

The value chain is a concept that could provide a meeting ground for economics, business administration and industrial sociology in the study of one important aspect of globalisation, namely the simultaneous economic integration of countries and disintegration of production processes.<sup>1</sup> Most research on value chains so far has been done by non-economists. This note, by contrast, looks at value chains from the perspective of economics.<sup>2</sup> It starts by reviewing what economists can learn from other disciplines and then considers what economics may have to offer to other disciplines, both in understanding value chains and in formulating policies to spread the gains from globalisation.

Three important things that economists should learn from the research of other scholars on value chains are:

- To look beyond manufacturing, mining and agriculture into the other sectors and stages of activity involved in the supply of goods to consumers. Economists of course know that other sectors exist, and pay increasing attention to, for example, research and development (R&D) and trade in services, but they have probably not paid enough attention to distribution and marketing, whose cost often accounts for a larger share of the final price of a good than the costs of its manufacture.
- To examine flows of information as well as of objects between the stages of activity in the supply chain, and to pay attention to non-arms-length linkages between the firms involved. Economists tend to see coordination as costlessly achieved by anonymous markets, whereas in reality complex international supply chains need active management, involving skills and knowledge that are scarce and command large financial rewards.
- To treat the characteristics of goods, production technology and the market at each stage of the chain as endogenously determined rather than exogenously given. Economists tend to view firms (and countries) as optimising subject to the constraints imposed by fixed markets, products and technologies, whereas the main strategic aim of most businessmen is apparently

# Value Chains

## *An Economist's Perspective*

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to improve their markets, products and technologies.

What economics may have to add to the contribution of other disciplines in the study of value chains can be considered under two broad headings: accounting and causation.

## 1 Accounting

Value chains are related to input–output tables. In principle, with such tables for all countries in the world, a ‘value chain’ could be calculated for each final good sold in each country. This would be an exhaustive decomposition of its price into the value added in each of the sectors and countries that had contributed, directly or indirectly, to its supply (value added being the sum of wages, profits and natural resource rents).<sup>3</sup> The list of sectors and countries in most such chains would be very long and many of the items on it very small, for example the value added in the electric power sector of the country in which a minor agricultural raw material was produced. For most goods and most countries, moreover, only a small share of value would be added outside the country in which the final good was supplied.

It might well be argued that most such accounting decompositions are not value chains in the relevant sense (even disregarding all items which account for less than, say, 1 per cent of the final price). In particular, it might be argued that the concept of a value chain should be limited to the subset of accounting chains within which there is some overt coordination among the activities at different stages of the chain – some form of ‘governance’, whether by a single dominant firm or by a coalition or network of firms. This would mean excluding all the accounting chains in which the relationships between stages consisted simply of arms-length buying and selling in competitive markets.

Nonetheless, it seems helpful to place value chains more narrowly conceived in the context of a complete (albeit hypothetical) accounting decomposition of the value of all products among sectors and countries, precisely because it obliges attention to be given to the definition and scope of value chains. Thus, for example, since all

accounting chains are mixtures, to some degree, of overt control and transactions in anonymous markets, it leads us to ask how much governance and of what sort (e.g. must it cross national boundaries?) is required for part or all of an accounting chain to be classified as a value chain. It also reminds us that, even with the narrower definition, there are a huge number of value chains – far too many for all of them to be studied individually. It reveals relationships between chains: that two or more chains may be competing for the same raw material or the same customers. And it leads us naturally to ask how large a share of world production is now (or in the future likely to be) within value chains, and to relate value chains to other forms of economic activity.

A rather different sort of accounting is helpful, indeed essential, for linking the focus of most analyses of value chains, namely firms, to the subject of principal interest to those concerned with policy, namely people. In other words, policymakers are concerned to spread the gains from globalisation among people and households, with the outcomes for firms being of only incidental or instrumental interest. A step in this direction is to split the value added in each firm between profits and wages, and to split the wage bill into wage rates and employment of workers of varying levels of skill. A simple accounting decomposition of this sort, assuming only two skill categories of worker, would be:

$$V/N = v = rk + s.w_s + (1 - s)w_u$$

This divides the firm’s value added,  $V$  (the value of sales or output less the cost of materials), by the number of workers it employs,  $N$ , to obtain its value added per worker,  $v$ . This is then expressed as the sum of profits per worker (capital per worker,  $k$ , times the rate of profit on capital,  $r$ ) and wages per worker, the latter being a weighted average of the skilled wage rate,  $w_s$ , and the unskilled wage rate,  $w_u$ , in which the weights are the shares of skilled workers,  $s$ , and unskilled workers,  $(1 - s)$ , in the firm’s employment,  $N$ . What policymakers particularly care about are the levels of  $w_s$  and  $w_u$  (and perhaps the difference between them), and the levels of employment of both skilled workers,  $sN$ , and unskilled workers,  $(1 - s)N$ . It is clear from the equation that these variables of interest to policymakers cannot immediately be inferred from

the value added of a firm, either in total ( $V$ ) or per worker ( $v$ ).

