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AmerenIP Contact: Kelly Bauza, PH (618) 236-4309

Scott AFB Utilities Contact: Larry Paesk, Deputy Base Civil Engineer, (618) 256-2701

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MidAmerica St. Louis Airport Contact: Ronald Owens, Director of Operations, (618) 566-5241

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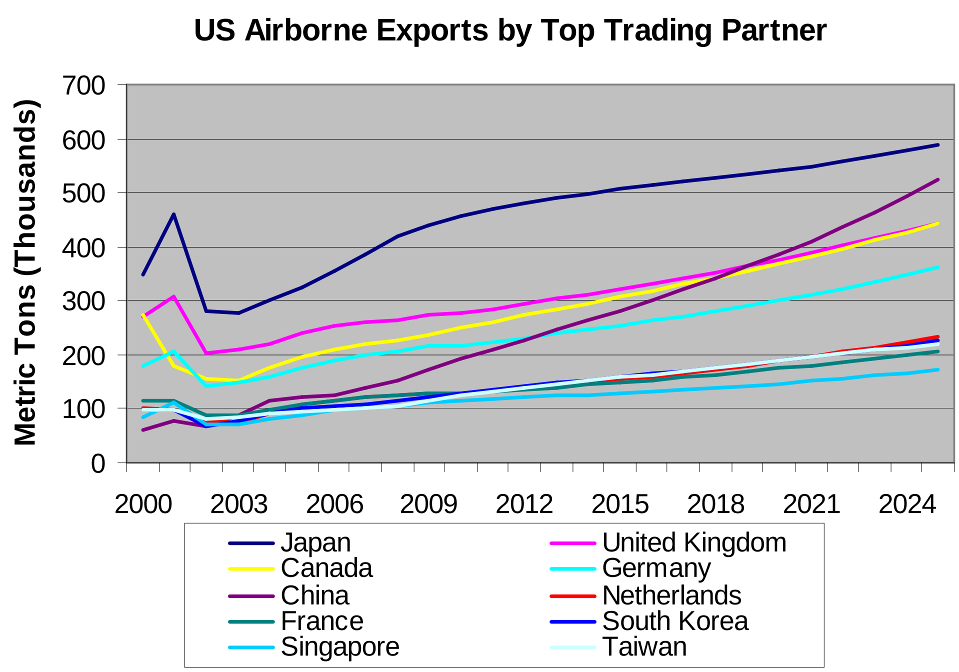
Mid America St. Louis Airport Contact: Scott Miller, Airport Director of IT, (618) 566-5250

Appendix B Cargo Support Data

Exhibit B-1

US Airborne Exports by Top Trading Partner



Source: Global Insight World Trade Service
Prepared by: Global Insight, Inc.

Table B-1

Cargo Support Data – Chicago, Illinois

	Avg. of TRK Miles	Share of tons
Chicago, IL	-	88.8%
Milwaukee, WI	93.9	9.5%
Elkhart, IN	108.8	1.0%
Madison, WI	149.1	0.6%
Davenport, IA	177.6	0.0%
Cedar Rapids, IA	247.8	0.0%
Peoria, IL	164.9	0.0%
Champaign, IL	136.1	0.0%
Indianapolis, IN	182.1	0.0%
Springfield, IL	197.7	0.0%
Grand Total	152.1	100.0%

*Within Chicago, over 98 percent of all cargo tonnage is to/from BEAs within 110 miles.

Source: Global Insight Transresearch
Prepared by: Global Insight, Inc.

Table B-2

Cargo Support Data – Dallas, Texas

	Avg. of TRK Miles	Share of tons
Dallas, TX	-	97.7%
Oklahoma City, OK	206.4	0.7%
Austin, TX	191.0	0.6%
Houston, TX	241.9	0.4%
Abilene, TX	191.5	0.4%
Shreveport, LA	187.2	0.2%
San Angelo, TX	283.3	0.0%
Little Rock, AR	321.5	0.0%
Lubbock, TX	357.6	0.0%
Amarillo, TX	379.3	0.0%
San Antonio, TX	270.4	0.0%
Grand Total	244.8	100.0%

For Dallas, without a BEA nearby, nearly 98 percent of all tonnage is to/from the local area.

Source: Global Insight Transresearch
Prepared by: Global Insight, Inc.

