

Contextualising the drivers for trade: some lessons from historical cases studies.

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Abstract

Within an established body of literature, a number of studies have sought to apply quantitative frame works, such as cross-country regression analyses, to ascertain the importance of potential drivers for trade. However such approaches are not without difficulties, particularly where different elements may interact or may have a questionable relationship with trade, resulting in calls for country specific experiences to be scrutinised. In response to such comments this paper examines existing literature on three historical case studies reflecting specific regions, commodities and timeframes in order to ascertain if established drivers were relevant and what important additional elements may be at play. This paper includes an examination of the inter-related economic and political factors which have been identified as influencing how trade has changed. The results confirm the importance of elements such as economic growth, openness, geography and transport costs but helps contextualise some of the high level drivers identified in the literature. This analysis affords three main conclusions, firstly distinct trading regions may react differently to similar circumstances, secondly, policies which can influence both supply and demand can have a significant impact on established trade patterns and finally initially isolated elements can (with the benefit of hindsight) prove to have had a significant impact on trade

1.0 Introduction

The quantity of material traded globally has dramatically increased over 30 fold since 1950 [1]. During this period trade has developed within the context of globalisation, reflecting the greater interconnectedness along supply chains, with cross-border investment flows [2]. Whilst this period arguably reflects the second age of globalisation, the scale of modern trade flows, and the speed with which information is exchanged, means that globalisation in the 21st century bears little semblance to globalisation in the 19th or early 20th.

1.1 The foundation of modern globalisation.

Arguably the current age of globalisation originated in the frameworks (and subsequent agreements) initially established by the General Agreement on Tariffs and Trade (GATT). The first agreement signed in 1947 arrived at a set of rules to govern how trade is conducted between contracting parties [3]. Furthermore it allowed for a multilateral forum for negotiating *reciprocal* reductions in barriers to trade, necessitating contracting actors to ideally treat goods coming from contracting parties indiscriminately [4].

The period following the establishment of the initial GATT agreements (subsequently replaced by the World Trade Organisation) oversaw the post-war reindustrialisation of key trading regions such as Japan, Western Europe and (arguably to a lesser extent) the United States (US), with a significant increase in the quantity of material traded by these regions, particularly energy commodities. The international demand for goods these economies produced had a significant impact on the increase in trade and was supported by the high ratio of investment to GDP in such regions [5]. These industrialised economies were impacted by the crises of the 1970 and the 1980s whilst that period also saw the emergence of newly industrialised countries such as Korea, Singapore Taiwan etc. The development of these emergent economies has been attributed to a move from initial policies of import substitution to more open trade. The 1980's also saw the emergence of containerisation which grew significantly in the following decades as the trade in intermediate goods increased in tandem with extension of supply chains and continued investment in Asian economies. The subsequent decades continued the Asian ascendancy with significant growth in the trade of containerised goods but also the emergence of China as one of the largest importers of bulk goods [6].

However the apparent dividends of globalisation have not manifested equally amongst all developing countries, with regions such as Africa being comparatively slower to build on and enhance existing competitive advantages [7]. More generally the structure of world trade has moved to one of greater parity in the trade of primary and manufactured goods between developed and developing regions (with the arguable exception of Africa) as well as a significant increase in the trade between regions in the developed world [8].

2.1 What drives or hinders trade: some high level perspectives.

The changes in the global summarised in the previous section have prompted significant effort within both the economic and policy literature to account for why and how trade has grown by such an extent. From a high level theoretical perspective the growth of world trade in industrialised countries has been attributed to economic growth and increases in income levels. The view presented by some commentators is that highly industrialised countries with a surplus output of high value goods are more likely to find a market in other highly industrialised countries [3]. Furthermore these frameworks assume that such regions will have a greater capacity to source cheaper primary goods.

Contrasting frameworks seek to explain the challenges faced by developing nations in replicating the economic growth of developed nations, in terms of lacking the capacity to respond to industrialising stimuli or not being sufficiently competitive [3]. The growth of emerging markets is seen as reflecting

the presence of more advanced economies which supply the 'economic preconditions' for trade growth in the form of capital, technology, knowledge, which support the emergence of modernizing elites who replicate the structures of more advanced trading partners.

2.2 Aims of this paper

The debate as to what ultimately drives trade has continued since the 1950s. As will be discussed later in this paper, despite significant advances in analytical techniques, the importance of fundamental elements, such as the openness of national markets, have arguably not been incontestably established. The conventional theoretical perspective ultimately viewed trade as a derived demand, in the absence of activities having an origin and destination, transportation becomes meaningless [9]. However additional literature reminds us that the complexity of modern trade cautions against a simplistic view of derived demand and that where and when trade is manifested will depend on numerous factors which are region and commodity specific [10]. Therefore this paper makes use of high level historical case studies of regional trading patterns, informed by literature, to ascertain the political and economic factors which have been deemed to have influenced not just changes in the demand for important traded commodities but also how the demand was met. This is based on the view as expressed in [11] on the value in studying specific country/regional experiences as a tool for understanding trade. Given that the shipping sector has been responsible for transporting the vast majority of goods traded globally, special consideration will be given to the role occupied by shipping [4].