The interest of policy-makers in the levels of  $w_S$  and  $w_U$  depends also, of course, on the level of the prices of consumer goods in the country concerned, which determines the purchasing power of (or living standard achievable with) a given money wage rate. It is thus important in value-chain analysis to recognise that price levels vary greatly between countries, being in general higher in countries where wages are higher (since labour accounts for most of the cost of non-traded goods and services).<sup>4</sup> Wage rates therefore vary less among countries in real terms than in money terms (when converted into, say, US dollars at the official exchange rate). The smallness of the shares of developing countries in most value chains, as compared with the large shares of developed countries, is thus misleading in terms of the distribution of the real gains from involvement in these chains.

At the same time, however, it would be a serious mistake in value-chain analysis to lose sight of money wages, which are what firms care about and what their decisions depend on. In particular, the choices of transnational firms or networks of firms about where to locate each stage of the supply chain depend on the 'dollar wages' of countries, not on their real wages. It is thus necessary in value-chain analysis to consider both sorts of wages, and to be aware of possible changes in the relationship between them – which depends on how official exchange rates move in relation to 'purchasing power parity' rates, both in the short term, as a result of, say, volatile capital flows, and in the long term (successful development causes a country's exchange rate to appreciate, so that its dollar wages rise by more than its real wages).

## 2 Causation

Various causal questions can be asked about value chains. The most obvious to an economist is probably 'what determines the allocation and remuneration of activities among countries within chains?' The obviousness of this question is a result of much of the economic theory of international trade being addressed to a similar question, though without reference to value chains, and having a

well-developed answer to it, which in short is 'comparative advantage, reciprocal demand, and transport costs'. The first of these three principles determines which countries export which goods, the second determines the terms of trade between them and the third limits the economically optimal degree of specialisation through trade.

Two economic theories of what determines comparative advantage are of obvious relevance to value chains. One stresses differences among countries in resource supplies – for example, that raw materials come from countries with suitable land and that labour-intensive stages of production tend to be located in countries with low wages. The other stresses differences in technology – that countries tend to specialise in activities about which their inhabitants are especially knowledgeable. These two theories make extreme and opposite assumptions about international diffusion of technical knowledge, the former supposing knowledge to be freely available everywhere, the latter that particular bits of knowledge are locked up in particular countries.<sup>5</sup> An intermediate position that seems even more relevant to value chains would be that knowledge can move from one country to another, but only at a price (e.g. payment of royalties – explicit or implicit in transfer prices – or of the salaries of foreign experts). This approach has been neglected by economists (but see Markusen 1997; Wood 2000).

It might reasonably be objected that the standard economic analysis of trade misses important issues in value chains by assuming that all transactions are made at prices set by competitive and anonymous markets, whereas in reality many prices are set in direct negotiation between firms at different stages of the chain, who are tied to one another by long-term contracts (and sometimes by common ownership). However, economic models of bargaining suggest that negotiated prices usually fall within bands set by the forces which would determine prices in competitive markets. Bargaining models also help to understand where, within such a band, the actual price is likely to be established – the key determinant being the relative quality of the fall-back options of the bargaining parties in the event of a breakdown of the negotiations. Potential competition between alternative buyers and alternative sellers thus

continues to play an important role, even in what appear to be non-competitive markets.

Another question about value chains is why some countries are involved in so many of them, while other countries (particularly developing countries) are involved in so few. Economics has two answers to offer. One concerns transport costs and other barriers to trade (including not only tariffs and quotas but also basic considerations such as language, laws, finance and personal security): countries where these barriers are high, for whatever reason, will tend to be less involved in all sorts of international trade, including trade within value chains. This answer has clear and conventional implications for policy. The other answer is externalities and economies of clustering: the more chains a country is already involved in, the easier is it to become involved in additional chains, because there are economies of scale in the supply of infrastructure, skilled labour, support services and information. This answer has different implications for policy, favouring more active intervention to attract and retain internationally footloose activities of sorts in which a country has a potential comparative advantage.

