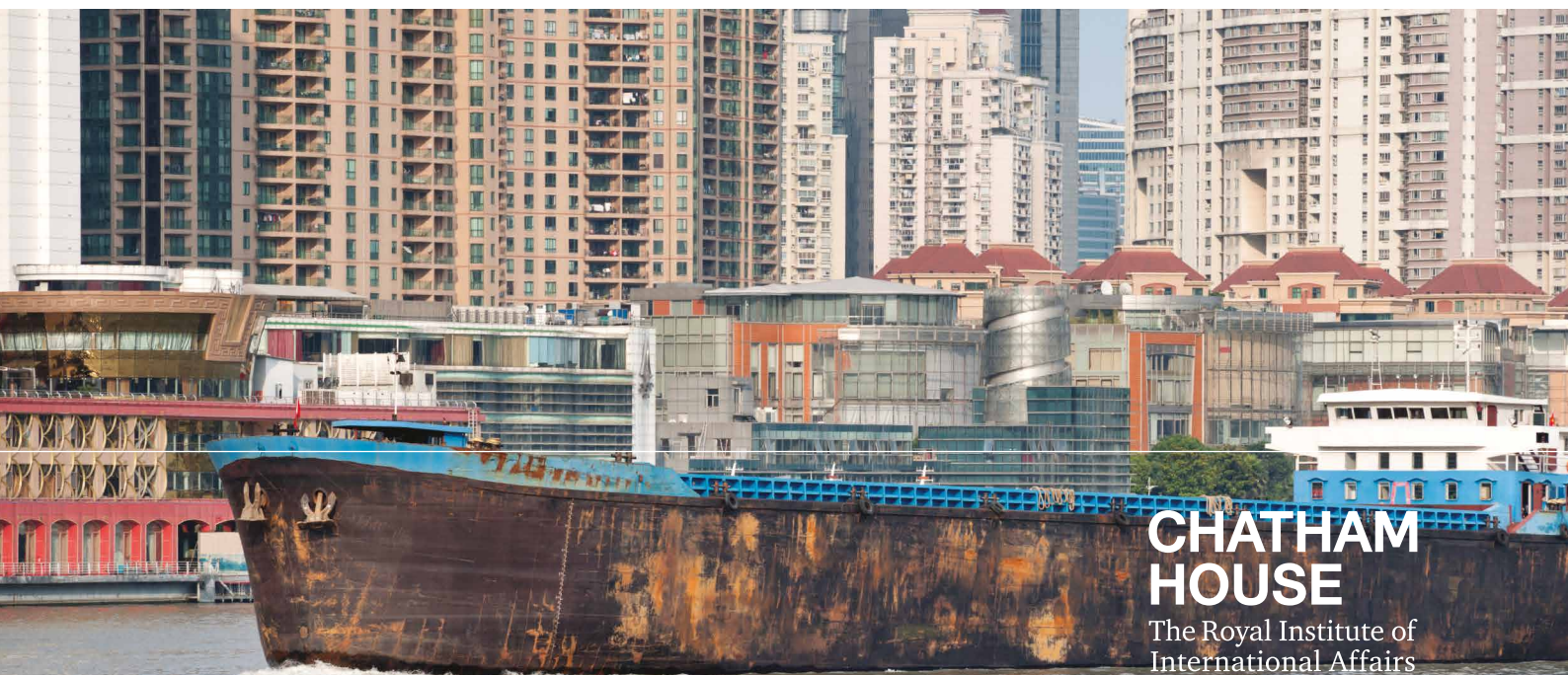


Research Paper

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Asia's Oil Supply Risks and Pragmatic Remedies



**CHATHAM
HOUSE**
The Royal Institute of
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1. Summary

Asia is more at risk from disruption of Middle East oil supplies than is either Europe or the United States, yet as a whole it is less prepared to deal with such an upheaval. (Asia here includes Northeast, East, Southeast and South Asia and Australasia, and is also often referred to in this paper as the Asia-Pacific region.) This paper analyses the risks that major Asian importers would face if oil supplies through the Strait of Hormuz were disrupted on a large scale – for example, if 10 million barrels a day (mbd) were interrupted for 90 days. It does not discuss the many possible causes of such a disruption, nor does it speculate on political or other responses in the Gulf or explore what might be the various medium-term developments in price, demand and supply. But it does discuss the capacity of Asian countries to maintain oil supplies for longer periods of disruption by drawing down stocks or using financial reserves to outbid competing importers for the limited supplies available. Every Asian government would inevitably respond to a major disruption of oil supplies. Uncertainty about governments' interventions would add to the risk premium generated by uncertainty about physical supplies. This paper identifies priorities for policies to mitigate these uncertainties. The supply risk for liquefied natural gas (LNG) is different from the oil supply risk for Asia and is touched on only briefly in this paper.

This paper identifies five priorities in the development of policies to mitigate these uncertainties:

1. Establishing a process involving the IEA, China and India to facilitate a very rapid and convincing announcement of a coherent response to any major disruption in Middle East oil supplies;
2. Further developing schemes by which exporting national oil companies (NOCs) hold stocks in importing countries;
3. Clarifying the policies of crude and oil-product exporters for allocating supplies between domestic consumption, exports and bunkers when those supplies are curtailed by disruption, especially in Asian product-exporting countries;
4. Developing mechanisms to target a rapid release of emergency stocks to companies affected by force majeure disruptions; and
5. Promoting government and industry cooperation at the national level to ensure continuity of supply to consumers in the event of disruption.

The problem

As Asia's dependence on oil imports has grown, it has become the focus of potential insecurity in the world oil market. Today Asia accounts for about 40% of world oil trade and buys 75% of Middle East oil exports. The Middle East, which has been the source of five major disruptions of oil markets during the past 40 years, now supplies nearly 50% of Asian oil consumption, compared with 12% and 16% of US and European consumption, respectively.

Asian dependence on the Middle East varies from country to country in the region (75% of total consumption in Korea and 30% in China), as does the ability of those countries to withstand and respond to disruptions in the oil supply.

The impact of the disruption on consumers in each country would depend partly on the impact in, and policy responses of, its trading partners – for example, exporters of refined products to Australia would be affected by the extent of the impact of the supply disruption on those countries.

It would also depend on the share of supplies through the Strait of Hormuz in total consumption in each country. This ranges from more than 90% in Bangladesh and the Philippines to 22% in China and 11% in Australia (17% if imports of products from countries dependent on Hormuz supplies are included).

If supplies through the Strait of Hormuz were disrupted, exporters would choose how to allocate remaining supplies. This could be either through sharing among existing customers or by 'looking after their own' – giving preference to refineries in importing countries, including some Asian importers such as Japan and Korea, and the United States.

A major question is to what extent governments can rely on the flexibility of the global oil market to respond to a major disruption. Such a disruption would force Asian importers to seek additional supplies from Africa, Central Asia, Russia and South America, bidding up prices for all oil importers and affecting both the global shipping and oil markets. Uncertainty about governments' reactions would add a risk premium to the oil price. The income of Middle East oil exporters would be affected too. If the disruption were not managed well, volatility would damage the long-term interests of producers and consumers alike.

Besides causing general upheaval on the world oil market, a major disruption would trigger special difficulties in Asia, for the following reasons:

- Nearly 30% of Asian consumption is supplied by imports of products, mostly from refineries in Asia (India, Korea and Singapore), which, in turn, are dependent on the Middle East for more than half of their crude supplies. How product-exporting companies and countries chose to allocate reduced supplies would affect Australia and Thailand in particular. No single Asian country can easily isolate itself from the knock-on effects on regional product trade.
- Oil stocks are low, except in Korea and Japan, as most countries have avoided the cost of building up emergency stocks.
- Asian importers depend on the flexibility and capacity of shipping companies. It takes longer to ship oil from Africa or South America than from the Middle East. Thus even if availability were increased by the release of oil from US and European emergency stocks, there would be a brief period of acute shortage before supplies of oil could be redirected from the Atlantic markets.
- Interventions by Asian governments would be inevitable. Every government would be impelled to intervene in the oil trade, but no mechanism exists for coordinating such interventions outside the OECD members of the International Energy Agency (IEA). The immediate impact of any major disruption would be confusion among governments and companies as regards their obligations, the tendency towards a free-for-all in the market and large price increases reflecting local shortages and the uncertainties about government actions.

The scenarios

The oil market is extremely flexible and patterns of trade can change in response to demand, supply and price. Scenario-building is necessarily mechanical and interpretation must be qualified by the reality that the market knows more and responds with much greater subtlety than can be represented. The trade statistics available from national and international sources are not always consistent and do not always track origins and ultimate destinations. The statistics in the scenarios are compiled from a variety of sources and must therefore be treated as broad indicators.

Our analysis is based on hypothetical scenarios in which 10 mbd of oil supplies through the Strait of Hormuz are interrupted for three months. Data for 2012 have been projected to a baseline of 2015, which is taken as a representative year for the 'short term'. Numbers are rough – some trade flows are estimated – and include natural gas liquids (NGL), liquid petroleum gases (LPG) and aviation and marine fuels. Each of these categories would have specific problems in the event of a major disruption of traffic through the Strait of Hormuz.

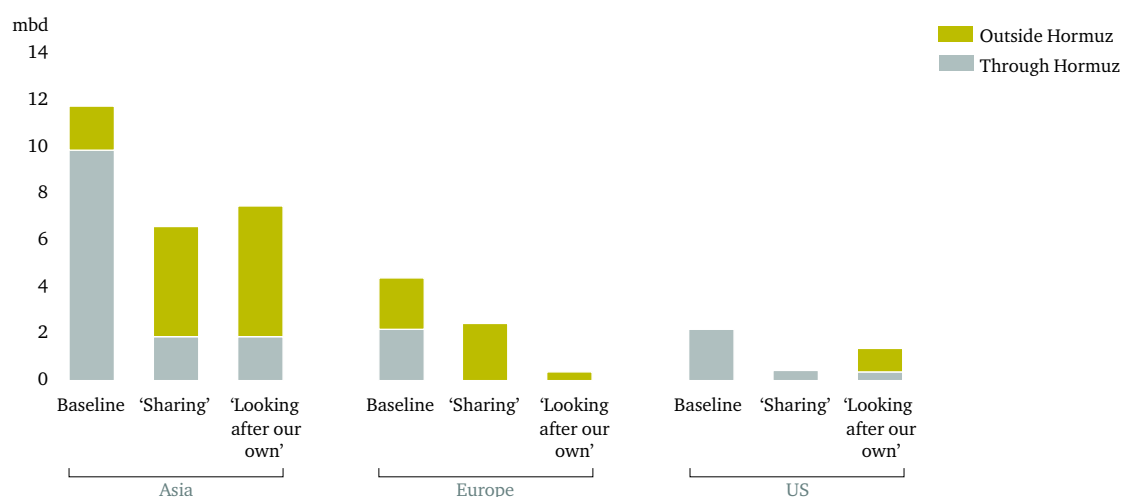
In reality, of course, the duration and even the scale of the disruption would be uncertain. Its impact would depend on the flexibility of shipping and other sources of supply at the time. Moreover, decisions would be influenced by events in the Gulf.

Our baseline scenario, assumes that Asian oil consumption will exceed the 2012 level by 2 mbd and the increase will be met almost entirely from outside the Middle East (the Atlantic basin, Russia and Central Asia). The Middle East would supply about 14.5 mbd to Asia out of total exports of 19 mbd. If the new UAE pipeline to Fujairah and the expanded Saudi pipelines to Yanbu were used to full capacity, total oil exports through the Strait of Hormuz would be about 12.4 mbd, of which 9.8 mbd would go to Asia, on the assumption that trade patterns were the same in 2015 as in 2012. A loss of 10 mbd through the Strait of Hormuz does not imply total closure: traffic has exceeded 17 mbd in the past. The remaining Middle East export capacity would be about 9 mbd.

