



*THE ECONOMIC IMPACT OF INTERNATIONAL
MERCHANDISE TRADE IN
MIAMI-DADE COUNTY*

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I. EXECUTIVE SUMMARY

- ❖ The international merchandise trade sector is a critical component of the Miami-Dade County (MDC) economy.
- ❖ This study quantified the substantial economic impacts on jobs, labor income, business output and public revenues of international trade in goods (merchandise) shipped through MDC's international airport, the Port of Miami and the terminals along the Miami River.
- ❖ The study results, utilizing professional and widely accepted input-output methodology, reveal the pivotal importance of the international merchandise trade sector for the economic well-being of County residents:
 - An estimated 121,000 jobs in MDC are supported by this sector. This is approximately 10 percent of total employment.
 - The jobs supported by the international trade sector pay higher than the average wage in MDC. The average annual employment earnings in the sector are \$41,700 per job. This is 16 percent higher than MDC's average annual wage.
 - The occupational distribution of jobs represented in international trade is widely dispersed, indicating that the labor income benefits of this sector reach across a broad spectrum of socio-economic groups that live within MDC.
 - An estimated \$5.1 billion of annual labor income are generated.
 - The sector contributes nearly \$15 billion in annual economic output to MDC.
 - International merchandise trade activity provides \$179 million annually in fiscal revenues to local governments and taxing authorities within MDC.
 - An additional \$182 million in fiscal revenues are generated annually for the State of Florida.
- ❖ The direct, indirect and induced economic impacts previously presented are summarized in the following Table:

Table ES-1. Economic Impacts from International Merchandise Trade Activity: 2003

Economic Indicator	Impacts due to:		
	Transportation Services and Trade Financing	Exports of Manufactured Goods	Total Impacts
Employment (Jobs)	42,638	78,606	121,244
Labor Income (Million \$)	1,694	3,360	5,054
Average Earnings Per Worker (\$/year)	39,725	42,745	41,683
Economic Output (Million \$)	4,436	10,521	14,957
Gross Regional Product (Million \$)	2,320	4,829	7,149
Capital Income (Million \$)	471	1,145	1,616
Local Govt Taxes and Fees (Thou. \$)	57,891	121,211	179,102
State Govt Taxes and Fees (Thou. \$)	58,777	123,040	181,817

The Washington Economics Group, Inc.'s model of Miami-Dade County, with data provided by the Minnesota IMPLAN Group, Inc.

- ❖ The quantification of international merchandise trade impacts **underestimates** the economic importance of the broader international sector of Miami-Dade, **of which international merchandise trade is a key but not the sole component.**
- ❖ International merchandise trade primarily impacts transportation and related industries, trade finance and manufacturing for exports.
- ❖ The **broader international sector** also includes economic impacts generated by tradable services such as legal, healthcare, media/entertainment, accounting, business services and others.
- ❖ Furthermore, the presence of a world-class international trade infrastructure attracts business visitors, trade shows and business conferences. Foreign capital inflows that stimulate activity in banking, real estate services and construction are also part of the broader international sector of MDC.
- ❖ Therefore, the authors of this study recommend the undertaking of a comprehensive study that estimates the economic impacts of the broader international sector as an additional complement to the present report on international merchandise trade activity.
- ❖ A full understanding of MDC's international sector economic impacts would facilitate the implementation of appropriate public policies and necessary investments to enhance the sector's future development.

II. RECENT TRENDS IN MERCHANDISE TRADE ACTIVITY

Miami-Dade County is the commercial gateway of the U.S. to South America and the Caribbean Basin. Billions of dollars worth of international cargo are shipped through Miami International Airport and the Port of Miami each year. In 2002, for example, \$54 billion worth of total merchandise trade were shipped via the Miami U.S. Customs District – \$26.4 billion of exports and \$25.3 billion in imports.¹ The flow of merchandise trade shipped

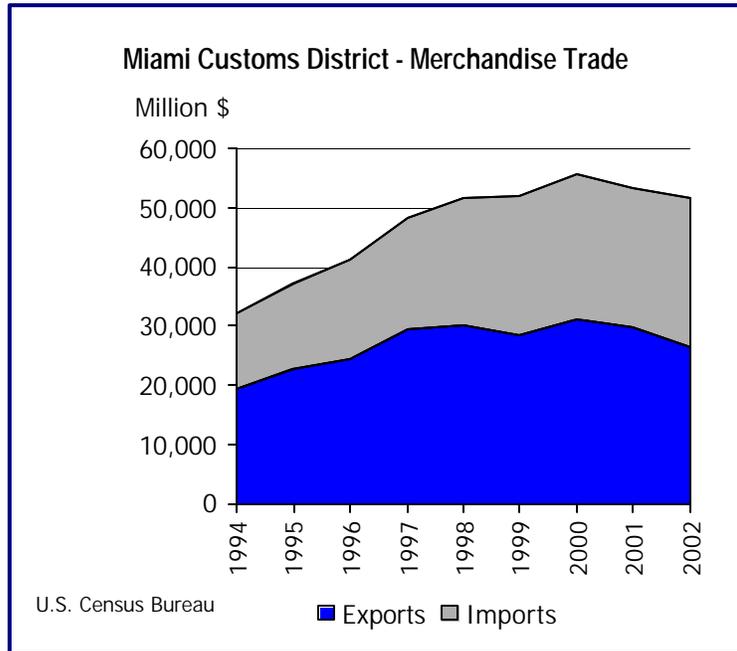


Figure 1

through Miami-Dade's ports grew steadily throughout the 1990's. While imports continued to grow from 2000 to 2002, exports fell sharply. It appears, however, that export shipments began once again to grow in 2003. Data through the third quarter of 2003 indicates significant growth in total trade from 2002.

While the value of exports shipped through the Miami Customs District declined at an annual rate of 1.3 percent (after adjusting for price inflation) over the 1998-2002 period, the value of imports grew at a real annual rate of 7.5 percent.² Total merchandise trade grew by \$3.5 billion from 1998 to 2002, or at an inflation-adjusted rate of 2.5 percent per year. Cargo activity at the Port of Miami reflected the increase in trade volumes experienced in the Miami U.S. Customs District as a whole.

International cargo handled through the Port of Miami has risen sharply since 1996. By 2003 nine million tons of cargo were loaded or unloaded from Port of Miami docks, representing a more than 50 percent increase over the Port's 1995 cargo volume.

¹ Although Miami's air- and seaports carry the largest volume of cargo, the Miami Customs District also includes ports in Broward and Palm Beach counties.

² Export and import data for 2003 is not yet available.

