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Globalization and its Implications: The Size and Location of Manufacturing Sector Export Firms in SC

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This Working Paper reports on selected results of the Economic Development research program supported by Clemson University's Public Services & Agriculture (PSA) program. Parts I and II of the paper summarize cogent findings of a 1993-99 research project on "Global Economic Restructuring and its Implications for South Carolina" conducted by Bill Ward, Jim Hite, and Gary McMahan.

Part III of this paper is based on recent research conducted with John Mittelstaedt of Clemson University and George Harben of the SC Department of Commerce under a PSA research project on "Trade Logistics Barriers Facing Small/Rural Firms in South Carolina". The full project team includes advisory researchers Will Lacey of the SC Department of Commerce and Peter Lehman of the SC State Ports Authority. It is on behalf of all of these colleagues that I take this opportunity to discuss with you some interesting and important findings of these continuing research and outreach activities directed at South Carolina's economic development in the context of a globalizing economy.

This paper was prepared for the University of South Carolina/Clemson University International Forum held in Columbia, SC, on November 15, 2000. For copies of this paper or for information about Clemson University's Economic Development Program and the activities of the new Center for International Trade, contact Bill Ward by electronic mail at waward@clemson.edu or by phone at 1-864-656-6745.

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Part I. Globalization, Globalism and Economic Development

There are basically five sets of changes that have been at the heart of the globalization process that has been building since the late-1970s and that became the leading international economic force in the 1990s:

1. **MARKET LIBERALIZATION.** Liberalization of markets WITHIN countries is the tricky and often under-appreciated part of the globalization picture. Globalization is usually thought of as integrating ACROSS national markets (i.e., global market liberalization). However, it makes little sense to liberalize across markets when the internal markets that are to be linked together are burdened by regulatory and other inefficiencies. The process of internal market liberalization started first (1970s) and was overlapped beginning from the mid-1980s by the broadening drive for globalization of these markets (Indicative of this is the fact that the first of the emerging market funds—the Korea Fund—was established in 1986).
2. **NATURAL BARRIERS.** Reduction in the natural barriers to moving information, money, things, and people between different locations, whether across a border or not. This is primarily the issue of “transport costs” for these various items. Some of the cost reductions during 1960-2000 (reviewed below) were based on technological developments, while others were based on efficiency-improving market liberalization.
3. **ARTIFICIAL BARRIERS.** Reductions in the artificial barriers to moving information, money, things and people across borders (reviewed below). This is primarily the issue of government policies that limit movements of the above items across borders. This is almost totally a market liberalization phenomenon, though it gets much support from technological developments as well.
4. **INSTITUTIONS.** Institutional integration, including the move to formalized and mutually-consistent rules of social and business association. This is the issue of reducing the risks and the costs associated with people in two nations entering into (fairly and consistently) enforceable contracts with each other. It is also about creating social support systems that allow firms in different countries to compete on the same cost bases (e.g., How do the unemployment insurance programs of the respective countries affect the cost accounting of competing firms from different countries?)
5. **STANDARDS.** Standardization of specifications, terminology, management processes, and contracts. [In practice, institutional integration easily could have been included under the heading of standardization.] Standards and standardization represent another of the often-unrecognized changes underlying globalization. Examples include international standardization of cargo container specifications, of definitions of pharmaceutical terms, and of weights and measures. Profoundly important to the present paper is the standardization of management processes by ISO 9000 and ISO 14000.

Social and Political Issues Raised by Globalization

The problem with globalization, of course, is that you can't just integrate national markets into a global economy without affecting a lot of other things. Take, for example, the issue of institutional integration. The French do not object to having an economy that makes France a rich and powerful country. But most French citizens have little interest in doing so by using Anglo-American institutions such as the case law that is said to be better at adapting to the ever-changing demands of commercial transactions. Nor do most Frenchmen want to integrate their agriculture into a competitive global economy that might drastically change the way that rural and urban landscapes interface and that might force their vineyards to consolidate into larger operations.

By the same token, many aspects of standardization also raise French ire. We know how most French feel about the issue of standardizing on the use of American English for business transactions and on the move to franchised food and entertainment—for now, perhaps the penultimate consumer experience in global standardization.

But then, some American businesses are not thrilled about standardizing on the metric system as a replacement for the feet, pounds, and miles measurements that long ago were inherited from the British. Reluctant Europeans that they are, the Brits themselves have made only a partial conversion to the metric measurements used on the European continent, though these measurement systems have been officially specified by both the EU organization for standardization (CEN – Comité Européen de Normalisation) and the International Organization for Standardization (ISO).

So it is not just the French who oppose some or other aspect of globalization. Otherwise, how could those large crowds be raised to disrupt meetings of such Globalism advocates as the World Trade Organization, the World Bank, and the International Monetary Fund? To understand this rather large opposition to globalization, one really needs to understand the difference between globalization and Globalism in a way that many opponents of globalization/Globalism often do not.¹

Globalism and Globalization

While globalization is a phenomenon, Globalism is a philosophy. In simplest terms, Globalism can be defined as the advocacy of globalization as an economic phenomenon. Globalism is promoted by the so-called “Washington Consensus” that is said to consist of the U.S. Treasury Department, the International Monetary Fund, the World Bank, and the Institutes for International Finance and for International Economics. Why would these economic organizations be proponents of globalization as a phenomenon? Well, because economic models generally show that what is true about market liberalization at the single-economy level is even more true for market liberalization at the global level. Market liberalization tends to increase the efficiency with which things get produced, and it tends to increase the efficiency with which choices can get made. The more broad the liberalization and the greater the number of liberalized markets that get integrated together, the greater the potential for economic efficiency.

¹ For more on the opposition to globalization, see Haas and Litan.

Economists are fairly unified in their belief that the record shows that market liberalization increases the rate of growth of real per capita income.²

As a philosophy of national and international economic development, Globalism took on steam between 1985 and 1999 as a replacement for the old approaches to economic development that ruled during the decades of the 1950s through the 1970s. The old approaches sought to achieve growth and development by deepening the physical investments within national economies that were not closely integrated with each other. In the old system, a developed country got richer by saving and investing internally. Poor countries were to be helped along towards economic development by having the rich countries make targeted transfers of official development assistance that were to go into capital investments via “projects”. This system gave rise to the bilateral aid programs of USAID, British ODA (now DFID), Canadian CIDA, etc. It also gave rise to the multilateral aid institutions of the World Bank Group, the UN agencies such as UNDP, and the regional development banks such as Asian Development Bank (ADB), Inter-American Development Bank (IDB), African Development Bank (AfDB), and Caribbean Development Bank (CDB). These were largely projects-based organizations for much of their history. The spreading philosophy of Globalism is now forcing all of these organizations to alter their approaches to development assistance. This includes a shift from primarily handing out money for investments towards using that money to cajole changes in not only policies but also institutions of public and private governance, legal systems, social safety net systems, etc.