How exporters would allocate that capacity is critical for Asian importers. The main exporters to Asia are state companies; most of their exports are under term contracts, which would probably require 'sharing' in proportion to their long-term contracts (but may well have escape clauses); this would be the first scenario. In a second scenario, their approach might be to 'look after their own' refineries and joint-venture refineries in importing countries. Since most of those refineries are in either the United States or Asia, such policies would work to the advantage of Asian and US consumers and to the disadvantage of those in Europe.

Figure 1 shows how exporters' choice of scenario would potentially affect exports during a 10 mbd interruption in supplies through the Strait of Hormuz, compared with the baseline of no disruption.

Figure 1: Potential impact of exporters' allocations on Middle East oil exports



Source: Scenarios (Annex 1).

In the event of a disruption, each importer and its government would canvass exporters and their governments for the allocation most favourable to the importing country. Unless exporting governments had committed in advance to one policy or the other, there would be a period of confusion until policies became clear, and it would be difficult for the IEA and importing governments to frame a detailed response. This would add to the uncertainty and risk premiums in global oil prices.

In a supply disruption of the scale assumed, the IEA would act but others would need to be involved too in order to help mitigate the potential economic damage. Decisions would have to be taken, despite uncertainty about the potential length of the disruption and the effectiveness of measures that might be needed to deal with its cause.

Prices

Prices would inevitably be the main factor determining how oil would be allocated in international trade during a major disruption. However, regardless of the exporters' allocations, pricing would be chaotic. The Dubai benchmark would be meaningless in these circumstances, while the Brent and WTI (US) benchmarks would be disconnected – and in the short term insulated – from the crisis of supply in Asia. This would cause problems for many Asian countries that control domestic prices and subsidize them: if such countries did not increase domestic prices, refiners would not bid for more expensive oil without an increase in the subsidy bill, which is already large in some countries.

A serious disruption of oil supplies through Hormuz would increase prices and curtail volumes. The extent and duration of such price increases for internationally traded oil is difficult to predict; it is for this reason that the analysis below focuses on the ability of various Asian countries to obtain supplies by paying for more expensive imports. In 2012 no less than 60% of revenues from Pakistan's non-oil exports were used to pay for oil imports; the corresponding figures for Sri Lanka and India exceeded 30%, while those for Japan, Korea and China were 20%, 15% and 10%, respectively. Even with lower import volumes, the effects on the balance of trade and the exchange rate would range from significant to intolerable. Besides adjustments to their trade, countries would have the option of meeting the additional cost of oil imports by drawing down their foreign-exchange reserves. These, too, vary widely from country to country. While in theory China could cover a 50% increase in the price of oil imports by drawing down foreign reserves at about 3% annually for 30 years, Pakistan's reserves would be exhausted within one year and those of India, Australia and Sri Lanka within about five years.

Continuity of supply

Stocks

Some Asian countries hold oil stocks under direct government control. Most have the authority to direct the use of companies' commercial stocks in an emergency. However, in the event of a disruption in supplies, companies would have normal commercial needs and might differ with the authorities over the level of stocks to hold against the possibility of continuing disruption.

The ability to maintain supplies by drawing down stocks differs from country to country in Asia. Among the main Asian IEA members, there would still be a sufficient level of government and commercial stocks at the end of the assumed 90-day period to cover the risk of another 90 days of disruption. Korea and Japan could maintain supplies for 90 days by drawing down 30% and 20%

of their total stocks, respectively. They would be less affected (needing to draw down 15% and 10%, respectively) if exporters chose to 'look after their own' because of investment by Middle East exporters in those countries.

Outside the IEA Asian countries, China, which has exporters' refineries on its territory, would use 33% and 1% of its stocks, respectively, to maintain domestic consumption under the two scenarios outlined above ('sharing' and 'looking after their own'); but Indian stocks would be exhausted in less than one month in both cases. Singapore's stocks would cover the domestic shortfall for at least six months; however, exports would depend on the balance between product imports and exports in the disrupted market.

Product exports

In 2012, 6 mbd (20% of consumption) in Asia were supplied by products imported from refineries elsewhere in the region, mainly in Korea, India and Singapore. About 40% of the input to these refineries comes from the Middle East and would be disrupted by restrictions in the Strait of Hormuz. Governments of the product-exporting countries could react to a disruption of supplies by imposing limits on the export of products.

If (as is most likely) a policy of limiting exports were expressed in 'guidance' without explicit legal instructions, the exporting refineries would have to overcome the conflict between such 'guidance' and their contractual obligations. Product-importing countries, particularly Australia and Thailand, would face shortfalls of 5–10% of consumption owing to their dependence on product imports supported by Middle East crude; they would also face disruptions of direct crude supply through the Strait of Hormuz. Export refineries and their customers would seek immediate clarification of government policies; however, reassurances beforehand would be preferable.

The same problem arises for international bunkers, particularly in major bunkering hubs such as Singapore, where bunker demand is greater than domestic consumption. Bunkers are generally supplied by global companies; thus the question for the government in a hub country would be whether to give these companies the freedom to supply their international customers without obliging them to divert fuel for domestic consumption. Middle East refineries are an important source of fuel oil for bunkers, and disruption of shipping through the Strait of Hormuz would increase the potential for a bunker shortage in the region.

Infrastructure and shipping

There are physical constraints to the trade shifts that would be necessary to respond to a disruption of supplies through Hormuz. Many ships would be trapped in the Gulf. Voyage times from alternative crude sources such as West Africa are 10 to 15 days longer than those from the Middle East to East Asia. Moreover, ships on the water might be in the wrong places.

Grades of crude and products available from replacement sources might not match those required by refineries and markets. It might be necessary to relax some product specifications to overcome the mismatch, and governments might need to facilitate inter-company cooperation, which under normal circumstances would be contrary to competition law. Exporting companies might be persuaded to relax restrictions on re-sales and swaps.

The role of the IEA

Because of the size of the stocks owned and controlled by IEA member countries, the initial effect of a disruption on the market would largely be determined by whether the IEA, in coordination with the Chinese and Indian governments, swiftly announces a large and credible programme of stock releases to markets in each region. In China, Korea and Japan (and India if storage currently under construction had been filled), this would mean releases from government-owned stocks (but could include obligated industry stocks as well), combined with demand restraints in countries where such was the appropriate early official response.

Bilateral cooperation between exporters and importers

It is in the interest of oil-exporting countries and companies to demonstrate their commitment to importing markets by contributing to arrangements for securing supply in the event of disruption.

The level of stocks in Korea and Japan is sufficient to allow those countries some freedom to support the stability of the Asian market over and above their IEA commitments, provided that the legislation governing those stocks permits them to do so. For example, the governments of Korea, Japan and Singapore could conclude bilateral agreements with the governments of countries importing products from their refineries to ensure those importers' continued supply, albeit at international market prices.

Higher stock levels in India and possibly elsewhere could be achieved if governments (or independent storage companies) were to lease storage to the exporting national oil companies (NOCs) that supplied their markets, in line with the models established in Japan and Korea. Such arrangements would need to be backed up by intergovernmental agreements that covered pricing, the conditions under which stocks would be reserved for use in the importing country and, perhaps, the normal level of stocks. Depending on the terms of such agreements, the stocks would remain the property of the exporting NOC, which would be allowed to use them for normal commercial operations; but in times of emergency, the use of the stocks would be restricted to the country in which they were physically held. In the case of Korea, it appears that the Korea National Oil Corporation (KNOC) would have the right to buy the oil in storage tanks, presumably at market prices.

Because such stocks would be filled from incremental domestic production and thus would not replace exports, the cost to the exporting country would simply be the cost of production. This would be an economically efficient method of adding liquidity to the markets and securing some continuity of income for exporters in the event of a major disruption. Singapore could protect its refineries' ability to export if storage were leased to exporting NOCs. For its part, the Indian Strategic Petroleum Reserves Limited (ISPR) might borrow oil from exporting NOCs.

Industry/government agenda

Intergovernmental action would be needed for the following:

- An agreement between the IEA and the Indian and Chinese governments on a consultation procedure that would quickly produce a statement of common policy in the event of a major disruption. Such an agreement would not depend on a wider structure for association or partnership, although it could, of course, form part of one.

- Bilateral agreements between some major exporting countries and importing countries to support arrangements for exporting NOCs to commit to secure markets by holding stocks in importing countries.
- 'Ticketing' arrangements whereby one country made some of its stocks available to another country at times of emergency.

At the national level, each country's industry and government would need the following (unless already covered in emergency preparedness plans):

- A mechanism for executive consultation and coordination at times of disruption;
- Policies on the relative allocations from government- and industry-owned stocks in the event of an emergency;
- Prior agreement on how supplies are to be allocated between the domestic market, product exporters and international bunkers;
- Prior agreement on the principles of passing through prices in countries where these are controlled; and
- A mechanism for implementing and controlling demand restraint if applicable.

The possibility of introducing innovative mechanisms should be examined. For example, in countries with high levels of stocks, companies that suffer force majeure could have automatic access to part of those stocks through an option whereby oil companies could borrow oil or (as in Japan) negotiate a reduction in their compulsory stock obligation. This could alleviate shortages precisely for the company for which they were most severe. The fast-access stock transfers (FAST) described in Annex 2 below would be an example of such a mechanism.

2. Background

The growing interdependence between the Middle East and Asia has shifted the focus of global oil security East of Suez, reaching beyond the OECD and related IEA oil security institutions.

Trade

One-third of the world's oil flows are consumed in Asia (North, East, Southeast and South Asia and Australasia). Half of the oil consumed in this region is supplied from the Middle East – the bulk of it through the Strait of Hormuz.

In 2012 Middle East oil exports were far more important to consumers in the Asia-Pacific region (satisfying 50% of total consumption) than to those in the US (12%), Europe (15%) or the rest of the world (1%). Moreover, the Asia-Pacific region was by far the most important market for Middle East oil exports, accounting for 75% of those exports in 2012.

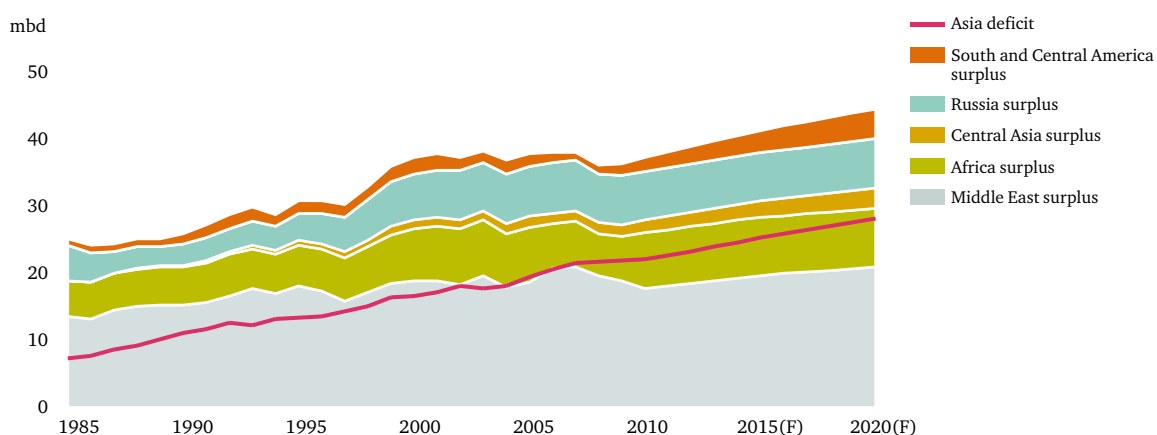
Table 1: Imports from the Middle East to Asia and other regions, 2012

Oil and NGL exports from the Middle East to:	mbd	% of total consumption	% of total Middle East exports
Asia	15	50	75
Europe	2	15	12
US	2	12	11
Rest of world	1	1	2

Source: *BP Statistical Review of World Energy 2013*.