This level of cargo activity not only provides employment opportunities for longshoremen, shipping company workers and port employees, but also for the truckers, freight forwarders, trade financing specialists and similar workers involved in the logistics of moving merchandise across international boundaries from either their domestic points of origins or to their domestic destinations.

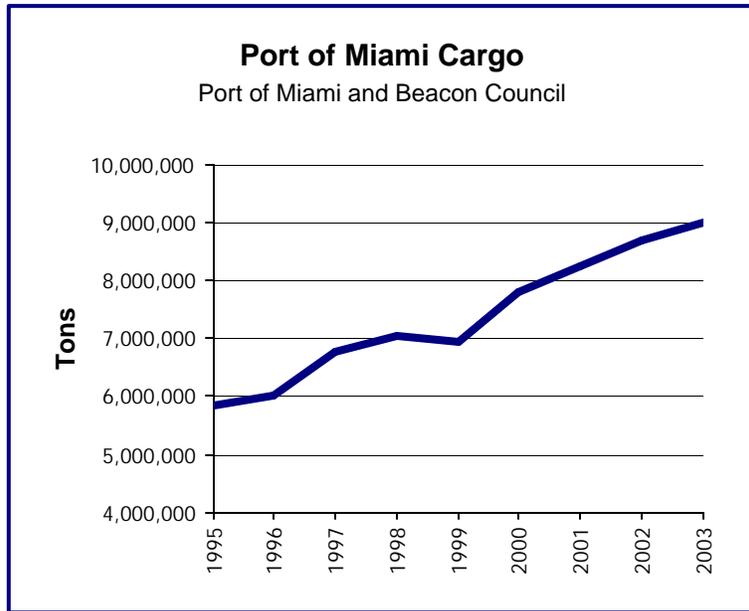


Figure 2

International air cargo through Miami International Airport (MIA) has shown considerable volatility over the past several years. Although the tragedy of September 11th had a negative impact on air transportation, MIA air cargo volumes actually began declining two years prior to 2001. Air cargo volumes at MIA, however, began to make steady gains after September 11th, but even after two years of significant increases, air cargo volumes

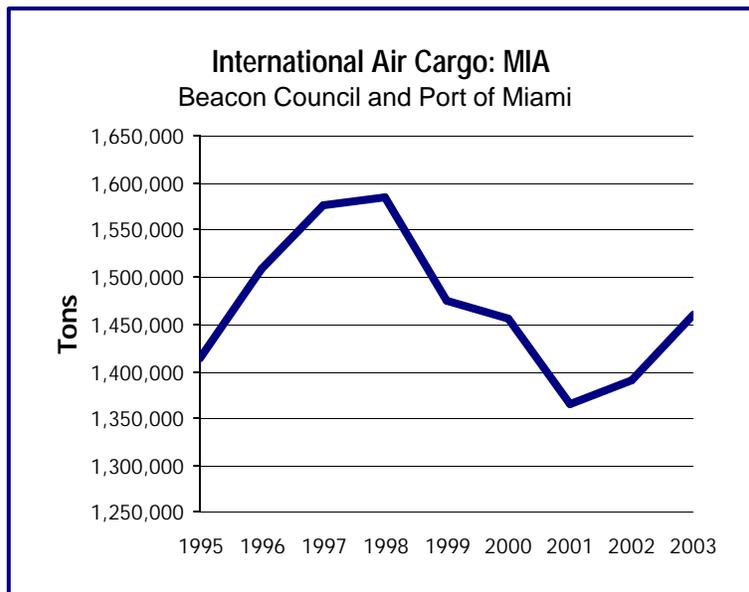


Figure 3

are similar to where they stood in 1995-96. Nevertheless, MIA handles a significant volume of cargo – 1.45 million tons of international cargo alone – providing a large number of job opportunities for workers engaged in the international movement of goods by air.

Workers engaged in international trade transportation services also hold jobs that traditionally pay higher salaries than the typical employment position found in Miami-Dade. Therefore, the local consumer spending by these transport workers magnifies the importance of the direct employment effects within the transportation sector and throughout the rest of the local economy.

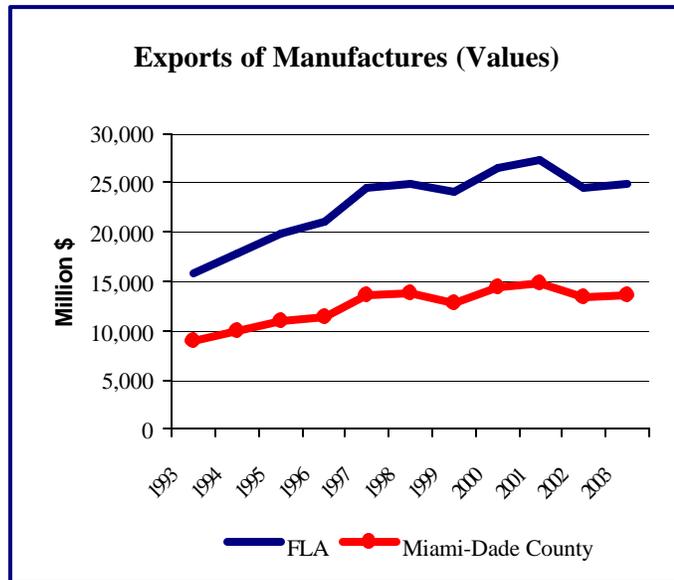


Figure 4

Census data shows that billions of dollars worth of manufactured exports can also be traced to sales **initiated** within the metro Miami area.³ In 2003, Miami-Dade firms exported \$13.6 billion worth of manufactured goods.⁴ International merchandise trade activity, therefore, directly impacts the Miami-Dade economy along two basic paths: 1) through transportation services (trucking, warehousing, shipping via air or ocean cargo vessels), by providing trade financing services, and/or 2) through the direct manufacture of goods destined for foreign markets.⁵

While employment opportunities in the international transportation sector directly provide substantial wage income and make a significant contribution to the local economy, manufacturing activity resulting from exports by local firms is a key factor in the local economic impact of international merchandise trade activity. Manufacturing activity is particularly important to a local economy because manufacturing wages are typically higher-than-average, and the manufacturing sector has especially strong supply-chain linkages with other sectors of the local economy. According to Census Bureau

³ This data is based on the U.S. Census Bureau’s export locator series, which is best described as point-of-sale data – the marketing origin of exports. This data series is, therefore, an imperfect indicator of the production origin of exports. Nevertheless, it is the best data available to get a sense of the relative importance of exports in local manufacturing activities.

⁴ This represents the authors’ estimates based on statistical regression analysis with State of Florida data from 1993 to 1999, and extrapolation of the Miami-Dade series based on actual State exports from 2000 to 2003.