Table B-3

Cargo Support Data – Columbus, Ohio

	Avg. of TRK Miles	Share of tons
Columbus, OH	-	91.7%
Cincinnati, OH	108.2	3.3%
Dayton, OH	68.3	3.2%
Charleston, WV	164.7	1.3%
Pittsburgh, PA	189.0	0.5%
Lexington, KY	188.7	0.0%
Grand Total	130.3	100.0%

The top 3 BEAs, all within 110 miles of Columbus, make up over 98 percent of all tonnage.

Source: Global Insight Transresearch
Prepared by: Global Insight, Inc.

Table B-4

Cargo Support Data – Memphis, Tennessee

	Avg. of TRK Miles	Share of tons
Memphis, TN	-	97.3%
Jonesboro, AR	70.3	1.1%
Tupelo, MS	106.2	1.0%
Little Rock, AR	135.3	0.4%
Greenville, MS	152.5	0.1%
Nashville, TN	211.6	0.0%
Grand Total	123.2	100.0%

The top 3 BEAs, all within 110 miles of Memphis, make up over 99 percent of all tonnage.

Source: Global Insight Transresearch
Prepared by: Global Insight, Inc.

Table B-5

Cargo Support Data – St. Louis, Missouri

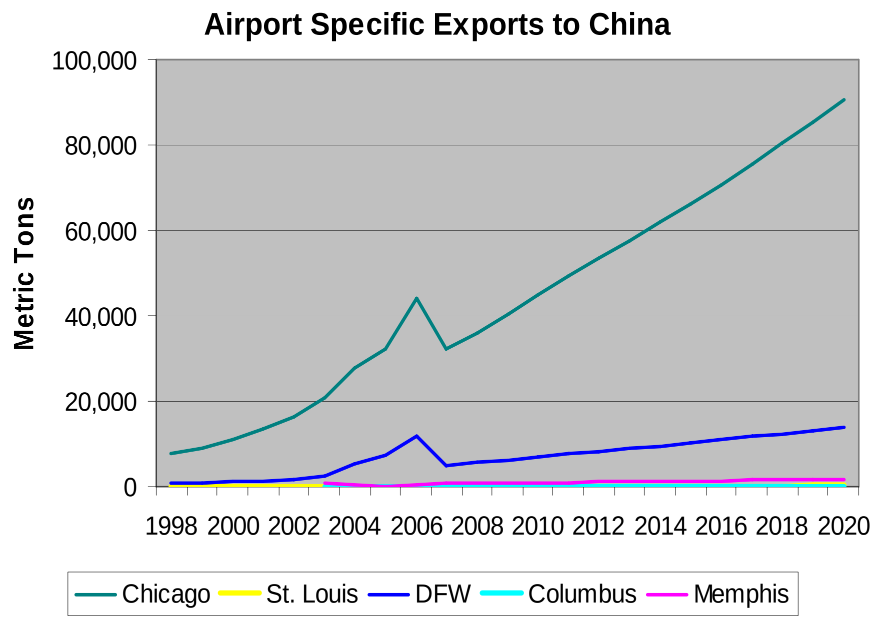
	Avg. of TRK Miles	Share of tons
St. Louis, MO	-	95.4%
Springfield, IL	108.6	2.2%
Columbia, MO	112.6	1.7%
Champaign, IL	190.2	0.4%
Springfield, MO	217.0	0.3%
Evansville, IN	183.7	0.0%
Grand Total	145.8	100.0%

St. Louis has two other BEAs in the 110 mile area to draw significant cargo tonnage.

Source: Global Insight Transresearch
Prepared by: Global Insight, Inc.

Exhibit B-2

Airport Specific Exports to China



Source: Global Insight Transresearch
Prepared by: Global Insight, Inc.

Exhibit B-3

US Airport Exports to Indonesia by Top Commodities

Source: Global Insight World Trade Service, WISERTrade Data
Prepared by: Global Insight, Inc.

