# Free Trade with Cuba:
# The Effects of a Lifted Embargo in Alabama

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**Abstract.** Trade with Cuba will provide export and investment opportunities, and ultimately some competition for Alabama. Cuba is a large neighbor with substantial economic potential that will provide trading opportunities missing with the embargo. The present paper examines the potential impacts of lifting the on Alabama at the aggregate level of manufacturing, services, and natural resource sectors. The effects on output levels, wages, capital returns, and energy prices are examined in a simulated general equilibrium model of production.

This paper presents some background information on the Cuban economy and gauges the potential effects in Alabama of a lifted embargo. The first section briefly reviews Cuban economic history and the second summarizes available economic data.

The following sections present a model of the Alabama economy adjusting to a lifted embargo with price changes simulating the impact of free trade. The sectors in the model are manufacturing, services, and natural resources, and the inputs are capital, labor, and energy. Output levels and input prices adjust to trade prices in the competitive production model.

## 1. History and Trade Potential of Cuba

The US became involved with Cuba following its independence from Spain in the early 1900s. Cuba began a period of growth but juntas vied for power in the 1930s leading to US military intervention to protect agricultural investment. There was some political stability in the 1940s under Batista but he became an unpopular dictator supported by the US during the 1950s leading to the rise of Castro by 1959 (Library of Congress, 2006).

Prior to the 1962 embargo there was substantial US investment in sugar and tobacco production for export. In 1926, US companies owned 60% of the Cuban sugar industry and 95% of the crop was exported to the US. In 1958, the US accounted for 67% of Cuba's total exports and 70% of its imports. In the other direction, Cuba accounted for 3% of US exports and 4% of imports, not a trivial amount.

Castro became politically prominent during the Cold War. The collapse of communism ended Soviet subsidies in 1991 leading to substantial economic adjustment. Some private business has developed, especially in agriculture, and there is limited foreign investment mainly from Europe. Sugar has remained the top export but cigars and fish have replaced citrus and are more competitive internationally as pointed out by Messina, Bonnett, and Taylor (2007).

Cuba has limited but normal relations with the world outside the US. Cuba rejects globalization, however, and investment controls remain tight as state enterprises do not want international competition, consistent with Alvarez's (2007) finding of higher productivity of non-state relative to state agricultural production.

There is little political rationale for the embargo as the US traded with other Communist countries throughout the Cold War. The embargo not only failed to reach any political objective but also spotlighted and strengthened Castro. With no embargo, Castro would have had no publicity and shrinking support within Cuba. The Southeast and Alabama in particular suffered due to the embargo. The US International Trade Commission estimates the embargo costs the US $1.2 billion annually in lost

export revenue, less than 0.1% of total US export revenue but focused on particular industries and regions.

The relaxed embargo in 2001 for humanitarian exports of food and medicine to Cuba catapulted Alabama trade to over $126 million by 2004. Political pressure from US agribusiness contributed to the relaxed trade embargo. By 2006, Cuba accounted for 1/4 of Alabama agricultural export revenue.

Cuba has substantial production potential. Cuba is the largest island in the Caribbean, about as large in land area as Alabama, and 2/3 of the land can be cultivated. Cuba's population of 11 million is about twice that of Alabama, and about equal to Georgia or the combination of Mississippi, Louisiana, and Arkansas.

Cuba's major agriculture exports are sugar, citrus fruit, fish, cigars, and coffee, while Alabama's are poultry, cotton, peanuts, soybeans, and feed grains. There would be little immediate direct competition in agricultural trade between Alabama and Cuba, and opportunity for profitable trade on both sides. Cuba also has mineral deposits of nickel (world's second largest reserves), cobalt, iron, copper, chromite, manganese, zinc, and tungsten, not to mention unexplored petroleum potential. Cuba has no potential to export manufactures at present but that will change with foreign investment.

Cuba trades with the US through third countries and smuggling. Exports from Europe, South America, and Asia to Cuba have higher transport costs than from the US. Mobile is only 600 nautical miles or a two day sail from Havana, and was the dominant port prior to the embargo. Under the present relaxed embargo, Alabama ships poultry, catfish, soybeans, and eggs to Cuba. About $30 million of poultry was shipped during 2006. Other major exports are utility poles, lumber, and cotton.

In 2006, about 1/3 of US exports to Cuba were from Alabama. There is potential to increase agricultural trade simply with relaxed travel and financial restrictions (ITC, 2007). Florida is more advanced in trade negotiations and operations, but the product mix may favor Alabama.