The old approaches to growth, development and economic management arose during the Post-War environment of the Bretton Woods economic system (put together in 1945 at the Bretton Woods, NH, conference by the Englishman John Maynard Keynes and the American Harry White). A prime objective of the Bretton Woods system was to promote international economic stability while allowing each country to pursue **policy autonomy**—i.e., to de-link their own economies from the global economy so that they could have internal economic and social policies that were different from those of other countries. Thus, the old Bretton Woods approach was not only much more tolerant of inter-country differences, it practically celebrated these differences. Of course, the Bretton Woods system began to fall apart in the 1970s, with the landmark event being the US abandonment of the fixed link of the dollar with gold in 1973. It is taking more than two decades for the fall of the old system to result in a new system for managing national and global economies, however. And, as we seek to show in Part I, we do not yet have unanimity on this new system that is being pushed by the world’s leading economic management organizations.

² This involves the interface between the high theory of the most arcane area of technical economics—general equilibrium theory—with the real world of growth and development. In practice, it boils down to an issue of coming closer to achieving “complete” markets for all kinds of contingent and other claims on resources. By liberalizing existing markets, and by connecting more of these markets together, one can presumably come closer to achieving the “general equilibrium of a competitive economy with complete markets” that underlay the Arrow-Debreu (1954) model. There is much discussion amongst high theorists about equilibrium with complete markets *versus* equilibrium with incomplete markets, but this need not concern us in the practical kind of a paper we are attempting here. If it does concern any of you, then a good place to begin the study of these issues is with Magill and Quinzii.

Globalism embodies an almost diametrically opposed approach to the policy autonomy that underlay the Bretton Woods system. Globalism is primarily about integration of markets into a larger economy. Global integration of markets takes away much of the scope for national political autonomy. The starkest example of this diminution of policy autonomy comes in the form of the currency boards now used in a number of countries to achieve exchange rate stability. These boards achieve that stability by completely taking out of the hands of local politicians the ability to affect the national money supply.³ The countries that have adopted currency boards basically have emasculated their central banks. No longer can a central bank in a currency board country “accommodate” the loose-purse-strings policies of politicians who would create one new spending program without thinking about what else has to be cut back to pay for that program. Do otherwise in today’s globalizing economy, and global capital markets will give your currency—and your domestic economy—the lashing that most economists would say that you yourself actually deserve.

Given that the old Bretton Woods system allowed policy autonomy while globalization does not, it is not difficult to imagine that many in the LDCs are not terribly fond of Globalism as an approach to economic development. This lack of fondness is particularly pronounced amongst the old-line politicians and bureaucrats in those countries who benefited from privileged access to the official development assistance flows. Thus, many people in the LDCs and in the old development establishment join the French and others in opposing Globalism as a socioeconomic philosophy and globalization as an economic force. But, as we suggested above, the opponents of these two things are not always clear in separating those parts that are natural outcomes of technological change versus those that are subject to philosophically based policy decisions and are thus mutable rather than immutable forces.

By the same token, many individuals in the developed countries are not fond of globalization’s tendency to diminish the scope for policy autonomy. People in industries that previously were protected from global competition by tariff barriers, for example, tend not to favor either Globalism as a philosophy or globalization of markets as a phenomenon. So one might expect that, as the tariff barriers that separate markets have been lowered by GATT and the WTO during the past forty years, there would be an emerging tendency for the previously-protected to push for non-tariff barriers to replace the old tariff barriers. Indeed, this tendency is observable.

And, of course, globalization—with or without acceptance of Globalism—forces a pace and a scope of institutional change that challenges both the private and the public

³ Most of these currency boards resemble the old “specie” standards in which gold or silver backed all currency units. In the currency board arrangements, a country generally must have a US dollar or some other international reserve currency in hand before the currency board will allow it to issue a specified number of units of that country’s own currency. Steve Hanke of Johns Hopkins University is one of the most outspoken among economists favoring currency boards or outright use of one of the world’s reserve currencies: “[A]most 70% of all dollars and 35% of deutsche marks are held and used outside their home countries. There are 31 political entities that officially use foreign currencies in lieu of their own, including Liechtenstein, Panama and Monaco. Of these, 13 have adopted the dollar as legal tender and 10 have adopted one European currency or another. The remaining 8 nations have adopted other currencies.” Steve H. Hanke, “How to Abolish Currency Crises”, *Forbes Magazine* (March 20, 2000).

governance systems of countries that are not yet up to the market institutions standards set by the Americans and the Brits. For example, the Asian financial crisis of 1997-99 was made worse (if not precipitated) by the over-reliance on bank lending relative to equity sources of finance and, in parallel, by the absence of markets for securitizing the bank loans. As a result, capital asset prices in these countries were not able to adjust fluidly to changing prices of materials and products and to changing conditions in global capital markets. So the adjustment came in the pent-up form of a crisis instead of a constantly shifting set of financial asset values.

Many of the countries caught up in the Asian financial crisis of the 1990s were among the most successful of the so-called emerging market economies (Korea, Thailand, Indonesia, Malaysia), not to mention Japan which was hailed in the 1980s as the new global economic power. But these countries—even Japan—did not have the kinds of equity and security markets that the Americans, the Brits, and—to a lesser extent—continental European countries have. And if these countries have had difficulty achieving the scope and pace of change in policies and the institutions required by globalization, just imagine the problems faced in the poorest of the less developed countries (LDCs) and in the formerly planned economies (FPEs) of the Soviet Union and Eastern Europe!