⁵ International trade in services (including tourism, legal and financial services, for example) is beyond the scope of this study, although they are also important contributors to Miami -Dade’s economy.

statistics, firms in Miami-Dade County increased their sales abroad from \$8.9 billion in 1993 to \$12.8 billion by 1999.

The Census Bureau discontinued reporting the metropolitan area export data after 1999, but continued to report this data for the entire State of Florida through this past year (2003).⁶ To provide estimates of Miami exports from 2000 to 2003, we developed a statistical regression equation that forecasts Miami exports as a function of Florida exports using the data from 1993 to 1999. This regression showed a strong, direct correlation between Miami exports and Florida exports. We then used this regression equation to forecast Miami exports based upon the Census' reported exports for Florida from 2000 to 2003. Miami exports are estimated to have reached \$13.6 billion in 2003 – closely following the growth pattern experienced in State exports.

While international merchandise trade activity is clearly recognized as a defining characteristic of Miami-Dade's economy, it is important to get a sense of the magnitude of this sector's contribution to the local economy as a whole. The purpose of this study is to utilize a quantitative model of the County's economy to estimate the economic impact of international merchandise trade in terms of basic macroeconomic indicators.

We have developed an input-output model of Miami-Dade's economy that can be used to estimate the contribution made by international merchandise trade shipments and exports of locally produced manufactured goods to Miami-Dade's economy. This model accounts for the inter-industry linkages that occur through supply chain relationships. That is, an expansion in production in one industry usually leads to increased production in other industries within the local economy. Our model also allows for an expansion of production in any local industry to have a positive impact on local household income and buying power, and, therefore, also accounts for additional spending of locally earned income. The latter is the basis for an additional round of economic benefits in terms of gross regional product and employment.

⁶ The Bureau also plans to continue providing State-level export series on an annual basis.

III. ESTIMATING THE ECONOMIC IMPACTS

The Direct Economic Impacts from International Trade Activity

International trade activity in this study refers to commercial activity directly related to the shipment of goods across international borders and the production of manufactured goods for export. The focus of our study, therefore, is the direct, indirect and induced economic impacts that originate from the transportation of both exported and imported goods, the financing of international trade and the local manufacturing of export products. The direct economic impacts from each of these three activities are described below.

The direct economic impacts, however, only reflect part of the total economic impact that these activities have on Miami-Dade's economy. In the process of producing goods or services, firms need to purchase inputs from other firms, and a significant proportion of the expenditures for inputs is directed to other local firms. Similarly, the payroll expenditures that firms make provide income to local residents, who in turn purchase goods and services throughout the local economy. These indirect and induced economic impacts need to be taken into account when estimating the local economic impact of international trade activity.

The Direct Impacts of Trade-Related Transportation Services

Approximately 19,000 workers were directly employed in international trade transportation services in 2003. These workers were employed in industries ranging from ocean vessel transportation and air transportation to trucking and warehousing. This level of employment accounts for approximately 48 percent of total transportation-related jobs in 2003. (See Table 1.)

Transportation services provide employment opportunities for a broad range of education and skill levels. The majority (55 percent) of the employment positions available in transportation services are production workers, but nearly one-fifth of the available jobs involve managerial, administrative and professional workers. Approximately 20 percent of the employment positions directly generated by transportation services are classified as clerical workers.

Table 1. Direct Employment and Payroll in Transportation of International Cargo and International Trade Financing: 2003

Industry	Jobs	Compensation	Average Wage
Motor Freight Transport and Warehousing	2,849	101,324,651	35,565
Water Cargo Transportation	4,342	163,649,592	37,687
<i>Deep sea freight transportation</i>	919	44,620,810	48,527
<i>Marine cargo handling</i>	3,084	102,178,669	33,133
<i>Port operations and navigational services</i>	339	16,850,113	49,719
Air Cargo Transportation	2,560	95,892,103	37,464
Transportation Services	9,226	307,365,863	33,315
<i>Freight arrangements, packing, crating</i>	5,547	211,744,615	38,175
<i>Support activities for air transport</i>	3,679	95,621,248	25,988
International Trade Financing	<u>2,810</u>	<u>255,477,999</u>	<u>90,917</u>
Direct Employment in Intl Movement of Goods	21,787	923,710,208	42,397

Estimates by Washington Economics Group from Bureau of Labor Statistics, CEW survey.

Includes only those jobs directly engaged in the movement of international cargo and their associated payroll.

International trade transportation generated a direct impact of \$924 million in labor income for Miami-Dade residents, representing \$42,400 in annual compensation per worker. (The average labor compensation in Miami-Dade is approximately \$35,800.)

International trade transportation services accounted for an estimated \$2.2 billion in gross economic output (or *business revenues*).

The Direct Impact of International Trade Financing

International trade financing activity accounted for an estimated 2,800 full and part-time jobs in Miami-Dade County in 2003 and generated \$152 million in labor earnings. Nearly one-third of direct employment in trade financing is found among managers, administrators and professionals, while half of the jobs are designated as clerical employment positions. The average annual compensation in the employment positions directly supported by international trade financing is estimated at \$54,000. The financing of international trade directly accounts for \$270 million of economic output.

The Direct Impact International Exports Manufactured Goods

The approximately \$13.6 billion of export sales by Miami-Dade firms in 2003 have a significant direct economic impact.⁷ Approximately 35 percent of these sales are believed to represent goods actually manufactured within Miami-Dade County, while the remainder represents the work of sales offices and local distributors or sales representatives. The goods produced within Miami-Dade provide employment and income for workers in the manufacturing sector, while the goods sold but not produced in Miami-Dade provide employment and income opportunities for sales and administrative staffs. In either case, these exports have significant economic impacts on the local economy.

Our input-output model of Miami-Dade's economy suggests that exports of manufactured goods directly support 30,400 jobs and provide labor income of \$1.6 billion. The average annual compensation for these workers is \$53,700.

Miami-Dade export sales represent a direct economic impact of \$5.9 billion in direct business revenues (i.e., *direct economic output*).

Direct Economic Impacts: A Summary

The direct economic impact of international trade activity can, perhaps, be better appreciated when taken together as a group. The direct impacts are summarized in Table 2.

International merchandise trade activity directly accounts for \$8.4 billion of economic output or sales revenues and generates \$3.4 billion in gross regional product. Similarly, international merchandise trade activity in Miami-Dade directly supports a payroll of \$2.6 billion and provides job opportunities for nearly 52,200 workers (or approximately five percent of total employment in Miami-Dade). These 52,200 jobs are spread over a large variety of occupational categories and, therefore, provide good jobs to residents with varied levels of education and skills. The direct employment benefits of merchandise trade accrue to a broad spectrum of the workforce.