Table B-6

Exports by Region

Chicago Exports	St. Louis Exports	DFW Exports	Columbus Exports	Memphis Exports
Industrial machinery, including computers	Industrial machinery, including computers	Industrial machinery, including computers	Industrial machinery, including computers	Industrial machinery, including computers
Electric machinery etc; sound equip; TV equip; pts	Organic chemicals	Electric machinery etc; sound equip; TV equip; pts	Electric machinery etc; sound equip; TV equip; pts	Aircraft, spacecraft, and parts thereof
Optic, photo etc, medic or surgical instruments etc	Electric machinery etc; sound equip; TV equip; pts	Optic, photo etc, medic or surgical instruments etc	Optic, photo etc, medic or surgical instruments etc	Electric machinery etc; sound equip; TV equip; pts
Vehicles, except railway or tramway, and parts etc	Plastics and articles thereof	Plastics and articles thereof	Vehicles, except railway or tramway, and parts etc	Miscellaneous chemical products
Plastics and articles thereof	Aircraft, spacecraft, and parts thereof	Meat and edible meat offal	Paper & paperboard & articles (inc paper pulp)	Optic, photo etc, medic or surgical instruments etc
Pharmaceutical products	Inorganic chemicals; precious & rare-earth met & radioactive compounds	Paper & paperboard & articles (inc paper pulp)	Printed books, newspapers etc; manuscripts etc	Organic chemicals
Paper & paperboard & articles (inc paper pulp)	Optic, photo etc, medic or surgical instruments etc	Miscellaneous chemical products	Organic chemicals	Special classification provisions, nesoi
Printed books, newspapers etc; manuscripts etc	Pharmaceutical products	Aircraft, spacecraft, and parts thereof	Plastics and articles thereof	Articles of iron or steel
Miscellaneous chemical products	Albuminoidal substances; modified starch; glue; enzymes	Vehicles, except railway or tramway, and parts etc	Spec woven fabrics; tufted fabric; lace; tapestries etc	Toys, games & sport equipment; parts & accessories
Articles of iron or steel	Miscellaneous chemical products	Articles of iron or steel	Tanning & dye ext etc; dye, paint, putty etc; inks	Paper & paperboard & articles (inc paper pulp)

Source: Global Insight World Trade Service
Prepared by: Global Insight, Inc.

Table B-7

Imports by Region

Imports Chicago	Imports St. Louis	DFW Imports	Imports Columbus	Imports Memphis
Industrial machinery, including computers	Industrial machinery, including computers	Electric machinery etc; sound equip; TV equip; pts	Apparel articles and accessories, knit or crochet	Industrial machinery, including computers
Electric machinery etc; sound equip; TV equip.	Electric machinery etc; sound equip; TV equip; pts	Industrial machinery, including computers	Apparel articles and accessories, not knit etc.	Electric machinery etc; sound equip; TV equip; pts
Apparel articles and accessories, not knit etc.	Footwear, gaiters etc. And parts thereof	Optic, photo etc, medic or surgical instruments etc	Electric machinery etc; sound equip; TV equip; pts	Special classification provisions, nesoi
Vehicles, except railway or tramway, and parts etc	Apparel articles and accessories, not knit etc.	Special classification provisions, nesoi	Industrial machinery, including computers	Articles of iron or steel
Optic, photo etc, medic or surgical instruments etc	Organic chemicals	Leather art; saddlery etc; handbags etc; gut art	Leather art; saddlery etc; handbags etc; gut art	Organic chemicals
Apparel articles and accessories, knit or crochet	Optic, photo etc, medic or surgical instruments etc	Fish, crustaceans & aquatic invertebrates	Toys, games & sport equipment; parts & accessories	Optic, photo etc, medic or surgical instruments etc
Toys, games & sport equipment; parts & accessories	Special classification provisions, nesoi	Plastics and articles thereof	Furniture; bedding etc; lamps nesoi etc.	Explosives; pyrotechnics; matches; pyro alloys etc
Plastics and articles thereof	Plastics and articles thereof	Articles of iron or steel	Vehicles, except railway or tramway, and parts etc	Pharmaceutical products
Edible vegetables & certain roots & tubers	Furniture; bedding etc; lamps nesoi etc	Apparel articles and accessories, knit or crochet	Footwear, gaiters etc. And parts thereof	Vehicles, except railway or tramway, and parts etc
Articles of iron or steel	Apparel articles and accessories, knit or crochet	Furniture; bedding etc; lamps nesoi etc.	Albuminoidal substances; modified starch; glue; enzymes	Apparel articles and accessories, knit or crochet

Source: Global Insight World Trade Service
Prepared by: Global Insight, Inc.