The year 2012 was a turning point in oil flows between Asia, the Middle East and the rest of the world. While oil consumption in Asia grew, production did not. Before 2012, surpluses from the Middle East covered the Asian deficit and contributed to deficits in other oil-importing regions. Since then, the balance has changed, as Figure 2 shows. The important point to stress is that from now onwards, Middle East surpluses will not support the growing Asian deficit, which will increasingly have to be met by supplies from other parts of the world. The details may vary from forecast to forecast, but the trend is clear.

Figure 2: Global oil balances, 1985–2020



Sources: *BP Statistical Review of World Energy 2013*, Joint Organisations Data Initiative (JODI): (historical data); *EIA International Energy Outlook 2013* (reference case).

Global oil trade is more complex than the matching of surpluses and deficits: heavy oils from the Middle East are exported to refineries in the West and light oils are imported from the Atlantic basin to supply the demands of Asian refineries. If supplies from the Middle East were disrupted, Atlantic and Asian refiners would compete for the available surpluses of pivotal suppliers in West Africa, Latin America, northern Iraq, eastern Siberia and the Russian Far East.

In 2012 the Asia-Pacific region imported approximately 20 mbd from outside the region, of which approximately 14.5 mbd came from the Middle East and 5.5 mbd from other parts of the world (including Russia, Kazakhstan and Angola). At the same time, 5 mbd was imported from the Middle East to the world outside the Asia-Pacific region (mainly the US, Europe and East and South Africa – see Table 2). As Figure 2 shows, imports from the rest of the world to Asia will increase over the next 10 years or so.

Table 2: Interregional trade, 2012 (mbd)

	To Asia-Pacific	To rest of world
Middle East exports	14.5	5
Rest of world exports	5.5	

Source: BP Statistical Review of World Energy 2013.

Strait of Hormuz

The Strait of Hormuz links the Persian/Arab Gulf to the Gulf of Oman and the Indian Ocean. Map 1 shows the main export points for Middle East oil exports, with the pipelines that avoid the Strait of Hormuz.

Map 1: Export routes avoiding the Strait of Hormuz



Source: Author, based on US Energy Information Administration.

The Strait carries all the oil exports of Iran, Kuwait, Bahrain and Qatar and most of the exports of Saudi Arabia, the United Arab Emirates (UAE) and Iraq. At their peak, in 2011, these exports totalled 17 mbd. In 2012 almost 90% of Middle East oil exports passed through the Strait. The balance of Middle East exports (about 2 mbd) was probably exported to Europe from the Saudi port of Yanbu on the Red Sea, from northern Iraq to the Mediterranean and from Oman and Yemen to the Asia-Pacific region. There are no hard statistics to support these assumptions, which are summarized in Table 3.

Table 3: Estimated direct exposure to Strait of Hormuz, 2012

Oil and NGL exports through the Strait to:	mbd	% of consumption	Days of consumption	% of total imports
Asia-Pacific	14	47	172	56
Europe	<1	<1	1	1
US	2	12	42	2
Rest of world	<1	1	5	2
Total (world)	16	18	66	34

Note: Total imports exclude Asian intra-regional trade.

Sources: BP Statistical Review of World Energy 2013, JODI, author's estimates.

Within Asia, dependence on the Strait of Hormuz varies considerably from country to country. In 2012 China was the least dependent of the major importers, as Table 4 shows.

Table 4: Implied crude imports through the Strait of Hormuz, 2012

	mbd	% of consumption
Asia-Pacific	13.5	47
Japan	3.5	74
India	2.4	78
China	2.1	22
Korea	1.9	79
Singapore	1.1	88
Thailand	0.4	33
Indonesia	0.2	15
Malaysia	0.2	29
Australia	<1	4
Other Asia	1.5	55

Note: Total imports exclude Asian intra-regional trade.

Sources: BP Statistical Review of World Energy 2013, JODI, author's estimates.

Use of the Strait has diminished and will diminish even further as a result of:

- The completion of a 1.5 mbd export pipeline in the UAE to connect Habshan (onshore fields) to the port of Fujairah on the Gulf of Oman. Capacity can be increased to 1.8 mbd by using drag-reducing agents.¹ In 2012 there were no significant exports from Fujairah, which at the time was being commissioned.

¹ See www.adco.ae/En/NewsEvents/Pages/Habshan---Fujairah-Pipeline.aspx (accessed on 29 October 2013).

- The doubling of capacity (from 2 mbd to around 4 mbd) of pipelines connecting producing fields in the Eastern Province of Saudi Arabia to the Saudi port of Yanbu on the Red Sea. The sea route from Yanbu to the US or Europe is shorter than that from Saudi Gulf terminals by about 7,400 km. However, only about 2 mbd of capacity appears to have been used in 2012, probably because of lack of demand from Europe and the US (Saudi crude and product sales to the US and Europe totalled about 2.8 mbd).²

LNG

A restraint on shipping through the Strait which blocked 10 mbd (about 60% of oil exports) would probably affect LNG exports from Qatar to Asia although the extent of the impact would depend on the precise nature of the disruption. Qatar supplied just over 10% of Asian gas consumption in 2012. Its LNG exports were concentrated on three countries: India, Korea and Japan, to which it supplied 29%, 28% and 18% of national gas consumption, respectively. There is no intraregional LNG trade (unlike the case of oil products); and uncertainty about Qatar's policy for allocating scarce supplies, combined with the logistics of obtaining alternative supplies, would be a source of major concern for these three countries. Continuity of LNG supply is more difficult to maintain than continuity of oil supply because of the need to keep constant pressure in the infrastructure network. Apart from practical difficulties, there is no IEA Emergency Response Mechanism (ERM) for gas. Moreover, the challenge of responding to an interruption of supplies from Qatar would fall to the governments and industries of the countries concerned and would be difficult to share.

Trends

The analysis above is based on 2012 data. As noted, in 2012 only 14.5 mbd of the Middle East surplus was exported to the Asia-Pacific region. The balance of the Asia-Pacific market was supplied from exporters elsewhere.

The focus of this paper is oil security in the short and medium term – that is, until 2020. It takes 2015 as a representative year. Projections by the principal agencies vary. The *EIA International Energy Outlook 2013* reference case suggests the following:

- Production in the Middle East will fall, possibly by as much as 1 mbd around 2015, before recovering to its present level by 2020. This estimate is based on the assumption that OPEC producers will respond to new US crude supplies by reducing their production to support the price (although there are, of course, other possible scenarios).
- Consumption in the Middle East will continue to increase by about 1 mbd until 2015 (after which demand may decrease in response to Saudi and UAE policies to promote energy efficiency and alternative energy).³
- As a result, Middle East surpluses are set to decline by more than 2 mbd until 2015, after which they will return to their present level.
- In the Asia-Pacific region, production will be more or less flat, but consumption will rise by more than 2 mbd by 2015 and another 3 mbd by 2020.

² JODI and the 2012 Saudi Aramco annual report.

³ See Glada Lahn, Paul Stevens and Felix Preston, *Burning Oil to Keep Cool: The Hidden Energy Crisis in Saudi Arabia and Saving Oil and Gas in the Gulf*, Chatham House reports, 2013.

Beyond 2015, oil consumption growth in exporting Middle East countries, combined with the slowdown in production growth, will lead to a fall in export revenues (unless prices rise proportionately) and therefore lower GDP and oil consumption. However, there are many uncertainties, including how quickly Iraq production expands and Iranian output returns to pre-sanctions levels, and to what extent Saudi and UAE policies to promote the efficient use of energy and develop renewable energy will restrain the growth of consumption. It is also uncertain whether Middle East exporters will choose to maintain the current level of supplies to their various markets as their export surpluses decline or whether they will prioritize maintaining the level of exports to the Asia-Pacific region in absolute terms (or even increase it) at the expense of exports to the rest of the world.

In the medium term, and probably in the longer term as well, Asia-Pacific dependence on Middle East oil supplies is likely to decrease both in absolute terms and proportionately as imports from the rest of the world increase.

Thus in the medium term, and probably in the longer term as well, Asia-Pacific dependence on Middle East oil supplies is likely to decrease both in absolute terms and proportionately as imports from the rest of the world increase. Table 5 below summarizes the baseline scenario in this paper on the assumption that Middle East oil exports to Asia will continue at their present level to 2020.

Table 5: Oil balance trends for Asia

	2012	2015	2020
Asia-Pacific consumption (mbd)	29	31	34
Asia-Pacific production (mbd)	8	8	8
Asia-Pacific deficit (mbd)	21	23	26
Middle East surplus (mbd)	20	18	20
Middle East exports to Asia-Pacific (mbd)/ with constant (73%) share of Middle East exports	14.5	13	14.5
Middle East exports to Asia-Pacific (mbd)/with constant volume of exports	14.5	14.5	14.5

Sources: 2012: JODI, *BP Statistical Review of World Energy 2013*; 2015 and 2020: JODI 2012 plus *EIA International Energy Outlook 2013* for incremental volume for 2015 and 2020.

3. Scenarios

Baseline scenario

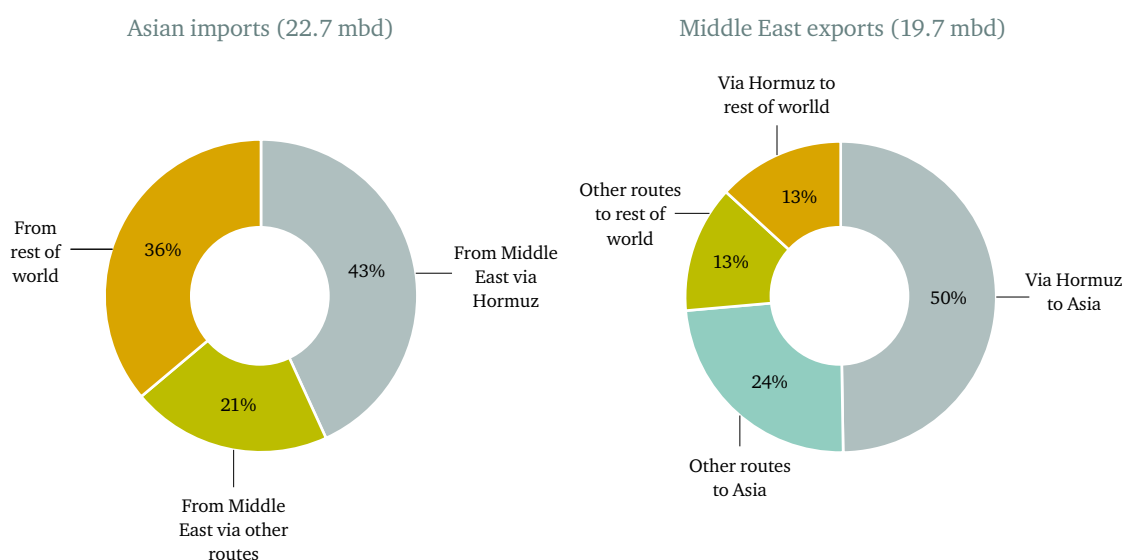
Most Middle East exports to the Asian markets take place under long-term supply agreements (while prices are set by the open market). For this reason, there is a certain stability to the patterns of trade as well as to the assumptions used in one of the disruption scenarios below.