⁷ This estimate of export sales initiated in Miami-Dade County is based on historical estimates provided by the U.S. Census Bureau for the period 1993-1999 and from Florida export sales from 1993 to 2003.

Table 2. Direct Economic Impacts of International Trade Activity: 2003

Economic Indicator	Direct Impact From:			Total
	Transportation Services	Trade Financing	Export Sales	
Economic Output (million \$)	2,204	270	5,918	8,392
Employment (Jobs)	18,977	2,810	30,369	52,156
Earnings from Employment (million \$)	772	152	1,630	2,554
Compensation Per Worker (\$)	40,681	54,010	53,674	48,964
Gross Regional Product (million \$)	1,000	176	2,175	3,351
Capital Income (million \$)	174	14	471	659

Notes: 1) Gross Regional Product represents Miami-Dade's "GDP" and is equal to the sum of labor earnings, corporate profits and rents before taxes, and indirect business taxes (primarily sales taxes). 2) Capital income refers to corporate profits and rents.

Seventeen (17) percent of the direct employment positions are in managerial, administrative or professional occupations, while 14 percent are for clerical workers. Approximately six (6) percent of the jobs directly supported by international merchandise trade activity represent sales and service workers (4.7 percent salespersons), and the remaining 62 percent are production workers.

Calculating the Indirect and Induced Multiplier Impacts – Methodology

Every business activity that operates within Miami-Dade County has the potential to generate positive economic impacts that exceed those directly related to the operation of that activity. These “spillover” or multiplier impacts are the result of each business activity’s supply relationships with other firms operating within the County, the proportion of business value added⁸ that accrues to County households in the form of labor and capital income, and the propensity of County households to spend income on goods produced within the State.

Economic models that explicitly account for inter-industry linkages (supply relationships), the generation of labor and capital income, and the spending of household income have been used since the 1960’s to estimate the contribution that a particular business or industry makes to the general economy. In these “input-output” models, as an industry experiences an increase in the demand for its products or services, it in turn needs goods and services from its suppliers and must increase its purchases from other

⁸ “Value added” refers to the difference between business revenues and the cost of non-labor and non-capital inputs used to produce goods and/or services.

industries in the economy. The effect on regional production resulting from successive rounds of inter-industry linkages is referred to as the *indirect effect*. The resulting increases in regional production also lead to expansions in employment and labor income, and the increases in labor income lead to increases in consumer spending, further expanding sales and production throughout the regional economy. The latter economic impacts are referred to as the *induced effects*. The successive waves of production, spending and more production result in *economic multiplier effects*, where the final or total increase in regional production, income and employment, respectively, is larger than the initial (or “direct”) increase in production, income and employment. The total economic contribution of an industry, therefore, is comprised of a *direct effect*, an *indirect effect* and an *induced effect*.

The Minnesota IMPLAN Group, Inc. (MIG) provides the software and basic data needed to construct the economic multiplier model we have developed for this study. MIG has been providing regional multiplier models for regional economic impact analysis since 1985.⁹ Models developed using IMPLAN software have been widely used by private-sector and academic economists and by federal, state and local government agencies. Our IMPLAN model for Miami-Dade County is based on the latest U.S. input-output tables, and income and employment data for Miami-Dade from the U.S. Department of Commerce.

Shipments of international cargo by air and sea, like other key transportation activities, have a special impact beyond those originating from these activities themselves and the shipping lines that utilize those ports. Manufacturing firms within Miami-Dade County rely on these transportation services to reach foreign markets. In the absence of Miami International Airport and the Port of Miami¹⁰, transportation costs would quickly become prohibitive and affect not only the profitability of local manufacturing enterprises, but also the national and global economic viability of many of these enterprises. It is also clear that the County’s international transportation infrastructure is a key factor that makes possible the \$13.6 billion in exports sold by Miami-Dade firms, and the direct, indirect and induced economic impacts associated with those exports. Without access and competitive international transportation costs, many producers and international sales offices would likely move their operations to other parts of the State where they can achieve distribution costs and foreign market access consistent with economic viability.

⁹ Information on their modeling software and company history may be found at www.mig-inc.com

¹⁰ International cargo is also shipped via cargo terminals along the Miami River, although the overwhelming majority of merchandise cargo is shipped via the Port of Miami.

Our simulation analysis with our Miami-Dade County economic model clearly suggests that the multiplier impacts from international merchandise trade activity are quite significant.

The Total Impacts on Miami-Dade’s Economy: 2003

Miami-Dade County’s international merchandise trade sector exercises a considerable impact on the local economy each year. Miami-Dade firms engaged in the services required for moving cargo across international borders or the export sales of goods (produced either in Miami-Dade County or in another part of the U.S.) in 2003 directly support nearly 52,200 jobs, but they also indirectly support another 69,000 jobs. (See Table 3 for summary and Appendix I for economic impacts by industry.) That is, Miami-Dade’s international merchandise trade sector directly and indirectly supported approximately 121,200 jobs in 2003 – approximately ten (10) percent of total County employment.¹¹ Thirty-five (35) percent of these jobs resulted from transportation and trade financing activities, while 65 percent of the impact on jobs resulted from local export sales.

Table 3. Economic Impacts from International Merchandise Trade Activity: 2003

Economic Indicator	Impacts due to:		
	Transportation Services and Trade Financing	Exports of Manufactured Goods	Total Impacts
Employment (Jobs)	42,638	78,606	121,244
Labor Income (Million \$)	1,694	3,360	5,054
Average Earnings Per Worker (\$/year)	39,725	42,745	41,683
Economic Output (Million \$)	4,436	10,521	14,957
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Capital Income (Million \$)	471	1,145	1,616
Local Govt Taxes and Fees (Thou. \$)	57,891	121,211	179,102
State Govt Taxes and Fees (Thou. \$)	58,777	123,040	181,817

Source: The Washington Economics Group, Inc.

¹¹ Including both salaried employees and self-employed workers.

The total employment impact (direct, indirect and induced impacts) of Miami-Dade's international merchandise trade sector is spread across a wide spectrum of occupational categories, indicating that the economic benefits of this activity are similarly spread across household of many income strata. Approximately 21 percent of the nearly total jobs supported by Florida's seaports are found among the ranks of managers, administrators, and professionals.