Appendix C A Brief Introduction to the World Trade Forecasting Methodology

Global Insight World Trade Service

A Brief Introduction to the World Trade Forecasting Methodology

Introduction

The primary purpose of Global Insight's world trade forecasting system is to provide information to assist decision makers involved with international transportation. International transportation businesses, such as ocean shipping companies, terminal operators and port authorities, need detailed global trade volume forecasts for their operations and development planning. Policy makers and managers in companies that are not in the transportation business also can use these comprehensive forecasts to analyze world trade issues.

To meet the needs of the users, our global trade forecasts include all commodities that have physical volume, but not trade in services or commodities without physical volume, such as electricity. These commodities are grouped into our own categories derived from the International Standard Industrial Classification (ISIC). We cover 77 ISIC categories, as listed in Table 1 of the Appendix to this paper.

For all trade partners in the world, we track 54 major countries individually and group the rest of the countries in the world into 16 regions according to their geographic location.[1] Therefore, we forecast 77 commodities traded among 70 country/regions. This is a framework of 77×70×(70-1), or 371,910 potential trade flows. Because not every country trades every commodity with every other country, we presently have about 270,000 trade flows in our forecasts.

We forecast world trade in nominal and real commodity value and then convert to physical volume by transportation mode. Primary modes of transportation include air, overland and maritime transport, all measured in metric tons as well as in value. Maritime transport is further detailed for liquid bulk, dry bulk, general cargo/neobulk, and container trades. Container trade is measured in twenty foot equivalent units (TEUs) as well as metric tons. Table 3 in the Appendix shows the 18 concepts of the world trade in the forecast.

Trade Data Sources

The primary international trade history data come from the United Nations as processed and published by Statistics Canada. These commodity trade statistics are collected from each member country's customs agencies. Customs departments have records of both the export and import sides of trade flows. Statistics Canada produces export data in f.o.b. (free on board) terms, which are better to use in estimating the real value of the commodity trade. This data covers all UN member countries and non-member economies, such as Taiwan. Global Insight also purchases OECD International Trade by Commodity Statistics for more current data from the developed countries.

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1 Table 2 in the appendix lists the 54 countries and 16 regions used in the trade forecasting models.

Because international trade statistics collected by different countries usually have discrepancies when compared to each other, and because no one source has entirely complete data, we also use U.S. Customs data and IMF Direction of Trade data to calibrate and supplement the historical commodity trade data. Data from different sources are recorded in different classification systems and units of measurement. We convert the data into thousands of current U.S. dollars and then into 1997 real commodity value.

The world trade forecasting models also rely on Global Insight's comprehensive macroeconomic history and forecast databases. Among the data used are population, GDP, GDP deflators, industrial output, foreign exchange rates, and export prices by country. We use these data as exogenous variables in the trade forecast models. For international commodity prices, we also obtain data from the U.S. Bureau of Labor Statistics' on international import and export prices. We also use other data, such as foreign direct investment and import tariffs, as available, as determinants of a country's export capacity and import costs.

Modeling International Trade

The basic structure of the model for the trade flow of a commodity is that a country's import from another country are driven by the importing country's demand forces, enabled by the exporting country's capacity of exporting (supplying) the commodity, and affected by the exporting country's export price and importing country's import cost for the commodity. A country will import more of a commodity if its demand for this commodity increases. At the same time, the country will import more of this commodity from a particular exporting country if that exporter's capacity to export this commodity is larger and its export price for this commodity is lower than in other exporting countries. Importers will ultimately purchase based on the delivered cost, importing more when the import cost decreases. The distance between two countries is also an important factor in determining the scale of trade between two countries. Our models are constructed to capture the dynamics of international trade so that geographic distance as a constant is embedded in determining the scale of the base.

Demand forces are commodity specific. Presently, we group 77 commodities into two types. For the first type of commodities, major demand forces are the importing country's population and income growth. For the second type of commodities, the major demand forces are the importing country's production and technology development.

A country's export capacity for a commodity is estimated based on the country's capacity to produce this commodity and its ability to export it. The infrastructure, the establishments and resources that are needed for production determine production capacity. For export capabilities, we pay attention to the capacity that exceeds that needed to meet a country's domestic demand. Export capability is also determined by the quality and cost of the products that face competition in world markets.

