

CHAPTER 3: EXPORT MARKET ANALYSIS

The following sections provide discussions on the international markets that have the best growth potential for Appalachian products. In particular, the discussions focus on six select industries that we identified to have growth potential in the ARC region. These manufacturing sectors based in the ARC region have competitive advantages in trade, and ample opportunities to flourish in the region through exporting their products to the global marketplace.

The six industries are:

- Automobile parts
- Household furniture
 - Wooden household furniture
 - Upholstered household furniture
- Machinery
 - Packaging machinery
 - Food processing machinery
- Microelectronics

Global market locations targeted for the six industries are very diverse. Markets include NAFTA economies (Canada and Mexico), Latin American countries (Argentina and Brazil), to Asian markets (Japan, Korea, China, Thailand and Taiwan), European economies such as Germany and Sweden, and eastern bloc countries like Poland, Hungary, Slovakia and Russia. The six industry sectors face a variety of issues and barriers competing in the assorted selection of global market opportunities. Table 3-1 presents a distribution of Appalachian exports by industry and destination.

Table 3-1. Foreign Markets

Appalachian Exports by Industry and Destination						
(Percent of Appalachian Industry Exports)						
Destination	Motor Vehicle Parts	Food Processing Machinery	Packaging Machinery	Electronic Components	Upholstered Household Furniture	Wooden Household Furniture
Africa	0.6%	2.3%	1.4%	0.8%	0.9%	1.3%
Asia	11.1%	20.8%	12.5%	30.2%	18.0%	28.4%
Australia	1.2%	3.2%	3.9%	1.2%	0.9%	0.5%
Canada	65.6%	20.6%	26.1%	25.6%	48.9%	42.6%
Central America	0.2%	3.3%	3.1%	1.4%	3.4%	7.0%
Europe	10.3%	32.1%	38.1%	25.7%	22.3%	15.3%
Mexico	9.5%	8.5%	9.3%	9.9%	3.4%	3.0%
South America	1.5%	9.3%	5.6%	5.1%	2.2%	1.8%

Sources: ITA, MISER, U.S. DOC through IMPLAN. Calculations by JFA.

3.1 Automobile Parts

The automotive industry is the largest manufacturing industry in the United States. No other single industry is linked to as much of U.S. manufacturing or generates as much retail business and employment. The automotive parts industry serves two market segments—the original equipment market (OEM) for parts that get used directly in the production of vehicles, and the replacement/repair parts for after-market consumption. This industry group is classified as NAICS 3363.⁵² The U.S. businesses in this industry group include producers of stampings, carburetors, pistons, rings, valves, lighting, batteries, electrical equipment and other motor vehicle parts. The U.S. automotive parts industry has shipped over \$200 billion in 2000, of which an estimated total of \$38 billion (18%) was exported.

The industry group has seen a decline (-5.5%) in employment between 1997 and 2001. However, its total value of shipment rose slightly from 1997 to 2001 by +5 percent (see Table 3-2).

Table 3-2. Motor Vehicle Parts Manufacturing (NAICS 3363) Sector

Year	Employees	Total Value of Shipment (\$1,000)
2001	736,003	186,838,614
2000	802,575	204,336,085
1999	799,174	202,797,009
1998	789,564	184,476,031
1997	779,913	178,511,569

Source: U.S. Department of Commerce: Bureau of the Census.

Automobile parts exports increased from 1997 to 2001. Although the value of exports has declined in recent years, a longer term trend reflects upward tendencies in automobile parts exports (see Table 3-3).

Table 3-3. Trade Data for Motor Vehicle Parts Manufacturing (NAICS 3363)

Year	1997	1998	1999	2000	2001
Value of Exports (US \$ millions)	36,230	36,716	39,280	42,288	39,076
Years	1997-98	1998-99	1999-2000	2000-2001	1997-2001
Change in Value	1.3%	7.0%	7.7%	-7.6%	7.9%

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration (ITA) and Jack Faucett Associates (JFA).

For Appalachian exporters of automotive parts, NAFTA economies (Canada and Mexico) present the largest export market, accounting for nearly 80 percent of all U.S. exports of automotive parts in 2002. The fastest growing market, in terms of the world region, is in Eastern Europe (Czech Republic, Hungary, Poland and Russia), with nearly 38 percent increase in U.S. exports from 2001 to 2002. However, the total export value to this market is a meager \$95 million in 2002.⁵³

Because the growth of the U.S. automotive parts industry is mainly affected by U.S. motor vehicle manufacturers' continued demand for improved quality and lower costs, future growth for U.S.

⁵² NAICS – North American Industry Classification System

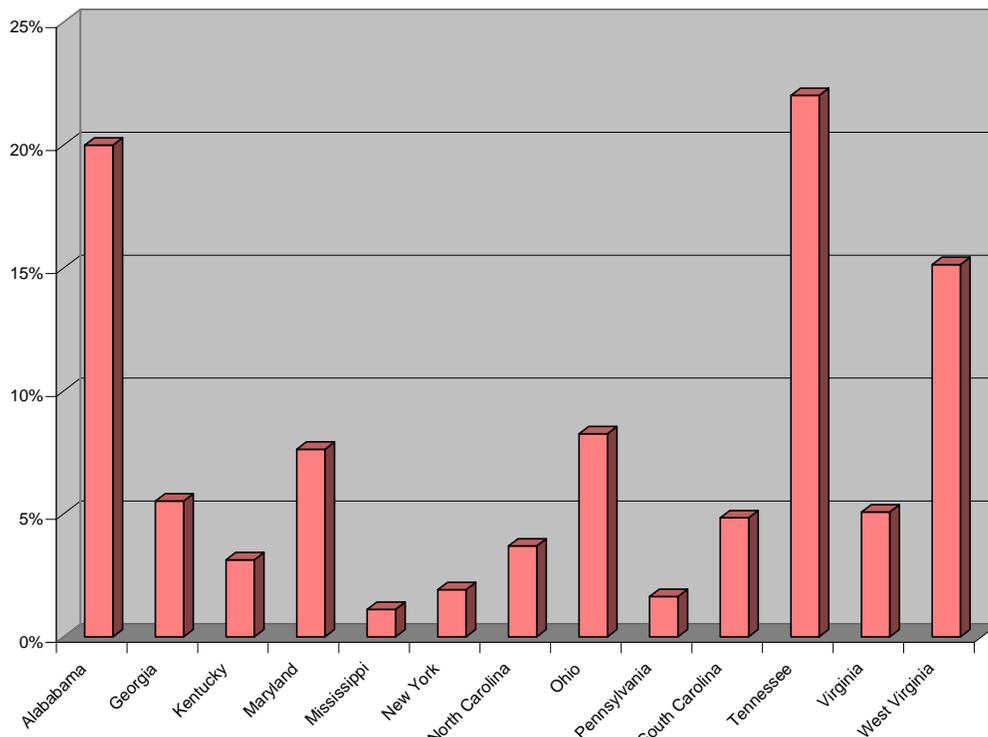
⁵³ U.S. Census Bureau

automotive parts suppliers will continue to be technology-dependent. The U.S. market continues to demand more products meeting stringent environmental regulations, safety features, and fuel efficiency. The U.S. automotive parts industry increasingly supplies lightweight body materials, mechanical components, and safety parts. Such technology driven products can command better value-added returns in the global marketplace.

There are a number of free trade agreements (FTA), some multilateral and others bilateral, that affect U.S. and Appalachia's exports of automotive parts. For example, the U.S.-Central America Free Trade Agreement offers the potential for improved export and investment opportunities for the U.S. automotive industry. In 2002, the Central American economies purchased \$133 million in U.S. auto parts. While the market currently has a limited size and purchasing power, the FTA can have the potential benefits in the long run. The CACM member nations signed a free trade agreement with the Dominican Republic in 1998 and are currently negotiating a free trade agreement with South American economies (MERCOSUR). Other economies with free trade agreements with CACM members are Chile, Mexico, Venezuela and Columbia.

Another set of free trade agreements is known as the Free Trade Area of the Americas (FTAA). While it may provide a framework under which the U.S. automotive parts industry can better integrate its operations in the Western hemisphere, the multiplicity of existing and other FTAs being negotiated prevent clear assessment of outcomes for U.S. exporting opportunities. FTAA covers Northern, Central and Southern Americas from Canada to Argentina. There are FTAs like NAFTA, CACM, Andean Pact, U.S.-Chile FTA and MERCOSUR. Currently, there are negotiations taking place concerning MERCOSUR-EU, Mexico-EU FTA, MERCOSUR-Andean Pact, Mexico-Brazil auto agreement and Mexico-MERCOSUR FTA. FTAA may evolve to eliminate tariffs and other trade barriers for U.S. auto parts suppliers to all Americas in the long run. Exhibit 3-1 presents the distribution of Appalachia's motor vehicle parts exports by state.

Exhibit 3-1: Appalachian Motor Vehicle Parts Exports (State Share of Appalachian Exports)



Sources: ITA, MISER, U.S. DOC through IMPLAN. Calculations by JFA.

Competing in the global marketplace, the U.S. has three major competitors, Japan, Germany and France, as major exporters of automotive parts in the world. They command 12.8 percent, 12.8 percent, and 7.7 percent of the total global exports of auto parts respectively. The U.S. accounts for 19.6 percent of the total exports in the world market of automotive parts.⁵⁴ For Appalachian exporters of automotive parts, NAFTA countries (Canada and Mexico), established Western European markets (Germany and Sweden), Asia/Pacific (Korea), and the Latin American (Argentina) markets offer good prospects for future growth. These markets provide either a large enough market size and/or disproportionately larger shares of U.S.-made goods in their import markets.

3.1.1 NAFTA: Canada

The Canadian automotive parts market is estimated to be \$45 to 50 billion in size. Over 80 percent of the market is served by foreign imports, and much of the imports originate from the U.S. The U.S. continues to be Canada's principal supplier of automotive parts, accounting for over 86 percent of the total market.

Currently, Appalachia's manufacturers and suppliers of automotive parts to Canada are in the best possible position to take advantage of the Canadian market. While there are other foreign competitors (Japanese and European automotive parts manufacturers) completing against U.S. firms in Canada, the U.S. parts and aftermarket products dominate much of the Canadian market. The U.S. market position will remain unchanged for some time, and will continue to provide good exporting opportunities for suppliers located in the Appalachian region.