The case studies seek to identify linkages between individual elements and recognise that the impact of an individual driver will not be felt in isolation, as proposed by [12] who suggest that, for example, the impact of trade liberalization is increased if it is accompanied by other regulatory reform. Authors such as [13] argue that international trade policy is closely linked with other policies. We are reminded that policies which in hindsight are deemed to have had a positive impact on trade may have been inappropriate under different circumstances and advocates studies which attempt to contextualise such issues [14]. Given their heterogeneity, these specific examinations should not be taken to produce generalizable accounts [15] but can highlight variables whose wider relevance can be tested using a more structured method such as econometric cross country regression analysis.

3.0 What are the factors which influence trade?

Broadly speaking the literature presents a number of factors which are considered to have an impact on trade and are summarised in Table 1, with some key factors expanded in the following section. This section will also comment briefly on the method used within the literature to ascertain how the impact of such proposed drivers are tested.

Insert Table 1 here

3.1 Trade and growth

The positive correlation between international trade and economic growth remains in many cases a "statistical regularity in need of explanation" [16, p 30]. Despite this, the view that economic growth

invariably has a positive influence on the rate of trade growth is not incontestable. In particular the bi-relational nature of trade and economic growth makes it difficult to arrive at a conclusive picture, whilst trade can have a significant impact on economic growth, so can many factors that can be related to trade [17]. Specifically, studies such as [16] describe the complexities involved in determining causality, particularly in distinguishing precedence and correlation. However the authors provide the caveat that demonstrating a robust relationship between trade and growth and demonstrating *how* trade affects growth are separate issues. For example using a simultaneous equation model to test competing hypotheses [18] suggests that investment, technology transmission and a stabilisation of macro-economic policies are the most important effect of trade. (The latter reaffirms the suggestion that trade may affect growth through other institutions).

3.2 Policy relevant interventions

Broadly speaking this section will comment on some of the factors, over which trading regions have political control.

3.2.1 Openness to trade

In terms of policy, [19] discuss previously published empirical work (such as cross-country regression analysis) which suggests openness to trade is a significant explanatory variable for the level (or growth rate of) trade and real per capita GDP. Trade openness/liberalization is a broad term which can refer explicitly to the modification of tariffs, quantitative restrictions or voluntary export restrictions. For example studies such as [20] employ a theoretical general equilibrium model of international trade in final goods suggesting that trade liberalization has contributed 75% of the (approximately) 2% average annual growth of world *merchandise* trade (as a % of income) between the late 1950s and the late 1980s. However reviewing the growth in real bilateral trade flows between 16 OECD countries suggests that 67–69% of the observed growth over this period could be explained by growth in real GDP, 23–26% by preferential trade agreements and tariff-rate reductions whilst 8–9% of this growth can be explained by reductions in transport-costs. In many respects this reflects the movement away from policies of import substitution whereby countries adopt foreign exchange and import controls to safeguard their export earnings and enabling available foreign exchange to be used strategically. However this approach of import substitution was reassessed by many countries (including newly industrialised countries) following the 1980s economic crisis [21], who adopted policies which promoted export orientated industries, including modification to subsidies and tariffs etc. Studies such as [22] find that foreign direct investment (FDI) is closely correlated with trade liberalization. However it should be mentioned that the use of cross country regression analysis to suggest a positive link between trade/growth and openness has been criticised [13, 17] as some of the variables used may have dubious relevance to trade policy or the relationships are invalidated by the inclusion of alternative variables. More recent empirical evidence demonstrates a positive but significant variability in the extent to which trade growth responds to trade liberalization [23, 24].

3.2.2 Regionalisation

In a related point to the issue of trade openness is the issue of regionalisation whereby a group of (often geographically proximate) countries adopt a regional free trade area, custom union or common market [5]. On the one hand, regionalisation allows circumvention of the 'no new

preferences rule' enshrined by the GATT agreements. Alternatively proponents of regionalisation say that regionalisation can speed up or act as stepping stones towards greater trade liberalization.

3.2.3 Aid

Foreign aid is a contentious issue, particularly in relation to whether aid is tied to other commitments. However, foreign trade has been suggested to mitigate the poor export performance of some developing countries by allowing them to import larger quantities of manufactured goods (often from industrial countries) than would be possible given their normal trading position [3].