Import costs are determined by export prices, import tariffs, and each importing country's foreign exchange rates. We categorize our 77 commodities into three groups to control the estimation of the impact of import costs on countries' imports of each commodity. These three groups generally can be described as price inelastic, low price elastic, and price elastic.

The models are constructed in real value terms. That is, value type variables are in terms of value minus the effect of price inflation. For example, the trade flow of a commodity is measured in the 1997 value of this commodity, and GDP of a country is measured in its 1990 value of GDP. We use the data in real value terms, because only in real terms do the levels of imports and exports show clear respective responses to changes in demand, supply, and prices.

As our main purpose is not simply forecasting a country's aggregate imports and exports, the models must be able to forecast each country's imports and exports with each of its trade partners. Trade between each pair of trading partners is generally quite volatile with importing behavior exhibiting switching of suppliers on an ongoing basis. A very simple example of switching behavior is when the pattern of an exporter's supply dynamic is smaller than the importer's demand dynamic, the exporter's supply dynamic will dominate the trade. In the opposite case, when an importer's demand dynamic is smaller than the exporter's supply dynamic, the importer's demand dynamic will dominate the trade. To capture such a pattern switch, we use multi-stage switch models.

Model Estimation

To minimize the impact of measurement errors and achieve stationarity for valid estimation of times series models, our models are constructed to represent the relationship between year-over-year growth indexes of commodity trade and the year-over-year growth indexes of other exogenous variables. Because the calculated year-over-year index is asymmetric around unity, it can exaggerate growth dynamics if the present year is an upturn and the previous year is a downturn. This problem can be serious for the detailed international trade data that have very volatile dynamics. To reduce such asymmetric distortion in model estimation, we rectify the asymmetry in the data before estimating the trade models.

Our trade models are nonlinear multi-stage switch models. Switch models are not continuous functions, so conventional derivative methods cannot be applied to estimating these models. So to estimate the trade models, we use a direct search method. Though thus use of the direct search method is infrequent in economic forecasting, it is popular in other scientific fields. This is because economists often abstract from reality to fit simplified theoretical models, while scientists must construct their models to capture reality as evidenced in empirical data. Our experience has shown that international trade of goods among world markets are so complicated with regard to each commodity, each pair of partners, and over time that they cannot be sufficiently abstracted to fit into simple continuous functions for accurate forecasting. Instead we have developed our system using complex switch functions, for which we employ a direct search method for estimation.

For estimating simple continuous functions, derivative methods have the advantage of quick convergence. However, with faster computers and decreasing computation costs convergence time is no longer a problem. This means our ability to estimate practical models can depend upon the criterion used for choosing our estimation method. The direct search method we use has three major advantages over conventional derivative methods. The first advantage, which is the most important one, is that it can be used to estimate switch functions. The second advantage is that it allows us to freely define our error minimization function. For forecasting it is minimizing the relative absolute error not the sum of squared error that is important for producing the most accurate models. However, an absolute error function is not continuous so we use a direct search method for its estimation. For nonlinear models, the continuous error function defined for derivative methods sometimes cannot avoid multi local minimums, so use of a derivative method frequently cannot attain global minima. Through the use of the direct search method, we can freely define the error function to only contain one minimum. The third advantage is that the direct search method allows us to conveniently set the boundary of model parameters. That means it allows us to apply prior information to our model estimation.

Forecast Approach

There are two key factors that influenced our choice of forecasting approach. One is the scale of our trade forecasts, and the other is the real character of international trade. The real character of international trade includes economic resource constraints, heterogeneous import behavior, and overall supply and demand equilibrium.