For the purpose of this paper, we have analysed as far as possible from existing data the pattern of Middle East supply to Asian importing countries in 2012. From this pattern we have constructed a baseline scenario for 2015, whose assumptions differ from the reality in 2012 as follows:

- Asia-Pacific demand is increased by 2 mbd in line with the EIA’s 2013 reference case projections.
- The Fujairah export terminal in Abu Dhabi, which was still under construction in 2012, is assumed to be fully utilized (capacity = 1.5 mbd).
- Exports from Yanbu are assumed to be at full capacity – that is, 4 mbd, of which 1.2 mbd goes to Asia and the balance to the US and Europe (in proportion to their respective shares of Saudi exports in 2012). This volume exceeds 2012 utilization and implies that before the assumed disruption, uncertainty about the situation in the Strait of Hormuz was sufficient to increase the use of Yanbu. The effect in the baseline scenario is to reduce the dependence on Hormuz from 16 mbd in 2012 to 12 mbd.

Figure 3 below shows the baseline scenario for 2015, which takes into account completion of facilities at Yanbu and Fujairah and continued supplies from Oman and Yemen on the Indian Ocean.

Figure 3: The importance of Hormuz for exporters and importers



Source: Author’s estimates.

The Strait is more important for Middle East exporters (63% of baseline exports) than for Asian importers (43% of baseline imports). However, both groups have an interest in the continuity of supply through the Strait.

Disruption scenarios

At its narrowest point, the Strait is just 30 km wide, of which approximately 10 km are used by deepwater tankers in outward, inward and buffer lanes. Many events could lead to the blocking or part-blocking of the Strait: pollution, earthquake, terrorism, a deliberate act by a Gulf state or war between two or more of the Gulf states. 'Interruption of supplies through the Strait' can serve as symbol for disruption in some exporting countries.

For the purpose of this analysis, we have assumed a disruption of 10 mbd through the Strait of Hormuz for three months. This is an arbitrary volume (just over 10% of world consumption, 18% of interregional trade, 40% of imports to the Asia-Pacific region, half of Middle East exports): it is big enough to matter globally, not so large as to overwhelm the global system, but sufficiently large to be very disruptive for the Asia-Pacific region. In the disruptions that have taken place to date, supply began to recover within three months.⁴ The speed of recovery depends on the nature of the disruption (production or transit), the remedies taken in the Gulf to restore supply, the effect of price increases on demand and the response of alternative suppliers. In this paper, we concentrate on the immediate effect (over three months).

Compared with the baseline scenario, the 10 mbd disruption would leave an availability of up to 10 mbd from the Middle East, of which roughly 2.5 mbd would be residual supply through Hormuz, 5.5 mbd from Yanbu and Fujairah and 2 mbd from exporters not affected by the Hormuz disruption: Yemen and Oman as well as northern Iraq.

The allocation of the oil that Saudi Aramco and the Abu Dhabi National Oil Company (ADNOC) would continue to export would have a major impact on availability for Asia-Pacific importers, both collectively and individually. We have analysed this impact on the basis of two scenarios (for full details, see Annex 1 below).

Scenario 1: 'Sharing':

- Supplies through the Strait of Hormuz are reduced by 10 mbd.
- The remaining Middle East availability from the Strait of Hormuz and other export terminals is allocated to destinations in proportion to their share of Middle East supplies in the baseline scenario.

This pro rata allocation would be more or less in line with the likely contractual obligations of exporters to treat their customers equally. It would not only apply to customers with long-term contracts but, under international commercial law, might also apply to normal trading patterns. Perhaps it could be argued that such a distribution of available oil supplies would result from an approach whereby governments cooperated to manage the supply crisis.

Scenario 2: 'Looking after our own':

- Supplies through the Strait of Hormuz are reduced by 10 mbd.
- ADNOC prioritizes its exports from Fujairah in accordance with the country shares of total UAE exports in 2012.

⁴ James D. Hamilton, 'Causes and Consequences of the Oil Shock of 2007–08', Working Paper 15002, National Bureau of Economic Research, 2009.

- Saudi Aramco prioritizes its export products from its export refineries (assumed to include the share of foreign oil company partners in the refineries (Mobil, Shell)) as well as the total crude requirements of its overseas refineries (including share of foreign partners (Shell, Sinopec, Exxon, Fujian Refining and Petrochemical). Both the remaining supplies from Yanbu and Saudi Aramco's share of the remaining supplies from Hormuz are allocated pro rata to Saudi third-party customers.

This scenario is significantly more favourable for the US, Japan and Korea, where the exporting NOCs have refinery investments, than for India and Europe, where they do not.

It is important to point out that *importing countries cannot choose the scenario*. The scenario that applied would be decided by the policy, practice and contractual obligations of Saudi Aramco and ADNOC.

Analysis of the risk to Asia

The main conclusion from comparing the two disruption scenarios is that Asia is less exposed under the 'looking after our own' scenario. This is because two-thirds of Saudi Aramco's overseas refineries are in Asia, while the UAE has refinery investments in that region too. Thus in the 'looking after our own' scenario, these refineries would receive a larger share of the available supplies from Yanbu and Fujairah than they would under the pro rata allocations in the 'sharing' scenario. The US would stand to benefit, too, because of the size of Saudi Aramco's US refinery interests relative to US imports from the Middle East. The loser is Europe; however, its exposure is quite small in both scenarios. The numbers given in Table 6 below cannot be taken as exact ones, but they do indicate strategic choices by Saudi Aramco and ADNOC that would favour Asia and reduce the impact of a large Hormuz disruption on Asian consumption and supplies from the Middle East.

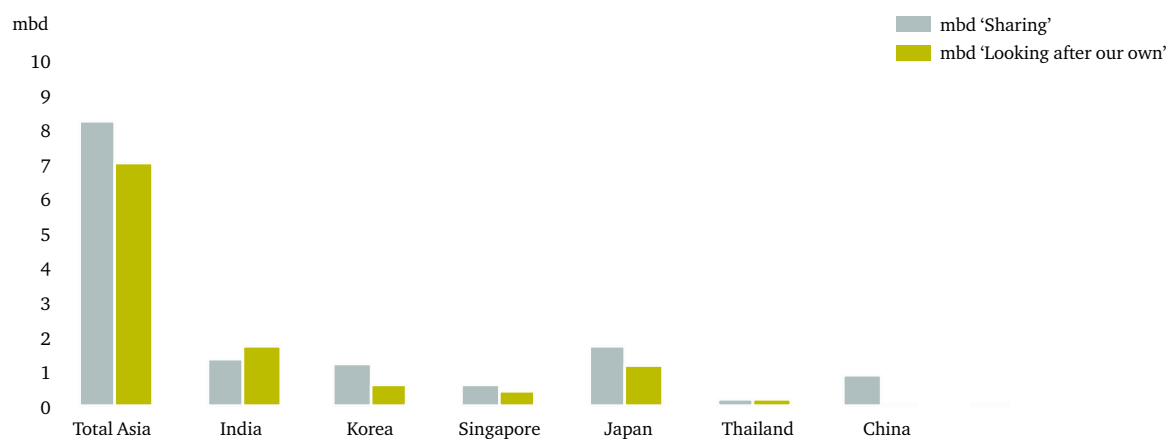
Table 6: Oil supply impact under two scenarios

	'Sharing'		'Looking after our own'	
	<i>mbd</i>	<i>% of consumption</i>	<i>mbd</i>	<i>% of consumption</i>
Asia excluding IEA	-4.7	21	-5.2	22.7
Asia including IEA	-3.3	37	-1.9	22
Europe	-0.1	0.3	-1.8	12.7
US	-1.7	9.7	-0.7	4.1
Rest of world	-0.3	1.1	-0.3	1.0

Source: Annex 1.

Within Asia, most Asian countries would be better off under the 'Looking after our own' scenario. India would be the exception, because exporting NOCs have not invested in refineries in that country. This is illustrated in Figure 4.

Figure 4: Potential losses of supply under the two scenarios



Source: Author's estimates.

The exporters' choice between 'sharing' and 'looking after our own' is important for both exporters and importers. Moreover, it is in the interests of both to reduce uncertainty about the choice itself: exporters would thereby clarify their commitment to existing customers and subsidiaries and importers would understand what a major disruption would mean for them. Such clarity could be achieved either through bilateral agreements creating advantages or through guarantees of most-favoured-nation treatment.

Products

Product imports accounted for a large share of consumption and almost 30% of Asian consumption in 2012, and more in some countries, as Table 7 shows.⁵ More than 80% (6 mbd) of these product supplies came from refineries in other parts of the region (more than 3 mbd from India, Korea and Singapore). The region's refineries, in turn, depend on the Middle East for nearly half of their crude supplies (see Table 9). Thus disruption to Middle East supplies through the Strait of Hormuz would affect not only crude supplies to the region's refiners but also product supplies from export refineries elsewhere in the region.

Disruption to Middle East supplies through the Strait of Hormuz would affect not only crude supplies to the region's refiners but also product supplies from export refineries elsewhere in the region.

In the event of a disruption, product-exporting companies would have to allocate supplies between domestic consumption, exports and, in some cases, international bunkering. Cutting exports in order to protect domestic consumption would prejudice the future of oil-dependent export businesses such as domestic refineries. Cutting supplies for international shipping and aviation would be immensely disruptive to trade and throw into doubt the reliability of the hub for servicing

⁵ JODI data for 2012.

international aviation and shipping. Thus consumers in product-importing countries would be affected by decisions taken in product-exporting countries, but product-exporting countries could significantly reduce the effect of a disruption of crude supplies on their own (domestic) consumers by banning or restricting product exports.

Table 7: Dependence of selected countries on product imports, 2012

	Volume of product imports (000 bd)	Product imports as % of consumption
Myanmar	7	100
Sri Lanka	79	73
Philippines	144	50
Brunei Darussalam	7	48
Australia	383	40
Indonesia	534	40
New Zealand	38	25
Japan	1185	25
China	895	10

Source: JODI data for 2012. Central Bank of Sri Lanka, 'Economic and Social Statistics of Sri Lanka 2013'.

Singapore is an example of a country where this dilemma is particularly acute. In the baseline scenario, imports of crude and products totalling about 3 mbd (of which 1.1 mbd would probably be through Hormuz) supports exports and re-exports of about 1.9 mbd of products.⁶ More than half of the products exported to Singapore are for supplies to international aviation and marine bunkers and about one-third is used as feedstock for the petrochemical export industry. Cutting supplies to the product-export, bunkering and petrochemical industries would have long-term negative consequences for their role in the Singaporean economy.

Dependence on product imports therefore creates indirect exposure to Middle East oil supplies. Australia is an example of a country with such exposure – in 2012 its net product imports totalled 0.3 mbd.⁷ In fiscal year 2012–13 products imported by Australia from refineries in India, Korea and Singapore accounted for 38% of middle distillate demand, 19% of light distillate demand and 51% of fuel oil sales (whose volume was relatively small).⁸ Petroleum products supplied 100% of the energy needed for aviation, 94% for road transport, 90% for agriculture, 37% for mining and 6% for construction. Disruption of product supplies to Australia from exporting refineries in Asia would have a big impact on the economic activity in all these sectors.

Australia's own crude production (0.5 mbd in 2012) does not reduce its exposure to disruption, although the volume of crude exports is similar to that of product imports (0.2–0.3 mbd). Australia's light sweet crude exports cannot be easily substituted for imports of Middle East heavier crudes, even if the required refining capacity were available (only about 100,000 bd of capacity is used to refine Middle East crude; and in the event of a disruption of supplies, less than that would be spare following the conversion of two refineries into import terminals). Moreover, since Australia's crude exports would not be disrupted, it would require strong government intervention to divert them from contractual destinations.