Increased political pressure to liberalize trade can be expected as more US firms and workers become aware of the potential gains. Most Cubans in Miami now favor diplomatic relations with Cuba as well as limited trade (Institute for Public Opinion Research, 2007). US tourism, cruises, and retirement in Cuba will become an important part of the Cuban economy when the embargo is lifted.

**2. Historical Economic Performance of Cuba**

Real output has grown continuously in Cuba over recent decades as shown in Figure 1 although the smoothly increasing output looks artificial. The bump in the early 1990s was due the lost Soviet subsidy and Hernández-Catá (2000) questions the quick recovery that follows.

**Figure 1 Real Output in Cuba (UN)**

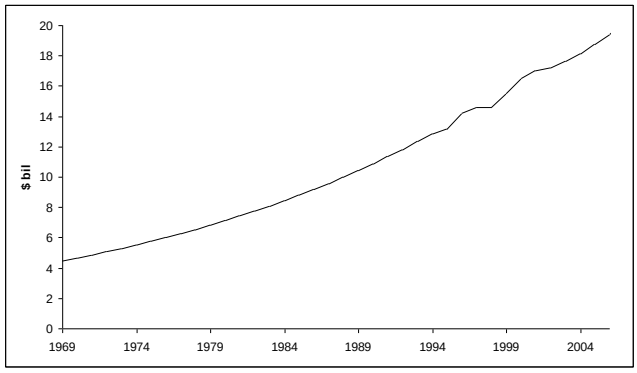
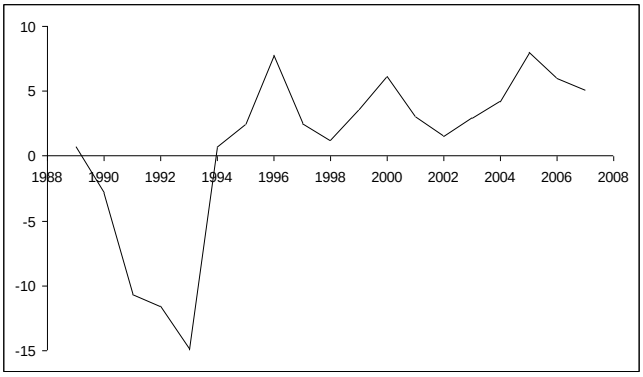


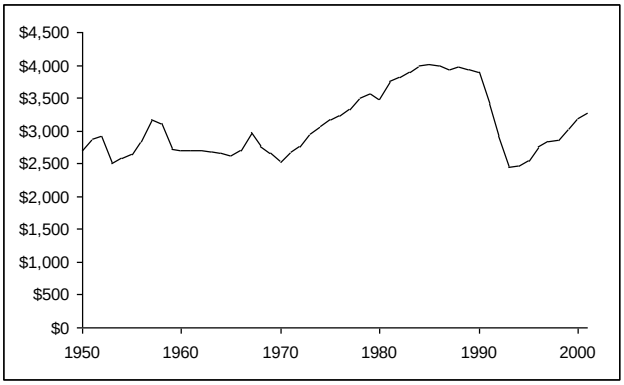

Figure 2 shows the negative output growth during the collapse of the early 1990s. The uneven performance since then is due to inefficient production and lack of investment. Other Caribbean countries are much healthier, and less developed countries open to foreign investment have had consistent growth rates over 10%.

**Figure 2 The 1990s Collapse of Real Output Growth (IMF)**




Income per capita remains near the level of the 1950s although the economy grew slowly during the 1970s and 1980s as shown in Figure 3. The collapse of the early 1990s is apparent. Cuba has about 10% of the per capita income of developed countries and is near the bottom in the hemisphere. By comparison, real income per capita in the US is close to $40,000 and in Mexico $8,000. The task of converging with the developed countries seems daunting but international investment can raise income per capita quickly as in the Pacific Rim and Eastern Europe over recent decades.

**Figure 3 Cuban Real Income per Capita ($2000, Lexus-Nexus)**




All sectors of the Cuban economy grew slowly during the 1970s and 1980s before faltering during the 1990s as shown in Figure 4. Trade and manufacturing have been growing faster than agriculture and construction. Agricultural output was higher than manufacturing but has lagged behind since the mid 1980s. Cuba holds potential for manufacturing with foreign investment. As economies modernize, service industries tend to become larger and the same can be expected in Cuba. Tourism will become a major industry when the embargo is lifted.