Previous international trade forecasting approaches can be categorized as bottom-up, top-down, and a (manual) hybrid approach. Our forecasting experience leads us to believe that none of these approaches are suitable to best meet our requirements. The bottom-up approach requires that the individual items to be forecast are not subject to total resource constraints or an overall equilibrium. This denies the existence of real resource constraints in international trade. For just one example, a country's imports are limited by its income constraint. We also find that there is an overall equilibrium in international trade, where no country can export more than what other countries are willing to import from it. In contrast, the top-down approach requires that individual items to be forecast have identical dynamic patterns. Examining commodity trade statistics quickly reveals that it is difficult to find one country's imports of a commodity from two different countries that have the same dynamic patterns. So this approach is not appropriate either. To overcome the shortcomings of using the bottom-up or top-down approaches alone, some economists have forecast individual commodities and their aggregates simultaneously and then manually reconciled the difference between the sum of individual forecasts and the aggregate forecasts. This is called a hybrid approach, which is generally a manual method. Unfortunately, the manual reconciliation is very time consuming, so it cannot be efficiently applied to comprehensive forecasts such as ours, which include more than a quarter million forecast series.

To overcome the weaknesses in these approaches, we have built a system that can be described as a top-down controlled approach. To implement this approach, we aggregate detailed trade flows to three top levels. We call the most detailed trade flows Level 4 (the lowest level) and aggregate them up level-by-level in the following structure:

Level 1

L1: World trade of total commodities,

$1 \times 1 \times 1 = 1$ series.

Level 2

L2C: World trade by commodity,

$77 \times 1 \times 1 = 77$ series.

L2M: Total commodities that each country/region imports from the world,

$1 \times 1 \times 70 = 70$ series.

L2X: Total commodities that each country/region exports to the world,

$1 \times 70 \times 1 = 70$ series.

Level 3

L3M: Commodities that each country/region imports from the world,

$77 \times 1 \times 70 = 5{,}390$ series maximum.

L3X: Commodities that each country/region exports to the world,

$77 \times 70 \times 1 = 5{,}390$ series maximum.

Level 4

L4: Commodities traded between each pair of countries/regions,

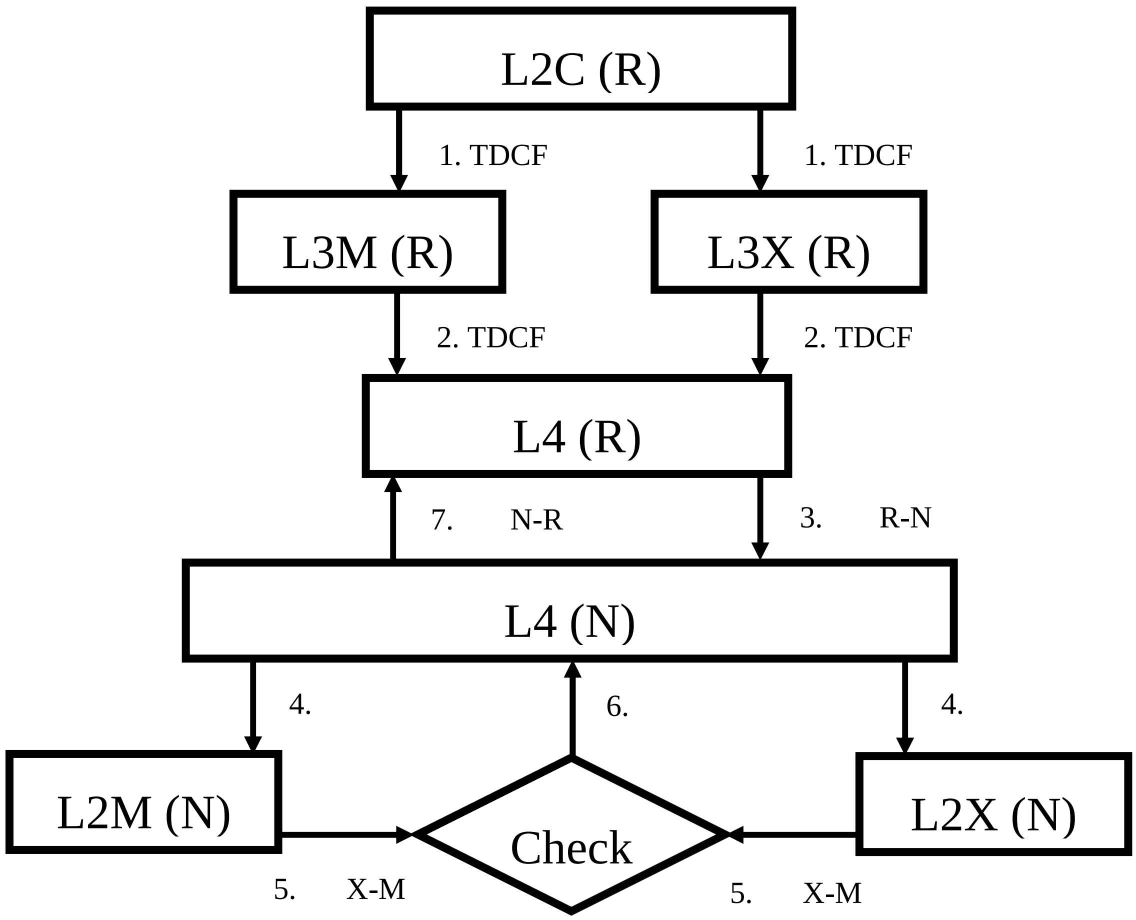
$77 \times 70 \times (70-1) = 371{,}910$ series maximum.