⁶ Precise numbers are difficult to obtain. Published statistics do not show the distribution of exports by country.

⁷ JODI.

⁸ Australian Petroleum Statistics: Bureau of Resources and Energy Economics.

Asia's Oil Supply: Risks and Pragmatic Remedies

Scenarios

Table 8 below shows the source of supply of refined products to Asia-Pacific consumer countries. Although 93% of these supplies come from refineries in the region, only 70% come from refineries in the consumer country; the remaining 22% come from refineries in other parts of the region and 7% from Middle East export refineries.

Table 8: Product supply to Asia-Pacific consumer countries, 2012

	mbd	% of total
Product consumption	29	100
Product imports from outside the region (mainly Middle East)	2	7
Products imported from refineries elsewhere in the region	6	21
Products from refineries in the consumer country	21	72
Total from Asia-Pacific refineries	27	93

Sources: JODI, *BP Statistical Review of World Energy 2013*, official national data.

The indirect dependence of Asia-Pacific refineries on Middle East crude supplies is shown in Table 9 below. Almost 70% of the production of Asia-Pacific refineries depends on crude imported from outside the region, of which 40% is from Middle East supplies; moreover, about 90% of these Middle East supplies pass through the Strait of Hormuz (as discussed above).

Table 9: Implied sources of crude inputs to Asia-Pacific refineries, 2012

	mbd	% of total
Total inputs	26	100
National crude production	7	27
Imports of other Asia-Pacific crude	1	3
Crude imported from outside the region	18	69
Of which: from the Middle East	11	42

Sources: JODI, *BP Statistical Review of World Energy 2013*, official national data.

The refineries of India, Korea and Singapore make the biggest contribution (over 4 mbd) to the 6 mbd of product exports within the region. Each country exported more than 1 mbd in 2012, while Singapore (a trading hub, as noted above) was also a significant product importer. Table 10 and Figure 5 suggest that more than half (2.5 mbd) of the product exports from these countries' refineries within the region may be dependent on supplies from the Middle East.

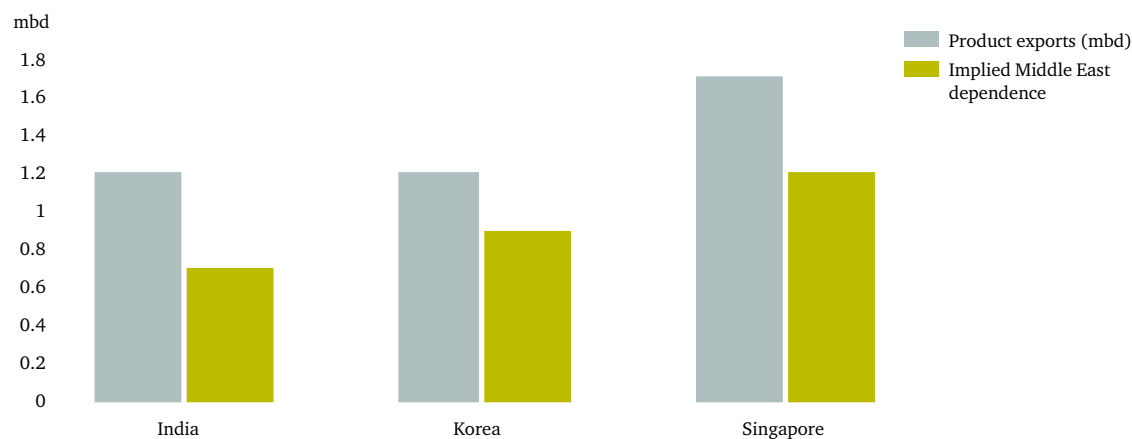
Table 10: Product exports dependent on Middle East supplies, 2012

	Product exports (mbd)	Middle East share of refinery inputs (%)	Implied Middle East dependence of product exports (mbd)	Product imports (mbd)	Net product exports (mbd)
India	1.2	56	0.7	0.3	0.9
Korea	1.2	74	0.9	0.8	0.4
Singapore	1.7	72	1.2	2.2	-0.5

Note: Data for Singapore are from 2011: exports include re-exports; consumption includes bunkers; and product imports include 0.3 mbd from outside the Asia-Pacific region – mainly the Middle East.

Sources: JODI, *BP Statistical Review of World Energy 2013*, official national data.

Figure 5: Dependence of regional product exports on Middle East crude



Source: Author's estimates.

Determining what proportion of product exports depends on imported crude and the pattern of product trade is difficult without data. Moreover, trade may fluctuate. However, if we assume that 50% of the product exports from Asian refineries depend on Middle East crude, the aggregate dependence of various product-importing countries is higher than indicated by their crude imports from the Middle East alone (see Table 11 below).

Table 11: Effect of indirect dependence on the Middle East, 2012

	Direct imports from the Middle East (mbd)	50% of imports of products from refineries dependent on Middle East crude (mbd)	Total dependence (mbd)	Total dependence as % of consumption	Of which products (%)
China	2.9	0.3	3.2	33	3
Japan	3.5	0.15	3.6	75	1
Thailand	0.5	0.15	0.6	50	8
Australia	0.1	0.05	0.15	17	6

Sources: JODI, BP Statistical Review of World Energy 2013, official national data.

The importing countries in Table 11 have an interest in the security of crude supply to the refineries elsewhere in the region that supply them with products. It would be reasonable for companies and governments of product-importing countries to seek advance assurances from companies and governments of the product-exporting countries that the latter would continue to support product exports.

4. Macroeconomic Effect

Because of the nature of global interregional trade (see Table 2 above), the impact of shortages in the Asia-Pacific region would be felt worldwide and would affect oil prices everywhere. While new supply patterns were developing, prices could vary from region to region to reflect local shortages and surpluses (such as might result from the release of stocks in the US and Europe, which would be least affected by interruptions in the Strait of Hormuz).

This paper does not speculate on how long oil supplies would be disrupted, the effect on prices or what a new 'business as usual' situation might be. However, a three-month period of disruption and the associated price increases would harm importers' economies in three ways:

- The interruption in supplies would disrupt the functioning of the domestic economy;
- The increase in international oil prices would be reflected in domestic prices in general and hence inflation; and
- Efforts would have to be made to boost exports in order to meet the higher cost of oil imports.

The Monetary Authority of Singapore has estimated that the inflationary effect in Singapore of a long-term oil price increase of 10% would be 0.2 percentage points in the first year and another 0.5 percentage points in the second year as higher costs were passed on to consumers (an oil price increase of shorter duration would have less impact). In an economy less open than Singapore's, the pass-through could be muted by price controls but at the cost of higher direct or indirect government subsidies. Moreover, inflationary effects depend to some extent on the monetary-policy response. If this response were not coordinated with that of other major oil-importing countries, there would be an exchange-rate effect besides that of the oil price increase on the balance of payments.

The impact of an oil price increase on the balance of payments would be proportional to the volume of oil imports. The balance-of-payments effect would be immediate: imports would have to be paid for even as the economy was adjusting to higher prices. Currency market expectations would affect the exchange rate too.

There would be effects on government finances, economic growth, employment and inflation. The scale of the impact would depend on the extent of the disruption, the size of the price increase triggered by the disruption, and the policy responses to the increase in the importing country and its trading partners. The length of the disruption would be another critical factor: obviously, a short disruption would have a much smaller impact than a prolonged disruption of uncertain length. Previous price shocks, though all sparked by relatively short-term disruptions of supply, had very different impacts on price. The price shocks of 1973 and 1978 led to a large permanent change in the price level that occurred over one year, whereas the shocks of 1980 and 1990 resulted in relatively short-term price increases over a period of four to six months followed by periods of stability or decline.⁹

For some countries (including India, Pakistan, Sri Lanka and Thailand), the IMF's 2013 consultations and country reports show that economic growth would be at significant risk from a global oil price shock (that is, an increase to \$140–160 per barrel) and the potential policy responses to it. For other countries (such as Indonesia), the effect of an oil price shock depends on the impact on China, the principal market for non-oil exports.

⁹ Hamilton, 'Causes and Consequences of the Oil Shock'.

This paper focuses on the potential immediate impact of a global oil price shock, without taking into account the effect of changes in the exchange rate or the supply of money either to accommodate or to pass on the effect of higher prices to the rest of the economy. For the purpose of illustration, the price effect is assumed to be an average 50% increase in oil prices in general over three months, without making a distinction between front- and back-loaded increases and without estimating the decrease in the volume of imports that would follow the disruption of supply or the price increases. There are, of course, many possible permutations of the figures for volumes, price increases and periods of disruption.

These reservations notwithstanding, the analysis below indicates the economic impact that the disruption of oil imports would have on various countries in the Asia-Pacific region. It also indicates the economic capacity of various Asia-Pacific countries to cope with the price impact of a disruption. For some states the immediate impact would spell an economic crisis, even if the price increase were limited to 50% and lasted no longer than 90 days, as in the above scenarios. Other states are more resilient and would be able to withstand higher price increases and disruptions of longer duration.

Balance of payments

There are two main indicators of resilience to higher oil prices:

- In the case of the first indicator, it is *net* oil imports that matter (assuming that oil exports benefit from the global price increases). The indicator is the proportion of non-oil exports required to pay for net oil imports (the share of oil imports in the total import bill is not relevant because it is recursive). It is not easy to identify how non-oil exports would be affected by the disruption, either owing to difficulties in maintaining continuity of supply (as discussed above) or because of changes in the exchange rate that would tend to support non-oil exports. Some countries, such as India, run a structural balance-of-payments deficit, which would be another means of accommodating increases in the cost of oil imports. Generally, countries that use a high proportion of their non-oil exports to pay for oil imports would face a larger economic adjustment in the event of an increase in oil-import prices. Moreover, a sudden price increase, combined with uncertainties about continuity of supply, could have social consequences and affect investment.

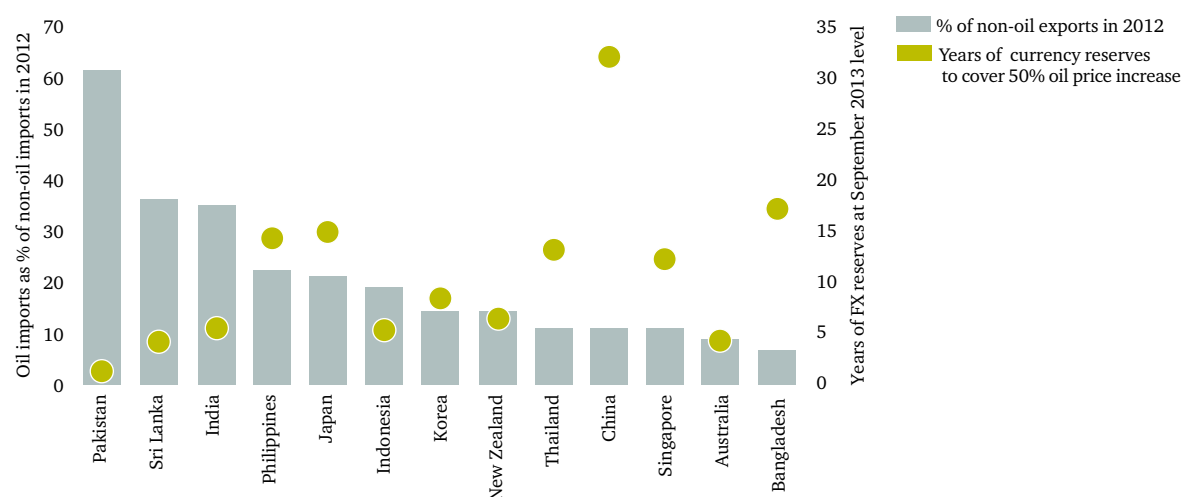
Generally, countries that use a high proportion of their non-oil exports to pay for oil imports would face a larger economic adjustment in the event of an increase in oil-import prices.