3.3 Issues of Geography

Moving away from areas of direct relevance to trade policy, other commentators have suggested alternative determinants which may impact upon trade. Comparing trade of different commodities between New Zealand, US and Latin American countries, by means of one and multi-sector monopolistic competition models [25] suggest that distance, language and adjacency effects are significant factors for the trade of certain goods. The issue of time, transport costs and geography appear to be perhaps unsurprisingly interconnected. For example, it was estimated by [26] that transport and freight insurance costs were approximately double for landlocked countries as opposed to coastal countries. Speaking in terms of Central Asian countries [27] suggest overland transportation costs, bargaining posture with, and infrastructure of, transit countries are important variables. The importance of both port and transit infrastructure is reiterated by [28], suggesting that a median landlocked country exhibits only 30 % of the trade volumes of the median coastal economy.

Other studies [29] suggest the negative affect of distance on trade peaked at the middle of the century and has remained persistently high. However we are reminded [30] that changes in transport technology means that distance is not a static variable and will be impacted by transportation technologies. This is important considering some studies do not distinguish between transport modes. Time series regressions of bilateral trade and suggest the relative importance of distance by air has been increasing while the importance of distance by sea is in decline, although the authors present a caveat in querying whether trade is the only bilateral factor shaped by distance [30].

In a related point, [31] states that lengthy shipping times impose inventory-holding and depreciation costs on shippers. On average, increasing shipment duration by one day reduces the probability of trade by 1%. However confining the analysis to manufactured material suggests that increasing transit length has a positive but marginal effect on trade. This would seem to be at odds with the assessment presented in [29], arguably reflecting the impact of distinguishing commodity types.

It is argued that studies which examine customs data consistently find that transportation costs represent a barrier that is comparable or greater than that of tariffs [32]. The authors suggest that prices for ocean shipping changed marginally from 1952–1970, exhibited significant increases from 1970 to the mid-1980s, followed by a steady 20-year decline. While ships have become larger and more efficient, the economics of trade have changed as well. Increased fuel costs (amongst other reasons) has meant that the proportion of shipping to total costs have not decreased drastically. Furthermore when measured relative to the commodity price deflator, the cost of shipping a ton of

ore has decreased the cost of shipping a dollars' worth has not. Other authors [33] suggest that the impact over time of maritime transport costs is diminishing over time while the distance effect (which is seen as a proxy for a range of determinants) is generally rising.

Results 4.0

4.1 Choice of case studies

Trade exists at the nexus between supply and demand therefore it is argued here that in choosing case studies there is value in representing different commodities, industrial sectors, time periods and regions. Similarly the policy or economic factors which will affect trade may be proactive or more reactionary. For these reasons three historical case studies are presented.

- 1960s-mid 1980s: The impact of the oil crises on the trade of crude oil to the United States: Western Europe.
- 1960-1970s: Raw material supply strategies adopted by Japan.
- 1980-2000: The growth of containerised trade particularly between the US and Asia.

These case studies were also chosen as they were deemed to have had global relevance beyond the regions directly impacted [4].

4.2 The response to the oil crisis.

In the 1960's the demand for oil by the US and Western European economies increased significantly, due to increasing demand in the energy and transport sectors. In the US this was a consequence of policies which incentivised suburbanisation (such as development of the highway system and underwriting mortgages for suburban one family homes [34, 35] During the 1960's air quality legislation prompted new power plants to be designed for oil or gas. Whilst the US remained a significant producer of oil during this period, the growth in demand outpaced production. In 1969 the quota system which restricted the amount of Middle-Eastern oil allowed into the United States was eliminated due to rising oil prices and quota loopholes [36]. Indeed the Suez Canal closing in 1967 prompted the beginning of a buoyant seven years for ship owners as large tankers were in high demand to sustain European and American demand [4].

In Western Europe the growth in the transport energy demand resulted from growth in income as well as the greater availability of consumer instalment purchases for motor vehicles. However in quantitative terms the demand for oil by the power sector was of greater importance, within European OECD countries the proportion of oil in non-transport energy demand doubled between 1960 to 1973 [37]. The inability of European coal mines to expand quickly enough meant that oil became a more attractive choice for the power sector. The European Coal and Steel community allowed oil companies to plan large-scale, inter-state oil refining and transportation infrastructure.

Underpinning this demand was a growing dependence on Middle Eastern sourced oil. The scale of available oil reserves and the complex arrangement between oil companies and exporting countries ensured the capital necessary to established large scale exporting infrastructures [38, 39].

Competition between exporting regions kept prices at a low level and by 1970, imports were approximately 13% and 80% cheaper than European domestic gas and oil respectively [40].