A central focus and policy aim of much recent value-chain work is the *upgrading* of firms in developing countries. This approach raises several questions which invite economic analysis.

One concerns the consequences of the upgrading of firms for the well-being of people, which returns to an issue raised earlier in this note. To upgrade a particular firm in a particular sector of one country would increase its profitability, but would be unlikely to raise the wages of its workers, since these are determined in the entire labour market of which the firm is a small part. If the upgrading enabled the firm to enlarge its share of the market for its output, its level of employment would rise, unless the gain in market share was achieved mainly by an increase in labour productivity. However, to the extent that its gain in market share was achieved at the expense of other firms in the same sector of that country, employment in the sector would rise by less than employment in the firm concerned. People are thus more likely to gain from upgrading when it involves most or all of the firms in a sector or a country – an unsurprising

conclusion, but one which is important in setting policy priorities. In particular, it means that efforts to reduce obstacles to upgrading which are common to most firms should usually get more emphasis than efforts to upgrade specific firms or specific sectors.

Widespread upgrading of firms in a country would usually raise the wages of all categories of workers, but the gains would not necessarily be concentrated on the poorest. If the upgraded sectors employed a relatively high proportion of skilled workers, or if the upgrading of firms within sectors required more skilled workers to be hired, then the wages of unskilled workers would rise by less than those of skilled workers (and might even fall absolutely). Unskilled workers would gain most if upgrading was concentrated on sectors of low skill intensity and did not reduce unskilled employment, absolutely or relatively – for example, introducing new or improved labour-intensive products. However, many sorts of upgrading do not have these characteristics. In the long term, moreover, the developmental benefits of greater demand for skilled workers, by strengthening incentives to provide and acquire skills, might outweigh the short-term disadvantages of increased wage inequality.

Whether and how governments should assist the upgrading of firms in developing countries are crucial questions to which the sceptical and grudging answers of economists deserve to be heard, especially because financial and administrative resources are scarce and because firms have obvious private motives for getting government money. The presumption of economists is not to intervene, on the principle that firms themselves will take care of their upgrading if (and to the extent that) it is economically worthwhile. To override this presumption, it is necessary to establish two things. First, that there is a 'market failure' of some sort – a lack of finance or information, say, that makes it unprofitable to introduce a socially desirable innovation. Second, that the benefits of intervention to correct this failure exceed the costs – and that the proposed method of intervention is the best of the possible alternatives.

Some proposals for government or external donor intervention to assist firm upgrading would pass

both these tests, but others – perhaps the majority – would fail one or other of them. I should emphasise that many of the proposals that have emerged from research in this area are in fact for low-cost interventions to correct market failures, for example by setting and monitoring quality standards, or by spreading information and improving coordination through business associations. My concern is simply that the phrase ‘assisting firm upgrading’ could be misconstrued by governments, donors and firms as an exhortation, for example, to spend public money on modern equipment for particular firms or to restrict competition. It needs to be made clear that this is not the intention.

## Notes

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1. Adapting the title of Feenstra (1998).
2. Several economists have recently analysed the growth of North–South Intra-industry trade: Deardorff (1998a, b); Feenstra (1998); Hummels *et al.* (1998); Yeats (1998). However, they rarely use the label ‘value chain’, but refer instead to ‘fragmentation’ (Deardorff), ‘outsourcing’ (Feenstra), ‘vertical specialisation’ (Yeats), and ‘production sharing’ (Hummels). There is also a long tradition of economic analysis of issues relevant to value chains in the context of North–South trade in primary products (e.g. Singer 1950; Girvan 1987).
3. This concept of ‘value added’, incidentally, is rather different from what businessmen usually mean by ‘adding value’. In practice, statistical sectors are aggregations of many products: thus many supply chains, rather than just one, would start in each final output sector; and some transactions between stages of the supply chain would be hidden within sectors (e.g. spinning and weaving are often aggregated into the textiles sector).
4. See for example the discussion in Kravis *et al.* (1982).
5. It is sectoral unevenness of technology that matters for comparative advantage and trade. If the technology of one country were uniformly superior to that of another country, its real wages would be higher, but it would have no special advantage in any particular sector.

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