**Figure 4 Cuban Economy by Sector ($2000, UN)**

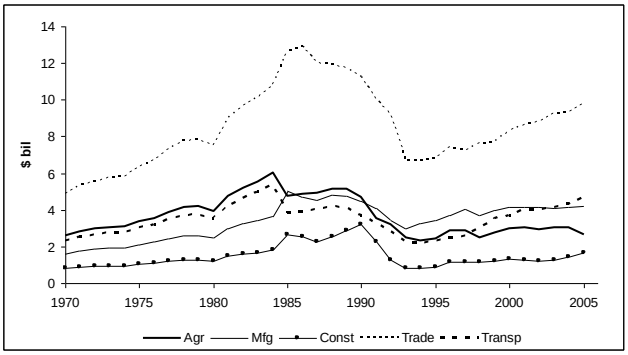
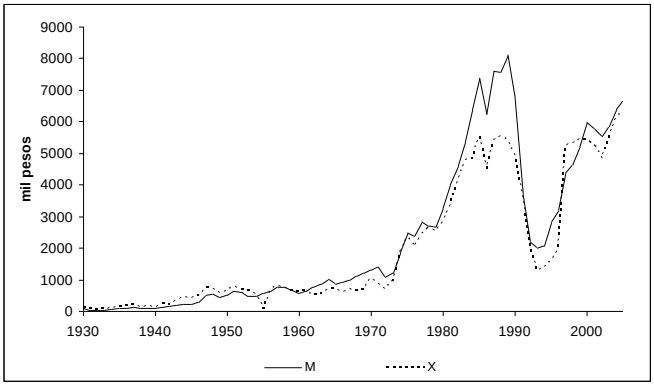


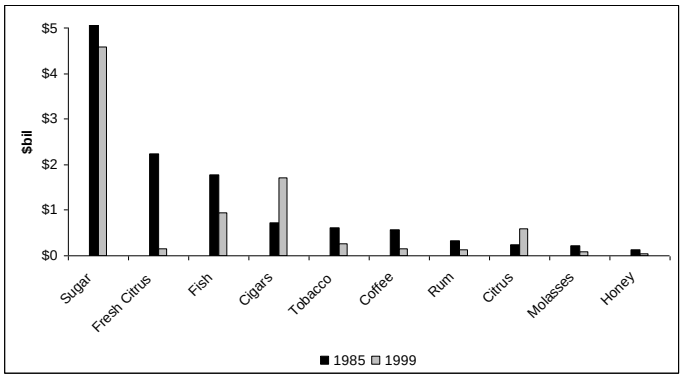

Figure 5 shows the steady growth of trade from the 1930s up to the embargo and beyond to the 1970s. Trade grew at a very fast rate from the middle of the 1970s but then collapsed with the lost Soviet subsidies. Soviet support is reflected during the 1980s with import spending consistently higher than export revenue. Trade has rebounded since the mid 1990s. Cuba's trading partners have changed from the Soviet era to a mix of Latin American, European, and Asian countries.

**Figure 5 Cuban Exports & Imports ($2000, *International Historical Statistics*)**




Sugar remains Cuba's primary agricultural export product although it has become less dominant. Figure 6 compares Cuban export revenue by product in 1985 and 1999. The largest categories are now sugar, cigars, fish, and citrus.

**Figure 6 Cuban Export Revenue ($1999, IMF) Sugar 1985 = $68 bil**




Citrus accounts for almost 10% of Cuban export revenue. Cuba is the world's third largest grapefruit producer following the US and Israel. These products do not represent import competition for Alabama agricultural producers. Kost (2002) points out that the Florida citrus industry stands to gain through investment in Cuba, supplying rootstock, technology, and entrepreneurial talent.

González, Spreen, and Jáuregui (2007) make the point that the Cuban citrus industry is undergoing adjustment with abandoned marginal production areas, new plantings, new fruit varieties, closer tree spacing, and new processing operations. Exports to Europe are the most important, and white grapefruit is exported to Japan. Cuba can also export grapefruit in late August before Florida. The Caribbean is a potential market for fresh and processed Cuban oranges and limes.

Pertolia (2007) simulates the effects of increased imports of Cuban sugar to the US assuming the US eliminates its tariff. Imports would generate a welfare gain of over $500 million in the US, about $2 per capita.

The recent history of US agricultural exports to Cuba under the relaxed embargo is shown in Figure 7. Cereals and meats are the leading US agricultural exports. Given its production potential, Alabama will enjoy increased export demand for agricultural products when the embargo is lifted.