Exporting to Canada from the U.S. is very straight-forward. There are virtually no trade barriers or impediments concerning automotive parts, components and aftermarket accessories. The U.S.-Canada Free Trade Agreement (FTA) went into effect in 1989. As a result, virtually all tariffs on U.S products entering Canada have been eliminated. NAFTA went into effect in 1994, removing some of the few remaining barriers. While some non-tariff barriers remain, trading of automobile parts between U.S. and Canada faces very few obstacles.

3.1.2 NAFTA: Mexico

The automotive industry is one of the largest and fastest growing manufacturing sectors in Mexico.⁵⁵ Auto parts and aftermarket supplies industry also represent a significant portion of the manufacturing sector in Mexico, and has been growing rapidly. The total market in Mexico for automotive parts and supplies is valued at more than \$150 billion in 2002, with imports accounting for about 30 percent of the total market (see Table 3-4). The market for automotive parts in Mexico grew by 14.1 percent in 2001, and one estimate for the market growth rate in 2002 is put at 12.2 percent. One of the factors fueling an expanding automotive parts market in Mexico is the aging of existing vehicles. Local production of auto parts increased by 13.8 percent from 2001 to 2002, while imports increased by 8.7 percent during the same period.

Competing in the Mexican auto parts market are German and Japanese suppliers. In 2001, the U.S. had a market share of 66 percent. Germany had a market share of 7.4 percent while Japan had a market share of 6.1 percent. The U.S. market share may decline when the newly completed Mexico-European Union free trade agreement comes into effect, liberalizing trade in automobiles and components.

⁵⁴ U.S. Automotive Parts Industry/Market Assessment, Office of Automotive Affairs, Transportation and Machinery, International Trade Administration, U.S. Department of Commerce, May 2003

⁵⁵ U.S. & Foreign Commercial Service and U.S. Department of State, 2003

Table 3-4. Mexican Auto Parts Market (UD \$ billions)

	2000	2001	2002
Total Market	115.3	134.3	152.9
Local Production	87.5	101.5	117.7
Imports	35.6	42.0	46.0
Exports	7.8	9.2	10.8
Imports from U.S.	23.4	27.6	32.5

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration (ITA) and Jack Faucett Associates (JFA).

For the Appalachia based suppliers, there are currently no major import barriers to auto parts market in Mexico because of NAFTA. This agreement removed all previous trade barriers and duties for several products improved from the U.S. including auto parts. The U.S. suppliers have been enjoying competitive advantage over European and Asian competitors. However, the newly completed free trade agreement between Mexico and the EU may increase a level of competition between American suppliers and European ones in near future.

3.1.3 Germany

Most major German auto makers tend to outsource high technology components and parts. This trend of outsourcing high-tech components can deliver German auto makers cost savings in a competitive global market. At the same time, such trend presents business opportunities for Appalachia's OEM suppliers of high-tech automotive parts. Increased investments by German firms such as those made by BMW in South Carolina and DaimlerChrysler in Alabama also provide further marketing opportunities for Appalachian parts manufacturers to German auto makers, and facilitate export opportunities of U.S. parts to Germany.

Coupled with this favorable trend, German market for imported automotive parts and components is expected to grow at a moderate pace and the U.S. is expected to maintain its market share. Table 3-5 below shows market size data for auto parts in Germany.

Table 3-5. Market Size Data for Automobile Parts and Accessories (US \$ millions)

	1999	2000	2001	2002-2004 Growth %
Import Market	11,286	10,769	9,860	0-5%
Local Production	38,020	37,076	41,860	
Exports	5,854	5,846	16,744	
Total Market	43,452	41,999	34,976	0-5%
Imports from U.S.	1,680	1,784	1,711	0-5%

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration (ITA) and Jack Faucett Associates (JFA).

German automobile manufacturers are reputed for the quality and durability of their products. Their investment in research and development is relatively high. According to one estimate, German auto makers account for nearly 30 percent of all research and development investments that take place in Germany. In part due to a very competitive global auto market, and in part due to a high research and development cost, German manufacturers have been seeking lower production costs.

By importing and outsourcing specialized components from abroad, they have achieved this goal. American parts have earned a good reputation among German buyers over the years. As shown in Table 3-5 above, the German imports market for auto parts is small. However, there is an upside opportunity for U.S. exporters. There is a slight increase in imports from the U.S. between 1999 and 2001, and a gradual growth in this sector is expected.

Main competitors in the German auto parts import market are the U.S., U.K., France, Japan, Belgium, Austria and Italy. Amongst the competitors, the U.S. accounts for most of the import market share—17 percent. U.K. is estimated to hold roughly ten percent of German import market share. Japan also controls about 10 percent of the import market.

There are no major trade barriers preventing Appalachian firms from entering the German market. This is due to EU-U.S. FTA. Customs duties for automotive parts and accessories into Germany are about five percent.

3.1.4 Sweden

Sweden is a good marketplace for high-end, technically sophisticated automotive parts and aftermarket accessories. Automotive components related to ‘safety’ or ‘environment’ aspects of vehicles have higher prospects in the Swedish import market. In addition, parts and products related to the Swedish climate such as engine heaters, roof rack systems for transporting cargo and skis face positive outlook in both OEM and aftermarket auto parts market.

In 2000, the total imports of automotive parts into Sweden were estimated to be over \$2.6 billion. The import market in Sweden is expected to grow at an annual average rate of 5 percent between 2001 and 2003. During the same period, the total amount of imports of auto parts from the U.S. to Sweden is expected to grow by 5 percent as well. The Swedish auto parts imports market presents positive growth potential for U.S. and Appalachia based suppliers. Suppliers that provide brake systems, steering systems, gearboxes, transmissions and body parts have great exports prospects in the Swedish market.

Competing in Sweden, U.S. suppliers hold a relatively minor market position compared to their German counterparts. German suppliers are the by far the largest group that sell automotive parts to Sweden, with a market share of 33 percent among imported automotive parts, components, accessories and other supplies. Other European countries like the U.K. and Belgium have a strong foothold in the Swedish automotive import market.

While not a dominant player in Sweden by the absolute measure, U.S.-made automotive parts are very competitive and successful. It is estimated that U.S. imports of auto parts and components account for about 5.4 percent of the Swedish imports market. However, the figure does not include U.S.-made parts that enter Sweden via other non-Swedish European ports. If these items were counted, U.S. imports of auto parts and supplies may amount to 7 or 8 percent of all auto parts imports in Sweden.

Exporting to Sweden faces no impediments as there are no barriers. Customs duties are relative low at 3 to 4.5 percent for most automotive parts and supplies. There is a value added tax of 25 percent on all such products regardless of origin—thus locally made parts do not gain much advantage over any foreign products using domestic tax structures.

3.1.5 Korea

While the Korean economy has yet to completely rebound from the 1997 financial crisis, there are signs of growth in the economy in recent years. In 2000, it is estimated that Korea's automotive parts and accessories market grew by 11 percent over 1999, and had a total value over \$17 billion. In the same year, the Korean automotive parts and accessories market imported over \$1.2 billion. It is projected that between 2002 and 2004, the overall market size will increase at an annual average rate of 5 percent. As the overall market demand increases, it is also anticipated that imports will increase faster than domestic supplies.

Imports of automotive parts and accessories account for 6-7 percent of the total market demand because most of the OEM and aftermarket demand is met locally by Korean and joint-international venture firms. Major international partners that participate in the joint ventures include Delphi (U.S.), Bosch (Germany), Valeo (France), and Visteon (U.S.). Over the years, international firms have been increasing their operations and investment in the Korean market. The number and sizes of the Korean auto parts suppliers tend to be smaller than what is observed in the global automotive market. Whereas Korea now has only two major automobile manufacturers, both in the top 20 assemblers in the world, Korea does not have a parts supplier that is in the world's top 50. There are many smaller suppliers ranging from 500 to 600. This number is expected to dwindle to 200 to 300 in near future, according to industry experts. It is expected that the import market will grow slightly.

Currently, direct imports of automotive parts and accessories into Korea are primarily supplied by Japan, the U.S. and Germany. In 2000, Japanese suppliers filled nearly 50 percent of the total imports while the U.S. accounted for about 21 percent of total imports, valued at \$253 million. German firms accounted for 11 percent of total imports in the same year. There are opportunities for U.S. and Appalachian suppliers to gain more of the import market share in coming years. Table 3-6 displays market size data for auto parts and accessories in Korea.

Table 3-6. Market Size Data for Automobile Parts and Accessories (OEM and Aftermarket)
(US \$ millions)

	1999	2000	2001 (projected)	2002-2003 (projected)
Import Market	950	1,206	1,200	9%
Local Production	16,546	18,100	18,000	5%
Exports	1,679	1,746	1,800	7%
Total Market	15,817	17,560	17,400	5%
Imports from U.S.	208	253	252	10%

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration (ITA) and Jack Faucett Associates (JFA).

While, a great majority of the total auto parts and accessories market is supplied by either domestic manufacturers or joint-venture companies, the Korean market for auto parts still requires foreign imports for several core components and parts, such as automatic transmissions, electronic engine parts, and airbags. Korean suppliers are not as competitive in the more technologically advanced segments of automotive parts, and continue to depend on foreign imports to provide solutions with newer technology.

After Japan, the U.S. is the second largest foreign supplier to Korea. Japan's solid market position is in part due to its geographic and cultural proximity. Also, many Korean auto makers have had technology transfers from Japan for decades, resulting in Japan's dominant market share in automotive parts imports. The U.S. and European competitors must compete under less favorable circumstances in terms of prices, technical services, and transportation costs. There is a tariff rate set at 8 percent of the CIF (cost,

insurance and freight) value when importing automotive parts and accessories into Korea. However, circumstances may be improving for U.S. suppliers as more favorable views on foreign automobiles gradually take a hold among the general public in Korea. In addition, a recent acquisition of the bankrupt Daewoo Motor Company by GM (in October 2002), and revival of Daewoo automobile production in Korea under a new management (GM Daewoo) would introduce more U.S.-made parts to Korean automotive industry sector.

Although there are good prospects in Korea for U.S. suppliers of automotive parts and components, there are barriers to exports. Exporting to Korea is encumbered by the lack of transparency in rule making in the regulatory system which is one of the principal problems cited by exporters. It is alleged that Korean officials exercise certain discretion in applying laws that are drafted using broad language, resulting in inconsistency in application and uncertainty among businesses. Such vague laws or regulations may be reinterpreted and then applied differently depending on business cases at different times. These transparency-related problems affect market entry in automotive sectors.