Objecting to their political stance during the Arab-Israeli conflict of October 1973, key Arabic members of OPEC imposed an embargo on exports to the US and its allies in Western Europe, precipitating a significant increase in the price of oil. In response the European council agreed upon a set of dedicated policy objectives which highlighted energy security concerns and adopted an action program for the 'rational utilisation of energy.' This manifested as inter-state cooperation in energy savings measures, diversifying sources of energy and exploitation of domestic energy [41] to enhance self-sufficiency. Between 1974 and 1981 the quantity of oil consumed in the EC declined from 587 to 464 Mtoe (million tonnes of oil equivalent) with the net import dependency declining from 98 to 77% [42].

As a response to the embargo US refiners affected short-term changes in oil sourcing, looking to import crude oil from any available source. Furthermore between 1973 and 1975 the US sought to protect and regulate the domestic oil industry through differing pricing structures which differentiated their exposure to the international market [36]. However this policy incentivised hoarding as long-term contract prices did not rise to meet spot prices and (after modification in 1975) acted as a mild incentive for oil companies to increase purchases of imported crude oil [43]. Crude oil imports more than doubled from 1973 to 1977, reaching a record level of 6.6 million barrels per day in 1977 and stagnated until 1979 [44].

With the additional increased prices following the Iranian revolution in 1979 further measures were required. The early 80's witnessed European governments offering more favourable terms for companies which were (or intending to) explore and produce oil in the North Sea. These factors meant that, along with the associated economic downturn and continued efforts towards efficiency, between 1980 and 1990 the quantity of crude oil unloaded at ports in developed European Market economies decreased from 586 to 447 Mt [8] (see Figure 1).

Figure 1 about here

The further increase in oil price provoked earlier regulation of the US domestic oil industry to be largely abandoned which prompted increased domestic production whilst additional exporters (such as Nigeria and Norway increased market share). This resulted in a decline in crude imports up to the mid-1980s after which they increased sharply along with the general economic recovery and a reduction in import prices [44] (See Figure 2).

Figure 2 about here

4.3 The Japanese bulk supply strategy

A key element of Japan's post war industrialisation was government support for the automotive industry which saw the production of 4.1 million cars in 1968 with 85% of which being used domestically [45]. Trade liberalization was deferred until 1965 by which time domestic industry could compete effectively. However the resources for large scale investment did not present themselves until the 1970s. Prior to the mid 1960's the US was the main coal exporter, however Australian coal mines signed contracts to export 3 Mt pa of metallurgical coal from New South Wales during the initial years of the 1960s. In the following decade this established a framework for state-

sector-firm cooperation [46]. Specifically this resulted in Japanese steel mills signing long-term contracts with mines and making small equity investments (e.g. in infrastructure) to simultaneously provided a lever to drive down market prices [47]. Such clauses provided incentives and guarantees to mining firms to undertake capital intensive investments, based on assuming low profit returns as investor expectations reflected the need to reliably secure low cost, high quality (large quantity) coal supply. A feature of this model was implicitly fostering competition between potential exporting regions further incentivising the investment in infrastructure at port and mine level as well as linking infrastructures.

A similar narrative is evident for ore imports. By 1960 Malaysia, India, Peru, Brazil, South Africa and Chile were the primary sources of Japanese ore. It was also recognised by the Ministry of International Trade and Industry (MITI) that the output of the largest suppliers would inevitably decline [48]. What became termed the “the steel-ship nexus” referred to cooperation between the state, steel and shipping companies and allowed the Japanese Steel Industry to overcome and arguably benefit from the large distance between trading partners. State support allowed Japanese shipyards to build specially designed and strengthened ships (itself increasing ore demand) in the late 1960s [46]. Some Japanese mills owned their own ships which allowed material to be transported on a free-on-board (FOB) basis such that any reduction in transport costs were captured by Japanese importers. (An important factor following the increase in marine fuel prices following the oil crisis.) Practices such as triangular trading patterns (whereby a ballast voyage is employed between two laden legs) allowed markets such as Brazil, which previously were considered too distant, to be exploited. By 1970, ore sourced by such contracts accounted for over 90% of Japanese ore imports. Such plans had two main outcomes; firstly they established important key trade partners such as Brazil and Australia who although unimportant by 1970 would become significant in the following decades [49]. Secondly, the pattern of state-sector-firm relations and the resultant learning, organizational, technological innovations established a framework which was replicated by other steel and coal sectors in other countries.

4.4 The growth of containerisation

Given that containers are not strictly commodities types in that they do not serve a consumer use in and of themselves, the growth of containerisation arguably represents a closer association of supply and demand based issues. This has been linked to increasing disposable incomes and an increasing demand for variety with increasing intra-industry trade between countries producing similar goods and services [50]. Similarly containerisation has facilitated the extension and fragmentation of supply chains allowing for manufacturing to benefit from regional specialisation or comparative advantage. It has been suggested that sectors that produce and export sophisticated goods, such as consumer electronics, tend to have a higher foreign content (in terms of value added) than other sectors [51].