Figure 8 takes a closer look at US agricultural exports to Cuba in 2006. Wheat, soybean products, chicken, corn, and rice are leading US exports to Cuba. Given this demonstrated demand for

agricultural products, it is safe to say that a lifted embargo will increase demand for Alabama agricultural products.

**Figure 7 US Agricultural Exports to Cuba (*TradeStat Express*)**

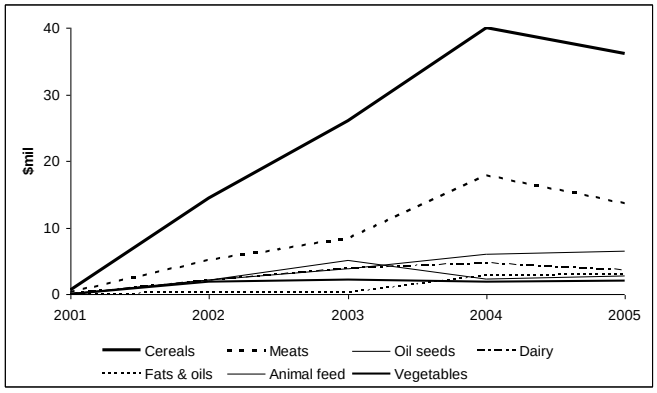
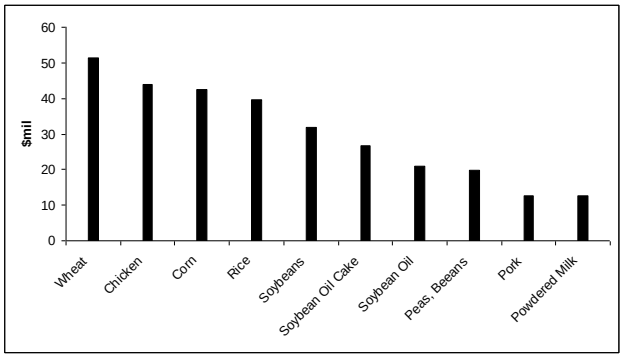
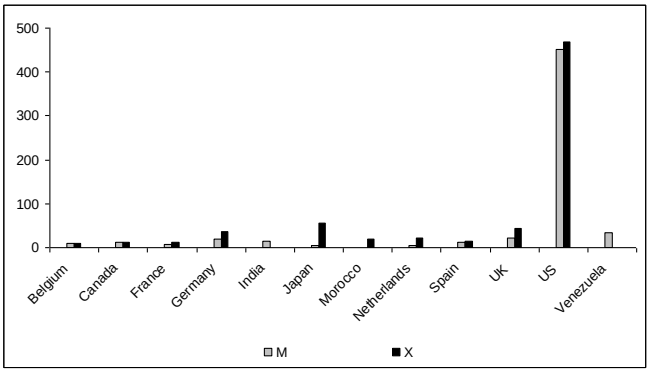



**Figure 8 US Agricultural Exports to Cuba (2006, US-Cuba Trade & Economic Council)**




In the 1930s the US accounted for about 1/3 of Cuban import spending and 3/4 of Cuban export revenue as pointed out by Messina, Brown, Ross, and Alvarez (2007). Cuba's imports were mainly rice, flour, vegetable oils, and lard, and exports were mainly sugar, tobacco, fish, and minerals. Their prediction is that US trade with Cuba will revert to this historical pattern when the embargo is lifted. Figure 9 shows that the US was the major trading partner with Cuba before the embargo, and Cuba's trade partners seem likely to revert to this historical pattern.

**Figure 9 Pre-Embargo Cuban Trade Partners, 1957 (*International Historical Statistics*)**




## 3. Potential Price Effects of Free Trade in Alabama

This section discusses the potential impact of trade with Cuba on prices of agriculture, manufactures, and services in Alabama. There will be increased exports as well as import competition across individual industries but the present focus is these aggregated sectors. The effects are gauged in a general equilibrium production model with competitive product and input markets adjusting to changing product prices.

Agricultural prices are likely to rise in Alabama with increased demand from Cuba. Messina, Spring, Moseley, and Adams (1996) make the point that Cuban agricultural products do not generally compete with Alabama. Messina (2001) describes the transition of Cuba in the 1990s to a market based agricultural economy concerned primarily with feeding its own population. Cuba can compete in only a few international agricultural markets including sugar, citrus, and tropical fruits. Increased demand can be expected for major Alabama exports of poultry, meats, soybeans, and grains. The price effects of trade with Cuba would vary across products but present simulations focus on aggregate agricultural output assuming price increases of 1% and 2% in model simulations.

