved reserves history,” *BP Statistical Review of World Energy*, June 2006 <<http://www.bp.com/statisticalreview>> (accessed May 18, 2007).

drilling wells, operational delays provoked by sand and corrosion, shortages in the supply of salt water, and failures in pumping equipment), which resulted in an unexpected drop in reservoir pressure.⁴⁶ By March 1973, rapidly falling reservoir pressures and earlier-than-planned encroachment of saltwater were already curtailing plans for raising capacity, and the Saudi government issued Aramco with a number of warnings to either cut back production or replace it with installed capacity from heavy crude oilfields. By September, just before war broke out, Aramco had already reduced its forecasts for forthcoming oil availability.⁴⁷

All these signs were overlooked in Europe and the United States, albeit with the remarkable exceptions pinpointed in the next section. The Libyan revolution was a traumatic occurrence for the oil companies that had tapped into the emotive language of breach-of-contract concessions. Kuwait's turnabout was pigeonholed as a case of uncertainty in estimating reserves. Saudi Arabia's troubles went completely unnoticed, save for some Aramco engineers, and only after the oil shock was the issue spotlighted in US Senate hearings. Altogether, the discovery of the magnitude of these problems was *ex post facto*. Not only did Western analysts and politicians disregard conservation and the nationalist appropriation of natural resources as driving forces in the Middle East, but, most of all, they also missed the fact that this was an opportune occasion to start a war against Israel and restrict production, "inasmuch as key Arab producing nations, had already planned cuts."⁴⁸ On the contrary, the repeated argument emphasized the belief that oil exporters would not risk cutting back on volumes, because they could not jeopardize long-term income. The scope for cutting back on volumes but still increasing total income, within a price setter's deployment of a market power framework, was surprisingly sidelined.

Ingrained into the cornucopian age, Western decision makers remained aloof to conservation practices, as they perceived no utility in conservation by design or in conservation imposed by circumstances. Leaving natural resources in the ground appeared unsound whether by choice or by condition. The link between the net resource price, the push conveyed to production, and the pace of exhaustion had somehow fallen into oblivion. This causal relationship had been cast in a seminal work published in 1931 by the economist Harold Hotelling, but drew little attention at the time. Now, under the tremor of the first oil shock and other civilizational forewarnings,⁴⁹ Hotelling's theory was quick-

⁴⁶ Committee of Foreign Relations of the United States, 1979, *The future of Saudi Arabian oil production*, Washington: Government Printing Office; Simmons 2005.

⁴⁷ Committee on Foreign Relations – US Senate, Ninety Third Congress, Second Session, 1974, *Hearings before the Senate Subcommittee on Multinational Corporations*, Washington: U.S. Government Printing Office; Simmons 2005, 377–384.

⁴⁸ Werth 1974, 5.

⁴⁹ Meadows et al. 1972.

ly rediscovered and put to good use. Owing to the rediscovery, the rational behavior of natural resource owners could be grasped and understood:

If the net price were to rise too slowly, production would be pushed nearer in time and the resource would be exhausted quickly, precisely because no one would wish to hold resources in the ground and earn less than the going rate of return. If the net price were to rise too fast, resource deposits would be an excellent way to hold wealth, and owners would delay production while they enjoyed supernormal capital gains.⁵⁰

After the fateful year of 1973, the rational explanation for leaving exhaustible mineral resources in the ground came into its own. Conservation was more likely to happen after a long period in which the price of the resource rose below the current rate of return, bolstering a race to the bottom in production. Seen from this perspective, 1973 was the year of a radical change in the relationship between the value of the resource and the rate of return. Once neglected, the economic theory of exhaustible resources sprang forth with full force. In reality, the economic theory of exhaustible resources was an offspring of the first oil shock.

5. Market Imbalance and Arab Interests

Little was known about the events unfolding in the Middle East. Secrecy veiled political and military developments, and the scarcity of information, coupled with biased outlooks, obscured the changes in oilfield management. This means that two out of the three likely causes for the increase in crude prices remained off the Western radar, leaving a single factor for which there was plentiful information: market imbalance. But could a singular assessment of market conditions in 1973 suggest that some fundamental discontinuity was in the offing? As pointed out in futures' literature⁵¹ about "disruptive events," "structural breaks," "discontinuous bursts," "wild cards," and "surprises," the forecasting of "low-possibility futures," or "not-impossible eventualities" involves the capacity to think the unthinkable (examples range from 9/11 to the fall of the Berlin Wall).⁵² Thus, the theoretical hint is that any attempts to surmise events like the oil shock would have to reach beyond observable market conditions.