The emergence of the modern container industry arguably owes its existence to the collapse of the tanker ship building sector following the oil crisis of the 1970s [4]. To compensate for the reduced tanker ship demand, shipbuilders began offering more favourable terms for new containerships which traditionally were more expensive given the intensive use of steel and labour in the construction. This was significant in that it allowed for the entry of companies which were later to play a major role (such as Maersk) as well as making larger, cellular containers more affordable [52].

The growth of containerisation is inextricably linked to both port terminal and inland infrastructure. Key US policy changes in the 1980 eased the extent to which containers could be transported by rail or by trucks, including as back hauls [52]. This coincided with the expansion of the “just in time” manufacturing process in the US, thereby enhancing the predictability afforded by containerisation [53]. In particular in 1980s the development of the US land bridge (e.g. express container rail services) were seen as providing a crucial link between economic hubs in the US and those in Industrialising Asia, particularly when using the Panama Canal incurred considerable delays [54].

The growth in manufactured goods also reflects the greater trade liberalisation that intensified in the 1990’s with many industrialising East Asian countries continuing to enact policies favouring export led growth [55]. Increasingly complex feeder services were introduced to link the regional ports to key hub ports of Hong Kong, Singapore. Sequential currency appreciation in industrialised countries (e.g. Japan, Korea) incentivised the outsourcing of labour intensive manufacturing processes to nearby regions with lower labour costs, many of which replicated the process [56]. For example Japan reconfigured it’s manufacturing sector during the 1990's by establishing production processes in other countries, mainly China and ASEAN countries, from where, in-turn, exports were shipped to established trade partners in Europe and North America [57]. Between 1995 and 2000 the transpacific container trade grew by 78 and 58% for eastbound and westbound container trade respectively, whilst inter-Asian trade increase by 53% [58] (See Figure 3). The construction of substantial ports in China, Thailand etc. during the 1990s was perceived as an investment in globalization [52].

Figure 3 about here.

5.0 Discussion

Perhaps the most fundamental challenges faced by econometric assays of the relationship between trade and other elements such as openness, growth, etc., is the issue of multi-colinearity, an existing degree of linear dependence between variables. This is elucidated by stating that as trade policy and (crucially) its outcomes, are likely highly correlated with additional facets of growth, it is difficult to determine what really matters [19]. Indeed [30] argues that a wider interpretation of such analyses suggests that trade is best viewed as a proxy for a number of bilateral interactions and phases of economic integration that are susceptible to different factors such as investment, and information exchange etc. Some of the issues raised in the above case studies, are summarised in Table 2 along with related factors which are suggested by the case studies to impact on how such drivers (or indeed barriers) are manifested.

Insert Table 2 here

5.1 The relevance of case studies

The presented case studies should not be interpreted as invalidating or contradicting the determinants presented earlier in this paper, and whilst specific examples arguably provide little

generalizable insight, they do however contextualise how these factors which have been manifested in these instances.

One of the issues illustrated by the above case studies, is the potential impact of policies outside the trade sphere. For example policies in the US in the 1950s leading to suburban housing, infrastructure and increased car ownership have been identified as contributing to the demand for oil in later decades, as domestic production could not keep pace with demand.

Furthermore a historical focus can distinguish some of the specific inter-relationships between trade and non-trade policies [14]. In the 1960s European regionalisation allowed oil transport and refining infrastructure to be planned across national boundaries and enabled crude oil to be transported in large quantities, which accentuated the economic competitiveness of cheap oil from the Middle East. What has been highlighted is the potential impact of policies which enhance or diminish personal purchasing power (such as credit availability, mortgage underwriting) or control the extent to which global price fluctuations are passed on the domestic/consumer market. For example the (de)regulation of the US domestic oil sector strongly influenced the relationship between levels of domestic production, global oil prices and the competitive advantage of externally sourced oil.

The second case study demonstrates how both government and industry policy sought to be proactive in mitigating the challenges posed by future supply constraints, commodity costs, and distance and in doing so distort the distinction between supply and demand. Government support (e.g. deferred trade liberalization) and industrial rationalisation in the 1960's allowed industrial capacity to be established and (subsequently) compete internationally. Concurrently government encouragement for steel firms to invest in the ship building industry enabled the common interests of the Japanese steel, shipping and shipbuilding sectors (all dependent on imported material) to be protected from wider market fluctuations. In this instance the ability of industrial and government policy to identify and capitalise upon co-benefits is important. The capacity to build larger and more robust vessels or vessels suited to triangular routing would not be possible without securing a supply of ore and coal.

