Integrative Trade: Issues for Trade Analysis, Statistics and Policy

Christopher Maule*

On December 6, 2006, the Centre for Trade Policy and Law at Carleton University organized a conference on the theme "Integrative Trade between Canada and the United States—Policy Implications". The discussion was structured around three main papers, which constitute the next three chapters of this volume:

- *Timothy Sturgeon, "*Conceptualizing Integrative Trade: The Global Value Chains Framework*", which provides an overview of the state of development of multi-disciplinary research on the evolution of global value chains;*
- *Art Ridgeway, "*Data Issues on Integrative Trade between Canada and the US: Measurement Issues for Supply Chains*", which examines the issues posed for statistical agencies in grappling with the changing international industrial landscape; and*
- *Michael Hart and William Dymond, "*Trade Theory, Trade Policy, and Cross-Border Integration*", which examined the implications of these developments for the trade policy community.*

This note sets out the background which motivated the organization of the conference and describes some of the concepts which shaped the discussions.

* Professor Emeritus, Department of Economics; c.maule@rogers.com.
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Introduction

International commerce is being re-shaped by the fragmentation of the production process—the splitting up of the stages of production and locating them in different places in the global economy—and the resulting expansion of trade in intermediate goods and services and inward and outward investment. Glen Hodgson refers to this as integrative trade [1]

In discussing integrative trade, new terms have entered the lexicon of industry studies, such as outsourcing, offshoring and supply chain management. Previously, the concepts of just-in-time production and total quality management were introduced to the analysis of industries. Do these new terms point to new phenomena or do they simply represent new labels for familiar activities? What implications does integrative trade have for the statistical agencies charged with measuring international commerce? And what issues do these developments raise for the conduct of trade policy?

To set up the discussion of these issues in the next three Chapters, this note describes some of the terms which have come into increasingly general use in discussing modern international commerce, looks at how different disciplines address the ways in which industries are organized to see if they throw light on policy issues, and notes some of the issues associated with data sources and what further research might be needed.

Some Terminology

Outsourcing and Offshoring

In public discussion, outsourcing refers to situations where firms purchase inputs from other firms as opposed to producing the inputs themselves. It is further refined to distinguish between outsourcing that takes place at home and abroad. Foreign

[1] Glen Hodgson, "Trade in Evolution: the Emergence of Integrative Trade," EDC Economics, March 2004, p. 5. See also Hodgson, "Integrative Trade and the Canadian Experience," EDC Economics, May 2004, both accessed at www.edc.ca. Other references to concepts surrounding integrative trade are found in the conference papers.

outsourcing is referred to as offshoring. A further distinction is made between outsourcing from a plant owned by the firm making the purchase or from an independent firm. Thus there are four possible cases:

1. Firm in Country A purchases from one of its plants in A
2. Firm in A purchases from an independent firm in A
3. Firm in A purchases from one of its plants in Country B
4. Firm in A purchases from an independent firm in B

All four cases involve some degree of outsourcing but only Cases 3 and 4 are offshoring. Cases 1 and 3 involve intra-firm transactions and transfer pricing but only in Case 3 does transfer pricing involve international trade. Case 4 involves trade but not transfer pricing since the transaction is arms-length between buyer and seller.

In business terms, outsourcing is part of the ongoing evaluation that a firm's management makes about whether to make or buy inputs when determining the most cost efficient way to organise production. As conditions change in different markets including changes in technology the make-versus-buy decision is reviewed.

As examples, offshoring in manufacturing takes place when a Canadian shoe retailer purchases shoes made either by its subsidiary plant in India, or by an Indian owned manufacturer. In the resource sector, Alcan supplies its Canadian smelters with bauxite and alumina from abroad, either from its own plants or from independent suppliers. It has no option to offshoring for these inputs as there are no commercial deposits of bauxite in Canada, but what Canada has is the energy needed to convert alumina into ingot.