The effect on the price of aggregate manufacturing should be similar. There will be increased demand and higher prices for Alabama's major exports including transport equipment and chemicals. There will be very limited import competition in manufacturing for years until investment in Cuba improves its infrastructure and capital stock to take advantage of cheap labor. Competition will be in

labor intensive products, and Alabama has already adjusted to cheap labor intensive imports from Mexico in NAFTA and from Asia in the WTO. Price increases of 1% and 2% for aggregate manufacturing are included in the simulations.

There will also be increased demand for Alabama business services including engineering, construction, shipping, transport, banking, finance, insurance, consulting, and higher education. Service industries supporting Alabama industry will also enjoy a positive spillover with increased manufacturing and agricultural production. The present simulations include price increases of 1% and 2% for services.

In the following general equilibrium models, input payments and output levels adjust to these projected price changes. Adjustments across factor payments and outputs depend on relative price changes, input intensities across sectors, and input substitution. Price changes of 1% and 2% are simulated to gauge sensitivity of the Alabama economy to free trade with Cuba.

**4. A Competitive Model of Production and Trade for Alabama**

The following model of the Alabama economy is based on full employment and competitive pricing. Outputs of natural resources N, manufactures M, and services S are produced with inputs of capital K, labor L, and energy E (a composite Btu energy equivalent). Paper products are added to agriculture in the natural resource output N. Capital input is derived as the residual of labor and energy bills from value added. Publicly available input data is from the US Census of Manufactures, USDA, and Department of Energy.

Table 1 reports the shares of the three inputs employed across sectors. The relatively small natural resource sector N (agriculture and forest products) employs less than 2% of the labor force L and its 4.5% share of capital K implicitly includes land. The large service sector S employs two thirds of labor L and over half of capital K. Manufacturing M employs almost one third of labor L and almost 90% of energy E.

**Table 1 Alabama industry shares $\lambda_{ij}$**

| | N | S | M |
|---|---|---|---|
| L | 0.017 | 0.667 | 0.316 |
| K | 0.045 | 0.520 | 0.434 |
| E | 0.033 | 0.091 | 0.876 |

Table 2 reports the shares of value added paid to each factor. The price of each factor is assumed equal across sectors. Labor L receives almost 60% of the value added in services S but only a quarter in natural resources N. Energy E receives almost a quarter of value added in manufacturing M, high relative to the US due to energy intensive production of chemicals and primary metals. Land input is included in the high capital K factor share for natural resource output N. Based on the largest factor shares, natural resource output N is capital intensive and services S is labor intensive. Manufacturing M is intermediate and has the highest energy share.

**Table 2 Alabama factor shares $\theta_{ij}$**

| | N | S | M |
|---|---|---|---|
| L | 0.259 | 0.579 | 0.342 |
| K | 0.615 | 0.401 | 0.417 |
| E | 0.128 | 0.020 | 0.241 |

Table 3 reports factor intensity comparisons. Natural resource output N is the most capital intensive relative to labor while services S is by far the most capital intensive relative to energy. Services is the most labor intensive relative to both capital and energy. Manufacturing M is the most energy intensive relative to labor and capital.

**Table 3 Alabama factor intensities**

| | N | S | M |
|---|---|---|---|
| K/L | 2.38 | 0.69 | 1.22 |
| K/E | 4.81 | 20.1 | 1.73 |
| E/L | 0.49 | 0.04 | 0.71 |

Substitution elasticities describe flexibility in cost minimizing inputs with respect to input prices as developed by Takayama (1982). The cross price elasticity between the input of factor i and the payment to factor k in sector j is $E_{ij}^{k} = \theta_{kj} S_{ij}^{k}$ where $S_{ij}^{k}$ is the underlying Allen (1938) partial elasticity of substitution. The present simulations assume Allen elasticities of 0.1 following the applied production literature that generally finds weak substitutes. Constant elasticity of substitution CES would scale substitution elasticities and other degrees of substitution are discussed. Linear homogeneity of cost functions imply $\Sigma_k E_{ij}^{k} = 0$ and own price elasticities $E_{ij}^{i}$ are derived as the negative of the sum of cross price elasticities. Aggregate substitution elasticities are the weighted average of cross price elasticities for each sector, $\sigma_{ik} = \sum_j \lambda_{ij} E_{ij}^{k} = \sum_j \lambda_{ij} \theta_{kj} S_{ij}^{k}$. The derived CES = 0.1 substitution elasticities are in Table 4 where w is the wage, r the return to capital, and e the price of energy input.