Arguably the growth of containerisation represents a clearer indication of the impact of time and distance as the initial motivation for its growth was the uptake of just-in-time process configuration which made time a significant decision in the sourcing of material. A range of policy and macro-economic factors (currency, trade liberalisation) incentivised the extension of different segments of the manufacturing supply chain across "Factory Asia." This would not have been possible without adequate infrastructure, in particular the establishment of infrastructure which supported a "hub and spoke" configuration of trade, linking smaller ports to the larger ports which serve the deep sea markets.

Of greater value in reviewing the historical case studies is that they contextualise the difficulty in conclusively generalising the factors which drive or impede trade. It is impossible to divorce the decisions which impact trade from the time and region where they made. For example the first oil crisis demonstrates how diverse importing regions made different choices in response to similar constraints. The US sought to secure short term sourcing of fuel, increased imports and (in a relatively short time frame) returned to a high dependency on the Middle-East, while European importers effectively reduced import dependency through focusing on energy efficiency as well as domestic production. This is key as both regions collectively represented a significant proportion of

the global oil trade prior to the crisis. Both these examples, as well as the bulk/supply strategy adopted by Japan demonstrate how similar motivations (in this case security of supply) can manifest in very different policies and trade practices. This will reflect not just economic differences but also differences in geography, such as the domestic availability of resources.

6.0 Conclusion

Despite significant advances in terms of the methods applied, establishing the linkages between trade, its consequences and determinants, remains a difficult prospect. Critics of established econometric studies are quick to reinforce that this is a response to the complexity of the problem, particularly in relation to the issue of multiple variables impacting upon each other. A number of different high level drivers (or indeed barriers) have been identified in the literature but the context in which they may interact is often unclear. By presenting 3 different case studies this paper does not seek to invalidate such factors but rather present some contextualisation for how different policy, economic or geographical factors may manifest in changes in trade patterns. These case studies, particularly when viewed as part of a narrative, demonstrate how non-trade policies can impact upon the eventual demand for a commodity. However such interactions can often depend on wider fluctuations in commodity prices or economic growth. At the risk of simplification, three broad observations can be made.

Firstly, distinct trading regions may react differently to similar circumstances, as seen in different responses to the first oil crisis. Secondly, policies which can influence both supply and demand for a commodity can have a significant impact on established patterns of trade as seen in the cooperation that allowed the Japanese steel-ship nexus. Finally apparently isolated elements can (with the benefit of hindsight) prove to be connected, such as the role of the oil crisis in enabling larger, cellular container ships and new companies to enter the market. Whilst accepting the difficulty in proving counterfactuals (i.e. it cannot be proved that similar outcomes would not emerge from different circumstances), the use of such limited narratives reaffirm that the concept of derived demand cannot be viewed as static and it is difficult to decouple the choice of where, when or how a commodity is traded from why it is traded in the first instance.

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Table 1: Factors which may act as a barrier or a driver for trade. Based on literature sources.

Name	Examples	Comment
Trade Policy Relevance		
Trade liberalization	Easing of tariffs, quantitative restrictions or quotas, etc.	Contested topic, significant econometric work suggested it is beneficial but these have been questioned.
Regionalization	Establishment of trade area, custom union or common market	Seen by some as way to circumvent trade liberalization.
Protectionism	Explicit measures which limit the effects of competition such as sector specific subsidies.	Most relevant for agricultural commodities. Critics argue it has led to surplus stock and trade disputes.
Embargos	Explicit injunctions against trading with specified partners.	Comparatively rare but can have significant consequences.
Foreign Aid	Direct subsidies to producers in developing nations.	Concerns over the extent to which trade can be tied.
Economic Development		
Economic Growth/income growth and convergence	Increased economic activity, disposable income.	Generally not contested in broad terms but specifics can vary. Income convergence normally associated with growth of manufactured goods.
Foreign Direct Investment	Directly investing in companies based internationally.	Often dependent on additional macro-economic factors.
Import substitution/export promotion	Extent to which domestic industries are sheltered from wider competition.	Close overlap with wider issues of protectionism and trade liberalisation.
Costs differential	Ability to offer comparative advantages in product or labour costs.	Likely to be influenced by stage in industrial development as wages improve and currency strengthens.
Institutions	The presence of stable political and regulatory structures which inform policy and gather information.	Institutions seen as important mediators between national and international institutions and facilitators of inter sectorial cooperation.
Other issues		
Infrastructure	The extent of cargo handling	The existence of bottlenecks can impede

	capacity at ports or the quality of transit routes.	trade or reduce additional competitive advantages.
Distance	Increasing distance seen as an impediment to trade	Some disagreement amongst commentators and the affect likely to be commodity dependent.
Time	Shippers willing to pay for more timely transit.	Does interact with modal choice and issues of distance and transport costs.
Transport costs	The various costs associated with movement of freight including fuel, insurance etc.	Reflects impact of both technological improvements but also associated fuel costs such as fuel.
Sea border	Direct access to seaborne trade	Lack of sea border increases the importance of inland infrastructure and permeable borders.