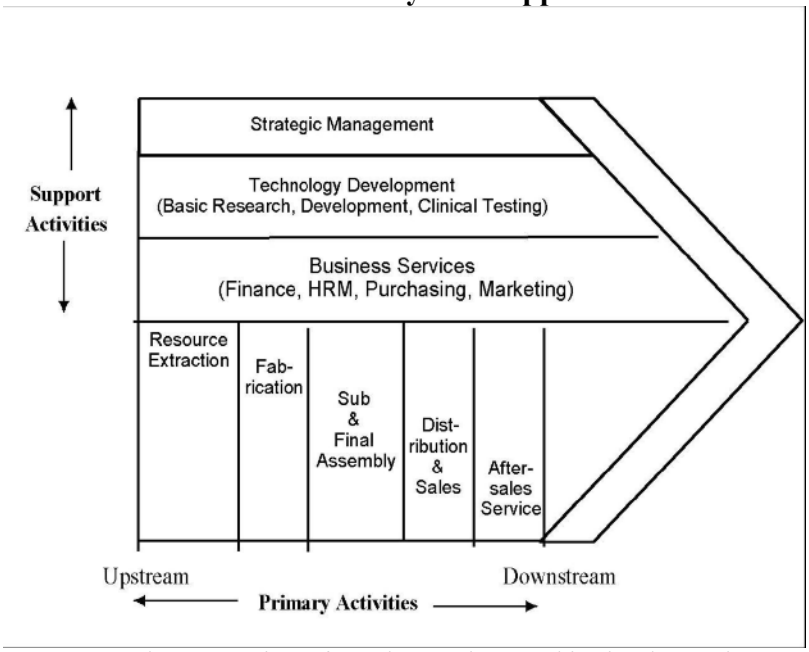
Offshoring in the service sector has received much of the public attention to date, in part because information technology has made it easier for firms to contract out for service activities abroad that were previously performed at home. Thus North American firms locate call centres, software programming activities and finance and accounting functions in countries such as India and the Caribbean. Technology has made it possible for many service activities to be much more footloose.

Public debate has focused on the employment impact of offshoring which represents only a part of the economic impact. There is nothing new about the general process of offshoring except that technological change now means that it affects a different and wider set of firm functions. In the past textile jobs migrated from North America to Asia due to lower costs in Asia, today accounting and programming jobs are migrating out due to lower costs made possible by technological change. In resource-based activities, such as agriculture and minerals, the extent of outsourcing depends on where the raw material and its final market are geographically located. The statement by Greg Mankiw that "services offshoring is just another form of trade," reflects the situation that technology now allows offshoring for a new set of activities affecting different occupations than was previously the case for offshoring manufacturing and resource activities.

Supply Chains

Supply chains describe the stages of production organized by firms to manage its operations. Managers purchase inputs which are then converted through value-added stages of the production process into outputs for sale to other firms as intermediate goods or to final consumers as end products. For example, steel firms have a supply chain of inputs that leads to the production of steel for sale as intermediate goods to automotive and other firms. Automotive firms purchase steel and other inputs for manufacture and assembly of cars for sale to final consumers. Part of manufacturing production involves tangible goods but production also requires service activities such as R and D, design, planning, finance, advertising, labour relations, transportation, and storage. Each of the required inputs of goods and services can be subjected to the make-versus-buy supply chain decision that can influence whether or not it is outsourced and if outsourced whether it is off-shored. The stages of a typical firm's organization are shown in Diagram 1 (below) in terms of a firm's primary and support activities, each of which has the potential to be located in a particular place.

Diagram 1:
Value Chain of Firm's Primary and Support Activities



Source: L. Eden. Strategies Of North American Multinationals In The New Regionalism. At http://www.carleton.ca/ctpl/conferences/index.html#tradeinvest

The supply chain or the successive stages of production for a firm will vary by firm and industry. The stages are sometimes referred to as the value chain and thus use is made of such terms as supply chain management or value (sometimes value-added) chain management. In economic literature on industrial organization the term vertical integration is used to describe the supply chain. Vertical integration refers to the extent to which stages of the production process are contained within a firm. Thus supply chain and vertical integration refer to similar aspects of a firm and industry. In economics there is an extensive literature that discusses aspects of vertical integration, while supply chain management is often used in discussions of business policy.