Furthermore, Korean markets still hold an anti-import bias that affects auto sectors in particular. While there are no evident campaigns against imports currently, the legacy of anti-import activities dating back decades tends to negatively impact the market entry momentum of some U.S. suppliers. Korean government agencies are mending such bias by equipping several official fleets with imported automobiles in recent years. As attitudes towards imported automobiles improve, there will be more favorable views on imported automobile parts and components.

3.2 Household Furniture (Wood and upholstered)

U.S. household furniture industry is classified as NAICS code 337. Under this broad classification, *upholstered household furniture manufacturing* and *non-upholstered wood household furniture manufacturing* sub-sectors are classified as NAICS 337121 and 337122, respectively. They produce household furniture and related articles as classifications titles indicate. Combined, this industry group has shipped nearly \$20 billion worth of merchandise in 2001. During the same year, the industry group had over 210,000 workers.

The sector has experienced slightly increasing shipment volumes and employment in recent years, but the overall trend is fairly flat. Upholstered household furniture manufacturing (NAICS 337121) sector had its value of shipment increase by over 13 percent between 1997 and 2001. During the same period, the value of non-upholstered wood household furniture manufacturing shipments rose by 5 percent. While the total value of industry output has risen in recent years, employment has not kept up with the increase in output (see Tables 3-7 and 3-8).

Table 3-7. Upholstered Household Furniture Manufacturing (NAICS 337121) Sector

Year	Employees	Total Value of Shipment (\$1,000)
2001	88,025	9,318,252
2000	94,248	9,608,430
1999	94,010	9,601,031
1998	92,426	8,971,462
1997	89,215	8,232,635

Table 3-8. Non-upholstered Wood Household Furniture Manufacturing (NAICS 337122) Sector

Year	Employees	Total Value of Shipment (\$1,000)
2001	122,774	11,860,891
2000	133,884	12,990,611
1999	134,169	12,995,810
1998	132,404	12,372,652
1997	127,703	11,318,807

Source (for both tables): Annual Survey of Manufacturers, Industry Statistics, U.S. Census Bureau, Dec. 20, 2002.

The furniture industry in the U.S. has been losing domestic market share to imports for the past two decades despite being amidst a very robust housing market. In the upholstered furniture sector, U.S. exports exceed imports. In the wood household (non-upholstered) furniture sector, however, the U.S. has been losing most of the furniture market share to the imports in recent years. During the 1990s, the U.S. trade imbalance for the wooden household furniture sector increased by 400 percent from -\$1.9 billion in 1990 to -\$7.3 billion in 2000.⁵⁶ The data suggests that the U.S. household furniture industry has been experiencing increasing competition in the global marketplace.

Internationalization of distribution and production in the global economy has affected the furniture industry as well. Open markets have allowed furniture trade to move ahead at a very fast pace. The trade of furniture has grown much more rapidly than furniture consumption. Currently, the largest import markets for furniture are the U.S., Germany, France, U.K., and Japan. For the U.S. furniture manufacturers, NAFTA (Canada & Mexico) area, Germany, Korea, Saudi Arabia, and the United Arab Emirates represent leading export markets. Respectively, Exhibits 3-2 and 3-3 present the distribution of Appalachia's upholstered and wooden household furniture exports by state.

⁵⁶ "Competitiveness of U.S. Wood Furniture Manufacturers – Lessons learned from the softwood moulding industry." *Forest Products Journal*, Vol. 51., No. 7/8 (July/August 2001)

Exhibit 3-2: Appalachian Upholstered Household Furniture (State Share of Appalachian Exports)

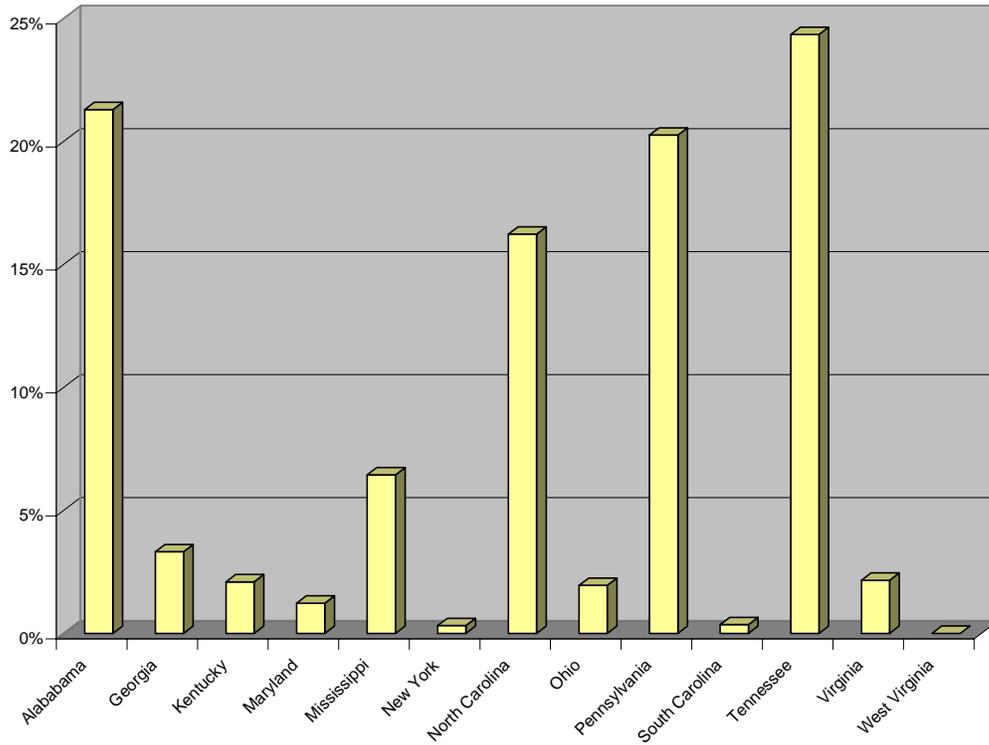
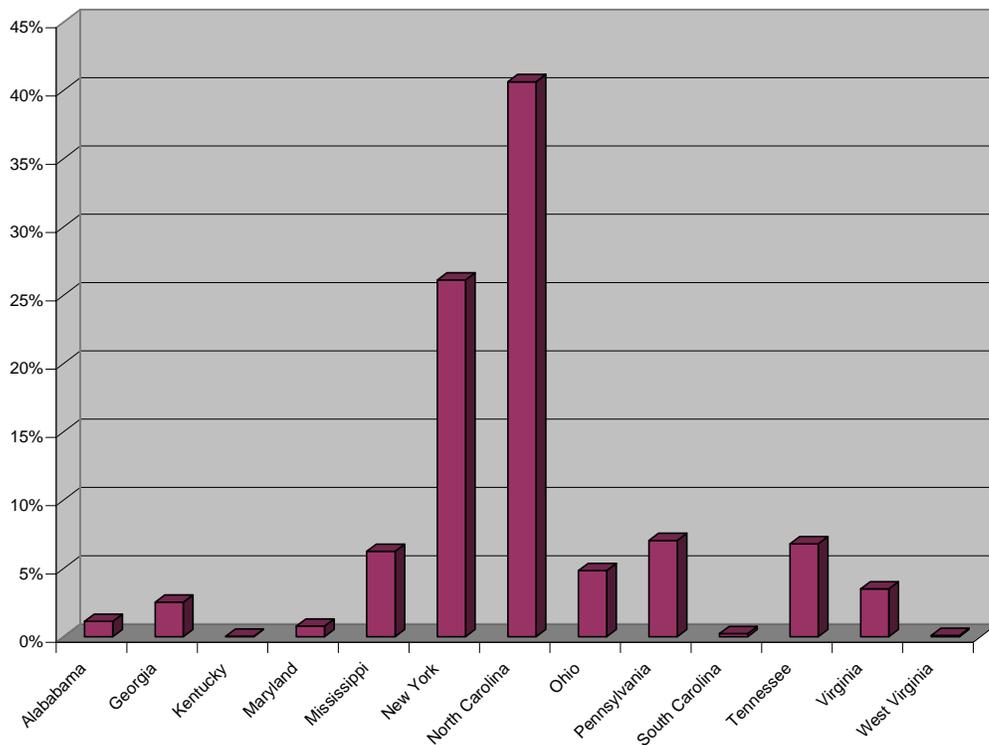


Exhibit 3-3: Appalachian Wooden Household Furniture (State Share of Appalachian Exports)



Sources for both: ITA, MISER, U.S. DOC through IMPLAN. Calculations by JFA.

3.2.1 Asia/Pacific: Korea

In 2002, Korea was the 6th largest export market for the U.S. The nation's retail industry has helped the recovery of the domestic economy since the currency crisis in 1997, exhibiting rapid growth in 1999 and 2000. In fact, the market size of the domestic retail market, in terms of sales, has continued to grow at an average annual growth rate of about 8 percent since 1999, and reached 115 trillion in 2001, or 24 percent of the nation's GDP. According to the Korean National Statistical Office, in 2002, consumer confidence reached its highest level since November 1998. Average household income has risen considerably, and the average monthly spending for urban salaried workers' households on goods and services is increasing. Such trends in increased consumer spending on furniture is reflected in increased export of household and upholstered furniture from the U.S. to Korea in 2002 as shown in Table 3-9.

Table 3-9. U.S. Export: Household and Upholstered Furniture (FAS Value. US \$1,000)

	1996	1997	1998	1999	2000	2001	2002	% change 01-02
Korea	14,286	16,003	2,129	5,910	9,933	7,001	19,047	172.0%

Note: F.A.S. represents the value of shipments via freight, air and ships including freight charges, insurance and other costs.

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration (ITA).

Korea's average tariff rate was 8.9 percent in 2001 and Korea will reduce tariffs to zero on most of all products in the furniture sector by 2004. Although there are good prospects in Korea for U.S. suppliers of household furniture, there are barriers to exports.

3.2.2 NAFTA: Canada

The Canadian furniture market, especially the household wooden and upholstered furniture sectors, has undergone renewed growth in the last several years in part due to a strong housing market, a robust demand for home renovation, and stronger consumer confidence. Market demand for household furniture in Canada is largely a function of the rate of household formation, housing construction starts and income growth. The housing sector has remained relatively healthy despite recent economic downturns.

Canada's total furniture market is estimated to be about \$4 billion, and this market is projected to grow at an average annual rate of 10 percent over the next several years. The Canadian household furniture sector accounts for 35-40 percent of the total furniture market. Approximately 45 percent of this market is attributed to wooden furniture, and 30 percent to upholstered furniture.