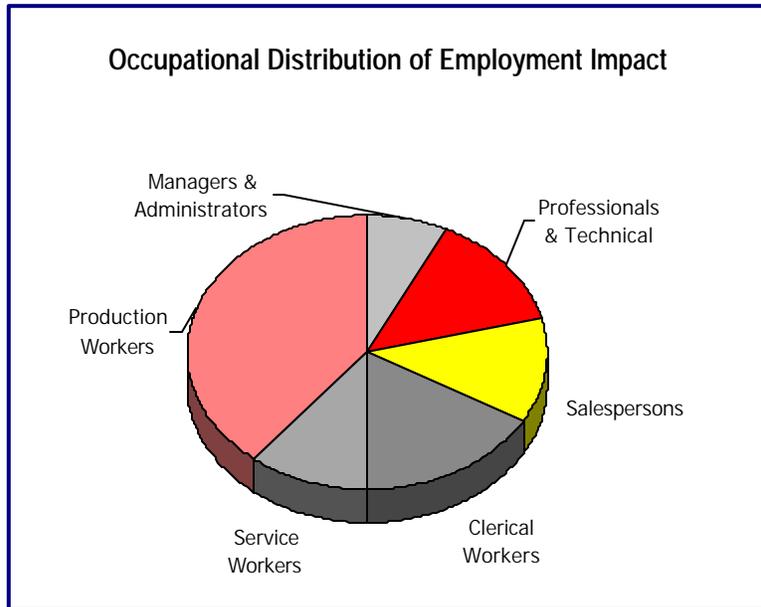


Figure 5

Twenty-seven (27) percent of the employment impact from international merchandise trade activity are found at the other end of the occupational spectrum – private-services employees (11 percent) and clerical/administrative support personnel (16 percent). Thirty-nine (39) percent of the employment impact is found among production workers, while 13 percent are salespersons.

The average annual earnings of workers directly or indirectly supported by the County's international merchandise trade sector are projected to be \$41,700, and compares favorably (16 percent higher) to the County average of \$35,800.

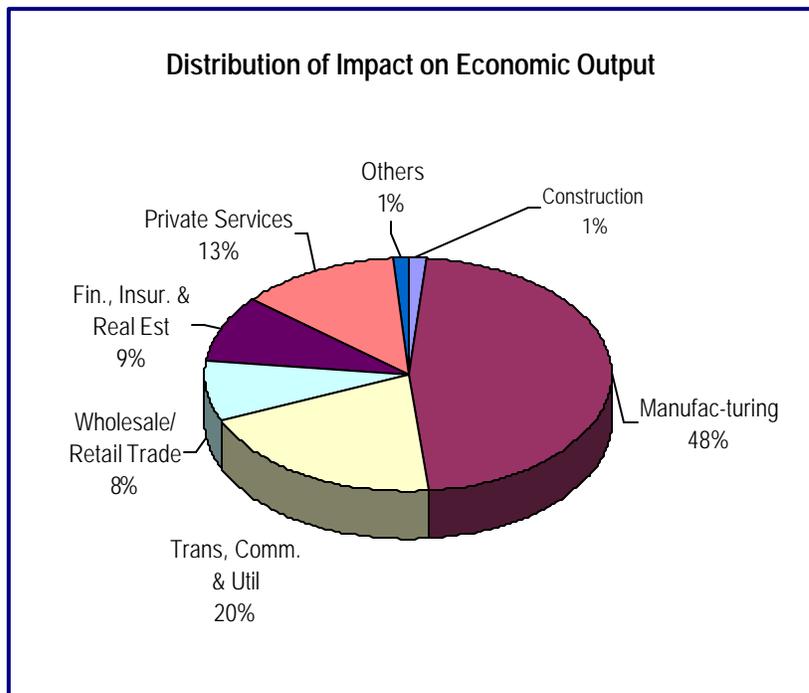


Figure 6

The international merchandise trade sector had a \$15 billion impact on gross economic output in Miami-Dade County in 2003, including the direct (\$8.4 billion), the indirect (\$3.2 billion) and the induced (\$3.3 billion) impacts. Approximately 30 percent of the total economic impact of international merchandise trade activity resulted from transportation and trade financing services, while the remaining 70 percent resulted from the exports of goods produced and/or sold by local firms. The bulk of this impact was experienced in the manufacturing sector (47 percent) and in the transportation sector (20 percent). The remaining impacts were spread almost evenly across private services (13 percent), banking and financial services (9 percent) and wholesale/retail trade (8 percent).

International merchandise trade activity also supported a total of \$7.1 billion in gross regional product.¹² The impact on gross regional product is distributed across a broad spectrum of industries in a pattern similar to the distribution of gross economic output. Gross regional product is an important economic indicator because (after deducting for indirect business taxes) it represents the total income that is available for distribution between labor earnings and the financial return to capital. The international merchandise trade sector generated \$5.1 billion in compensation (including fringe benefits and employer contributions to social insurance) to workers and \$1.6 billion in capital income, according to our analysis.

The State and Local Fiscal Revenue Contributions from Merchandise Trade

The economic activity generated directly by Miami-Dade's international merchandise trade sector and through its economic multiplier effects also yields significant impacts on tax and fee revenues for the State and local governments. As economic activity expands property values, taxable sales and non-tax fees increase, and government revenues therefore increase as well.

Computer simulations with our model indicate that economic activity related to the movement of international cargo through County ports and export sales by local firms generate important revenues for Florida and for local governments in Miami-Dade County. Total State and local government revenues generated as a result of the economic activity supported by merchandise trade are estimated at \$361 million. These revenues are split almost equally between the State and local Miami-Dade governments (including

¹² Gross Regional Product (GRP) represents the net value of production ("value added") and is a concept analogous to Gross Domestic Product (GDP) at the national level. Gross Regional Product consists of compensation to labor, compensation to capital (business profits and interest income), and indirect business taxes (mainly sales taxes).

the school board), although the sources of revenue are different. (See Table 4.) Additional sales taxes accounted for nearly 75 percent of total State revenues, while additional property taxes accounted for 57 percent of the projected local government revenues.

Table 4. Summary of State and Local Govt Revenue Impacts: 2003
(Thousands of \$)

	State	Local	Total
Sales Taxes	138,667	27,606	166,273
Other Indirect Taxes and Fees	14,979	19,555	34,534
Property Taxes	5,882	102,843	108,725
Other Personal Taxes	9,500	12,403	21,903
Other Taxes and Fees	<u>12,789</u>	<u>16,695</u>	<u>29,484</u>
Total	181,817	179,102	360,919

Source: The Washington Economics Group, Inc.

IV. CONCLUSIONS

The foregoing analysis of international merchandise trade activity within Miami-Dade County indicates that merchandise trade accounts for a substantial proportion of jobs, income, business revenues and gross regional product, and generates (either directly or indirectly) considerable government revenues for local governments and for the State of Florida.