Just-in-Time and Total Quality Management

Two other terms used in management literature, just-in-time (JIT) production and total quality management (TQM), relate to aspects of the supply chain. JIT refers to the way in which goods move from one stage to another in the production process. If the item produced at Stage 1 is required as an input at Stage 2 of the production process, then Stage 1 output can be produced and stored ready for use at Stage 2 in which case there are inventory costs between the stages. Alternatively, the output at Stage 1 can be produced just in time for use at Stage 2, thereby reducing inventory costs. But organizing production in this way may give rise to other costs. Suppose there is an interruption in the supply of Stage 1 output, then, with JIT production, Stage 2 has to cease operating as there is no inventory to call on. The reduced costs of holding inventory can be offset by the risk and costs associated with production stoppages. Interruption can occur for numerous reasons such as defective parts, the breakdown of machinery or the failure of deliveries to arrive. If these deliveries involve cross-border shipments then customs clearance must occur.

TQM refers to the idea that if there is 100% checking of inputs for quality in production processes then the stages of production will flow more smoothly, reducing or eliminating the need for inventories of parts at each stage in the process. TQM supports the functioning of JIT and reduces costs of operating and managing the supply chain. TQM may involve higher costs of monitoring product quality but can reduce inventory costs.

Technology and the Supply Chain

Along with economic and population growth, technology has had an impact on the worldwide growth of international trade in a number of ways especially relating to transportation and communications. Lower transportation costs have occurred in maritime shipping through containerization, in railways with the use of high speed and unit trains, in pipelines used for liquids and solids, and in air transportation with jumbo jets and Fedex-type overnight delivery services.

In communications, digitization means that information of all types (print, audio and video) can be coded as digital signals and shipped by wired and wireless means. Activities that were previously undertaken within or close to a manufacturing plant can now be done more cheaply at a distance. Call centres are located in India and the Caribbean for companies located in North America and Europe; clerical services for insurance and financial companies are dispersed around the world; software programming, consulting, accounting and other service activities are now more easily traded. The services segment of the labour force that previously was partly protected from foreign competition now, because of technology, faces competition from cheaper labour in other countries.

Activities that were once considered as being non-tradable are now traded. Examples of non-tradable activities include services like haircuts, restaurant meals and funeral parlours where the supplier and customer have to be in the same place, but even in these cases a customer in one country can travel to the supplier in another to receive the service. The supply of medical tourism is precisely this with the patient traveling to medical facilities in another country and is reflected in the GATS Mode 2 form of service supply. While some service items may be difficult to trade, most can be subject to some form of trade and technology increases the likelihood of trade.

Supply chain changes over time

The term Fordist production refers to the early organization of vertically integrated automotive firms, a format initially copied by Toyota and other Asian car manufacturers. With Fordism, the design of an automobile, manufacture of parts, assembly, sales, financing and promotion were all conducted by the same firm. It might have many departments and divisions by functions and products for its primary and support activities but these were coordinated domestically and internationally by a head office. Such a firm could become multinational with some functions and products undertaken abroad. Many firms in natural resource and manufacturing developed in this way.

The same Fordist vertical integration was the case initially for firms in many service industries such as banking, advertising and management consulting. Over time, as a result of changing costs conditions including the effects of trade barriers and policies affecting the ownership of foreign direct investment, the cross-border movement of persons and the licensing of technology, these vertically related structures became modified and the supply chain altered as ways were found to reduce costs.