**Table 4 Substitution elasticities, CES = 0.1**

| | L | K | E |
|---|---|---|---|
| w | -.050 | .041 | .009 |
| r | .046 | .058 | .012 |
| e | .036 | .043 | -.079 |

The comparative static model is built as in Jones and Scheinkman (1977) and Thompson (1990) with the substitution elasticity matrix matrix $\sigma$, industry share matrix $\lambda$, and factor share matrix $\theta$ in (1). The first equation in (1) is based on full employment and the second on competitive pricing, and differentials represent percentage changes. Endowments are held constant by the null vector dv = 0 and price changes in the vector dp represent percentage changes. Comparative static partial derivatives are solved by inverting

$$\begin{pmatrix} \sigma & \lambda \\ \theta^{T} & 0 \end{pmatrix} \begin{pmatrix} dw \\ dx \end{pmatrix} = \begin{pmatrix} dv \\ dp \end{pmatrix} = \begin{pmatrix} 0 \\ dp \end{pmatrix}. \qquad (1)$$

Table 5 reports the elasticities of factor prices and outputs with respect to product prices derived by inverting the system matrix (1). When the price of a product increases, demands for factors increase in that sector attracting inputs and forcing adjustments in factor prices and outputs. These factor price elasticities are identical for any degree of substitution.

**Table 5 Factor price and output elasticities**

| | $p_N$ | $p_S$ | $p_M$ |
|---|---|---|---|
| w | -1.95 | 2.09 | 0.86 |
| r | 2.92 | 0.15 | -1.52 |
| e | 2.30 | -2.25 | 5.56 |
| $x_N$ | 19.4 | -5.82 | -13.6 |
| $x_S$ | -0.33 | 0.40 | -0.07 |
| $x_M$ | -0.96 | -0.09 | 1.06 |

Output elasticities in Table 5 scale proportionately with the degree of CES substitution. These output elasticities are based on full employment with fixed supplies of labor, capital, and energy, and one output can increase only if others fall along the production frontier. A higher price raises output in that industry drawing resources from the others and lowering their outputs.

**5. Simulated Adjustments to Projected Price Changes**

Table 6 presents adjustments in factor prices and outputs to the various combinations of 1% and 2% price increases. Percentage price changes are first multiplied by factor price and output elasticities, and then summed to arrive at the total effects for each scenario.

**Table 6 Free trade price scenarios**

| Scenario | $p_N$ | $p_S$ | $p_M$ | $\%\Delta w$ | $\%\Delta r$ | $\%\Delta e$ | $\%\Delta x_N$ | $\%\Delta x_S$ | $\%\Delta x_M$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1% | 1% | 2% | 1.86 | -0.52 | 6.56 | -13.7 | -0.07 | 1.06 |
| 2 | 1% | 2% | 1% | 3.09 | 0.58 | -1.25 | -5.85 | 0.40 | -0.09 |
| 3 | 2% | 1% | 1% | -0.94 | 3.92 | -1.30 | 19.4 | -0.33 | -0.96 |
| 4 | 2% | 2% | 1% | 1.15 | 3.51 | -3.55 | 13.6 | 0.07 | -1.05 |
| 5 | 2% | 1% | 2% | -0.08 | 2.40 | 4.26 | 5.75 | -0.40 | 0.09 |
| 6 | 1% | 2% | 2% | 3.95 | -0.93 | 4.31 | -19.5 | 0.33 | 0.97 |

With prices increases of 1% or 2% the real return to a factor has to rise by more than 2% for an unambiguous increase its real income. An increase between 1% and 2% results in an uncertain effect on that factor's real income. For instance, in Scenario 1 the wage rises by 1.86% and the real wage depends on the product mix consumed by labor. Given that services represent the bulk of output and consumption and the price of services rises 1%, it is likely the real wage would increase in Scenario 1.

Any increase of less than 1% implies a decrease in the real income of that input. For instance, in Scenario 2 the capital return rises 0.58% implying a loss for capital owners. Of the 18 possible outcomes for factor prices, there are 8 clear winners and 8 clear losers with 2 uncertain outcomes.

The wage impact ranges from nearly 4% to almost -1%. Labor clearly wins in Scenarios 2 and 6 but loses in Scenarios 3 and 5, and is in an intermediate position in Scenarios 1 and 4. Labor generally enjoys higher prices for services but not higher prices for the natural resource output. In Scenario 2 with the relatively large 2% increase in the price of services, the wage rises over 3% as labor is attracted from natural resources and manufacturing. In Scenario 6 the price of manufactures also increases 2% leading to a nearly 4% increase.