It is certainly not by accident that the men who came closest to guessing what was coming were employed in mapping developments in the global oil market. More tellingly still, they arrived at similar conclusions far apart from

⁵⁰ Solow 2008, 69–82, quotation on 71. The economists Robert Solow and William Nordhaus were primarily responsible for rediscovering the Hotelling theories in 1973–74. See Nordhaus 1973, 529–70.

⁵¹ Miles 2010, 1448–56.

⁵² van Notten 2005, 175–94.

each other and drawing upon different methodologies. James Akins, in his role as Director of Fuels and Energy at the US State Department, had first-hand information on the Middle East. He resorted to a historical overview of recent events to infer that a price increase, if not a turbulent energy crisis, was likely to occur. Meanwhile, Pierre Wack and Ted Newland, planners in the London office of the newly formed Group Planning Department of Royal Dutch Shell, resorted to the construction of multiple scenarios in the oil business to depict a synthesis of possible paths of events. Later, through a design process based on intuition and inductive reasoning, Wack and his team narrowed the initial catalogue into a new class of scenarios, grounded on the occurrence of an inevitable disruption. A “predetermined” factor that cut across all possible futures had been discovered. Irrespective of what might actually happen, oil prices would rise rapidly and leave the whole business environment badly shaken. In brief, “the unthinkable was going to happen.”⁵³ In May 1973, Shell’s Group Planning began focusing on the single scenario of a sharp oil price increase.

Each of these methodologies blended observation with the induction of unobservable trends. Long acquainted with the backstage of Middle Eastern governments, and a fluent Arabic speaker, James Akins made use of his “inside” information crossed with historical analysis to formulate hypotheses about the most likely Arab economic decisions. Considering the opportunity costs for selling oil in international markets beset by mounting inflation and dollar devaluation, the approach of a saturation point in the absorption of income from exports, the looming stream of conservationist viewpoints within the Arab ruling class, and the political strains caused by American-Israeli assistance, the obvious conclusion favored an impending rupture with the past as increasing oil production no longer served Arab interests.⁵⁴ By the same token, Shell’s Planning Group designed an assortment of graphs characterizing driving forces in Arab policy (1970-1985). For each country, a graph represented the forecasts of the producing government’s oil take, the capacity to absorb income from oil exports, the pace of reserve depletion, and the incentives for high production levels. As Wack’s team weighted more heavily than Akins the long-term factor of exhausting conventional oil, along with the income absorption capacity,⁵⁵ their bottom line likewise emphasized a halt in the age of abundance and the correspondingly expected curtailment of oil supplies.⁵⁶

Separate bits of information were integrated into a holistic image of the future, which exposed stable causal factors and driving force mechanisms that linked actions to outcomes. Once every piece found its place, the conclusions could hardly be different: the assemblage of what was known (tight interna-

⁵³ Wack 1985, 73-89, quotation on 88. DuMoulin and Eyre 1979, 76-86.

⁵⁴ Akins 1973, 462-90.

⁵⁵ Jefferson and Voudouris 2011.

⁵⁶ DuMoulin and Eyre 1979, 76-86; Jefferson 2012, 186-97.

tional markets with excess demand, no spare capacity, inelasticity of supply in the short and medium term) with that hypothetically conjectured (national interests in restraining production, Arab self-interest in mutual cooperation) and what was uncertain (political turmoil, war) could only produce full-blown turbulence. It was precisely the capacity to integrate the separate features of economics, international relations, and business that enhanced the foresight of these predictions. The small role ascribed to political events indicates that both Akins and Wack believed the oil crisis was going to occur irrespective of the evolution of the Israel-Arab conflict.