At the other end of the Fordist spectrum are companies that own few assets. They design products, arrange for their manufacture by others and organize delivery of the products to customers who also receive post-sales service arranged by the company. Dell Computer is one example—see Box 1 below. It designs computers based on parts such as Intel manufactured processors, hard disk drives and flat screens produced and assembled elsewhere. Dell receives orders from customers that it transmits to its manufacturers who in turn order the components needed to assemble the computers. It then arranges for shipment and for the provision of call centres to support customers and provide for warranty service. Production and inventory management are activities that tie up capital and expose the company to financial risk as sales fluctuate. By performing only a few of the vertically related functions and merely coordinating the others, Dell reduces but does not eliminate its exposure to risk. It has few of the direct costs of production but it depends on the reliability of suppliers for the quality and timely delivery of their products. While some costs are reduced there exists the potential for others to increase. WalMart and Ikea are other examples of firms that follow this model for some of the products they sell to consumers. Kenney and Florida (2004) provide other industry examples of firm locational decisions.

Box 1: In 2005, a Dell laptop was designed in Texas and assembled in China. It had its keyboard made in China, the motherboard in Malaysia, the flat screen in South Korea, and the software was compiled in the US, India, Sweden and Russia. The product label stated "Made in China," although establishing nationality seems to be an arbitrary process (Gave, 2005:10)

In order for a more vertically disintegrated or fragmented approach to industrial organization to work, an efficient communications and transportation infrastructure is needed as well as the absence of government policies that impede the cross-border movement of trade in goods and services. There also has to be a level of trust between buyer and seller and confidence in the judicial system to settle fairly any disputes that arise.

These examples illustrate how technology permits different ways of producing, distributing and coordinating industrial activity, that is different ways of organizing an industry's supply chain. As change occurs, some goods and services disappear or diminish in importance such as the typewriter, black and white television set, and postal services, while others increase such as email communications and the transfer of digital files of audio, video and print materials. For example, copies of print encyclopaedias still exist but new ones are hard to buy, while online versions such as Wikipedia are competing with print versions. Each firm examines it supply chain to see how technology can be introduced to reduce costs and make the firm more competitive.

Offshoring and supply chain management is also related to policies affecting the movement of labour. If North American firms outsource clothing manufacture to Latin America and China because of lower labour costs, one alternative would be to import labour to North America to do the work. This happens and is reflected in the temporary work visas given to migrant workers in North America as well as the inflow of illegal workers; the estimated number of illegal workers in the US is currently 11 million. In some instances the configuration of the industry supply chain allows work to be sent to the workers as in the case of call centres, while in others the workers have to come to the work as in the case of harvesting agricultural products where mechanization may not provide as efficient an alternative.

Disciplinary Approaches to Industry Studies

Literature that examines changes in industrial organization can be found in economics, business administration, geography and sociology as well as in discussions of trade policy. Each disci-

pline has its reasons for making such a study and a particular framework and terminology for its analysis. Students of economics, business administration, geography, and sociology study industries, but through different lenses and for different reasons. Each examines a series of issues some of which are overlapping and some unique to the discipline's focus. One common denominator is industrial organization, but that term is used for different purposes. For example, economics stresses issues of competitiveness and efficiency, business administration the overall performance of firms, geography the location of production, and sociology issues such as industrial development and poverty alleviation. Before exploring these disciplinary differences, we outline what is meant by some frequently used terms.

Economics

The field of microeconomics contains the subfield of industrial organization that examines the way in which firms can be grouped into industries in order to assess the extent of competition and the consequences for society of competitive conditions, for example when markets exhibit different degrees of monopoly power with the ability to influence prices[2]. A main concern of economics is the efficiency of resource use. Its focus on market power is because less competitive markets are likely to result in a waste of resources from the viewpoint of society as a whole. Among the main factors considered in industry studies are:

- The importance of economies of scale influencing the extent of horizontal integration.
- The extent to which firms are vertically integrated thereby owning stages in the production process, for example in the oil industry the stages of exploration, production,

[2] Industrial organization in economics has two dimensions, the organization of firms within industries and markets which leads to a focus on competition, and the organization of the firms themselves by functions, by divisions and departments and as domestic and multinational firms. The two are related in that the efficiency with which a firm is organized will affect its ability to compete in a market.

transportation, refining and distribution of refined products for sale to final consumers.