- The second indicator of economic resilience is the extent to which a country's foreign-exchange reserves could be drawn down to cover the increased cost of net oil imports while giving time for the necessary economic adjustments in the importing country. Obviously, this would be a temporary measure only, and not all reserves could be used for this purpose. Nevertheless, the ratio of foreign-exchange reserves to net oil import costs gives an indication of how long the former could be used in theory to buy time for adjustment to high oil prices.

The weight of net oil imports in the total balance of trade is shown in Figure 6 on the left-hand Y axis as the percentage of non-oil exports used to pay for net oil imports in 2012: Pakistan is worst placed, with 60% of its non-oil exports being used for this purpose, while Australia and Bangladesh are best placed, with less than 10%. Here the net figure is relevant because oil and gas exports would benefit from the price increase.

Importing countries can also use their foreign-currency reserves to accommodate increases in the price of imports as their economies adjust to those increases. The right-hand Y axis in Figure 6 shows the number of years for which foreign-currency reserves (at their September 2013 level) could cover a 50% price increase in net oil imports at 2012 volumes. This is, in fact, a simple indicator of how long governments could in theory 'buy time' for the economic adjustments needed to cope with a 50% increase in the cost of maintaining 2012 volumes of oil imports (although in reality only a limited proportion of the foreign-exchange reserves could be used for this purpose).

Figure 6: Economic resilience of countries in the Asia-Pacific region to higher oil prices



Sources: International Trade Centre (for trade statistics), IMF (for figures on foreign-exchange reserves).

Some states would be unable to afford to cover the costs of a prolonged period of high oil prices caused by a supply disruption. Pakistan, Sri Lanka and India, which used the highest proportion of non-oil exports to pay for net oil imports in 2012, are also the worst placed in terms of foreign-currency reserves available to cover more expensive oil imports. In the case of Pakistan, all foreign reserves would be exhausted if a 50% price increase lasted for 16 months (assuming import volumes remained unchanged). Sri Lanka, India and Australia would all fare better, but their reserves would be exhausted within four to five years. While the Philippines and Japan used more than 20% of non-oil exports to pay for net oil imports in 2012, both have substantial foreign-currency reserves – equivalent to about 15 years of net oil imports at prices 50% above 2012 levels. China is the outlier: it is more resilient to a disruption of supplies through Hormuz than any other Asian importing country. It used only about 10% of its non-oil exports to pay for oil imports in 2012 and has foreign-currency reserves capable of covering a 50% per cent increase in oil prices at current volumes for more than 30 years.

Government budget

Some Asian oil-importing countries subsidize the domestic consumption of oil products. Subsidies take many forms. In some countries, state enterprises are required to keep down consumer prices and/or are compensated wholly or in part by the government's accepting losses. In other countries, subsidies are provided through the government budget. Most Asian countries that subsidize oil product consumption are currently reducing those subsidies in stages, either by limiting the number of subsidized products or by increasing the prices charged to consumers – sometimes offering assistance to low-income consumers.

There are various definitions of subsidies, and estimating their total volume is complicated. The magnitude of the impact on governments' finances of maintaining subsidies in the event of an oil price shock is indicated below in Table 12, which compares the IEA estimate of subsidies in various Asian countries in 2011 with central government expenditure in the same year or in fiscal year 2011–12. The comparison is rough only, because of definitional problems and the use of various sources for data on government expenditures.

Table 12: Subsidies on oil product consumption

	Oil product subsidies (\$ billion)	% share of central government expenditures
India	13	<1
China	18	<1
Pakistan	3	<2
Bangladesh	1	<5
Philippines	1	<5
Thailand	3	<5
Sri Lanka	1	>5<10
Indonesia	16	>5<10
Malaysia	5	>5<10

Sources: IEA *World Energy Outlook 2013* (oil subsidies); IMF 2013 country reports, official national statistics (government expenditure).

Owing to the on-going reduction of subsidies, the impact of a supply disruption on oil prices could be smaller today than it would have been in recent years. Nevertheless, if a supply disruption caused a significant increase in oil prices, governments that provide subsidies would have either to increase them to compensate, wholly or in part, for higher prices or to allow a full pass-through of prices, which, in turn, would contribute to reducing demand for the product. For most countries, the additional government expenditure would not be trivial and there would be an immediate need to find a way to support those costs.

5. Response: Mitigating the Impact

The impact of a disruption in supplies through the Strait of Hormuz would depend on the circumstances in which the disruption took place and on perceptions of how long it would last. If oil demand were strong and spare capacity elsewhere limited, the situation would be much more difficult than if demand were weak and spare capacity available throughout the global oil system (although weak demand before the disruption would be likely to coincide with weak economies, which in themselves would be less capable of dealing with the disruption). This paper analyses the impact of a supply disruption in a ‘normal’ economic situation – that is, one in which oil supply and demand are more or less balanced and prices relatively stable (as indicated in the *EIA International Energy Outlook* and similar forecasts for 2015).

Uncertainty about the length of the disruption and the speed and nature of government responses would add a risk premium to the oil price in the short term.

The mitigation of the impact of a major disruption in oil exports through the Strait of Hormuz on supply and the economy depends on the ability of governments to do the following:

- Maintain the continuity of oil supply that is necessary for the functioning of the economy. Drawing down stocks would maintain supplies in the short term as longer-term responses develop. Meanwhile, governments would undoubtedly intervene in the markets’ redistribution of scarce resources.
- Reduce uncertainty about such interventions in order to lower the risk premium in the price. This would require contingency planning, advance resolution of conflicts along the supply chain and the rapid communication of decisions to the market.
- Recognize that unilateral actions may sometimes have unintended consequences: if the importers most affected by the disruption bid aggressively for remaining oil supplies, the resulting high prices would feed through into the marginal transactions that set the global price. By the same token, attempts to suppress prices could result in failure to obtain supplies.

Continuity of supply

Stock drawdown

The quickest way to offset an interruption in supplies of oil through the Strait of Hormuz would be to draw down the stocks of crude and products held in importing countries. However, those stocks would not necessarily match the types of oil whose supply is disrupted. While such mismatches would be sorted out in the marketplace, there would inevitably be price increases driven by the bottlenecks in each country for specific products.

Because oil is easily traded internationally, stocks drawn down in one country would ease global shortages for oil. This would benefit countries that have not invested in stocks and/or the owners of stocks or agencies controlling government stocks that are unwilling to release them. IEA member countries are committed to coordinating action to overcome this free-rider problem among the organization’s members; however, non-members such as China and India are not committed to such coordination and are building up their own reserves.

IEA members in the Asia-Pacific region (Australia Japan, Korea and New Zealand) are committed to coordinating with the rest of the IEA their responses to supply shocks and holding a minimum of 90

days of net oil imports for use in such contingencies. These 'emergency' stocks may be held either by public agencies (which are the major stockholders in Korea and Japan) or by companies, and may comprise either crude or products. They are under government control and in addition to normal commercial stocks.

Australia does not comply with its IEA stock obligation: its policy is to rely on the spot market for oil. For their part, Japan and Korea hold more than the stocks required by the IEA (see Table 13).

Table 13: Stocks of IEA member countries in the Asia-Pacific region, as of August 2013

	Days of net imports		
	<i>Total</i>	<i>Industry</i>	<i>Public</i>
Japan	148	65	83
Korea	255	133	122
Australia	61	61	0
New Zealand	103	93	11
Total IEA Asia-Pacific	152	75	77

Source: <http://www.iea.org/netimports.asp> (accessed 3 December 2013).

Non-IEA members China and India have built up strategic stocks under government control, and both countries plan to expand these stocks when oil is cheaper. The Singaporean government requires power generators to hold stocks of oil equivalent to 90 days of their requirements, but these holdings are small as oil accounts for only a very small proportion of the input to power generators. However, Singapore has a high level of commercial stocks, part of which is held in refineries and part in independent facilities (which are being expanded).

In the 'sharing' scenario, if less than half of their strategic stocks were drawn down, the volume would be sufficient to maintain continuity of supply for domestic consumption in the IEA member countries, including Japan and Korea, for three months.

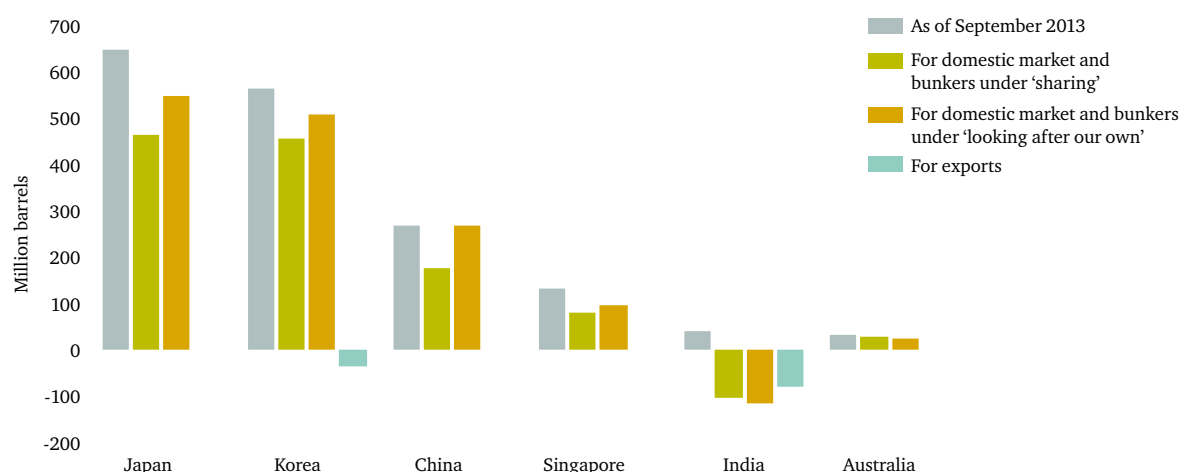
Figure 7 shows the potential for oil stocks under government control in the Asia-Pacific region to be used to maintain continuity of supply in the event of a major disruption of imports through the Strait of Hormuz. The numbers are subject to all the reservations expressed above and thus should be regarded as indications only, not precise estimates. They do not take into account the problem of matching the types and grades of crude and products in stock with those of the crude and products whose supply would be interrupted. Moreover, the comparison assumes that all other supplies remain constant: in practice, this would depend on the ability of importers in the Asia-Pacific region to continue to secure supplies in the face of bidding by importers in other parts of the world affected by the disruption.

In the 'sharing' scenario, if less than half of their strategic stocks were drawn down, the volume would be sufficient to maintain continuity of supply for domestic consumption in the IEA member countries, including Japan and Korea, for three months. In the 'looking after our own' scenario, an even smaller drawdown would be required to maintain supplies in Japan and Korea because of Saudi and UAE

investments in those countries' refineries. In both scenarios, drawing down stocks to support the continuing export of about 340,000 bbl of products from Korea would still leave more than half of the country's stocks after three months. China would have the ability to maintain continuity of supply for almost six months in the 'sharing' scenario and for much longer in the 'looking after our own' scenario. By contrast, in India the entire strategic stock, assuming it was immediately accessible, would cover the shortfall for domestic consumption for about 12 days only (India has plans to add another 90 million barrels in the state agency ISPRL, and state oil companies are expected to contribute a further 25 million barrels).