Capital clearly gains in Scenarios 3, 4, and 5 and clearly loses in the other scenarios. Capital enjoys an increase in the relative price of the natural resource output. Energy input is affected the most, with large gains in Scenarios 1, 5, and 6 but losses in the others. Energy input benefits from an increase in the relative price of manufactures where 90% of energy is consumed.

Output adjustments in the last three columns of Table 5 are small except for natural resource output $x_N$. The natural resource sector is small and any induced factor movements have relatively large output effects. Output adjustments in manufacturing $x_M$ and services $x_S$ are negligible and just as likely positive as negative.

These factor price and output effects scale in price changes. If price changes were twice as large as those in Table 6, factor price and output changes would be twice as large. At a more detailed industrial level there would be larger price changes and more variation in output adjustments.

**6. Short Run Adjustment in a Specific Capital Model**

Capital input is less mobile across sectors than labor and energy in the short run. For instance, turret lathe machines cannot readily move from manufacturing. A lack of capital mobility is captured by the specific factors model with capital input specific to its sector. The effects of price changes on capital returns differ across sectors. Elasticities of factor prices and outputs with respect to product prices are in Table 7.

Adjustments in factor prices and outputs to the price scenarios are in Table 8. There is more impact on the capital returns when capital is specific in the short run. Capital returns in services $r_S$ and manufacturing $r_M$ are tied to prices in those sectors. The return to capital in natural resources $r_N$ is less dependent on the price $p_N$ of natural resource output due to the small size of that sector. The real return to capital $r_N$ in natural resources falls except in Scenario 5 when both $p_N$ and $p_M$ increase by 2%. In contrast, the return to capital $r_S$ in the large service sector clearly gains in Scenarios 2, 4, and 6 when the price of services $p_S$ increases 2%. The same is true for the return $r_M$ to capital in manufacturing, and both $r_S$ and $r_M$ gain in real terms when both $p_S$ and $p_M$ increase by 2% in Scenario 6.

**Table 7 Sector specific capital elasticities**

| | $p_N$ | $p_S$ | $p_M$ |
|---|---|---|---|
| $r_N$ | 5.30 | -1.56 | -2.74 |
| $r_S$ | -0.01 | 1.39 | -0.38 |
| $r_M$ | -0.03 | -0.44 | 1.47 |
| w | 0.02 | 0.50 | 0.48 |
| e | 0.01 | -0.28 | 1.28 |
| $x_N$ | 2.15 | -0.78 | -1.37 |
| $x_S$ | -0.01 | 0.19 | -0.19 |
| $x_M$ | -0.01 | -0.22 | 0.24 |

**Table 8 Specific capital trade scenarios**

| Scenario | $p_N$ | $p_S$ | $p_M$ | $\%\Delta r_N$ | $\%\Delta r_S$ | $\%\Delta r_M$ | $\%\Delta w$ | $\%\Delta e$ | $\%\Delta x_N$ | $\%\Delta x_S$ | $\%\Delta x_M$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1% | 1% | 2% | 0.65 | 0.60 | 2.51 | 1.23 | 2.21 | -0.04 | -0.04 | 0.05 |
| 2 | 1% | 2% | 1% | 0.73 | 2.41 | 0.52 | 1.76 | 0.77 | -0.03 | 0.04 | -0.05 |
| 3 | 2% | 1% | 1% | 0.22 | 1.01 | 0.94 | 1.25 | 1.10 | 0.06 | -.002 | -.002 |
| 4 | 2% | 2% | 1% | -0.05 | 2.42 | 0.45 | 2.01 | 0.87 | 0.03 | 0.04 | -0.05 |
| 5 | 2% | 1% | 2% | 2.26 | 0.59 | 2.48 | 1.24 | 2.23 | 0.03 | -0.04 | 0.05 |
| 6 | 1% | 2% | 2% | 0.38 | 2.02 | 2.02 | 1.99 | 1.97 | -0.06 | .002 | .002 |

Labor is generally in an intermediate position although the wage rises about 2% when the price of services $p_S$ increases by 2% in Scenarios 2, 4, and 6. The real wage never clearly falls although it only clearly rises in Scenario 4. Energy is more closely tied to manufacturing and the price of energy e rises about 2% when the price of manufacturing $p_M$ increases 2%. In Scenarios 2 and 4 the real return to energy clearly falls. Outputs increase in their relative price but the effects are not large in the specific factors model as capital immobility hinders output adjustment.