- The degree of product differentiation examines whether a firm produces one type of product, such as small cars, or a range of products, such as small, medium and large cars, trucks and buses. The extent of competition with other producers can vary depending on the range of products produced by each producer. This dimension is also referred to as diversification, but diversification can be both by product and by regional location. Note, vertical integration can also be considered a form of diversification by stage of production as opposed to by end product. The concept of scope economies is used to help explain the extent of diversification within a firm.
- The ease with which new firms can enter a market where the firms may be either newly established or firms in another industry that diversify into a new industry; and the ease with which failing and other firms can leave the industry.

Industrial organization is not especially concerned with where a firm locates the various stages of its production process, an interest that falls more within the economic fields of international trade and investment. A combination of cost factors associated with the above four sets of economic conditions and the effect of political boundaries will be major influences on where activities are located geographically.

Note that economics distinguishes between an industry and a market—see Box 2. The cement industry in Canada may be represented in all regions of the country but it consists of separate markets. For example, for reasons of transportation costs, cement producers in Atlantic Canada and British Columbia will find it difficult to compete in each other's markets. This is an example where scale economies in production may be offset by freight costs of reaching consumers leading to more and smaller plants than might exist in a market with higher population density. Distance becomes an important factor in how a firm organizes its activities.

Box 2 : A market refers to a situation where producers of like products (goods and services) compete for sales to a common group of buyers. An industry includes all producers of like products regardless of whether they sell to the same customers. The restaurant and hairdressing industries have numerous producers nationally and internationally but each is made up of many markets where a supplier competes for customers with a limited number of other suppliers in a geographic space. At the other extreme, the segment of the software industry that provides operating systems for computers has only a few producers, Microsoft being the principal one, that supply customers in all parts of the world. Here the industry tends to coincide more closely with the market unless government policy creates some barrier to trade. With the imposition of tariffs, producers tend to locate production behind the barrier thereby fragmenting the organization of production that would occur in the absence of a tariff.

In industrial organization studies, the concept of the miniature replica effect refers to situations where one or more stages in the production process, for example manufacture and assembly in the case of automobiles, is divided between geographic locations because barriers such as tariffs may prevent concentrating production in one place and the attainment of scale economies. With the lowering of tariffs assembly can often occur in fewer places with trade as opposed to foreign investment servicing different markets. Trade associated with outsourcing focuses on production of each stage of the industry's supply chain with each concentrated in a certain location (for example shirt manufacture in China) and then shipment to the next stage. Outsourcing may permit scale economies in the production of each stage of the supply chain but depends on domestic and/or international trade to connect with the other stages. Outsourcing is a way of overcoming the inefficiencies due to the miniature replica effect but can only occur if there are no artificial barriers to trade.

Business Studies

Faculties of business share many interests with economics but business studies focus more on factors concerned with managing the firm, thus they offer courses on topics such as production, finance, marketing, strategic planning, organizational behaviour, and advertising and promotion. Their interest is in the factors leading to firm success measured in terms of return on investment regardless of whether this is associated with competitive or monopolistic market conditions.

Discussion of strategic and tactical decision-making and planning is an important concern of business studies and leads to examination of the organizational structure of the firm in terms of factors such as make-versus-buy, outsourcing, offshoring and the extent of vertical integration and diversification. All these terms relate to the idea of supply management.

Geography

In contrast with the concerns of economics on questions of efficiency and competitiveness, and of business studies with reasons for firm performance, geographers are often more interested in explaining the location of industrial activities. They look at the same set of activities but with a different focus. The economics of agglomeration is used to explain why particular industries cluster in certain areas, for example film and television production in Hollywood and Mumbai, financial services in London, New York and Tokyo, hard disk drive assembly in Singapore, semiconductors in Silicon Valley, and the manufacture of clothing in China and Mexico.