In addition to the stocks reported above, Saudi Arabia and ADNOC have agreements with the Japanese and Korean state companies (Japan Oil, Gas and Metals National Corporation (JOGMEC) and KNOC) to store 3.8 million and 4 million bbl in tanks in Okinawa (free of leasing charges) and Yeosu, respectively. Oil stored in these tanks is for commercial use by exporting companies; but in the event of a disruption, the importing partner would have first refusal for supplies.

Figure 7: Drawdown of oil stocks to cover Hormuz-related shortfall



Sources: IEA; *Wall Street Journal*, 31 October 2013 (for China); *The Financial Express*, 28 September 2013 (for India).

Therefore, in either scenario, the net effect of the stock drawdown in the Asia-Pacific region would be the following:

- IEA importers would be able to maintain continuity of supply to meet domestic demand for more than three months – and, if necessary, for more than six months.
- Korean product exports could be maintained by drawing down stocks, provided the government made the necessary decision (about 12% of Korean product exports are for destinations outside the region).
- Indian product exports would be immediately challenged. Drawing down strategic stocks to support exports would disrupt domestic supplies and companies might be forced to limit exports (about 25% of Indian product exports are for countries outside the region; and India's low stock levels are a problem for countries both in the region and elsewhere (such as East Africa) that depend on Indian product imports).

- Assuming that commercial stocks were available and the decision was taken to use them, Singapore should be able to maintain continuity of supply to meet domestic consumption but would be unable to support exports (less than half of its refinery output is used for local consumption).
- Companies and countries that had imported products from India and Singapore would have to compete for new supplies.

The Asia-Pacific region would face more severe calls on their stocks than would major importers in other parts of the world. This can be seen in Table 14, which indicates the percentage of stocks used after three months of disruption. In the 'sharing' scenario, continuity of supply to the US and European IEA member countries would barely be affected by a disruption, provided those countries could maintain their share of the remaining global supplies in bidding against Asian importers, which would be much more seriously affected.

Table 14: Stocks used after three months of disruption (% of total)

	'Sharing' scenario	'Looking after our own' scenario
IEA Asia-Pacific	22	14
China	30	3
India	312	378
Singapore	67	54
US	6	2
IEA Europe	1	28

Sources: IEA; *Wall Street Journal*, 31 October 2013 (for China); *The Financial Express*, 28 September 2013 (for India).

The difference between the volumes that would be used in the two scenarios raises several questions about coordinating action among IEA member countries:

- Should the IEA agree to the release of stocks in individual member countries to cover their specific shortfalls?
- Or should it agree to the release of stocks in all member countries to make up for the overall shortfall (9%)? And, if so, on what basis? (A formula based on the percentage of the total IEA stock would imply that Japan and Korea would release much smaller volumes and the US and Europe much larger volumes; while global trade would eventually redress this imbalance, there would be considerable dislocation that would be accompanied by risks as well as risk premiums in prices, and delays in shipping.)
- Or should it agree that each country draw down stocks to cover its own shortfalls but that IEA members draw down additional stocks to cover the shortfalls of non-IEA members in the Asia-Pacific region, thereby leaving allocation to the market?

Past experience and new approaches

Experience of past supply disruptions shows that:

- The peak loss of supply occurs within the first two months as alternative production is being increased and shifts are under way to longer supply routes; at the same time, demand is being dampened by price increases and other measures.

- The overall impact is uneven: prices in the spot market reflect demand from the importers most affected rather than the average shortfall. Whether the impact is felt first at the consumer or refinery level depends on how the refineries cut back deliveries to protect their position when the crude supply vessels fail to arrive.

This suggests there may be scope for a mechanism that would release new supply only to those importers suffering force majeure so that their acute demand would be diverted from the spot market, relieving the pressure on price in that market and dampening the price shock for the market as a whole. Such a mechanism could permit companies to borrow oil from either the government oil stocking agency or from their own compulsory emergency stocks (see Annex 2 below). It would build on the ticket system and discretionary loan facilities already recognized by the IEA, but at the same time decentralization would allow company decisions to be taken quickly on the basis of commercial criteria.

Oil supplies to Asia avoiding the Strait of Hormuz

Our scenarios assume that before disruption in supplies through the Strait of Hormuz, exports from Yemen and Oman would be at their maximum level and pipelines to the ports of Yanbu (Saudi Arabia) and Fujairah (UAE) and Iraqi pipelines to the Mediterranean, through which oil is imported to the Asia-Pacific region, would be operating at full (expanded) capacity. The same assumption applies to the pipelines to China from Kazakhstan and Russia.

There may be some scope for increased production in Asia's oil-exporting countries. Under an ASEAN petroleum security agreement, member countries undertake to try to increase supply to a country affected by a critical shortage (the loss of the equivalent of 10% of consumption over 30 days). To date, this mechanism has not yet been activated. As regards Asian exports of crude and products outside the region (about 1 mbd), diverting those supplies would be subject to the same contractual obligations and restrictions imposed by most-favoured-nation treatment that would apply to other exporters.

Asia could receive some additional oil from Asian companies that have production facilities in foreign countries other than those in the Middle East and from advance purchases of oil from state companies in Venezuela and Nigeria. It is possible that some of this foreign oil is already being shipped to Asia; however, some of it is marketed – at international prices but with lower transport costs – in the US, Europe, Africa and the Atlantic basin. In some cases, it may be possible to divert this oil to the Asian markets. However, since the exporting country itself would not be suffering force majeure, the freedom to switch destinations would depend on contractual relations with buyers and/or the willingness of the exporting country's government to divert trade.

Table 15: Estimated Asian company oil production outside Asia and the Middle East, 2012

Country in which company based	Total production abroad 2012–13 (mbd)	Shortfall in 'sharing' scenario (mbd)	Shortfall in 'looking after our own' (mbd)
China	1.5	0.9	0
Korea	0.2	1.0	0.6
India	0.2	1.4	1.7
Japan	0.6	1.7	1.1
Total	2.5	5.0	3.4

Sources: Annual reports, author's analysis.

It is difficult to obtain reliable numbers on how much additional oil could be secured by these means because of the complicated nature of the reported percentage shares of production, the various types of cost recovery, shares in equity investments and the terms of repayment of the 'loans for oil' deals. If the last-named is excluded, Asian companies' production outside Asia and the Middle East in 2012 may have been as shown in Table 15.

Indian companies might be able to divert oil or swap it for supplies that could be delivered cost effectively to India – in a crisis, it is better to have some oil somewhere than no oil anywhere.

Companies in China, Korea and Japan would have no need to divert their foreign production to Asia since the shortfall in both scenarios could be met by stock drawdowns. Indian companies might be able to divert oil or swap it for supplies that could be delivered cost effectively to India – in a crisis, it is better to have some oil somewhere than no oil anywhere. In the 'sharing' scenario, over six months the Indian shortfall would be reduced from 256 million barrels to 219 million barrels and in the 'looking after our own' scenario, to 178 million barrels after drawing down all strategic stocks (232 million barrels).

Fuel switching

There is little scope for fuel-switching. In most Asian countries, oil plays a minimal role in power generation, ranging from 5% in Japan to just 1% in China – although in some other countries, such as Sri Lanka (where it is mainly used off grid), it accounts for a larger share of the fuel mix for generating power. Shortages of diesel for auto- and backup generation and off-grid areas could create serious problems.

6. Conclusions

Although Asia is more dependent on oil supplies from the Middle East than are the US or Europe, it is less organized to deal with disruptions in those supplies. Unlike the US and the EU, the Asia-Pacific region comprises geographically diverse and separately governed markets. There is no regional mechanism for dealing with supply disruptions in the region. Of the major Asian oil importers, only Japan and Korea are part of the IEA's Emergency Response Mechanism, which is dominated by the US and Europe. Governments are bound to intervene in the event of a disruption; and since exposure and resilience to such a disruption would vary considerably from one Asian importing country to another, conflicts between government interventions would be likely – unless, that is, governments were to take account of the interests of the other countries in the region. For some Asian countries, even a relatively short supply disruption (accompanied by a large price increase) would pose a major economic challenge.

The only way forward at present is to draw up a list of critical issues that would arise in the event of a disruption of oil supplies and identify the means by which they could be addressed *pragmatically* – some in conjunction with the IEA, some through bilateral or multilateral agreements between governments and others within national jurisdictions.

The IEA would undoubtedly play a leading role in responding to a major disruption in Middle East oil supplies. While it is possible that some kind of IEA partnership agreement with China and India would be concluded, many Asian countries would not be included in such an agreement. Within Asia, only ASEAN has an oil-supply emergency response agreement; however, this mechanism is much more limited in scope than the IEA's ERM and depends on cooperation between the state companies of the ASEAN countries. Thus, in all likelihood any major disruption of oil supplies would generate considerable uncertainty about how the various Asian governments would respond; and this uncertainty would, in turn, exacerbate the effect of such a disruption on global oil prices.

One way to deal with these problems would be to seek to establish an overall Asian oil security 'architecture'.¹⁰ Many Asian organizations (including APEC and ASEAN) actively research and discuss the issue of energy security but their membership is not comprehensive. Moreover, the current political environment is not conducive to establishing new strong institutions across Asia.

Thus this paper concludes that the only way forward at present is to draw up a list of critical issues that would arise in the event of a disruption of oil supplies and identify the means by which they could be addressed *pragmatically* – some in conjunction with the IEA, some through bilateral or multilateral agreements between governments and others within national jurisdictions.

The issues that would be critical for the general stability of the oil market in the Asia-Pacific region in the event of a disruption in supplies are as follows:

- How to generate a rapid statement by the IEA and the governments of China and India on a coordinated response to the crisis;
- What policies the NOCs of Saudi Arabia and the UAE would adopt in allocating their available supplies – pro rata with pre-crisis sales or taking into account their own exports and overseas refineries and partners;

¹⁰ Tom Cutler, 'The Architecture of Asian Energy Security', National Bureau of Asian Research, forthcoming.

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- Whether the governments of Korea, Japan and China would release strategic stocks to the extent needed to make up the regional shortfall;
 - Whether the government of Korea would release strategic stocks to support product exports;
 - What policies the governments of Korea and Singapore would adopt towards product exports;
 - What the contractual rights of importers of products from Korea, Singapore and India would be in the event of a disruption in supplies to exporting refineries;
 - What the IEA's policy would be on sharing the burden of disruption between its Asian and other members;
 - To what extent contractual arrangements and non-discriminatory commitments of governments would allow Asian companies to divert their overseas production to Asia.

As regards macroeconomic stability, the challenges that Asian importers would face in the event of a major disruption would vary considerably from country to country. An important factor would be the expectation of how long the resulting price increase would last. As shown in Figure 6 above, the following would apply:

- Some countries, such as China, would have a policy choice: to accommodate the increased price of imports by using foreign-currency reserves or to reduce demand for oil in the non-oil economy.
- Others, including India, would face very difficult policy choices in the short term. These choices would be influenced by whether the US and the EU opted to accommodate or adjust to the higher prices.
- The extent to which oil-exporting countries using the Strait of Hormuz suffered would be in proportion to their share of remaining export capacity. Because of their small non-oil export sectors, these countries' ability to protect their economies would depend mainly on their drawing down foreign-exchange reserves and investments, which, in turn, could have consequences for global financial balances.