We can begin our wrap up of Part I by summarizing four sources of opposition to Globalism/globalization:

1. Those who oppose the social and institutional changes that must be made in order to efficiently integrate markets together.
2. Those who profited from the distortions that separated markets in the old system of policy autonomy and want to continue to benefit from these overall economic inefficiencies.
3. Those who fear that the pace and the scope of institutional change can not be made to accommodate the currently rapid rate of globalization.
4. Those who simply do not understand either Globalism or globalization and, thus, are talking from beliefs and perceptions that simply do not match the current reality.

Now, where does the foregoing leave the state of South Carolina as we seek to define the economic development strategies that are most likely to succeed in the first decades of the 21st Century? Well, first of all we start out by recognizing that South Carolina reacts to what is happening in the big world outside—we do NOT get to determine what is happening, for the most part. So we simply accept Globalism and globalization as probable realities. This means that we need to understand the philosophy (theory) of Globalism and the phenomenon of globalization; and we need to understand their implications for South Carolina and for the world at large in both general and specific terms; and then we must design appropriate investments and policies to deal with these implications.

Part II. Distance Costs and Firm Scale: Theory & Historical Evidence

What we should have learned from Part I is that Globalism is about philosophy (grounded in arcane elements of economic theory), while globalization is about facts—some of which are affected by philosophy. What we want to do in Part II is to (a) Present some of the facts about globalization, after (b) Reviewing some further theoretical developments in economics that bear importantly upon the interpretation of some of the globalization facts we will review. Specifically, we want to look at the implications of the New Economic Geography and of the New Trade Theory as these bodies of theory relate to the interplay between distance costs (transport costs in the economic geography models, and ‘spatial friction’ in the trade theory models) and economies of scale in production and marketing. Then in Part III we will look at how the globalization facts and the new theory come together to influence the size and location patterns of manufacturing firms in SC, in particular those firms who have integrated into the global economy (as indicated by their success in exporting).

First, let us look at the recent theoretical developments in economic geography and international trade. This will help us to better appreciate the selectivity in presentation of globalization facts that will follow.

New Economic Geography and New Trade Theory

The “New” versions of these two bodies of theory are both largely attributable to Paul Krugman, previously of MIT and recently moved to Princeton University and *The New York Times*.⁴ Both bodies of theory work off of two aspects of quantitative modeling:

- Firstly there is the old conceptual model of economic geography that analyzes the interplay between scale economies in production and the costs of transportation.
- Secondly there is the emergence of a mathematical model, developed by Avinash Dixit and Joe Stiglitz, that allows increasing returns (i.e., economies of scale) to be modeled in a tractable form.

What Krugman did was to show that one can analyze the scale-distance interplay using the Dixit-Stiglitz model. Why is the *mathematical* presentation of this analysis so important? Well, that has been the trend in economics since the early 1950s. In technical economics, if it cannot be subjected to mathematical modeling, then it cannot be considered economics. The concepts are relatively straight forward, mind you. It is just that it could not be called “theory” until it could be presented in a tractable mathematical model.

Mathematics aside, the basic concept in economic geography that we are addressing here is the long-ago observed relationship between (a) transport costs and (b) the scale of production. At one extreme, imagine a world in which transport costs are very high while there are no economies of scale in production—i.e., costs per unit of output are the same whether you produce one unit of output or one million units of output

⁴ Dr. Krugman maintains a Web page at “<http://www.mit.edu/~krugman/>”. The New Economic Geography is laid out in Krugman (1991, 1995). The New Trade Theory is laid out in Helpman and Krugman (1986, 1989) and in Krugman (1990, 1991).

per day. In that case, there would be none of the “division and specialization of labor” observed by Adam Smith (1776) as he wrote about the First Industrial Revolution. [A century later, Alfred Marshall (1964—originally published in 1890) would popularize the substitute term “economies of scale” that is more commonly used today.] What Smith was observing in the late-1700s was, in part, the result of developments in transportation that had allowed firms to amass materials from dispersed sources and to sell the resulting outputs over a large area.⁵

So with high transport costs and no economies of scale, everybody would tend to be self-sufficient in producing everything. There would be no advantage to be had from scaling up production and selling to a large market over a wide area. First of all, with no scale economies present the costs per unit of production would not decrease as a result of scaling up production. Secondly, it would cost you a fortune to transport it to the consumers. And when you got the product to the consumers, the delivered cost would exceed their own costs of producing it themselves! So with high transport costs and zero economies of scale, you get a bunch of small production units spread around all over the map.

Jump to the other extreme and imagine a world in which transport costs are zero (like digitizable products in the presence of the Internet) while scale economies in production are pronounced. In that case, you would have only one producer of each good. That one producer would supply all the dispersed consumers of that good, taking joint advantage of the scale economies in production and the fact that it cost nothing to assemble the inputs and to move the resulting goods about.

And in between the above two extremes you get a less crystal clear world. Combine low-but-not-zero transport costs with moderate scale economies, and you get the answer that you would expect from an economist: “It depends.” What does it depend upon? Well, it depends upon the relative slope of the transport cost function compared to the size of production plant at which scale economies show up (related to the minimum efficient scale of plant) and then at which scale diseconomies start to set in. And since both transport costs and tendencies towards scale economies differ product-by-product, you get a different pattern of size and location of production on a product-by-product basis. We already mentioned digitizable products (i.e., software, digitizable images, databases, etc.) that can be shipped over the Internet for free and that tend to also exhibit low or even zero incremental costs of reproduction. So we expect to get winner-take-all markets (i.e., monopoly) in many “New Economy” industries. Concrete blocks, in comparison, have high transport costs and intermediate scale economies in production. The result is that we have a large number of producers who do not ship them very far. And cement has both high transport costs and fairly profound economies of scale in production. But with cement, the high transport cost of the raw materials tends to dictate location near the source of the materials. And on, and on...

In general, however, we can surmise that anything that reduces transport costs will TEND to lead to larger-sized firms that will sell over a larger spatial area. And as

⁵ Including the canal system and the development of more efficient ships—often attributed to the Dutch. For those interested in this aspect of economic history, a standard source is Braudel.

transport costs go down, we also would expect to see new innovations in production technology and in product technology emerge that would take advantage of the scale opportunities afforded by lowered transport costs. This is what happened, of course, with the First and Second Industrial Revolutions where first canals and ship improvements made feasible the factory system for producing textile products, and then the railroads and the telegraph made feasible the huge, vertically-integrated operations like Henry Ford's auto production system.

OK. So from the perspective of the New Economic Geography, lower transport costs will TEND to allow scale economies to be exploited. Is the New Trade Theory different from the New Economic Geography in this regard?