U.S. exports of furniture products to Canada take a predominant position in Canada's import market. Over 70 percent of all furniture imported into Canada originates from the U.S. While imports from China, Italy, Taiwan, Malaysia and Mexico also compete with the U.S.-made household furniture products in Canada, their combined import market share adds to less than one third of that of the U.S. furniture suppliers. This success of U.S. furniture suppliers over others can be attributed to geographic proximity, common design, similar quality demand, tariff-free entry, and familiar distribution channels.

3.2.3 NAFTA: Mexico

The size of the Mexican household furniture market is valued to be well over \$500 million. The Mexican wooden furniture market alone is estimated to be over \$400 million. From 1996 to 2002, the total value of U.S. exports of household wooden furniture and upholstered furniture products increased from \$60 million to \$84 million (an increase of 40 percent in six years).

The major trading partners in this sector are the U.S., Spain, Italy, China, Canada and Taiwan. American suppliers hold a dominant market share of nearly 70 to 75 percent in the Mexican furniture import market, and the others hold relatively smaller market shares.

For Appalachia based suppliers, there are no major import barriers to the household furniture market in Mexico as part of NAFTA. NAFTA removed all previous trade barriers and duties for several products imported from the U.S. including household furniture products. American manufacturers face duty free imports, while imports from other countries into the Mexican market face an average of 25 percent import duties. In addition, American suppliers enjoy geographical proximity and a good reputation built over many years of competing in Mexico. While others must compete in the marketplace with higher tariffs, they must also incur greater transportation costs. However, it is anticipated that American suppliers will begin to face more competition from European counterparts. There is a recently signed Mexico-European Community Free Trade Agreement, under which tariffs on European wooden furniture fell from 25 percent to zero starting in 2003.

3.2.4 Middle East: Saudi Arabia

The Saudi market is the largest furniture market in the Middle East, and is relatively protected. It is estimated to be about \$600 million of which 60 percent is for household furniture. The Saudi furniture market is mainly served by imported products. Seventy percent of furniture sold is imported while 30 percent of market demand is met by domestic production. However, this ratio is gradually shifting as Saudi domestic production share is increasing. The whole market is expected to grow at an annual rate of 7 to 8 percent for the coming 3 or 4 years. The U.S. market share is one of the largest amongst the foreign competitors.

The main suppliers for the Saudi furniture market include Italy, Asian producers, France, Spain and the U.S. Italy holds the largest share in the market with about 22 percent. The Far East suppliers hold about 7 percent. France has a 6 percent share and Spain about 5 percent. American suppliers have about 16 percent. While Italy holds the largest market share, its position has been declining. The U.S. exports of furniture to Saudi Arabia have been rising at a very rapid rate, taking away some of the Italian share of the market. From 1999 to 2001, the Saudi household furniture market experienced increases in imports from U.S. suppliers at an annual average rate of 10 percent. Demand for American furniture is high among affluent and middle class Saudis. It is especially high among the population segments that have spent time in the U.S. Wooden furniture is very popular, and American or Canadian wood products are in high demand.

Exporting to Saudi Arabia is not without barriers. The Saudi market is not fully open. There is a 5 percent custom duty levied on all imports of furniture. In addition to facing tariff barriers, U.S. suppliers must overcome non-tariff, and otherwise technical obstacles. While there are no standards in effect on imported furniture, religious concerns prohibit any likeness or replica of human and animal forms on furniture products. Imported goods are inspected to ensure no carvings or engravings displaying such figures.

3.2.5 Middle East: United Arab Emirates (UAE)

Although the United Arab Emirates (UAE) furniture market is relatively small compared to that of Saudi Arabia, the UAE furniture market has grown at a very remarkable pace in recent years. It has experienced a double-digit rate of annual growth since 1999. According to one estimate, the market size will grow at a rate of 10 to 12 percent over the next several years. In 1999, the UAE furniture market was estimated to be about \$255 million.

Construction and tourism are two sectors of the UAE economy that have in part fueled demand for household furniture. Imported household furniture meets roughly 80 percent of the total market demand household furniture. Meeting this demand, Italian suppliers have secured a strong foothold in the imported furniture marketplace with a market share of 28 percent. U.S. suppliers are second with 11 percent of the imported furniture market in the UAE. Demand for American-style wooden furniture is the driving force behind increased growth in exports from the U.S. Such wooden furniture accounts for over 80 percent of all furniture exported to the UAE from the U.S. Overwhelming segments (over 80%) of the UAE population have been to the U.S. for vacation, business or education. As a result, the vast majority of the UAE population is very familiar with American-style wooden household furniture. In addition, a substantial population segment of expatriates living in the UAE proves to be a good market segment for U.S. suppliers. The value of the U.S. export share is expected to grow by an average of 18 percent annually for several years as there are strong preferences for American wooden furniture.

Exporting to the UAE is a fairly straight-forward process. Unlike other Middle Eastern markets, there are no significant trade barriers to the importation and sale of household furniture in the UAE. Customs duties are 4 percent.

3.3 Machinery (Packaging and Food Processing)

U.S. packaging machinery and food processing machinery industry sub-sectors are classified in NAICS code 333993 and 333294, respectively. They produce very specialized machines and tools such as packaging equipment and processing equipment for food, dairy, beverage and related sanitary processes. This industry shipped nearly \$4.8 billion worth of merchandise in 2001. During the same year, the industry had over 1,500 establishments employing about 45,000 workers.

The sector has experienced declining shipment volumes and employment in recent years. The total value of packaging machinery manufacturing (NAICS 333993) shipments decreased by over 13 percent between 1997 and 2001. During the same period, the value of food products machinery (NAICS 333294) shipments shrunk by 5 percent (see Tables 3-10 and 3-11).

Table 3-10. Packaging Machinery Manufacturing (NAICS 333993) Sector

Year	Employees	Total Value of Shipment (\$1,000)
2001	27,923	4,229,635
2000	29,259	4,615,645
1999	31,000	4,689,757
1998	32,385	4,928,283
1997	32,109	4,900,477

Table 3-11. Food Product Machinery Manufacturing (NAICS 333294) Sector

Year	Employees	Total Value of Shipment (\$1,000)
2001	17,733	2,707,791
2000	18,376	2,860,402
1999	19,102	2,899,710
1998	19,054	2,906,838
1997	18,898	2,857,928

Source (for both tables): Annual Survey of Manufacturers, Industry Statistics, U.S. Census Bureau, Dec. 20, 2002.

Between 1997 and 2001, U.S. exports of packaging and food processing machinery have fallen by 20 percent, while imports of such industrial equipment swelled by over 30 percent during the same period.⁵⁷ Such trends are also noticeable in the industry data collected for 2001. The industry, in 2001, faced growing U.S. domestic market demand, while experiencing a decline in both exports and shipments to the domestic market. Some imports would satisfy the unmet demand in the marketplace.

The total exports of packaging and food processing machinery, as a percent of total U.S. shipments, have been declining in recent years. In 2001, exports accounted for 15.5 percent of total shipments, down from 17.1 percent in 2000, 17.8 percent in 1999, and 21 percent in 1997.⁵⁸

Although this industry has been experiencing reduced value of total shipments in recent years, the long term trend continues to mirror the growing global demand. For thirty years, “the estimated value of world trade in processed foods has increased by an average annual rate of more than 10 percent.” In addition, over 2/3 of agricultural products traded in the international market is in processed food and beverages. More markets face increasing demand for processed food and beverages as developing countries experience economic and cultural changes stemming from industrialization, urbanization and rising wealth. It is expected that worldwide demand for processed foods will continue to increase in the future.⁵⁹

In the global marketplace, the following countries are leading markets for U.S. exports of food processing and packaging machinery: Canada; Mexico; China; Thailand; Poland; Argentina; and Brazil. Considerations were given to total value exported to these markets as well as growth rates, economic forecasts, trade barriers and other factors.⁶⁰

In addition to these markets, Japan, the EU, Australia and other locations present opportunities for exporting packaging and food processing equipment. The following section will discuss potential markets, opportunities and possible barriers of trade in terms of region, country, market size, type of barriers and export outlook: Exhibits 3-4 and 3-5 present the distribution of Appalachia’s food processing machinery and packaging machinery exports by state respectively.

⁵⁷ Office of Machinery, International Trade Administration (ITA), U.S. Department of Commerce (webpage updated 10/2002)

⁵⁸ PMMI Eighth Annual Shipments & Outlook Study (2003)

⁵⁹ Office of Machinery, ITA, U.S. Department of Commerce

⁶⁰ ditto

Exhibit 3-4: Appalachian Food Processing Machinery Exports (State Share of Appalachian Exports)