Table 2 Supplementary factors which may influence trade, based on historical case studies.

Name	Comment	linkages
Trade Policy Relevance		
Security of Supply	Political motivations to ensure specific sectorial demands are met, including stockpiling. Can result in contrasting trade practices and increase or decreases in trade.	Import dependency, efficiency measures, economic growth.
Import dependency	Increased self-sufficiency through reduction in imports or increases in domestic production. May not result in an absolute trade reduction.	Security of supply, commodity price, distance.
Economic measures and policies		
Efficiency measures or environmental policies	Dedicated measures to reduce material or energy inputs for key industries, or reduce their environmental impact.	Commodity price, regionalisation, security of supply, regionalisation
Personal purchasing power	Range of options which enhance the ability of individuals to acquire goods and services for example enhanced credit availability.	Income growth and convergence, transport costs
Currency appreciation	Increasing the value of a currency incentivises outsourcing of labour intensive supply chain segments.	Income growth, FDI, Trade liberalization
Sectorial (de)regulation	Broad category reflecting the establishment or relaxing the specific rules which govern individual sectors such as pricing structures, or the movement of material and capital between sectors.	Dependent on context can link to issues of price, trade liberalization and domestic production.
Substitutability	The commodities which have the capacity to be substituted to provide the same service. This can influence the extent to which domestic commodities can compete with imports.	Domestic production, commodity costs, industrial rationalisation.
Inter-sectorial investment	Policies which incentivise related sectors investing in each other in order to mitigate risks or mitigate costs.	Distance, transport costs, commodity costs, sectorial regulation.
Other issues		
Freight Policy/regulation	The rules which determine how freight is moved particularly inter/intra modal linkages.	Distance, transport costs, commodity costs, regulation

Infrastructure investment	Investment in both ends of the supply chain as well as the linkages between manufacturing centres and transport hubs. Includes port expansion/development.	Freight policy, distance, transport costs, commodity costs, regulation, industrial rationalisation, regionalisation, trade liberalization, domestic production.
Industrial rationalisation	Modernisation of industrial processes to incorporate additional technologies and relocation of manufacturing centres to integrate with transport hubs.	Freight policy, distance, transport costs, commodity costs, infrastructure investment.
Domestic production	The domestic production of commodities and the extent to which domestic production can satisfy overall demand.	Security of supply, commodity price, distance, import dependency, substitutability.

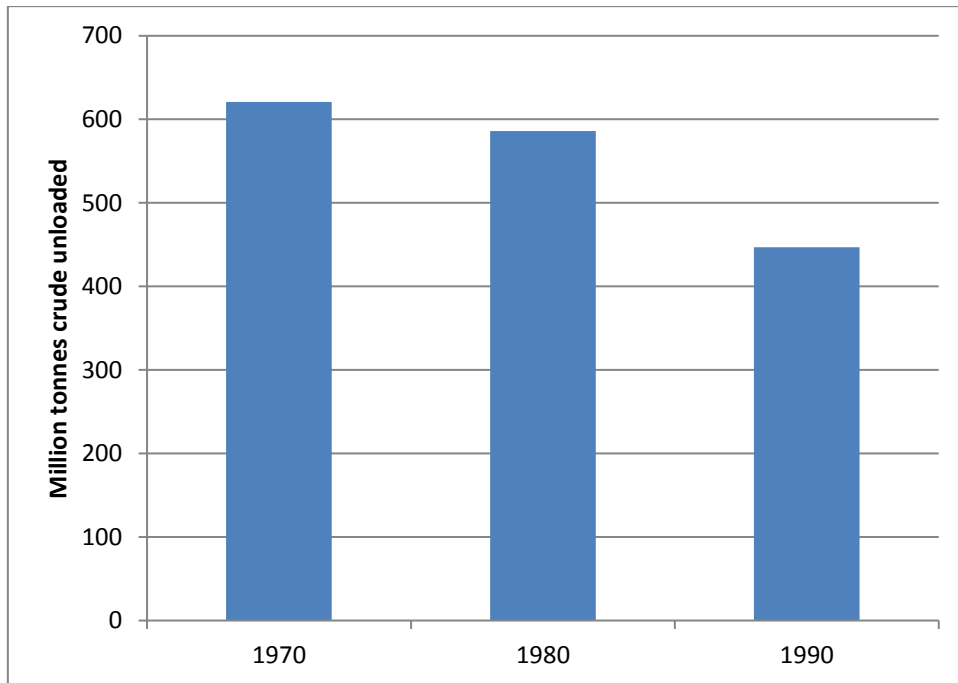


Figure 1: Crude oil (Mt) unloaded in developed European market economies taken from [8].