The New Trade Theory and the New Economic Geography are different only in that national borders come in between the various producers and consumers in the New Trade Theory. Thus, in the New Trade Theory application, "artificial" barriers to trade join with differences in currencies and institutional environments to supplement the "natural" barriers posed by the transportation costs that are the only distance cost element of the New Economic Geography models. So when we go from theoretical mathematical model to real world application, the "policy autonomy" that we discussed above with respect to national economies becomes a big factor in raising distance costs and, thus, suggesting smaller firms in the old compared to the new global economic environment.

So now the question is an empirical one. IF natural barriers have come down and IF artificial barriers have come down, then one would expect to see LARGER firms engaged in trading across larger spatial areas—including across international borders. The first part of our empirical analyses involves exploring whether natural and artificial barriers that create "spatial friction" have been reduced. The second part of our empirical analysis (discussed in Part III) is to see whether this has resulted in particular patterns of firm size and location around the state of South Carolina.

Trends in Transport and Communication Costs—1960 to 2000

During 1998-1999, two research assistants helped me compile four decades of data on trends in the real costs of transporting Information, people, and things.⁶ What did we find? Well, the cost trends differ quite a bit both between and within those three categories of resources. But, in general, those four decades saw marked reductions in costs and marked increases in efficiency of moving Information, people and things around the globe. Let us look at each of these categories of resources in turn.

Information Transport Costs. Clearly, the greatest increase in transport efficiency has been for moving Information (defined here as anything that is DIGITIZABLE—including data, text, software, images, and audio). Before the Internet was opened up for commercial use in 1993 (and made the incremental cost of Information transport equal to zero), these trends were largely measured by what was happening with long distance telephone rates. Indicative of this trend is the fact that a New York to London phone call of three minutes that cost \$45.86 in 1960 cost only \$3.32 in 1990 (more detail on these

⁶ The resulting Working Paper is available on line at <http://cherokee.agecon.clemson.edu/wp020299.pdf>

trends can be found in the Working Paper). Information (as defined above) is a special case in all of this discussion of distance and scale. Much of the talk about a “borderless world” (Kinichi Ohmae 1990) and about the “death of distance” (Frances Cairncross 1997) is really about Information, not about the other resources that go to make up an economy. When one talks about Information in isolation from other resources, the Internet made distance practically meaningless. And it greatly diminished the direct impact of national borders as a barrier to moving Information. While the changes in distance costs associated with other resources (people and things) are great, they are not nearly so profound as for Information.

People Transport Costs. During 1960-1996, airfares decreased by 58% in real terms. Commuter rail fares dropped by more than 16%, and inter-city bus fares dropped by 14%. On the other hand, inter-city rail fares fluctuated a bit around the 1960 value, but there was little real change during the period 1960-1996. Meanwhile, there was a huge increase in the use of air travel. And as airfares went down, the speed of air travel went up. Basically, the “friction” associated with moving people across distance went down fairly dramatically during the final decades of the 20th Century—though there were pronounced differences between modes in the rate of change of these costs.

Domestic Transport Costs for Things. Between 1960 and 1996, rail freight charges dropped by 58% in real terms. Inland waterborne freight charges dropped by 46%. Air freight charges dropped by 27% between 1960 and 1990, before rising to 90% of the 1960 level again by 1996 (i.e., a net drop of 10% over the 1960-1996 period). Inter-city motor freight rates fluctuated a little bit around the beginning value with little or no real trend away from the 1960 real costs. Overall, there was a fairly pronounced reduction in the domestic costs of transporting things in the US during the final four decades of the Century—though, again, there was substantial variation between modes.

International Transport Costs for Things. International shipping costs are extremely volatile, depending as much as they do upon a fixed short-run supply of ships and demand that is subject to both seasonal variation and changes in the business cycle. Two sources of data on international ocean shipping rates showed no clear trends upwards or downwards—only extreme year-to-year volatility (Tables 1 and 2).

Table 1. Trends in Simple Annual Average of the Baltic Freight Index, 1985-96

1	2	3	4	5	6	7	8
Year	BFI Annual Mean	BFI Annual Minimum	BFI Annual Maximum	BFI Annual Range	Range as % of Mean	U.S. PPI	BFI Adjusted by U. S. PPI
1985	906.318	711.5	1064.5	353	39%	105	863.16
1990	1364.077	1056	1669	613	45%	119	1,146.28
1991	1591.536	1432	1780	348	22%	122	1,304.54
1992	1201.941	1033	1534	501	42%	123	977.19
1993	1398.901	1215	1642	427	31%	125	1,119.12
1994	1477.567	1110	2043	933	63%	126	1,172.67
1995	1980.754	1538	2352	814	41%	128	1,547.46
1996	1313.838	992	1598	606	46%	131	1,002.93

Source: Ward, Bhattarai and Huang (1999).

The Baltic Freight Index is of relatively recent vintage (the mid-1980s). It is linked to trading on the London LIFFE that is designed to allow shippers to conduct hedges and other financial transactions designed to deal with the risk posed by the volatility of shipping prices. Thus, its very existence is an outgrowth of volatility in the shipping costs that it measures. You can see from the extracts and calculations presented in Table 1 above that the BFI itself is very volatile. Research by Rauch (1996) came to similar conclusions about international shipping cost volatility and the absence of meaningful trends (Table 2).

Table 2. Transport Costs as a Share of Customs Value (%)

	1970	1980	1990
Homogeneous	15.59	12.45	13.51
Near-Homogeneous	13.06	12.19	12.05
Differentiated	6.58	6.40	5.88

Source: Rauch (1996), presented as Table 1 of Davis (1997).

Rauch (1996) looked at shipping costs for three categories of products—homogeneous, near-homogeneous, and differentiated—between 1970 and 1990. While there is some evidence of a downward trend for differentiated and near-homogenous products in his data, the homogeneous products (i.e., commodities) show no such trend (Table 2).

Inter-Modal Transportation and its Management. What all of our international shipping price index series miss is the impact of the inter-modal logistics management systems that developed from 1960 to 2000. Three forces came together to make inter-modal shipping the transportation story of the late-20th Century. First of all was the development of containerization from the 1960s. Second was the beginning of transport deregulation in the late-1970s that moved sector-by-sector through trucking, railways and

only recently ocean freight. Third was the development of computers, telecommunications and the Internet that allowed much more sophisticated management of shipping capacities and—in particular—back-haul management and load coordination.