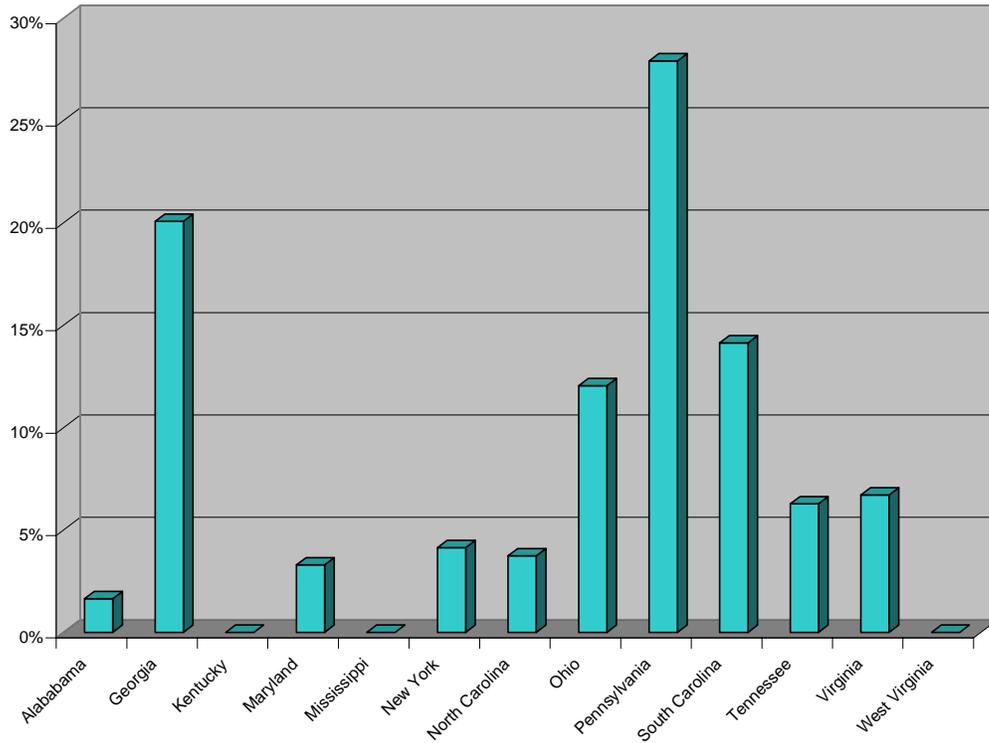
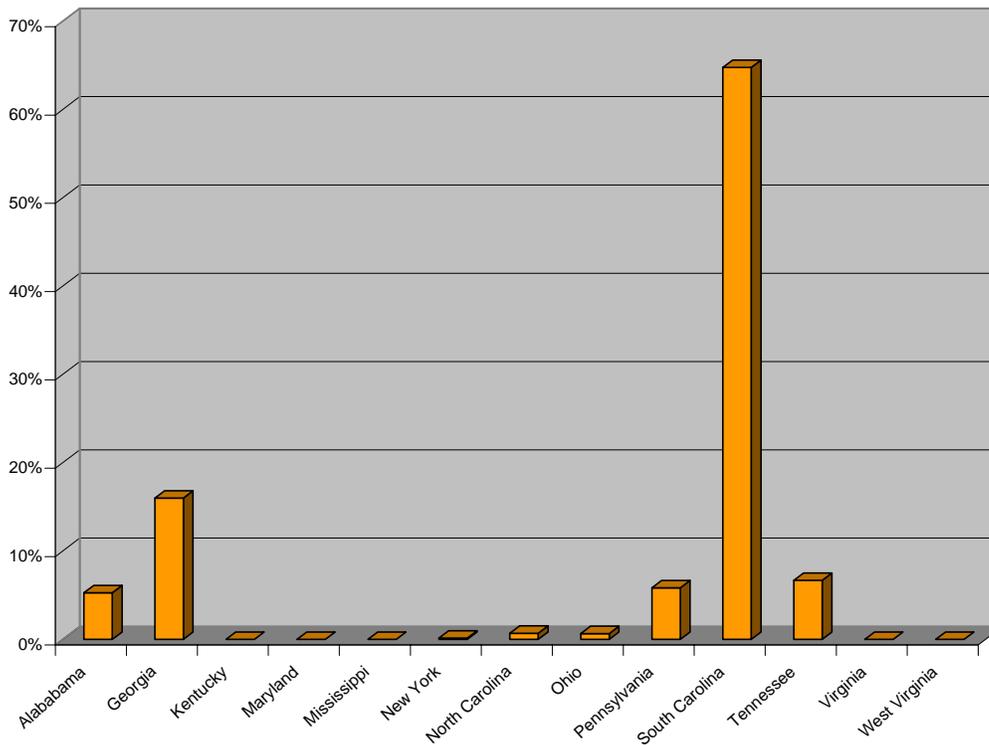


Exhibit 3-5: Appalachian Packaging Machinery Exports (State Share of Appalachian Exports)



Sources for both: ITA, MISER, U.S. DOC through IMPLAN. Calculations by JFA.

3.3.1 Asia/Pacific: China

China is one of the world's fastest growing markets despite recent downturns in the global economy. Rapid development and success among the Chinese are increasingly altering traditional diet and eating preferences. As China modernizes, people have less time to prepare food in traditional ways. With less time to make traditional meals and a growing appetite for western-style packaged food items, there is rising demand for processed, packaged food products. Currently, China only processes about 25 percent of its total food output. In comparison, the U.S. and other developed economies have over 90 percent of their food processed and packaged.

China's growing market for handling, processing and packaging food products calls for investing in more equipment to meet the demand. In a way, the rush for food processing and packaging equipment has already begun. According to the U.S. Department of State Commercial Service, China's market has seen tremendous expansion, and there is much more growth potential. A total of \$18.1 billion worth of food processing and packaging equipment entered China in 1998. In 1994, China imported such equipment valued at only \$800 million. An increase of over 126 percent from 1994 to 1998 offers an indication of fast growing demand for processed, packaged food products in China. Chinese domestic output of the food processing and packaging industry has picked up, and is expected to increase at a rate of 13 to 14 percent per year. In addition, there is a growing need to upgrade existing equipment for the industry.

U.S. exports to China face a very competitive market. Mainly, equipment originating from Japan, the EU (primarily Germany) and Taiwan dominate China's imports market for food processing and packaging machinery. Japanese equipment exports to China currently account for about 27 percent of the total imports. European, particularly German, machinery manufacturers have a strong presence in China. Germany controls nearly 22 percent of the imported food processing machinery market. The Taiwanese control about 16 percent of the imports market, while U.S. exporters have a market share of about six percent.

While opportunities exist, barriers to China's food processing and packaging equipment market for many U.S. and Appalachian firms are numerous. High tariffs constitute an effective import barrier. Under the WTO bilateral agreement, China's industrial tariffs will fall from an overall average of about 17 percent to an average of 9.4 percent. While import tariffs are falling after China's accession to the WTO, there are still other institutionalized non-tariff barriers. Chinese import quotas are largely non-transparent. Import licensing and other administrative control systems add more obstacles in penetrating China's lucrative imports market for food processing and packaging equipment.

Other non-institutional barriers may be overcome by many U.S. companies by investing in understanding the needs and culture of Chinese end-users. According to some Chinese industry sources, Americans' lack of familiarity with Chinese culture and customs weakens their market competitiveness whereas Japanese and German exporters cater to China's needs with higher satisfaction rates.

3.3.2 Asia/Pacific: Thailand

Thailand is another growing market that may bring positive opportunities for the U.S. manufacturers of food processing and packaging machinery. Increases in investment, export demand, and domestic sales of processed foods have been translated to a rising demand for food processing and packaging equipment. Thai food companies have been investing in equipment and materials to meet local and international demand for packaged food products. Trade sources estimate a double-digit growth rate for the market for food packaging equipment over the next few years. Equipment used in filling, closing, sealing, and labeling of bottles, cans, boxes, bags and other containers used in packing food items are expected to present ample opportunities for foreign equipment in the next several years. There are ongoing talks

between Thailand and the U.S. concerning a bilateral free trade agreement. This agreement stands to affect automotive, textile and agricultural products that Thailand exports to the U.S. While the current pursuit of an agreement between the two economies may impact foreign multinational corporations involved in automotive and clothing industries, many Thai food processing and other packaging businesses may draw benefits from a future bilateral agreement between the two economies. Increasing activities in the packaging and food processing industry will in turn create demand for additional equipment, much of which comes from foreign, including American, suppliers.

The market for packaging and processing machinery in Thailand is a competitive one. There is little competition from Thai domestic packaging equipment manufacturers. The Thai food processing and packaging industry imports much of its equipment from Japan, Germany and Italy. In 1999, Japanese suppliers had a market share of 21 percent, followed by Germany 14.5 percent, and Italy 13.6 percent. The U.S. had a market share of 12.7 percent in 1999.

Many foreign suppliers face similar competition as Thailand promotes an open market and free economy. There are no restrictions or technical standards imposed by the Thai government. Food processing and packaging equipment faces no import tariffs. While the marketplace is level, food regulations and standards that govern Thai food exporters in the international export markets tend to benefit U.S. suppliers of food processing and packaging equipment. One barrier some of the U.S. exporters face is that of the non-tariff/non-institutional kind. U.S. suppliers generally provide larger scaled, high-technology packaging and processing equipment and much of the Thai food industry cannot utilize larger U.S. machines. Small and medium businesses in the Thai food industry either cannot afford hefty investments or find larger scale equipment unsuitable. While many American machines used in packaging and food processing command a good reputation for quality and advanced technology, scale and cost of products often range outside what local food processors can afford. Provision of smaller, versatile and more scalable products may erode this obstacle.

3.3.3 NAFTA: Canada

In the NAFTA area, Canada presents a large marketplace that is an open-market economy that is close in terms of both geography and culture. One sub-sector in the Canadian food processing and packaging equipment segment is the meat processing equipment industry. Canada's meat processing sector expends more than \$5.5 billion a year on materials and supplies. Of the spending on supplies and materials for the meat processing sector, meat processing equipment accounts for nearly \$40 million a year, and the industry is expected to increase spending on the machinery at an annual average growth rate of 4-5 percent for next several years. Growth outlook on this sector is optimistic.

In 1999, U.S. companies had an import market share of 50 percent in Canada. This large market share has been relatively unchanged since the late 1980s. In the Canadian market, main competitors include the Netherlands with 16 percent of the import market share, Germany with 14 percent, Italy with 6.5 percent, and Switzerland with four percent.

The dominant market position held by U.S. manufacturers is well secured according to trade experts. Similarities in eating habits, packaging requirements, and technical codes and standards between the U.S. and Canada promote a favorable competitive environment for American exporters. Further, there are no significant trade barriers or restrictive practices impeding U.S.-Canada trade. Following provisions under NAFTA, Canadians importing U.S. food processing and packaging equipment face no import duties.

3.3.4 NAFTA: Mexico

The Mexican market for processed foods has been expanding at a rapid rate since 1995. Given the mounting market demand, Mexico's food processing industry has been growing as well in order to keep pace. Mexico's total market for food processing and packaging equipment, including parts, was over \$3 billion in 2000, and there are over 13,000 registered food-processing firms in the country. The Mexican market is expected to grow by 10 to 12 percent annually in next several years.

According to Asociacion Mexicana de Envasey Embalaje (Mexican Process and Packaging Association), the growth in consumption of processed and/or packaged foods is anticipated to increase at an average rate of 15 to 20 percent annually. As appetites for processed, prepared food products rise among Mexicans, and increased demand for such food products applies pressure to foods suppliers, the Mexican food industry must upgrade infrastructure and equipment to meet the market demand. Some sources indicate that the Mexican packaging industry is about five years behind the U.S. packaging industry. Further, there are no significant trade barriers or restrictive practices impeding U.S.-Mexico trade. Following provisions under NAFTA, Mexican establishments importing U.S. food processing and packaging equipment face no import duties. Imports of food processing equipment have no restrictions but are subject to strict labeling requirements and compliance with mandatory standards.

The U.S. suppliers of food processing and packaging equipment have a very dominant position in the Mexican import marketplace. American manufacturers of food processing equipment have benefited from NAFTA in part due to the low import duties. Almost all of the equipment is exempt from duties compared to non-NAFTA countries, which must pay 23 to 30 percent of tariff rates for the same equipment. The geographic proximity of Mexico to the U.S. border, results in lower transportation costs for U.S.-Mexican trade. Further, Mexicans are more accustomed to doing business with U.S. companies. U.S. import market share has increased over the years and more than half of food processing equipment imported to Mexico is from the U.S.