The location of natural resource and agricultural production are strongly influenced by resource endowment and climate, but manufacturing and service activities often require a different explanation. Any country (location) could have a film industry, and many do, but production tends to be concentrated in certain places. The US, India, Egypt, Hong Kong and Nigeria are examples of locations where a significant amount of film production occurs, but the technology required to make films is widely available.

Geographers look at the process of agglomeration or the benefits of grouping similar or related activities in the same location. Film production requires a wide range of support activities such as sets, props, carpenters, technicians, costumes, hair dressers and makeup persons, stunt performers, animals, scenery, composers, and musicians, in addition to producers, directors and performers. Once production in a location reaches a critical size these inputs are attracted to the production site and become available for a number of film companies. The

benefits of locating in one place provide reasons for the structure of industry organization that occurs. The contribution of geography to explaining industry organization is similar and complementary to the approach taken by economics.

Like other disciplines, geographers focus on the supply chain or the vertically related stages of an industry's production process but with emphasis on where each of these stages is located, as opposed to the economist's concern, for example, with efficiency and competitiveness. The concepts of vertical integration and supply chain are similar if not identical although they tend to be used for different purposes by the different disciplines.

Sociology

Work by Garry Gereffi and others have focused on the organization of industries (Gereffi, 2005:79)

> "…the starting point for understanding the changing nature of international trade and industrial organization is contained in the notion of a value chain, as developed by international business scholars who have focused on the strategies of both firms and countries in the global economy. In its most basic form, a value-added chain is 'the process by which technology is combined with material and labour inputs, and then processed inputs are assembled, marketed, and distributed. A single firm may consist of only one link in this process, or it may be extensively vertically integrated…'(Kogut, 1985:15).

Concepts used in this analysis that overlap with other disciplines are the significance of transaction costs, the vertical disintegration of multinational corporations, core competencies of firms, the growing international trade in components and intermediate products as opposed to final goods and services, information flows and the variation in value chain governance from markets to hierarchies.

In contrast to the efficiency concerns of economists and the locational interests of geographers, sociologists have emphasized factors that affect "... not only the fortunes of firms and the structure of industries, but also how and why countries ad-

vance—or fail to advance—in the global economy." Their interest is in crafting "…effective policy tools related to industrial upgrading, economic development, employment creation, and poverty alleviation. (Gereffi, 2005: 79). The aim is to explain how particular industries can assist in a country's economic development. The extent to which stages in a production process can be located regionally provide opportunities for the dispersion of production in different parts of the world and to countries at different stages of economic development.

Other Disciplines

Disciplines such as law and political science also have an interest in industrial organization. Corporations are the principal form of organization for industrial activities. Corporate and contract law are vital to an understanding of how firms operate and do business with each other as are the branches of law dealing with bankruptcy, taxation, labour, the environment, trade, investment and intellectual property. Politics is concerned with the concept of power. Corporations are able to exercise power in numerous ways thereby affecting the sovereignty of states, a topic examined by political scientists.

Outsourcing, Offshoring and Supply Chains: Data Issues

Public discussion of outsourcing stems mainly from its employment impact that now, due to technological change, affects services as well as goods. Debate is reinforced by statements that industrialized economies are primarily service economies with around 70% of employment being services related, while declining employment shares are associated with the manufacturing and resource sectors. What does this mean and how is it measured?

The distinction between goods and services is enthroned in public debate, in data on production, employment and trade and in the WTO with the GATT disciplines for goods and GATS for services. Underlying the distinction are some difficulties. The production of a good, such as an automobile or a pair of shoes,

involves the production of tangible objects, while production involving financial, medical and engineering advice involves an intangible output. The production of music illustrates a combination of good and service. When transmitted over the air, a song is a service; when embodied in a disk, it becomes a good. Should music then be considered the production of a good or service or both?