Unfortunately, there are no secondary data systems in place, as best we can tell, for measuring the impacts of inter-modal management innovations on the overall efficiency of logistics management. With inter-modal shipping, a “load” now goes into a cargo container at the shipper’s dock and does not come out of the container until it gets to the receiver’s dock. The transport of that container is managed across a combination of trucking companies, railway companies, ships, and storage areas by integrated logistics managers using telecom, computers, and (lately) software that allows the computers of the shipper, logistics manager, and receiver to interface with each other. Anecdotal information suggests that logistics costs have gone down as a result.⁷ A related measure that helps shed light upon efficiencies to be realized from inter-modal shipping is the impact that containerization has had upon port handling charges.

Port Charges. Officials at both the Port of New York and at the Port of Charleston report a ninety percent decrease in personnel at the ports as a result of the move to containerized shipping from the 1960s and the related move away from break-bulk cargoes. The move to containerization was a major factor in the overall reduction of 54% in the real costs per ton of handling cargo at the Port of Charleston between 1960 and 1996.

Tariff Barriers to International Trade. OK, so the natural barriers to moving goods internationally have generally been reduced during the final four decades of the 20th Century. But what has happened to such artificial barriers as import tariffs? In a nutshell, tariff barriers have been reduced dramatically as a result of a series of General Agreements on Tariffs and Trade (GATT) reached between the end of WW II and the early 1990s and by the World Trade Organization (WTO) that came to fruition from the mid-1990s. In the case of the United States, import duties decreased from 12.35% of the dutiable value of imports in 1960 down to 4.7% of dutiable values of such imports in 1996. When calculated as a percent of the total value of all imports (whether dutiable or not), tariff collections were reduced from 7.5% of the value all imports in 1960 down to 2.3% of the value of all imports in 1996. In other words, import duties dropped by more than two-thirds during the final four decades of the 20th Century.

Non-Tariff Barriers to International Trade. We noted in passing in a previous section that we would expect to find pressure building from special interests to put up

⁷ Complicating all of this is the increasing importance during the 1980s and 1990s of “lean manufacturing” (also called ‘just-in-time’ inventory management) that made logistics management an important business function. Lean manufacturing seeks to reduce inventories of materials and products at all stages of the production and distribution process. One extremely important effect is that most inventories then exist in the form of materials and products that are in *transport* rather than in *warehouse*. Researchers at Michigan State University (Bowersox and Calantone 1998) have been following the cost of logistics management as a percent of GDP for the US and for other countries for a number of years now and find that it has been trending downwards. They provide the following estimates of logistics costs as a percent of GDP for the following countries and regions: United States (implied global leader in logistics efficiency) 10.5 percent; United Kingdom 10.63 percent; France 11.14 percent; North American average 10.77 percent; 12 original European Union countries average 11.79 percent; Asia 11.64 percent; Aggregate for all remaining countries, including developing nations 12.94 percent.

non-tariff barriers to trade to replace the tariff barriers that were brought down by GATT and WTO negotiations. Non-tariff barriers come in many forms, including sanitation, safety and other standards that favor local over foreign suppliers. Indeed, “standards” of some sort or other seem to be emerging as the most prominent non-tariff barrier to trade in the first decade of the 21st Century. While some of these, no doubt, are protectionist in origin, others of these standards are based on legitimate attempts to increase economic and technical efficiencies. Perhaps the most important of the global standards that are legitimately directed at efficiency improvement is the ISO 9000 series of standards that relate to quality management in the production process.

ISO 9000 allows a firm based anywhere in the world to buy, say, water pumps that have been produced by one or more firms from anywhere in the world that have been independently certified as meeting global standards for quality management. This has become such an important part of the global attempt to extend lean manufacturing across the entire supply chain that ISO 9000 certification is rapidly becoming a *sine quo non* for participation in global manufacturing systems. In other words, if you produce an intermediate good these days, you can almost forget about exporting it if you do not have ISO 9000 certification.

What the emergence of non-tariff barriers such as ISO standards do is to change the cost structure of the artificial barriers to trade from variable cost-focused to fixed cost-focused. Why is this? Well, tariffs tend to be applied as per unit taxes—either as *ad valorem* taxes (meaning “at value”) or as unit taxes (meaning per ton or per liter). Thus, tariff payments tend to vary with the level of trade. Most non-tariff barriers, on the other hand, tend to force fixed costs upon the shipper or upon the receiver that do not vary with the level of trade. To sell intermediate goods, we have just said, will require ISO 9000 certification (and, in the future, ISO 14000 certification as well—i.e., certification that your production process is environmentally friendly).

Both the current literature on this subject and the Clemson faculty who do quality management consulting tell us that it costs from \$30,000 to \$700,000 to complete the ISO 9000 certification process. The smaller number is for single plant, single product firms. The higher number is for more complex processes and for multiple plant, multiple product firms. This is a fixed cost that a firm must bear if it is to sell even one unit of an intermediate good to another firm located in another country.

Other non-tariff barriers are the paperwork and documentation costs necessary to comply with laws and regulations of both the exporting and the importing country. These costs are pretty much the same no matter how large the shipment. They require specialized expertise in freight forwarding, customs brokering, and international finance. This expertise must either be available in house (and thus a fixed cost) or it must be “outsourced” from specialized firms.

Summation of Part II

Part II tells two stories. The first story is about the development of “New” theory in economic geography and in international trade. In both bodies of theory, one ends up expecting that increased efficiencies that reduce transport costs and “spatial friction” will lead to larger sized firms doing better than smaller sized firms across a broad range of industries and sectors. These theoretical developments then raise the cogent issue of

whether, indeed, spatial friction was reduced over the period in which we began to talk about globalization as a phenomenon.

The second story in Part II involved the interpretation of data series on the costs of moving Information, people, and things about the globe. Caveats and data shortcomings notwithstanding, I think that reasonable people can agree that the second story is pretty convincing: Transport costs and spatial friction were substantially reduced in the final decades of the 20th Century.