A change in the capital return alters investment in the sector. Suppose the capital stock changes in proportion to the capital return. For instance, in Scenario 1 the stock of capital in manufacturing would increases over time by 2.51%. Sector output changes about proportionately to the capital stock. The implication is that outputs will adjust in the long run according to the $\%\Delta r$ columns in Table 8. These long run output adjustments are larger than the short run adjustments in Table 8 with capital specific to the sectors.

**7. Conclusion**

The aggregate Alabama economy has a moderate amount at stake when the trade embargo with Cuba is lifted but changing prices will affect both outputs and income distribution. There will be winners as well as losers but the adjustments are not large, stressing the merit of the general equilibrium production model with its broad perspective. At a more detailed level, particular industries will have more at stake. Overall gains will outweigh losses.

Subsequent studies can examine disaggregated models with industrial detail leading to larger industry effects but the wage and energy price effects will be similar to the present model. The model can be modified to include industry supply and demand between Cuba and Alabama, or Cuba and the Southeast. The structure of the energy market can be modified to allow for an exogenous world price of imported oil and gas. Special attention can be paid to the industries in manufacturing, services, and agriculture that will face higher degrees of export opportunities and import competition from Cuba.

**References**

Allen, R.G.D. (1938) *Mathematical Analysis for Economist*, MacMillan, 1938.

Alvarez, José (2007) "Differences in Agricultural Productivity in Cuba's State and Nonstate Sectors: Further Evidence," The Association for the Study of the Cuban Economy, www.lanic.utexas.edu/la/cb/cuba/asce/cuba10/alvarez.pdf

Institute for Public Opinion Research of Florida International University (2007) Cuba Poll Final Results, www.fiu.edu/orgs/ipor/cubapoll/index.html

González, Armando, Thomas Spreen, and Carlos Jáuregui (2007) "The Citrus Industry in Cuba 1994-1999," University of Florida, Cuban Research Center, www.cubanag.ifas.ufl.edu/about.php

Hernández-Catá, Ernesto (2000) "The Fall and Recovery of the Cuban Economy in the 1990s: Mirage or Reality" IMF Working Paper WP/01/48.

Institute for Public Opinion Research (2007) Florida International University webpage.

ITC (2007) *US Agricultural Sales to Cuba: Certain Economic Effects of US Restrictions*, International Trade Commission Publication 3932.

Jones, Ronald and José Scheinkman (1977) "The Relevance of the Two-Sector Production Model in Trade Theory, *Journal of Political Economy*, 909-35.

Kost, William (2002) "Cuba's Citrus Industry: Trade and Growth Prospects," *Agricultural Outlook*, June, ERS/USDA.

Library of Congress (2006) "Contry Profiles: Cuba," Federal Research Division, lcweb2.loc.gov/frd/cs/profiles/Cuba.pdf

Messina, William, Thomas Spreen, Anne Moseley, and Charles Adams (1996) "Cuba's Non-Sugar Agriculture: Current Situation and Prospects," Proceedings of the Fifth Annual Meeting of the Association for the Study of the Cuban Economy, University of Miami.

Messina, William (2001) "Structural Change in Cuban Agriculture in the 1990s," University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS) edis.ifas.ufl.edu

Messina, William, Eric Bonnett, and Timothy Taylor (2007) "Cuba: A View of Revealed Export Advantage," University of Florida, Cuban Research Center, www.cubanag.ifas.ufl.edu/about.php.

Messina, William, Richard Brown, James Ross and José Alvarez (2007) "Cuban Non-Sugarcane Agricultural Trade Patterns: Historical Perspectives and Future Prospects," University of Florida, Cuban Research Center, www.cubanag.ifas.ufl.edu/about.php.

Petrolia, Daniel Ryan (2007) "Havana Daydreaming: A Partial-Equilibrium Simulation of Increasing the U.S. Quota for Cuba and Mexico," University of Florida, Cuban Research Center, www.cubanag.ifas.ufl.edu/about.php.

Takayama, Akira (1982) "On the Theorems of General Competitive Equilibrium of Production and Trade – A Survey of Some Recent Developments in the Theory of International Trade," *Kieo Economic Studies*, 1-37.

Thompson, Henry (1990) "Simulating a Multifactor General Equilibrium Model of Production and Trade," *International Economic Journal*, 21-34.