The use of computer simulations with our input-output model of Miami-Dade's economy reveals the following:

- Just over 121,000 jobs in Miami-Dade County are supported by international merchandise trade activity.
- The average annual employment earnings of the jobs generated by this sector are \$41,700, which is 16 percent higher than the County's average wage of \$35,800.
- Approximately \$5.1 billion of annual labor income are generated by this activity.
- This sector is responsible for nearly \$15 billion in annual economic output (primarily private-sector business revenues).
- Merchandise trade provides the local economy with \$7.1 billion in gross regional product each year.
- International merchandise trade activity generates \$179 million of fiscal revenues for local governments and taxing authorities within Miami-Dade County and an additional \$182 million in State of Florida fiscal revenues.

The occupational distribution of the jobs supported by international merchandise trade activity indicates that the economic benefits of this sector reach across a broad spectrum of socioeconomic groups that live within Miami-Dade County.

Our estimates of international merchandise trade impacts **underestimates** the economic importance of the broader international sector of Miami-Dade, **of which international merchandise trade is a key, but not the sole component.** International merchandise trade primarily impacts transportation and related industries, trade finance and manufacturing for exports. The **broader international sector** also includes economic

impacts generated by tradable services such as legal, healthcare, media/entertainment, accounting, business services and others. Furthermore, the presence of a world-class international trade infrastructure attracts business visitors, trade shows and business conferences. Foreign capital inflows that stimulate activity in banking, real estate services and construction are also part of the broader international sector of MDC. International trade is a key component of the larger international sector of MDC. This sector also includes exports of knowledge-based services, business tourism and foreign capital flows. A comprehensive study of the broader international sector should be undertaken. An understanding of the economic impacts of international activities in MDC is essential to the implementation of appropriate public policies and investments required to enhance its development.

APPENDIX I: DETAILED IMPACT TABLES

Table A.1 Economic Impact from International Merchandise Trade Activity

Total Economic Output (Business Revenues and Government Expenditures, Million \$, 2003)

Industry	Direct	Indirect	Induced	Total
<i><u>From International Trade Transportation and Financial Services</u></i>				
Agriculture and Mining	0	1	5	6
Construction	0	6	53	59
Manufacturing	0	42	64	106
Transportation, Communications, Utilities	2,204	364	57	2,625
Wholesale and Retail Trade	0	50	231	281
Finance, Insurance and Real Estate	270	174	248	692
Private, Non-financial Services	0	307	325	632
Government	<u>0</u>	<u>12</u>	<u>24</u>	<u>36</u>
Sub-Total	2,474	954	1,008	4,436
<i><u>From Exports of Manufactured Goods</u></i>				
Agriculture and Mining	0	41	11	52
Construction	0	57	103	160
Manufacturing	5,918	775	218	6,911
Transportation, Communications, Utilities	0	224	181	405
Wholesale and Retail Trade	0	466	484	950
Finance, Insurance and Real Estate	0	173	506	679
Private, Non-financial Services	0	537	735	1,272
Government	<u>0</u>	<u>6</u>	<u>86</u>	<u>92</u>
Sub-Total	5,918	2,279	2,324	10,521
<i><u>Total Impact From International Merchandise Trade Activity</u></i>				
Agriculture and Mining	0	42	16	58
Construction	0	63	156	219
Manufacturing	5,918	817	282	7,017
Transportation, Communications, Utilities	2,204	588	238	3,030
Wholesale and Retail Trade	0	516	715	1,231
Finance, Insurance and Real Estate	270	347	754	1,371
Private, Non-financial Services	0	844	1,060	1,904
Government	<u>0</u>	<u>18</u>	<u>110</u>	<u>128</u>
Total	8,392	3,233	3,332	14,957

Source: The Washington Economics Group, Inc.

Table A.2 Economic Impact from International Merchandise Trade Activity

Employment (Jobs)

Industry	Direct	Indirect	Induced	Total
<i>From International Trade Transportation and Financial Services</i>				
Agriculture and Mining	0	10	95	105
Construction	0	82	404	487
Manufacturing	0	276	354	629
Transportation, Communications, Utilities	18,977	2,822	372	22,171
Wholesale and Retail Trade	0	496	4,221	4,717
Finance, Insurance and Real Estate	2,810	972	830	4,612
Private, Non-financial Services	0	4,388	5,132	9,520
Government	<u>0</u>	<u>86</u>	<u>312</u>	<u>398</u>
Sub-Total	21,787	9,131	11,719	42,638
<i>From Exports of Manufactured Goods</i>				
Agriculture and Mining	0	743	199	942
Construction	0	424	766	1,189
Manufacturing	30,369	4,276	1,234	35,878
Transportation, Communications, Utilities	0	1,594	1,291	2,885
Wholesale and Retail Trade	0	6,705	6,959	13,664
Finance, Insurance and Real Estate	0	722	2,112	2,834
Private, Non-financial Services	0	8,058	11,045	19,103
Government	<u>0</u>	<u>85</u>	<u>2,026</u>	<u>2,111</u>
Sub-Total	30,369	22,607	25,630	78,606
<i>Total Impact From International Merchandise Trade Activity</i>				
Agriculture and Mining	0	753	295	1,047
Construction	0	506	1,170	1,676
Manufacturing	30,369	4,552	1,588	36,508
Transportation, Communications, Utilities	18,977	4,416	1,662	25,055
Wholesale and Retail Trade	0	7,202	11,179	18,381
Finance, Insurance and Real Estate	2,810	1,694	2,942	7,445
Private, Non-financial Services	0	12,446	16,177	28,623
Government	<u>0</u>	<u>172</u>	<u>2,337</u>	<u>2,509</u>
Total	52,156	31,738	37,350	121,244

Source: The Washington Economics Group, Inc.

Table A.3 Economic Impact from International Merchandise Trade Activity

Labor Income (Million \$, 2003)

Industry	Direct	Indirect	Induced	Total
<i><u>From International Trade Transportation and Financial Services</u></i>				
Agriculture and Mining	0	0	2	2
Construction	0	3	15	18
Manufacturing	0	14	15	29
Transportation, Communications, Utilities	772	117	18	907
Wholesale and Retail Trade	0	21	104	125
Finance, Insurance and Real Estate	152	62	43	257
Private, Non-financial Services	0	166	173	339
Government	<u>0</u>	<u>6</u>	<u>11</u>	<u>17</u>
Sub-Total	924	389	381	1,694
<i><u>From Exports of Manufactured Goods</u></i>				
Agriculture and Mining	0	14	4	18
Construction	0	17	30	47
Manufacturing	1,630	198	54	1,882
Transportation, Communications, Utilities	0	75	61	136
Wholesale and Retail Trade	0	204	212	416
Finance, Insurance and Real Estate	0	32	92	124
Private, Non-financial Services	0	280	383	663
Government	<u>0</u>	<u>4</u>	<u>70</u>	<u>74</u>
Sub-Total	1,630	824	906	3,360
<i><u>Total Impact From International Merchandise Trade Activity</u></i>				
Agriculture and Mining	0	14	6	20
Construction	0	20	45	65
Manufacturing	1,630	212	69	1,911
Transportation, Communications, Utilities	772	192	79	1,043
Wholesale and Retail Trade	0	225	316	541
Finance, Insurance and Real Estate	152	94	135	381
Private, Non-financial Services	0	446	556	1,002
Government	<u>0</u>	<u>10</u>	<u>81</u>	<u>91</u>
Total	2,554	1,213	1,287	5,054

Source: The Washington Economics Group, Inc.