The reverse conclusion is also true. The lack of integration was one of the main reasons attributed to the consecutive failures in the CIA's prospective analysis during the Yom Kippur War. According to the US Senate Commission appointed to assess the secret services performance, the bulleted worldview of the organization was based on "analytic components organized around offices, each of which treated a separate discipline, with only limited substantive interaction among them."⁵⁷ Dealing moreover with scattered and incomplete pieces of information under conditions of internal tensions and cleavages led the agency to miss the signs of the preparation for war, the shift in Saudi attitudes, and the impact of oil price increases on the international economy.

From the foregoing observations, we should not conclude that everything ran smoothly in keeping with the Akins and Wack outlook. To begin with, they had no clear-cut idea about when the crisis was supposed to start or about the magnitude of the shock resulting. Shell's Planning Group admitted that the events might begin unfurling perhaps from 1975 onwards, as this was the term of the Tehran-Tripoli international agreements. Price projections, on the other hand, were relatively optimistic in both forecasts, with the authors positing Arabian Gulf crude oil prices doubling to \$5 per barrel by 1975 and rising to \$7 or \$8 by 1985. Hence, the most unexpected development and the one that no one came close to guessing was the magnitude of the change, specifically the sudden fourfold increase in crude prices, which corresponded with an unimaginable deviation from the regular course of events – more than thirty-seven moving standard deviations ("thirty seven sigmas")⁵⁸ relative to the historical norm of price changes. Such an unimaginable outcome was, by all accounts, the real shock.

To a large extent, the underestimation of the intensity of the resulting turbulence explains why the recessionary and inflationary impacts of the oil price increase went unnoticed in both Shell's scenarios and in James Akins' outlook. Another relevant misperception was the skepticism of OPEC member state capacities to spend increased oil revenues rapidly and without spawning large

⁵⁷ Staff Report of the Senate Select Committee on Intelligence, 1977, *U.S. Intelligence analysis and the oil issue, 1973-74*, 5, Washington: Government Printing Office.

⁵⁸ Nordhaus 2007, 219-38; Nordhaus 2011, 240-57.

macro-economic instability.⁵⁹ Globally, what appeared to contemporaries as an alarmist perspective proved in reality to be a conservative estimate of the potential disruption. The “unthinkable” was broader than foreseen.

Although Wack’s report was able to change Shell’s management mindset and prepare the organization for the troubling times ahead, he also realized that the warnings were ignored outside the oil company. Akins, in turn, encountered little support from within the State Department and even less from within the White House, particularly when Henry Kissinger became the ascending star of Foreign Policy. Despite that, Akins was able to inscribe the measures of the urgent policy shift into Nixon’s “Special Message to the Congress on Energy Policy,” which was delivered around the same time as the well-known article published in the April 1973 issue of *Foreign Affairs*. Most efforts were to no avail, however. Decades of progress, economic catch-up, and affluence imbued a sense of ease in a world that, paradoxically, seemed utterly chaotic and difficult to understand. In the end, Akins, Wack, and Ted Newland stood out like characters of a famous theatrical play: together but alone, waiting for the energy crisis.

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The Journal: Cooperations, Archiving & Coverage

Cooperating Associations / Networks / Journals

QUANTUM (Association for Quantification and Methods in Historical and Social Research) <http://www.gesis.org/en/hsr/profile/quantum/>.

INTERQUANT (International Commission of the application of Quantitative Methods in History) <http://www.gesis.org/en/hsr/profile/quantum/>.

H-SOZ-U-KULT (Humanities, Sozial und Kulturgeschichte) <http://hsozkult.geschichte.hu-berlin.de>.

AFC (Association Française de Cliométrie) <http://www.cliometrie.org/>.

AGE (Arbeitsgemeinschaft Geschichte und EDV) <http://www.age-net.de>.

AHC (International Association for History and Computing) <http://odur.let.rug.nl/ahc/>.

FQS (Forum Qualitative Sozialforschung – Forum Qualitative Social Research; <http://www.qualitative-research.net/fqs/>.

HISTORICUM.NET <http://www.historicum.net/>.

ZOL (Zeitgeschichte-online) <http://www.zeitgeschichte-online.de/>.

PERSPECTIVIA.NET <http://www.perspectivia.net>.

Archiving by Information Services

JSTOR (ITHAKA) <http://www.jstor.org/r/histsocres/>.

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