3.3.5 Latin America: Brazil

The total value of the Brazilian market for food processing and packaging machinery is estimated to exceed \$450 million. According to estimates, nearly 70 percent of the market demand is met by domestic production while the remaining 30 percent of the market is served by foreign imports. Imports from the U.S. make up approximately 14 percent of the total imports market with Italy (27%) and Germany (21%) holding significant import market shares.

Brazil has a mature food processing and packaging industry. While much of the demand for equipment is met domestically, many technically advanced, sophisticated machines are supplied by foreign manufacturers. Many small and medium sized Brazilian food processing and packaging firms tend to purchase domestically produced packaging and processing equipment while larger firms and multinational firms operating in Brazil often turn to foreign suppliers for equipment. These larger businesses also seek highly advanced, automated, efficient machines. Regulatory and market trends point to more sophisticated technology and higher efficiency in food processing and packaging in Brazil. Many U.S.-made machines and products have a good reputation for advanced technology and high quality. The U.S. industry supplying equipment to Brazilian food processing and packaging businesses have good prospects in providing machinery with higher efficiency levels, automated devices and new technology.

U.S. companies exporting to Brazil face a number of tariff and non-tariff types of trade barriers. While virtually all imports from its MERCOSUR partners enter Brazil duty-free, U.S. suppliers experience a distinct disadvantage entering the market in Brazil. As a member of MERCOSUR, Brazil implements the

MERCOSUR Common External Tariff (CET). Capital goods such as machines used in food processing and packaging, mostly bear a 14 percent tariff.

The Brazilian Government imposes a series of restrictions in the importation of used equipment, parts, pieces and accessories. Regulation No. 370 (Portaria) of the Brazilian Ministry of Industry, Commerce and Tourism dated November 28, 1994 establishes the rules and regulations for importing these products into Brazil. Transfer of manufacturing plants from overseas to Brazil that generate new jobs, increase exports and result in cost reduction are exempt from these restrictions. Because of the substantial price difference between used and new machines, there is a niche market for used machines in Brazil, although the procedures for gaining import approval are complicated. Import duties on refurbished machines are the same as on new products; however, even when the new machine is exempt from the Tax over Industrial Product, the tax is levied on imported used machines.

The Brazilian Government, through the Foreign Trade Secretariat and the Industrial Policy Secretariat, authorizes imports of used food processing and packaging machinery, provided they are not produced in Brazil nor can they be replaced by locally-made equipment that performs the same functions of the imported machinery. The import authorization will only be granted if no local producer can prove that domestic production of a similar product exists. This proof must be provided to the Foreign Trade Secretariat within thirty days from publication in the Brazilian Daily Registry (*Diario Oficial da Uniao*).

3.3.6 Latin America: Argentina

Total market for packaging equipment in Argentina is estimated to be over \$100 million. Virtually all (roughly 90%) of the packaging equipment in Argentina is imported. The main suppliers for Argentina are Italy, Germany and the U.S. Italy is the leader with 31.5 percent of the import market while Germany holds over 20 percent of the market. The U.S. is ranked third among packaging equipment exporters to Argentina with 12 percent of the market share. European competitors in the marketplace have been able to provide more competitive financial terms, thus gaining additional market share. Among food processing, meatpacking, and sugar packaging equipment sub-sectors, the U.S. ranks first in exports. The Argentine market for food processing equipment is estimated to be over \$70 million. This market is also mostly dominated by imported equipment. The main suppliers for Argentina's food processing machines include American, German, Italian, French, Spanish and Brazilian companies. Together, they account for more than 70 percent of food processing equipment imported to Argentina. In 1999, the import market share for the U.S. was 20 percent. Italy held 19.5 percent; Germany 11.8 percent; France 11.2 percent; Brazil 8.8 percent; and Spain 6.4 percent. In terms of quality, local production offers little competition. Imported equipment provides superior products to the Argentine market. The U.S.-made machinery is recognized for quality. Additional offering of attractive payment terms can increase the competitive position of U.S.-based suppliers of food processing equipment in Argentina.

Even though the import market has decreased, mainly due to a serious economic downturn in Argentina, projections forecast increasing market share and imports from U.S. suppliers in coming years. Outlook for U.S. and Appalachian food processing machines in Argentina is fair despite difficult economic conditions. The U.S. increased its market share from 17 percent in 2001 to 21 percent in 2002. Table 3-12 shows information concerning market size and potential of Argentine food processing equipment and related packaging machine subsectors.

Table 3-12. Argentine Market for Food Processing and Packaging Equipment

	2000	2001	2002	Projected Growth (%)
Total Market	78	57	44	5%
Local Production	27	25	20	10%
Exports	13	13	12	8%
Imports	64	45	33	5%
Imports from U.S.	19	8	7	10%

Source: unofficial estimates based on Argentine Customs data and other sources.

Argentina has eliminated much of non-tariff barriers and specific import duties over the recent years. The intra-MERCOSUR tariffs are currently at zero. Most extra-MERCOSUR tariffs for food processing and packaging equipment are 14 percent. In addition to trade barriers stemming from tariffs, exporting to Argentina faces cumbersome customs procedures that pose obstacles to legitimate trade activities. Argentina has import monitoring mechanisms, similar to an import-licensing regime, which affect roughly 20 percent of all imports. U.S. suppliers also complain that unwieldy certificates of origin requirements introduce added burdens for them.

3.3.7 Europe: Poland

In the European marketplace, Poland is becoming increasingly attractive for foreign investors and exporters. Its food processing and packaging equipment segment has a prominent place in the Polish economy, and is well positioned to take advantage of the country's agricultural output. The Polish food processing industry is undergoing modernization, and the industry is expected to continue rapid development. In addition, Polish consumers have been experiencing a rise in purchasing power, and preference for processed/packaged food items is increasing. These trends encourage the demand for food processing and packaging equipment.

In 1999, the equipment market was estimated to be about \$340 million. Only about 13 percent of market needs are met by Polish domestic production. The rest is supplied by foreign imports. Machines originating from the EU (i.e. Germany, Italy) dominate the imports market, in part, due to their proximity, and lower cost of transportation. The value of food processing and packaging machines from the U.S. accounted for over three percent of food processing equipment imports in 1999.

While U.S.-made equipment is not well known in Poland, it is expected that imports from the U.S. will increase at an estimated annual growth rate of two percent. The U.S.-made machines have burdens of higher price. Other key factors of competition such as productivity, after-sale service and specialization of machineries can enhance sales in Poland as American machines currently have a good reputation.

Penetrating the Polish market for food processing and packaging equipment, some of the tariff and non-tariff barriers must be overcome. In terms of tariffs, machines imported from the U.S., including Appalachian manufacturers, face higher customs rates than those imported from the EU, other European nations, and other developing nations. Current customs tariff codes for U.S. food processing equipment range from 5 to 9 percent. Since Poland joined the EU in 2004, U.S. exporters can have tariffs on U.S.-produced machinery to reflect EU levels. In terms of non-tariff trade barriers, Poland's inefficient and slow legal system can impede the ability of exporters and investors to conduct business there. U.S. firms have complained frequently that the Polish court system is slow and unreliable, preventing many U.S. suppliers of machinery from protecting their investments, rights and business interests there. Ineffective court cases that do not resolve disputes or punish the infringing entity tend to result in lost business

opportunities for U.S. suppliers. Such deficiencies limit the ability of U.S. firms to enforce the terms of contracts with their Polish business partners.

3.4 Microelectronics

Manufacturing segments that make up the microelectronics industry produce semiconductors, printed circuit boards, electron tubes, capacitors, resistors, inductors and other electronic connectors and components are examples of manufactured microelectronics products. Their products reflect, by and large, light-weight, high-value items requiring speedy yet flexible transportation of the goods. Largely, the microelectronics group can be classified under NAICS code 334—Computer and Electronic Product Manufacturing. While these establishments have experienced rapid growth in the past five to ten years, they also faced precipitous drops in market demand for high-technology commodities as the recent downturn in the economy has been suppressing economic activities in the tech sector. The following tables (3-13 and 3-14) will attest to both the enormity of the microelectronics industry value and the difficult times the industry has been facing in recent years. Both employment and total value of shipment have declined from 1997 to 2001. It is worthwhile to note that the total value of shipment of the microelectronics industry eclipsed a half trillion dollars in 2000. With economic recovery on the way, the sector will regain some ground in coming years.

Table 3-13. Computer and Electronic Product Manufacturing (NAICS 334) Sector

Year	Employees	Total Value of Shipment (\$1,000)
2001	1,598,766	429,470,841
2000	1,652,745	510,638,486
1999	1,610,202	467,059,396
1998	1,686,623	443,767,112
1997	1,691,146	439,381,300

Table 3-14. Semiconductor and Other Electronic Component Manufacturing (NAICS 3344) Sector

Year	Employees	Total Value of Shipment (\$1,000)
2001	566,864	124,215,433
2000	614,083	166,670,953
1999	586,221	146,798,872
1998	585,395	133,193,113
1997	587,313	139,083,873

Source (for both tables): Annual Survey of Manufacturers, Industry Statistics, U.S. Census Bureau, Dec. 20, 2002.

Following general trends of the economy and the industry group, the sector's export volume and value of shipment also fluctuate over the years. While the export shipment volume dropped since 2000, a longer term trend shows that it has been up slightly from \$42 billion in 1998 to \$44 billion in 2002 (see Table 3-15). It is worthwhile to note that the Asian region consistently received nearly one half of all microelectronics exports from the U.S. from 1998 to 2002. Despite the economic downturn, over the five year period from 1998 to 2002, U.S. exports of microelectronics to Asia increased by 14 percent in five years. As shown in Table 3-16, U.S. exports of semiconductors to China drastically rose between 1998 and 2002, roughly by a multiple of three. Another notable marketplace is Eastern Europe. While the absolute size of the market is still relatively small, the market poses growth potential. From 1998 to 2002,

the total exports of microelectronics to Eastern Europe increased by 160 percent (from \$46 million in 1998 to \$120 million in 2002). Exports to Canada have experienced some fluctuation while exports to Latin America have remained fairly steady over the years.