Annex 1: The Scenarios

Table A1

	Asia	Europe	US	Rest of world	Total
Baseline scenario					
<i>Supplies (mbd)</i>					
From the Middle East	14.5	2.3	2.2	0.4	19.3
Via Yanbu	2.2	1.8		0	4
Via Fujairah	1.5	0	0		1.5
From Yemen and Oman	1	0	0	0	1
Via the Mediterranean	0	0.4	0	0	0.4
Implied via Hormuz	9.8	0.1	2.2	0.4	12.4
%					
Hormuz imports as % of consumption	32	0	12	1	14
Hormuz imports as % of Middle East supply	68	3	100	100	64
Middle East imports as % of consumption	47	16	12	1	21
'Sharing'					
<i>Supplies (mbd)</i>					
Via Yanbu	2	2	0	0	4
Via Fujairah	1.5	0	0	0	1.5
From Yemen and Oman	1	0	0	0	1
Via the Mediterranean	0	0.4	0	0	0.4
Total available via Hormuz	1.9	0.0	0.4	0.1	2.4
Total available from the Middle East	6	2	0	0	9
Potential shortfall	8.1	0.05	2	0	10.2
Shortfall as % of consumption	26	0	10	1	11
Shortfall as % of Middle East supply	56	2	81	81	53
Shortfall as % of Hormuz supply	83	81	81	81	82
'Looking after our own'					
<i>Supplies (mbd)</i>					
Via Yanbu					
For own and joint refineries	2.0		1.0		3.0
Other	1				1.0
Via Fujairah	1.45				1.45
Via the Mediterranean		0.4			0.4
From Yemen and Oman	1.1				1.1
Total available via Hormuz	1.9	0.0	0.4	0.1	2.4
Total available from the Middle East	7.5	0.4	1.4	0.1	9.4
Potential shortfall	7.1	1.8	0.7	0.3	10.0
Shortfall as % of consumption	23	13	4	1	11
Shortfall as % of Middle East supply	49	81	34	69	52
Shortfall as % of Hormuz supply	72	72	34	69	80

Annex 2: Fast-access Stock Transfers (FAST)

FAST is the author's proposed mechanism for borrowing oil from national strategic stocks to supply oil importers whose supplies are disrupted by force majeure.

Background

Experience of past supply disruptions shows that:

- The peak loss of supply occurs within the first two months as alternative production is being increased and shifts are under way to longer supply routes; at the same time, demand is being dampened by price increases and other measures.
- The overall impact is uneven: prices in the spot market reflect demand from the importers most affected rather than the average shortfall. Whether the impact is felt first at the consumer or refinery level depends on how the refineries cut back deliveries to protect their position when the crude supply vessels fail to arrive.

Objectives of the FAST mechanism

- To release new supply in importing countries quickly – stocks could be made available before new production and alternative supplies reach the market and the risk of a physical shortage ('lines at the pumps') would be reduced;
- To divert from the spot market the acute demand of importers suffering force majeure – FAST stocks would be released only to those players, relieving the pressure on prices in the spot market and dampening the price shock for the market as a whole; and
- To decentralize decisions on drawing down stocks – under FAST, such decisions would be taken by the importers affected, who could draw stocks to meet demand from what they deemed the most critical point in their supply chain.

Key elements

FAST would operate in two different ways – one for 'compulsory' stocks held by companies and under government control and the other for stocks held by a government agency.

For 'compulsory' stocks, the FAST mechanism would operate as follows:

- Companies would have the automatic right to exercise the option to draw down a given proportion of stocks (that is, an option to borrow) with the obligation to replace those stocks (matching both the grades and types of crude and product) within, say, three months.
- No government intervention would be necessary as long as a company's force majeure situation was recognized (see below).
- Governments would not be required to decide what volume should be released or set a price for the additional oil supply.

For stocks owned by a government agency (such as the strategic petroleum reserve in some countries), the FAST response would be the following:

- Governments would dedicate a part of their strategic oil stocks – say, the equivalent of supplies for 30 days – to FAST, matching the volume earmarked for the mechanism in companies' compulsory stocks.
- The government agency managing the strategic reserves would create stock transfer options (STOs) for a volume equivalent to the dedicated stocks.
- The STOs would, in effect, be an option for importers to borrow oil for up to, say, three months to replace contracted or customary supply from the source affected by force majeure.
- If a force majeure situation were recognized, the agency would allocate STOs to importers to match the volume of disrupted supplies; this would be done on a pro rata basis up to the limit of the STOs available.

Pricing

The cost to companies of replacing oil would be capped by the price of forward purchases or buying call options in the open market, which in a period of disruption would normally be in backwardation – that is, a market situation in which forward prices are below the spot price; The relative price of prompt oil on the open market and the three- or six-month forward price would reflect the market perception of the extent and duration of the disruption. The release of stocks through the FAST scheme would tend to limit price increases in the spot market (which would be one of its principal objectives).

Tradeability?

The FAST mechanism described above would provide companies affected by force majeure with additional oil in proportion to the supplies they had lost through the disruption. Depending on how much oil is available under the automatic options to borrow, the mechanism might yield only small volumes compared with the loss of supply. Thus there would be a case for allowing companies that are not directly affected by force majeure to lend their options to those that are. The lending company would still be obliged to replace the oil, while the borrowing company would pay a fee to cover the discounted cost of replacement (that is, the difference between the prompt and forward price) but would have more oil available to it than would be the case without tradeability. Moreover, options could be traded by importers within the country or in countries where reciprocal stockholding is recognized, as the trading of tickets for leased oil allowed today in the EU.

Force majeure

The proposed FAST mechanism assumes that it would be easy to apply the definition of force majeure in international commercial law, which, in turn, assumes that the party pleading force majeure would be able to defend its claim successfully either in court or in arbitration. In some cases, it may be the supplying company (for example, an exporting NOC) that is subject to force majeure in the first instance rather than the importing customer. The essence of FAST would be the speed of its response to a disruption; for this reason, STOs should not be subject to the risk of prolonged disputes or legal challenges. Such problems could be overcome by including a 'safe harbour' clause in the text of the

option so that companies seeking to borrow oil could be asked to prove to an independent panel of legal and industry experts that their supplies had been curtailed by 'an overwhelming or irresistible force or an event or effect that may be considered impossible to control or anticipate'.¹¹

Grades and quality

The stocks available in company storage or in strategic petroleum reserves would not necessarily match the types of crude and oil products directly affected by force majeure. For the FAST mechanism to work, acceptable equivalents (known in advance) would be needed, leaving operators to distribute available resources as best they could. This would create winners and losers in individual trades.

Carrying costs

The cost of carrying the FAST stock would be borne through a levy on sales by members in countries where stocks are held by an industry agency (such as the Erdölbevorratungsverband (EBV) in Germany) or by the government (as in the case of the US Strategic Petroleum Reserve). This would be same procedure as that used for the rest of the strategic reserve (that is, the stocks held by individual companies in countries with compulsory stock obligations, such as the UK).

Relation to other mechanisms

IEA and the ERM

The IEA currently has the ability to allow the lending of oil; but its normal method of operation is either to ease the compulsory obligation on companies, thereby freeing up stocks for their own use, or to coordinate releasing government-owned stocks to the market. However, there may be a delay in an IEA decision being taken.

- The FAST mechanism could be incorporated into the IEA's ERM by recognizing a part of the obligatory stocks or strategic reserves (the equivalent of 90 days of net imports) as FAST stocks to be released under the FAST mechanism rather than the IEA's rather lengthy activation procedures.¹² The 'ticketing' concept already recognized by the IEA could be extended to cover the FAST 'options to borrow'.
- But since the major importing countries and regions currently hold stocks in excess of the IEA's 90-day minimum, it would be possible for a FAST mechanism to be set up in an individual country or group of countries to supplement the IEA's 90-day obligation. In August 2013 compulsory and strategic stocks held in the main importing countries were as shown in Table A2 below.

¹¹ This is the definition of force majeure in *Random House Kernerman Webster's College Dictionary* (2010 edition).

¹² Assessment; Call for Collective Action; Consultation; Activation: IEA Fact Sheet: IEA Emergency Response 2010.

Table A2: Compulsory and emergency stocks held by main oil importing countries as of August 2013 (days of net imports)

Country	Stocks held
US	209
Japan	148
Korea	255
China	46
IEA Europe	129
India	12

Source: IEA.

- Part of the stocks that remained under government control could be used for the purpose of dealing with local emergencies (for example, earthquakes in Japan). Even then, earmarking the equivalent of 30 days of net imports for the FAST mechanism would leave more than 90 days under the IEA system in each region.
- Some countries might need to amend their laws or regulations to allow oil from strategic reserves to be borrowed.

EU

The EU obligation is for member countries to hold strategic reserves equivalent to 90 days of consumption – which is more than the IEA requirement (see Table A2 above). The Union does not have an independent mechanism for managing stock releases; but in theory, it would be able – just – to create a 30-day FAST mechanism as part of its own stock obligations while still meeting the IEA requirement.

FAST for Asia?

The oil-stock situation of non-IEA member countries in Asia is fundamentally different from that of IEA member countries in the region. The main non-IEA Asian importers are building up strategic stocks; while currently below both the IEA requirement of 90 days of net imports and that of the EU of 90 days of consumption, these stocks are growing rapidly in most Asian countries. China is expected to provide emergency cover for 50 days of consumption by 2015 and 90 days by 2020.¹³ India has announced plans to build up stocks equivalent to 90 days of net imports by 2020; it has set up an agency to achieve this goal, but progress has been slow. Thailand and Vietnam plan eventually to achieve 90 days of net import cover, while the Philippines, Cambodia and Laos are all aiming for 30 days and Indonesia for 23 days. The ASEAN Petroleum Supply Agreement provides for coordination – on a ‘best endeavours’ basis – to support a member country experiencing sustained disruption of 10% of its supplies. This could include a coordinated stock release of some form – if the countries had stocks.

¹³ Tomoko Matsumoto, ‘Decelerated China’s [sic] Oil Demand’, paper published by the Institute of Energy Economics, Japan, December 2012.

Because the capacity of non-IEA members to contribute to a drawdown of stocks varies from country to country, cooperation with the IEA in the event of disruption would lead to a differentiated response – some IEA countries would be likely to press for demand restraint in some non-IEA countries. The economic consequences of such a response would raise political questions about inequitable burden-sharing and/or free-riding.

The FAST mechanism could allow Asian countries to develop an Asia-based approach:

- Under the simplest arrangement, demand on the Asian spot market would be reduced and all Asian importers would benefit if major importers, including IEA members, adopted the mechanism. A slightly more complex arrangement would entail part of the major importers' stocks being held in a regional hub, such as Singapore; importers anywhere in the Asian FAST system could borrow oil from those stocks under FAST terms and conditions.
- Some importing and exporting countries could apply FAST or bilateral arrangements with exporting countries by leasing to exporting NOCs for commercial purposes as long as the oil is made available to the importing country in the event of a disruption in supplies (as in Korea and Japan).
- A FAST mechanism for Asia would require an intergovernmental agreement giving it legal force and identity and recognizing stocks held outside national borders (on the same principle as the IEA 'ticketing' scheme). It would not prevent cooperation between non-IEA countries and the IEA, either routinely or at times of emergency; but it would provide a flexible and speedy mechanism for a cooperative Asian response.

Final comments on FAST

- The idea of 'borrowing oil' was considered in the 1970s but not pursued because of the difficulty of dealing with allocation and price issues. Since then, the development of forward and option markets has provided the means of resolving the problem of pricing borrowed and returned oil.
- Targeting stock releases at companies that experience disruption and letting those companies decide whether to borrow oil would relieve governments of the need to decide when, and at what price, to release oil from compulsory stocks – that decision would, in effect, be decentralized to companies experiencing force majeure.
- Pricing issues would be resolved since companies would be able to establish the cost of repaying oil by reference to forward and future markets.
- Thus the proposed FAST mechanism (or something like it) deserves attention – both as a means of increasing the flexibility of the IEA's ERM and as a basis for developing Asian emergency responses that would include non-IEA countries that have rapid demand growth but low levels of strategic stocks.
- The benefits would be widespread: physical supply for directly affected markets would be ensured and price shocks in the spot market (which would affect all markets) dampened.

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