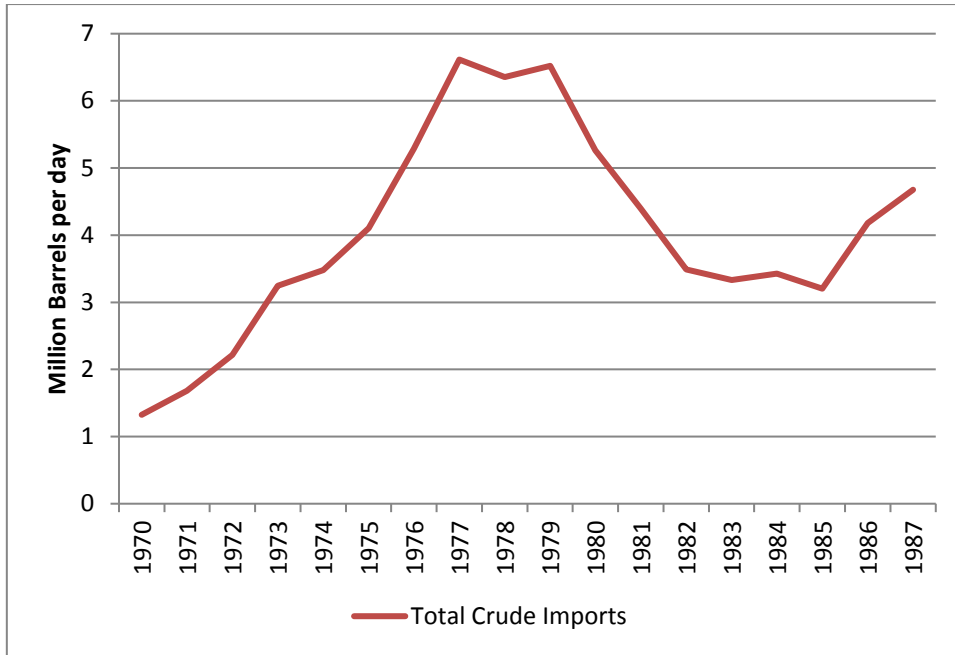


Figure 2: Total US crude imports (million barrels per day) 1970-1977, taken from [44].

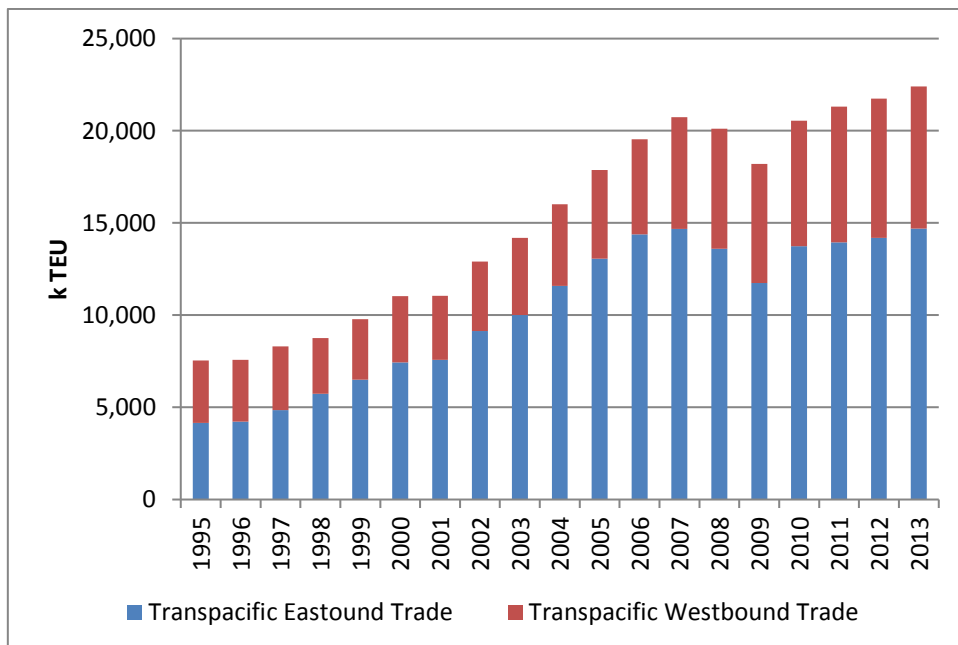


Figure 3: Transpacific trade in twenty foot equivalent (TEU) container units 1995-2012 taken from [58].