Table 3-15. Microelectronics Exports from the U.S. to the World

NAICS 334 Microelectronics	1998	1999	2000	2001	2002
	<i>In 1,000 Dollars</i>				
Canada	4,140,889	4,500,106	5,488,675	3,559,192	2,528,103
Latin America	7,810,413	9,353,477	12,211,708	9,233,214	7,800,756
EU	5,654,909	6,375,107	8,792,565	7,237,169	5,530,089
Eastern Europe	46,825	60,824	100,176	74,708	120,953
Russia	17,497	16,273	21,229	24,026	21,395
Asia	24,033,613	31,050,427	39,150,542	27,361,644	27,408,724
Oceania	154,009	153,519	175,114	148,474	138,230
Other	666,504	873,290	1,303,427	976,400	770,282
World	42,524,659	52,383,023	67,243,436	48,614,827	44,318,532

Sources: Data on this site have been compiled from tariff and trade data from the U.S. Department of Commerce, the U.S. Treasury, and the U.S. International Trade Commission.

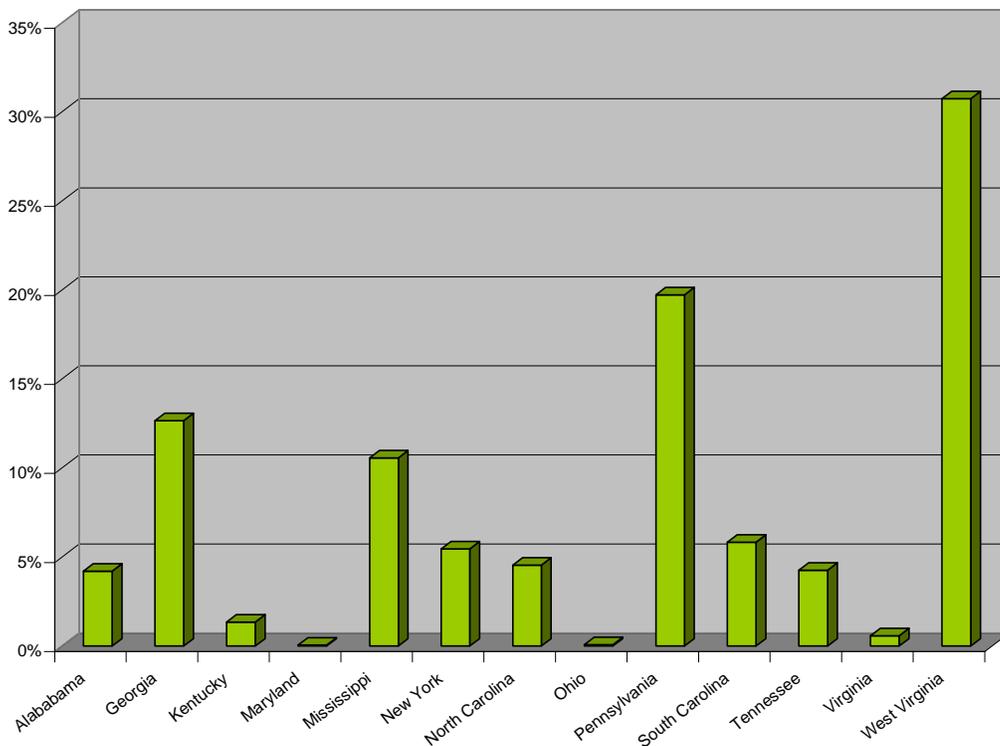
Table 3-16. Semiconductors Top 20 U.S. Exports and Total

NAICS 334413 Semiconductors	1998	1999	2000	2001	2002
	<i>In 1,000 Dollars</i>				
Malaysia	3,610,407	4,410,584	5,030,203	3,618,863	4,439,023
Philippines	3,276,776	3,997,519	4,697,596	4,315,552	4,406,583
Taiwan	2,119,334	2,594,733	3,845,048	3,014,346	3,520,697
Korea	3,197,280	5,633,241	5,435,274	3,049,292	3,329,186
Mexico	2,386,251	3,177,717	4,487,737	3,382,329	2,497,241
Japan	2,282,738	2,800,683	3,295,506	2,558,123	2,054,715
Singapore	2,463,820	2,541,024	2,977,516	1,805,386	1,559,269
Germany	635,278	784,419	1,042,321	1,178,938	1,317,490
Canada	2,643,684	2,786,539	3,302,162	1,833,674	1,294,241
China	440,620	641,848	685,815	946,060	1,237,502
Hong Kong	1,355,931	1,751,153	1,904,789	1,339,887	1,227,889
Thailand	1,073,777	1,175,709	2,099,641	1,523,231	758,399
United Kingdom	1,026,315	1,153,542	1,405,185	1,019,909	728,549
Costa Rica	12,296	139,900	219,195	241,553	726,069
Netherlands	265,179	317,888	333,519	341,641	474,155
France	547,975	540,433	801,200	496,804	348,097
Brazil	225,839	372,080	629,738	487,791	260,926
Ireland	227,979	302,831	377,148	306,027	223,638
Israel	116,705	165,161	408,188	285,891	211,725
Italy	153,706	202,230	399,703	246,886	192,315
Subtotal, Top 20:	28,061,889	35,489,231	43,377,482	31,992,182	30,807,711
All Other:	992,823	1,126,080	1,450,793	1,462,457	929,877
Total	29,054,712	36,615,311	44,828,274	33,454,639	31,737,587

Sources: Data on this site have been compiled from tariff and trade data from the U.S. Department of Commerce, the U.S. Treasury, and the U.S. International Trade Commission.

Canada and Mexico represent relatively large export markets that are close to U.S. suppliers. Both countries import significant amounts of semiconductors and other microelectronic components and products from the U.S. While the absolute size of Canadian and Mexican opportunities is large, the markets also have been affected by domestic economic downturns due to their geographic proximity. Among the global markets farther away from the U.S., Asian economies import a bulk of American microelectronics products. Of the Asian economies, Taiwan has had very strong demand for U.S.-made semiconductors and microelectronic components, and is forecast to have robust growth in future demand for U.S.-made microelectronics. China and Eastern European markets also open many dynamic growth opportunities for exporting microelectronic components for American manufacturers. China, especially after its recent accession to the WTO, is one of the fastest growing markets for technology products. Exhibit 3-6 presents the distribution of Appalachia's microelectronics exports by state.

Exhibit 3-6: Appalachian Exports: Electronic Components (State Share of Appalachian Exports)



Sources: ITA, MISER, U.S. DOC through IMPLAN. Calculations by JFA.

3.4.1 NAFTA: Canada

The Canadian market for electronic parts and components is composed of semiconductors, printed circuits, connectors, capacitors, resistors, diodes, switches, relays, transformers, plugs, switchboards, and other varieties of electronic parts. A sub-sector of the electronic parts and components market is semiconductors. This sub-sector makes up an increasing part of modern manufacturing, and the Canadian market represents a large potential for semiconductor makers. Canada represents a good market for U.S. suppliers in the industry. Canada has historically run trade deficits in its trade of electronic components with the world and the U.S. The Canadian market size for electronic parts and components is estimated to exceed \$15 billion, and approximately 86 percent of the total market is supplied by imports. The U.S. controls nearly 50 percent of the Canadian electronic parts and components market, and over 62 percent

of all electronic parts and component imports into Canada. Table 3-17 shows electronic components that Canada imported most in 2001.

Trade experts anticipate that U.S. suppliers of electronic components will continue to enjoy a very receptive market in Canada. As more Canadian-based companies engage in the manufacturing of electronics systems, more parts and components will be necessary. Taking advantage of proximity and a very dominant market position, U.S. suppliers of microelectronic components have good outlook in exporting opportunities to Canada.

Table 3-17. Top 5 Electronic Components Canada Imported in 2001

Product	U.S.\$ (in millions)
Integrated circuits	4,330
Switches, relays and plugs	2,714
Wire and cable	2,413
Cathode-ray tubes	2,294
Printed circuits	1,211

Source: International Trade Administration (ITA).

3.4.2 NAFTA: Mexico

Much of Mexico's electronic components market is dominated by foreign imports. This industry is a significant sector for the Mexican economy, and is an evolving one. Mexico imports many electronic components and produces finished or intermediary products and (re)exports the assembled products. After NAFTA, this industry has grown both in terms of size and scale. The industry has moved into new product lines away from traditional markets. It is a very important industry in Mexico and involves automotive electronics, network equipment, game consoles, printers, high capacity servers, storage media and even semiconductor design. The industry imports 92 percent of necessary parts and 85 percent of the imports are provided by U.S. suppliers. The U.S. holds a dominant market position in the Mexican electronics component market.

Geographic proximity and inexpensive labor provide Mexico with opportunities to import foreign microelectronic components and assemble intermediary or final products that get shipped to the U.S. and other global markets with much more value added. Multinational technology firms such as HP, IBM, Siemens, Kodak, Sony, Samsung, and Mitsubishi have manufacturing plants in Baja California and Guadalajara, among many other locations inside Mexico. Texas Instruments and Siemens are examples of growing specialty microelectronics segments in Guadalajara. They are venturing in automotive electronics. Others produce computers (laptops), telecommunication equipment, computer peripherals (printers) and circuit boards. Table 3-18 summarizes market size data for electronics parts in Mexico.

Table 3-18. Market Size Data for Imported Electronics Parts and Accessories (US \$ millions)

	2000	2001	2002
Import Market	42,347	30,010	27,000
Local Production	438	501	550
Total Market	42,785	30,510	27,550
Imports from U.S.	33,071	26,650	21,000

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration (ITA).

Mexico still represents an attractive marketplace for exporting microelectronic components. The market has recovered somewhat from 2000-2002 economic slowdown which dampened the overall demand for the microelectronics sector. Renewed growth in 2003 coupled with proximity of U.S. suppliers to the Mexican market and the low transportation costs contributes to the U.S. dominant market position in Mexico.

The top five electronic components imported from the U.S. to Mexico are: integrated circuits; cathode-ray tubes; printed circuits; switches, relays and plugs; and capacitors. Under NAFTA, it is advantageous for Mexican businesses to import electronic components from U.S. suppliers. NAFTA affords virtually duty-free trade of electronic components, and improved customs procedures. In addition, geographic proximity allows short lead time and lower transportation costs.

3.4.3 Asia/Pacific: China

China with its rapidly growing export industries, combined with swelling trade deficits in the U.S., has been viewed as a serious economic competitor in recent years. As China has been forging its economy as a future economic power with its exports, its domestic marketplace has been expanding very quickly. With its accession to the WTO, China's emerging domestic market poses abundance of opportunities for foreign exporters.