Table A.4 Economic Impact from International Merchandise Trade Activity

Capital Income (Million \$, 2003)

Industry	Direct	Indirect	Induced	Total
<i><u>From International Trade Transportation and Financial Services</u></i>				
Agriculture and Mining	0	0	1	1
Construction	0	0	2	2
Manufacturing	0	4	7	11
Transportation, Communications, Utilities	174	37	10	221
Wholesale and Retail Trade	0	6	31	37
Finance, Insurance and Real Estate	14	35	108	157
Private, Non-financial Services	0	21	21	42
Government	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-Total	188	103	180	471
<i><u>From Exports of Manufactured Goods</u></i>				
Agriculture and Mining	0	6	2	8
Construction	0	2	4	6
Manufacturing	471	74	22	567
Transportation, Communications, Utilities	0	30	25	55
Wholesale and Retail Trade	0	62	64	126
Finance, Insurance and Real Estate	0	73	214	287
Private, Non-financial Services	0	36	50	86
Government	<u>0</u>	<u>1</u>	<u>9</u>	<u>10</u>
Sub-Total	471	284	390	1,145
<i><u>Total Impact From International Merchandise Trade Activity</u></i>				
Agriculture and Mining	0	6	3	9
Construction	0	2	6	8
Manufacturing	471	78	29	578
Transportation, Communications, Utilities	174	67	35	276
Wholesale and Retail Trade	0	68	95	163
Finance, Insurance and Real Estate	14	108	322	444
Private, Non-financial Services	0	57	71	128
Government	<u>0</u>	<u>1</u>	<u>9</u>	<u>10</u>
Total	659	387	570	1,616

Source: The Washington Economics Group, Inc.

Table A.5 Economic Impact from International Merchandise Trade Activity

Gross Regional Product (Million \$, 2003)

Industry	Direct	Indirect	Induced	Total
<i><u>From International Trade Transportation and Financial Services</u></i>				
Agriculture and Mining	0	0	3	3
Construction	0	4	17	21
Manufacturing	0	18	23	41
Transportation, Communications, Utilities	1,000	162	30	1,192
Wholesale and Retail Trade	0	34	166	200
Finance, Insurance and Real Estate	176	105	172	453
Private, Non-financial Services	0	192	200	392
Government	<u>0</u>	<u>6</u>	<u>12</u>	<u>18</u>
Sub-Total	1,176	521	623	2,320
<i><u>From Exports of Manufactured Goods</u></i>				
Agriculture and Mining	0	21	6	27
Construction	0	19	34	53
Manufacturing	2,175	285	80	2,540
Transportation, Communications, Utilities	0	115	93	208
Wholesale and Retail Trade	0	330	342	672
Finance, Insurance and Real Estate	0	120	350	470
Private, Non-financial Services	0	327	448	775
Government	<u>0</u>	<u>5</u>	<u>79</u>	<u>84</u>
Sub-Total	2,175	1,222	1,432	4,829
<i><u>Total Impact From International Merchandise Trade Activity</u></i>				
Agriculture and Mining	0	21	9	30
Construction	0	23	51	74
Manufacturing	2,175	303	103	2,581
Transportation, Communications, Utilities	1,000	277	123	1,400
Wholesale and Retail Trade	0	364	508	872
Finance, Insurance and Real Estate	176	225	522	923
Private, Non-financial Services	0	519	648	1,167
Government	<u>0</u>	<u>11</u>	<u>91</u>	<u>102</u>
Total	3,351	1,743	2,055	7,149

Source: The Washington Economics Group, Inc.

Table A.6 State and Local Government Revenues, 2003 (Thousands of \$)

	State	Local	Total
<i><u>From International Trade Transportation and Financial Services</u></i>			
Sales Taxes	44,899	8,939	53,838
Other Indirect Business Taxes and Fees	2,814	3,674	6,488
Property Taxes	1,906	33,323	35,229
Other Personal Taxes	3,167	4,135	7,302
Other Taxes and Fees	<u>5,991</u>	<u>7,820</u>	<u>13,811</u>
Sub-Total	58,777	57,891	116,668
<i><u>From Exports of Manufactured Goods</u></i>			
Sales Taxes	93,768	18,667	112,435
Other Indirect Business Taxes and Fees	12,165	15,881	28,046
Property Taxes	3,976	69,520	73,496
Other Personal Taxes	6,333	8,268	14,601
Other Taxes and Fees	<u>6,798</u>	<u>8,875</u>	<u>15,673</u>
Sub-Total	123,040	121,211	244,251
<i><u>Total Impact From International Merchandise Trade Activity</u></i>			
Sales Taxes	138,667	27,606	166,273
Other Indirect Taxes and Fees	14,979	19,555	34,534
Property Taxes	5,882	102,843	108,725
Other Personal Taxes	9,500	12,403	21,903
Other Taxes and Fees	<u>12,789</u>	<u>16,695</u>	<u>29,484</u>
Total	181,817	179,102	360,919

Source: The Washington Economics Group, Inc.

APPENDIX II: IMPLAN MODEL AND METHODOLOGY

The multiplier impacts calculated by the IMPLAN model are based on input-output methodology, which explicitly considers the inter-industry linkages that exist within an economy. Each industry needs labor and inputs from other industries in order to produce economic output. Whenever an industry experiences an increase in the demand for its output, many other industries within that economy indirectly experience an increase in demand as well because of these inter-industry linkages. This increase in demand that results from the need for material inputs is called the *indirect effects*. In addition, an increase in production within a region also leads to an increase in household income through the hiring of workers, which in turn generates further demands for goods and services within the region. Firms also need to expand their base of physical capital to meet higher levels of demand, and this too stimulates regional economic growth. The latter effects are referred to as *induced effects*. The inter-industry linkages and the induced effects on consumer and capital spending lead to successive rounds of production, and this process results in an increase in output that exceeds the initial change in demand, or a *multiplier effect*. Similarly, the increase in household income will exceed the initial payroll increase encountered in the industry that experienced the original increase in demand. The total change in employment in the regional economy is a multiple of the direct change in employment.