But the second story turns out to be a bit more than a simple tale of monolithic and monotonic cost reductions across the entire front of natural and artificial barriers to trade. Sure, we have said that we perceive a generalized story of reductions in spatial frictions—just as the man who puts one foot on a block of ice and the other in the fireplace is pretty comfortable, on average. Often it is the differences and the variations within that are equally or more important than the trend story. And we believe that is the case with the story of changing barriers to trade.

The theory and the data discussed above lead to a suspicion that small firms will have great difficulty competing in a world in which

- (a) Spatial frictions, in general, have been reduced, but
- (b) The pattern of the changes has added to the complications faced by all firms who would compete in the global economy of the 21st Century.

The foregoing discussion suggests three reasons why large will be better than small in the new international trading environment: (1) The theory and the general downward trend in spatial friction suggest larger firms will do better. (2) The shift to non-tariff barriers from tariff barriers implies a change from variable to fixed costs of international trading, which obviously favors large traders over smaller traders. (3) The complicated pattern of changes in which different modes of transport have changed at different rates and in which transport deregulation is proceeding apace suggest that firms with a strong supply chain management department will have advantages over firms who do not have such expertise in-house. Generally, large firms have specialized logistics management/supply chain management departments, while small firms have jack-of-all-trades managers.

Because the whole globalization process has been accompanied by a tendency to ‘out source’, this all raises the question of whether some of the above disadvantages felt by smaller firms might be ameliorated by their having access to business service firms that are focused upon international trade facilitation. The particular types of business service firms that facilitate trade are (a) Customs house brokers/freight forwarders; (b) International law firms; (c) International departments of major banks; and (d) Export management companies. In a very simple exercise, CIT faculty mapped out these firms in SC and found that almost invariably these kinds of business services are located in Charleston, Columbia/Lexington, Greenville/Spartanburg, and Charlotte/Rock Hill. They are not located in Bamberg or Allendale. Nor are they located in Abbeville or even Florence.

So Part II leads to a suspicion that small firms will have a disadvantage in international trade relative to large firms. Some of that disadvantage—but not all—can be

made up by being in an urban area in which the firm has better access to business services that are directed at trade facilitation.

The above stories then set the stage for our final question: What does all of this mean for a basically rural state such as SC in which 83% of the manufacturing firms have fewer than one hundred employees and 60% have fewer than twenty employees?

Part III. SC's Small and Rural Manufacturing Firms as Exporters

The SC Department of Commerce (previously known as the SC State Development Board) has produced an Industrial Directory every year since 1941. Recent editions have been compiled electronically using an Excel format. The latest editions of the Directory were compiled under the direction of Director of Research and Presentation Services George Harben, one of the researchers on the current PSA project on "Trade Logistics Barriers Facing Small/Rural Firms in SC".

Information in the Directory is now being supplemented with data from the 1997 Economic Census and from other sources to provide an exceptional database on more than 80% of the 5,200 or so manufacturing firms in the state. The adjustments to the files to create an emerging database of SC manufacturing firms are being made under the direction of John Mittelstaedt, with research assistance provided by Yu Man. We are adding to the existing data a number of data fields so that the database will include the SIC code of the firm, the number of years in business, the location of the firm, whether it is branch or headquarters, the number of employees, whether it exports or not, and whether it imports or not. Without adding a question to the SC DOC questionnaire distributed to these firms, we will not know export intensity—only whether or not the firm exports at all. With Global Information System software, we can map these firms according to one or more of the data fields in our database and in related GIS databases that we have on file at Clemson University. We have done some initial experiments in GIS mapping of the data and expect to do much more in the coming year.

These Directories present us with a gold mine of data that we are attempting to compile into a historical database. We expect it will take us about two years to get a complete historical database put together. For now, we have a pretty good database on SC manufacturing firms that covers the decade of the 1990s. We are planning to make the database available on a subscription basis to other researchers, once we have it compiled and vetted. Meanwhile, we invite researchers across the state to work with the CIT researchers in conducting collaborative research using the emerging database. The remainder of Part III reports on the initial findings from analysis of this database that was completed during the Summer of 2000. A number of publications (with John Mittelstaedt as senior author—see References) are in process as a result of this work.

South Carolina Export Manufacturing in General

Overall, one has to say that South Carolina manufacturing is fairly well integrated into the global economy. Of all manufacturing firms in South Carolina, 27% exported their product to buyers in other countries during 1999. Because (as we discuss below) firm size is very strongly correlated with export performance, exporting firms dominate the manufacturing employment picture in South Carolina, with 59% of all manufacturing employment being in firms that are involved in export activity. This is not to say that ALL of these workers are involved in export production. Rather, it is to say that more than half of all manufacturing sector employees in the state currently work in firms that do SOME exporting. As I said earlier, we do not have data that would allow us to calculate each firm's export intensity—only the presence or absence of exporting by a particular firm.

There is great diversity among export manufacturing firms, including companies exporting goods ranging from automobile parts to textile machinery to wood chips. In fact, more than one hundred and twenty different industry categories are involved in export manufacturing in South Carolina (123 industries have been identified at the 3-digit SIC level). The industry category having the largest number of exporting firms is plastic products, including molded and injected plastics (See Table 3). Likewise, export manufacturing is relatively widespread across the state, with every county in SC having at least one export manufacturing firm—though there are striking differences amongst the counties in terms of relative export success.

Table 3: The Ten SIC Categories Most Heavily Involved in Export Manufacturing in South Carolina in 1999

1. 308 Misc. Plastic Products (76 exporters)	6. 286 Industrial Organic Chemicals (33)
2. 355 Special Industry Machinery (66)	7. 344 Fabricated Structural Metal Prod.s (31)
3. 354 Metalworking Machinery (43)	8. 222 Broadwoven Fabrics, Manmade (26)
4. 371 Motor Vehicles and Parts (39)	9. 282 Plastic Materials and Synthetics (25)
5. 356 General Industrial Machinery (36)	10. 331 Steel Works & Blast Furnaces (20)
	267 Electronic Components (20)

Source: CUCIT WP #000626

The Location of SC Manufacturing Exporters in 1999

Which areas of South Carolina have been the most successful in getting manufacturing firms involved in exporting? The I-85 corridor has been the most successful in terms of the numbers of manufacturing firms involved in exporting (see Table 4). Greenville, Spartanburg, and Anderson Counties combined have 492 of the state's 1,397 manufacturing export firms (i.e., 35% of the statewide total). Less successful have been the areas that are away from South Carolina's Metropolitan Statistical Areas and those not located on the interstate highway system. Thus, there is a clear clustering of exporting firms around the municipalities of Greenville-Spartanburg-Anderson, around Charlotte-Rock Hill (i.e., York County, in Table 4), around Charleston, and—to a lesser extent—around Florence.