China is one of the fastest growing IT markets in the world, and recently passed Australia to become the second largest market in Asia after Japan. In the past two years, China's IT industry has been growing at an annual rate of over 30 percent. Last year, China's IT market size exceeded \$22 billion, according to International Data Corporation (IDC). China's market is expected to grow to be a \$40 billion marketplace by 2006, according to IDC. Much of the market (over 70%) is attributed to hardware purchases while the rest of the market consists of software and IT services.

Trade of IT hardware products between the U.S. and China has tripled between 1998 and 2002. U.S. exports to China have been growing much slower than China's exports of computer and related items to the U.S., leading to a significant trade deficit in this area. The U.S. exports of IT hardware products to China amounted to nearly \$580 million in 2002. China shipped over \$9 billion worth of computer equipment to the U.S. in the same year. China's accession to the WTO is expected to encourage more IT exports from the U.S. to China as some tariffs levied on IT hardware products are adjusted.

Relative to other sectors and the IT software segment, the Chinese market for IT hardware is comparatively open. For various reasons, the Chinese government is willing to allow greater competition in the hardware segment—especially after China's accession to the WTO. China has signed the Information Technology Agreement (ITA) as a condition of joining the WTO. The ITA began eliminating tariffs starting in 2002, and eliminating tariffs on 2/3 of the products by January 2003. Tariffs on all remaining products are scheduled to disappear by 2005. Industry experts estimate that the U.S. saved about \$500 million in tariffs in 2002 alone.

While many large U.S. companies such as IBM, Dell, HP and Compaq already have a good foothold in China, many U.S. suppliers face competition from domestic producers and regional suppliers from Taiwan, Japan and Korea. Chinese domestic competition is very fierce. Chinese PC makers hold over a half of the domestic market demand. Multinational firms such as IBM and HP had to form local joint ventures in order to penetrate and gain market access into China. Despite its accession to the WTO, local Chinese technology companies maintain close-knit relationship with large government and other official buyers. Cost is a key factor in gaining competitive advantage in China. Dell, known for its operational efficiency and scalable and inexpensive hardware, lowered prices in China, only to be countered by a 14

percent discount offered by a Chinese PC giant, Legend. Legend and other Chinese producers maintain a strong foothold in the domestic PC market in China.

Internationally, many U.S. companies must face stiff competition from regional foreign suppliers from Taiwan, Japan and Korea. Along with the U.S. firms, these foreign suppliers also face similar limitations and challenges entering China. With additional market access projected with China's entrance into the WTO, the U.S. must improve pricing structure and services to better compete in a more open marketplace.

There are also other barriers. U.S. Department of Commerce export licensing applies to technologies that may have "dual-use" for both civilian and military purposes. China, while committed to the WTO agreements, still has several trade barriers. China recently announced a new import standard, "China Compulsory Certification." PCs, portable (laptop) computers, monitors, printers, multipurpose printer/fax/copy machines, scanners, power supply units, game consoles, leaning machines, servers and others must carry the China Compulsory Certification Mark (CCC) starting May 2003. The certification process is another hindering step for U.S. exporters.

3.4.4 Asia/Pacific: Taiwan

Taiwan has been an important industry leader in technology, especially in the semiconductor sector. In recent years, the global economic downturn and slow market demand for IT products have affected most industrialized nations and electronics component marketplaces around the world. Despite the slow economy, Taiwan's market for semiconductors has seen improvements, and its market is recovering. The Taiwanese market for electronics parts and components can offer U.S. suppliers an opportune place to increase their market share.

Economic slowdown has reduced Taiwan's market for semiconductors from \$16 billion in 2000 to \$10 billion in 2001. While such reduction is a drastic one, the market still represents substantial business opportunities. U.S. exports of electronic components, including semiconductors, improved by 16.5 percent from 2001 to 2002 (from \$3.2 to \$3.7 billion). Current conditions provide U.S. suppliers with good footing especially in light of the recent withdrawal of Japanese competitors from Taiwan's DRAM market. U.S. suppliers now have secured the third largest market share in Taiwan's semiconductors import market, over their Japanese counterparts. Tables 3-19 and 3-20 display data reflecting Taiwan's strength in semiconductors and data showing U.S. exports of microelectronic components to Taiwan.

Table 3-19. Taiwan's Market for Semiconductors

	2001	2002	2003	Projected Avg. Annual Growth Rate
Total Market	10,056	10,100	11,850	10-15%
Local Production	6,510	7,500	6,900	15-20%
Exports	2,987	3,900	4,500	15-20%
Import Market	6,533	6,500	6,900	10-15%
Imports from U.S.	784	780	830	10-15%

Source: U.S. Department of Commerce: Bureau of the Census; International Trade Administration (ITA).

Table 3-20. U.S. Exports of Electronic Components to Taiwan 1998-2002 (in \$1000)

	1998	1999	2000	2001	2002	%Change 2001-2002
Taiwan	2,346,588	2,807,356	4,092,048	3,187,444	3,713,279	16.5%

Source: International Trade Administration (ITA).

U.S. suppliers of electronic components and parts to Taiwan face competition from Malaysia, the Philippines and Japan. In 2001, the three countries held Taiwan's import market shares of 18.4 percent, 16.6 percent and 11.8 percent respectively. Japanese firms, principal competitors of U.S. suppliers, have been losing market share in recent years. Meanwhile, U.S. producers have been enjoying increased sales in the segments of micro-components, logic ICs, DRAMs, microprocessors and analog ICs. The U.S. products are well received, and generally carry a reputation of superior technology, quality and performance in Taiwan's import market.

Currently, Taiwan uses a tariff system based on the Harmonized System, and the duty on imported products is defined on an ad valorem basis. There are no import duties for semiconductors and U.S. technical standards are generally accepted in Taiwan.

3.4.5 Eastern Europe & Russia

Economies of Eastern Europe and Russia offer tremendous business opportunities for U.S. firms supplying microelectronics products, parts and accessories. These economies have begun opening up, and liberalization process creates prospects for U.S. exporters.

The Russian market for the IT sector represents a growing and dynamic market for U.S. suppliers. The Russian market for the IT hardware segment is expected to grow at a double-digit annual growth rate. The market size increased at a 20 percent rate from 2001 to 2002. The Russian IT market size in 2002 was estimated to be \$3.9 billion. The Hungarian IT sector is also a dynamic marketplace that is growing fast. It is estimated that the market size in 2002 was around \$4.7 billion and the sector would experience a healthy growth rate of over 8 percent in 2003. In Slovakia, the IT market is estimated to be about \$450 million at an 11 percent growth rate. For 2003 onward, the IT market growth in Slovakia is expected to range from 10 to 13 percent annually.

In Russia, the total number of computers was over 11 million in 2001, which was an increase of over 6 percent from 2000. There is significant room for growth in this market. Only about 15 percent of Russia's computer segment demand is met by imports. The rest of the demand is met by locally assembled, manufactured products. While Russian manufacturers provide low-cost assembled PCs, other system components including printers, peripherals, servers and networking hardware are mostly imported.

Russia's IT imports market is very receptive to U.S. suppliers and their products. Larger companies such as IBM, HP/Compaq, Microsoft, Sun Microsystems and others have strong presence in the Russian market already. Major groups in Russia that are end-users of IT products, microelectronics parts and components are multinational companies, government agencies and Russian companies. Market access to Russia is fairly straightforward according to many analysts. U.S. exporters generally report few problems.

In Slovakia, the IT market was estimated to be around \$450 million with an 11 percent annual growth rate in 2002. It is expected that the market will increase in size at an annual rate ranging from 10 to 13 percent in coming years. Much like other Eastern European bloc economies, recent liberalization processes in Slovakia have provided export opportunities for many American microelectronics suppliers. Robust

demand for technology in both consumer and corporate sectors has been fueling a rapid increase in the IT market. The number of Internet users in Slovakia more than tripled between 1997 and 2001.

Competing in Slovakia is not without challenge. European competitors such as Germany, France, UK, Sweden and Finland have a clear advantage in geographical and cultural proximity with Slovak markets. Besides the market competition, U.S. microelectronics suppliers face few problems. Market access to Slovakia is fairly straightforward. Import/export documentation is similar to that of EU countries. Most high-tech western technology can flow into Central and Eastern Europe without U.S. export licenses.

In Hungary, the domestic computer hardware equipment market is estimated to be over \$450 million. If network equipment and telecommunication hardware were counted, the market potential may exceed one billion. The segment has been growing at a very high annual growth rate ranging from 7 to 8 percent in recent years. An estimated 2 million PCs are used in Hungary, and about 1.6 million people are using the Internet. With increasing demand for technology and computers, Hungary represents an emergent and energetic market for U.S. microelectronics suppliers.

PC sales in Hungary have had significant increases from 2001 to 2002. The overall PC market expanded by 10 percent and demand for laptops grew by over 30 percent during the same period. Larger multinational corporations such as IBM, HP/Compaq, Microsoft, Sun Microsystems and others have a strong presence in Hungary. Many U.S. companies have a solid foothold in Hungary, and represent a majority in several different market sub-segments (i.e. markets for servers, consumer PCs, printers and other peripherals, and components). The Hungarian government has identified the IT sector as a priority economic sector, and is actively supporting business and individual access to IT. Such initiatives include direct spending of over \$100 million in 2001; and over \$150 million in 2002. Principal opportunities in Hungary for exporting U.S. microelectronics include individual consumers of IT products (computers, peripherals), Hungarian businesses (servers, peripherals, laptops and components) and Hungarian manufacturers (components). Market access to Hungary is favorable. Although Hungary has not signed the 1996 Singapore Treaty that stipulates duty rates on import of IT products, there are no import duties on computers, storage units, printers and other equipment from the U.S.

Summary

- ◆ For Appalachian exporters of automotive parts, NAFTA economies (Canada and Mexico) present the largest export market. Established Western European markets (Germany and Sweden), Asia/Pacific (Korea), and Latin American markets (Argentina) also offer good prospects for future growth.
- ◆ For Appalachian wooden household and upholstered furniture manufacturers, NAFTA markets (Canada & Mexico), Germany, Korea, Saudi Arabia, and the United Arab Emirates represent leading export markets.
- ◆ Canada, Mexico, China, Poland, Argentina, Brazil and Thailand are leading markets for Appalachian exports of food processing and packaging machinery.
- ◆ China and Eastern European markets open many dynamic growth opportunities for exporting microelectronic components for Appalachian manufacturers. Asian economies such as Taiwan also offer opportunities for growth in future demand for U.S.-made microelectronics.