The following represents the system of equations that comprise the regional economy in an extended input-output model like IMPLAN:

$$\begin{aligned}
 x_1 &= a_{11}x_1 + a_{12}x_2 + a_{13}x_3 + \cdots + a_{1k}x_k + a_{1h}x_h + a_{1I}x_I + a_{1g}x_g + f_1 \\
 x_2 &= a_{21}x_1 + a_{22}x_2 + a_{23}x_3 + \cdots + a_{2k}x_k + a_{2h}x_h + a_{2I}x_I + a_{2g}x_g + f_2 \\
 x_3 &= a_{31}x_1 + a_{32}x_2 + a_{33}x_3 + \cdots + a_{3k}x_k + a_{3h}x_h + a_{3I}x_I + a_{3g}x_g + f_3 \\
 &\vdots \\
 x_k &= a_{k1}x_1 + a_{k2}x_2 + a_{k3}x_3 + \cdots + a_{kk}x_k + a_{kh}x_h + a_{kI}x_I + a_{kg}x_g + f_k \\
 x_h &= a_{h1}x_1 + a_{h2}x_2 + a_{h3}x_3 + \cdots + a_{hk}x_k + a_{hg}x_g \\
 x_I &= a_{I1}x_1 + a_{I2}x_2 + a_{I3}x_3 + \cdots + a_{Ik}x_k + a_{Ig}x_g \\
 x_g &= a_gx_1 + a_{g2}x_2 + a_{g3}x_3 + \cdots + a_{gk}x_k + a_{gh}x_h
 \end{aligned}$$

The variables x_1 to x_k represent total production of output in each industry. The coefficients a_j represent the purchases from industry “i” that are needed to produce a dollar of output in industry “j”. These are known as the *direct requirement* coefficients. The variable x_h refers to household income and the coefficients a_{hi} refer to the average amount of household income spent on purchases from industry “i”, or the *average propensities to consume*. The coefficients a_{hi} are similar to the inter-industry purchases (a_{ij} ’s), but they represent the household income that is generated from each dollar of output produced in industry “i”. The coefficients a_g represent government purchases from industry “i” per dollar of government revenue. The variable x_g represents state and local government output, and the coefficients a_{gj} represent government revenues collected from each dollar of output produced in industry “j”. Similarly the variable x_c represents regional spending on capital goods, and the coefficients a_j represent the spending on capital goods for each dollar of output produced in industry “j”. The coefficients a_j represent the amount purchased from industry “j” for each dollar spent on capital goods within the region. The variables f_j represent the exogenous final demand faced by each industry, respectively.

This system of equation reduces, using matrix notation, to the following solution for industry output, household income, and state and local government revenue:

$$X = (I - A)^{-1} F$$

X is the vector of industry outputs plus household income and F is a vector of exogenous final demands. The “output multipliers” (i.e., the change in industry output and household income that results from a change in final demand for the output of a particular industry) are given in the columns of the $(I-A)^{-1}$ matrix. The IMPLAN software calculates these multipliers for counties, states and other sub-state regions. These multipliers can be used to provide a sense of the economic importance of an industry or an economic activity in a given region. The multipliers impacts for gross state product, labor and capital income and the government revenue impacts are derived from the basic output multipliers given by $(I-A)^{-1}$.

Our IMPLAN model uses historical relationships between public-sector revenues and regional economic output in order to estimate the public-sector revenue impact resulting from the establishment of a new, or expansion of an existing economic activity.

APPENDIX III: THE WASHINGTON ECONOMICS GROUP QUALIFICATIONS

J. Antonio “Tony” Villamil, Principal Advisor

Tony Villamil is Chief Executive Officer of The Washington Economics Group, Inc., serving until the summer of 2000 as Director of the Governor’s Office of Tourism, Trade and Economic Development of Florida. He is currently Chairperson of the Governor’s Council of Economic Advisors, and a member of the Board of Directors of Enterprise Florida. Mr. Villamil has over 25 years of successful experience as a business economist and as a public official of both the federal and State of Florida governments. He served as U.S. Undersecretary of Commerce for Economic Affairs in the administration of President George Bush, and most recently he was appointed to President George W. Bush Transition Advisory Committee on U.S. commercial and trade policies. Tony received his undergraduate and graduate degrees in economics from Louisiana State University (LSU) in Baton Rouge. Presently he resides in Coral Gables, Florida with his family.

Robert David Cruz, Ph.D., Chief Economist

Bob Cruz serves as Senior Consulting Economist at The Washington Economics Group, Inc. and is a specialist in quantitative economics, modeling and simulation analysis. Dr. Cruz holds the position of Associate Professor of Economics and International Business in the Andreas School of Business of Barry University in Miami Shores. Dr. Cruz has extensive public sector and business consulting experience, having advised local governments and numerous domestic and transnational corporations over the past two decades. His academic career spans over 20 years as teacher and researcher and he has published numerous articles in professional journals and scholarly books. Dr. Cruz received his Ph.D. in economics from the University of Pennsylvania in 1985 and his Bachelor of Arts degree from Georgetown University in 1978.



The Washington Economics Group, Inc. has been successfully meeting client objectives since 1993 through economic consulting services for corporations, institutions and governments of the Americas. We have the expertise, high-level contacts, and business alliances to strengthen your competitive positioning in the growing marketplaces of Florida and Latin America.

Our roster of clients, over the past eight years, includes multinational corporations, financial institutions, public entities, and non-profit associations expanding their operations in the Americas.

EXCLUSIVE CONSULTING APPROACH:

Each client is unique to us. We spend considerable time and effort in understanding the operations, goals, and objectives of clients as they seek our consulting and strategic advice. We are not a mass-production consulting entity nor do we accept every project that comes to us. We engage a limited number of clients each year that require customized consulting services in our premier areas of specialization. These premier and exclusive services are headed by former U.S. Under Secretary of Commerce, Dr. J. Antonio Villamil, with over twenty-five years of experience as a business executive and as a senior public official of the U.S. and most recently of Florida.

PREMIER CONSULTING SERVICES:

Comprehensive Corporate Expansion Services for Florida. Our seamless and customized service includes site selection analysis, development of incentive strategies and community and governmental relations.

Economic Impact Studies highlight the importance of a client's activities in the generation of income, output and employment in the market area serviced by the entity. These studies are also utilized to analyze the impact of public policies on key factors that may affect a client's activities such as tax changes, zoning, environmental permits and others.

Strategic Business Development Services. These services are customized to meet client objectives, with particular emphasis in the growing marketplaces of Florida, Mexico, Central and South America. Recent consulting assignments include customized marketing strategies, country risk assessments for investment decisions and corporate spokesperson activities and speeches on behalf of the client at public or private meetings.