These location patterns also have firm-size characteristics associated with them that we shall be exploring in coming months. For example, the counties along the I-85 and I-26 corridors tend to have a plurality of Micro and Small exporting manufacturers (i.e., having 1-99 employees—see Box 1), while those along the Georgia border and in the Pee Dee are dominated by firms with 100 employees or more.

Table 4: County-by-County Tally of Manufacturing Export Firms in South Carolina in 1999

County	Firms	County	Firms	County	Firms
Abbeville	11	Dillon	9	<u>Lexington</u>	63
Aiken	29	Dorchester	22	Marion	14
Allendale	3	Edgefield	11	Marlboro	7
<u>Anderson</u>	66	Fairfield	8	Newberry	17
Bamberg	15	<u>Florence</u>	39	Oconee	28
Barnwell	9	Georgetown	13	Orangeburg	29
Beaufort	10	<u>Greenville</u>	246	<u>Pickens</u>	37
Berkeley	10	Greenwood	21	Richland	69
Calhoun	28	Hampton	6	Saluda	2
<u>Charleston</u>	61	Horry	22	<u>Spartanburg</u>	180
Cherokee	20	Jasper	6	<u>Sumter</u>	35
Chester	19	Kershaw	16	Union	10
Chesterfield	18	Lancaster	24	Williamsburg	11
Clarendon	10	Laurens	34	<u>York</u>	74
Colleton	15	Lee	2		
Darlington	17	McCormick	1		

Source: CUCIT WP #000626; ten largest exporting counties are bolded

Size Distribution of South Carolina Manufacturing Exporters⁸ in 1997

When it comes to exporting, does firm size matter? Judging from the S. C. Department of Commerce survey data the answer seems to be “Yes, size matters a lot.” As you can see from Table 5, as firm size increases (firm size categories are defined in Box 1) the proportion of firms exporting increases, as well.

⁸ While we have data for 1999—as indicated above—we have used the 1997 data in this section because we are able to “truth” it against the data from the 1997 Census of Economics.

Box 1: Firm Size Category Definitions

Micro Firm: A firm having fewer than twenty employees.

Small Firm: A firm having 20-99 employees.

Medium-Sized Firm: A firm having 100-499 employees.

Large Firm: A firm having more than 500 employees.

Large-scale manufacturing firms in South Carolina export. Micro-scale manufacturing firms in South Carolina generally do not export. There appears to be a strong break in these export probabilities at the boundary between the Micro and Small firm size—i.e., at about twenty employees. While employment level is clearly an incomplete measure of firm size, this nevertheless suggests that the Micro scale firms may well be “too small to export” across a fairly wide spectrum of industry categories.⁹ This represents a challenge to manufacturing in South Carolina, since more than three-fifths of all manufacturers employ fewer than 20 workers.

Rural versus Urban: SC Manufacturing Exports 1997

Already we have said that there is a tendency for the exporting firms to cluster around the urban areas of Greenville-Spartanburg-Anderson, Columbia-Lexington, Charlotte-York, and Charleston. In the present section, we use generally-accepted definitions of rural versus urban counties to look at the differences in probability of exporting from rural counties versus urban counties for each of the size classes of firms that were introduced above.

Table 5: Percentages of Firms Exporting, by Size and Location (1997)

	<u>State</u>	<u>Urban</u>	<u>Rural</u>
Micro	10.99%*	12.55%	6.93%
Small	24.58%	26.78%	19.8%
Medium	39.83%	41.83%	35.95%
Large	57.66%	61.63%	50.98%

* 10.99% of all micro firms statewide export.

You can see from Table 5 that, in all firm size categories, there is a greater tendency for manufacturing firms in urban counties to engage in exporting than for firms in rural counties to do so. Table 6 takes these same data and restates this tendency in comparison to statewide averages for each size class of firm.

⁹ This is the subject of a paper by Mittelstaedt, Harben and Ward titled “How small is too small?” recently submitted to a marketing journal.

Table 6: Rural/Urban Exporting, Compared to State Averages for Firm Size

	<u>Rural</u>	<u>Urban</u>
Micro	63.06%*	114.19%
Small	80.55%	108.95%
Medium	90.26%	105.02%
Large	88.41%	106.89%

* Micro Firms in Rural areas are only 63% as likely to export as firms of that size statewide.

From Table 6, we can see that Micro firms in rural counties are only 63% as likely to export as are Micro firms statewide, while Micro firms in urban counties are 114% as likely to export as are firms statewide. Directly comparing these two likelihoods suggests that the Micro firms in urban counties are almost twice as likely to export as are their counterparts in rural counties of South Carolina.

Implications of the Findings & Follow-Up Activities

The discussion in Part II of “New” theory in economic geography and international trade suggested that larger firms would have advantages over smaller firms as spatial friction is reduced. Empirical analysis in Part II indicated that, indeed, there have been substantial reductions in spatial frictions during the final decades of the 20th Century—though the reductions in frictions related to moving people and goods in no way match the reductions in the frictions associated with transporting Information.

The shift from variable to fixed costs amongst the barriers to trade combined with the complicated logistics management environment to suggest that specialized expertise in logistics management and trade facilitation would be needed by those firms who export successfully. The theory and the evidence on spatial frictions combined to suggest that (a) Larger firms would have advantages over smaller firms, and (b) Urban firms—particularly amongst the Micro and Small firms—would have advantages over rural firms.

The analysis conducted in Part III provides fairly clear evidence that, indeed, (a) Larger firms are more prone to export than are smaller firms, and (b) Urban firms are more prone to export than are rural firms. And firms that are BOTH small (Micro) and rural have the lowest probability of export participation. In fact, the analysis of the database on manufacturing firms in South Carolina gave much stronger evidence on both of these counts than we had expected when we began our analysis. So, where do we go from here?

Well, the first thing that we do is to feed this information back to the economic development and the trade facilitation professionals in South Carolina. This is fairly easy for us to do, since we worked hand-in-hand with a number of these folks in the

identification and the conduct of this research. As we said at the outset, the overall research project includes advisory researchers from SC DOC and the SC State Ports Authority.