It is not clear that the automobile and shoe examples are pure goods. If finance, advertising, transportation and warehousing are service activities, all are associated with and can take place within a goods producing firm. If the firm is classified as goods producing it is because most of its value added activity is associated with the tangible side of the product and not with the intangible service inputs. Assume that the firm decides to contract out for some or all of its financial, advertising, transportation and warehousing requirements thereby reducing its work force, the final output of the firm may remain the same but the configuration of inputs used to produce the output has changed. The firm now out-sources for these services which when counted separately make it appear that the service sector has expanded at least in terms of employment.

What has actually happened is that the services once performed within the manufacturing firm are now contracted out with a contraction of manufacturing employment and an expansion of services employment. Management is continually engaged in reconfiguring the firm's supply chain in order to reduce costs and remain competitive. In so doing the national economy may appear to become more service oriented when in fact little has changed. Data on employment by occupations should provide more accurate information of what has actually changed. It may well be the case that developments in information technology have led to the need for more persons to be engaged in the provision of programming services, the operation of call centres and the supply of repair services, in which case the occupational structure of an economy's labour force may change with a greater emphasis on services. Some combination of the needs of new service industries and the reconfiguration of production within existing goods producing industries probably ac-

counts for the larger percentage of persons employed in services, and the finding that economies are becoming more service oriented. Data should be able to provide a more precise description and explanation of these. What do the data show?

The answer is not clear but the work needed to provide an answer is set out in a recent report published by the Industrial Performance Centre at MIT.[3] It concludes that in the case of the US, there is an absence of adequate data on services traded internationally; a similar absence of data on domestic trade in services; and a lack of adequate data on employment by occupation and industry. Until such data become available, it will be difficult to assess accurately the extent of outsourcing and offshoring by industry and the trade and employment impacts. The MIT study notes that the classification system for traded items includes 16,000 categories for goods versus only 17 for services. Similar discrepancies exist for goods and services traded domestically within the US and for the occupations associated with goods and services production. Goods trade has always been easier to measure because a tangible object is involved for which customs paperwork is required before it can cross a border to its destination as an import. Exports usually have no such requirement and their record may depend on surveys taken in the seller's country or import data supplied by the buyer's country. For example, for goods exports to each other, the US and Canada rely mainly on import data from the other country. Measurement of services trade depends largely on surveys conducted in each country with all the problems associated with ensuring that the surveys are completed[4].

The under-reporting of the service sector is tied up in part with the underground or informal economy whose size varies by country but even in the case of a developed economy such as Greece is large. A recent report in the *Financial Times* (Sept.

[3] "Services Offshoring Working Group, Final Report," lead Author T. J. Sturgeon, September 10, 2006, MIT Industrial Performance Center http://web.mit.edu/ipc/publications/pdf/IPC_Offshoring_Report.pdf.

[4] In the US the threshold for collecting services trade data has been $6m per annum for imports and $8m per annum for exports.

29, 2006) noted that "Greece suddenly found itself 25 per cent richer on Thursday after a surprise upward revision of its gross domestic product, the fruit of a change to national accounts designed to capture better a fast-growing service sector including parts of the black economy such as prostitution and money laundering."

With services, there is considerable domestic and international trade conducted for no charge or trade that may be underreported. Users of Skype make telephone calls in Canada and abroad for no charge. Foreign published newspapers and journals are read for free on the Internet. International calls are made by using a phone card whose value is probably not captured in services trade data. These are examples where border policies have little or no impact on trade. For trade in goods, borders are a much more significant issue.

Conclusions

A new and complex international commercial landscape is emerging, which is spawning new concepts and new terminology, creating new demand for improved statistical measurement, and raising questions for traditional trade policy and practice. It is timely that these issues be aired in Ottawa, as Canada seeks to consolidate its place in the North American production platform and enhance its role in the global division of labour.

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