In addition, the Clemson University Center for International Trade participates in the export assistance activities of the SC Export Consortium by engaging four graduate assistants to provide export marketing help to small businesses in the upstate. This assistance in the upstate parallels work done by ten graduate students at USC working with SCEC to assist companies in the Midlands part of the state. The SCEC export assistance activities are directed primarily at smaller firms (i.e., the Micro and Small firm categories in our analysis). The SCEC motto that “We are your first export marketing department” is exceptionally prescient of the specific issues that are highlighted by the research that is reported upon in this paper. Indeed, a number of practitioners in South Carolina had “feelings” regarding these issues. But, prior to this body of research, they did not have the rigorous analysis that would prove that they knew what they were talking about.

In response to a growing feeling that small business needed to become more international in orientation, a fairly large number of state, Federal, and partnership programs of export assistance were developed during the 1990s. Those operating in South Carolina include the SC District Export Council, the SBA Export Assistance Center for the Carolinas operating out of Charlotte, the official representative of the US Export-Import Bank operating out of Greenville, the International Trade and Existing Business Services Division of SC DOC, and some offices of the Small Business Development Centers (e.g., the office in Spartanburg is headed by someone with a strong background in international trade). In addition, the SC World Trade Center at Charleston (a licensee of the World Trade Centers international operations) provides trade assistance services for all comers; and a number of full-service freight forwarders/customs house brokers are interested in serving as “trade management departments” of companies. Unfortunately, most of these private firms will admit that it is much more profitable for them to work with larger firms than with smaller ones.

In addition to trade assistance activities out of USC and Clemson, the SCEC is contemplating the extension of their outreach programs (a) Into Charleston to work with lower state firms, (b) Into rural areas of the state, and (c) Into the export of agricultural products. With regard to the last of these, the CIT is now putting together a research team and a funding proposal to look at the potential exportability of the agricultural products that are produced in the state and to look—in particular—at the scale issues that are involved in exporting agricultural products.¹⁰

Because of the receptiveness to the idea of university/practitioner collaboration that we have experienced, the CIT is now developing a formal process for maintaining a continuing dialogue with a number of “Research and Outreach Partners”. This partnership is expected to include the SC Department of Commerce, the SC State Ports Authority (especially its trade promotion group), the SC Export Consortium, the various

¹⁰ Abstract logic would suggest that scale requirements would be greater for agricultural than for most manufactured goods exports because of the higher policy risk and spoilage risk (which tend to interplay with each other) associated with the former.

regional trade associations around the state, and the SC World Trade Center at Charleston. By working in collaboration with these Partners, the CIT seeks to identify, produce and disseminate results from a program of “rigorous and relevant research” that would be both rigorously conducted and immediately applicable to trade and economic development issues facing South Carolina. By simultaneously engaging our faculty, graduate students and undergraduate students in the outreach activities conducted by our Research and Outreach Partners we seek to help them to add applied content to the theoretical orientation of much of their in-class work.

As a result of this research/outreach collaboration, a number of additional research questions have been identified, and we will be seeking to answer these questions in coming months. These include the following:

- The data indicate that Micro firms are only lightly engaged in directly exporting. What about INDIRECT exporting—i.e., do they tend to provide inputs to other firms that do export? We are preparing a research project that would survey the exporting firms to identify the SC firms that are part of those firms’ supply chains to see to what extent there is a supply-chain-network effect that our database is missing. We will be particularly interested in using GIS mapping to look for patterns of clusters, and we will be developing funding proposals in conjunction with the Spatial Analysis Laboratory at the Strom Thurmond Institute at Clemson University towards that end.
- SC DOC officials have a “feeling” that Micro and Small firms tend to sell to other Micro and Small firms. We hope to use the above survey process to also begin to answer such questions as this.
- As a follow-on to the above two questions, we will explore the co-location phenomenon associated with larger manufacturing firms locating in SC. SC DOC has identified for us a total of 32 companies in SC that supply BMW in Spartanburg. We have used the database of manufacturing firms discussed above to see how many firms appear to have co-located with BMW, how many of the supplying firms were already here, how many of the co-locators came from abroad, and what “spin-off exports” might have been generated by the co-locating plants from the difference between their sales to BMW and the capacity provided by the minimum efficient scale of plant that they had to build to supply BMW. We have a Working Paper under preparation that will discuss this analysis of BMW’s suppliers. We expect to extend this analysis to a number of other cases using the data collected for the indirect exporting analysis outlined at the previous bullet.
- Is there a difference in export propensity between headquarters or sole-plant companies in SC compared to branch plants of national or international companies? The economic development community wants this question answered, because it has the potential to influence their economic development strategy and their investment promotion efforts. We can answer this question from the existing database and will be accomplishing this analysis in coming weeks.
- Given the policy risks facing agricultural exports, what kinds of scale and organizational obstacles must be overcome for various agricultural commodities and products produced in SC in order to develop successful export promotion

programs for agriculture? The CIT is assembling a research team (consisting of a supply chain management/international logistics expert and a post-harvest handling expert) to prepare a funding proposal that would assess the exportability of a number of SC agricultural commodities and products.

As I said above, the database on SC manufacturing firms that we are putting together with the help of the SC Department of Commerce can be used for a number of purposes. These uses can cross the boundaries of academic disciplines, and they can cross the boundaries between academia and the business and policy communities in the state. For example, the questions posed at the bullets above are relevant to trade facilitation and to economic development. But some of these also are relevant to international business strategy—e.g., what does a firm do when confronted by a co-location demand as a precondition for selling to another firm? How would a firm go about integrating such an international investment into its overall business strategy?

Furthermore, with the GIS capability that the database provides, it will be feasible to link these economic data with social and educational measures that have spatial characteristics associated with them. Sociologists, educators and others should find things here with which they can work.

In the end, those of us in the Economic Development Program and at the Center for International Trade at Clemson University hope to play a part in preparing the citizens and the organizations in South Carolina to be better players in the very competitive global economy that we foresee for the 21st Century. Indeed, there are roles to be played by many of us in the two universities represented in this Forum today. And I am personally excited by the prospect of working with each of you towards the common goals that we have for the development of South Carolina as a better place to work and to live. Let us each seek to engage greater numbers of our colleagues in these two Universities in this collaborative endeavor.

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