In this hierarchical structure, each series in levels L2C, L3M, L3X, and L4 has its own behavioral equation in the model structure (as described above in section 3). In this top-down controlled forecasting approach, each series is forecast by its own behavioral equation, but individual items at the lower level are forecast under the control of the forecast of their aggregate at the higher level. The forecasting program detects the discrepancy between the sum of individual forecasts and the aggregate forecast, identifies individual items that can be adjusted, and adjusts them step by step to diminish the discrepancies. The identification and adjustment are based on the estimated allowable variation of the behavior models. With such a design, the top-down controlled forecast adheres to the reality that international trade is subject to economic resource constraints, has heterogeneous behavior, and will attain overall supply and demand equilibrium.

Forecasting Process

Our forecast approach determines our forecasting process, as shown by the flowchart that follows. The numbers in the flowchart indicate the sequence of the forecasting. The forecast starts from L2C. These are the top-level forecasts. We then use them to do top-down controlled forecasting of L3M and L3X, and in turn use L3M and L3X to do top-down controlled forecasting of L4. They are all forecast in real commodity value. After we obtain the detailed forecasts of the international trade in real commodity value, we check whether the overall forecast implies a reasonable trade balance that we should expect for every country/region according to their macro economic development. Trade balance is a financial concept that we need to examine in nominal, not real, value terms. Therefore, we convert real value L4 into nominal value L4 and then aggregate them to import and export by country/region, i.e., L2M and L2X in nominal value. Although our forecast does not include service sectors, we take into account the development of services trade for each country/region when examining the trade balance between L2M and L2X. If the forecasted trade balance for a country/region is not reasonable, we adjust L2M or L2X, or both, and then use the adjusted L2M and L2X to do a top-down controlled adjustment of the nominal L4 detailed trade. Because the trade of these countries/regions link to each other, adjusting the trade balance of one country/region affects the trade balance of other country/regions, depending on the magnitudes of their trade links. Therefore, usually we need several rounds of adjustments to attain reasonable trade balances for all country/regions. After completing the trade balance check and adjustment step, we convert nominal value L4 to real value L4 and aggregate these final detailed forecasts to their upper three levels.

Global Insight World Trade Forecasting Process



Where:

R – real commodity value

N – nominal value

TDCF – top-down-controlled forecast

R-N CV – real-nominal value conversion

AG – aggregation

X-M CP – export-import balance comparison

TDCAD – top-down-controlled adjustment

N-R CV – nominal-real value conversion

Because the release of trade data always lags behind current trade activity, and because behavioral forecasting models cannot include unexpected events, such as disease outbreaks in livestock, oil price shocks, earthquakes, strikes, wars, etc., we create dummy variable multipliers for each series, and modify some of them at certain levels in accordance with development of events in the world.

Converting Real Value Trade to Transportation Volume

There are predictable relationships between the physical volume and the real value of each trade flow. After we obtain the forecasts of world trade in real commodity value, we use these relationships to convert the real commodity value to the physical volume of 77 commodities transported among 70 countries/regions, by transportation mode. We first convert the commodity flows to the value and physical volumes shipped by different transportation modes. Transportation mode represents the primary mode of transport used in the international shipment, usually for the greatest distance (or line haul) part of the complete origin-to-destination shipment. These major modes are air, overland/other (comprised mainly of truck, rail and pipeline) and maritime. For maritime trade, we further distinguish between liquid bulk, dry bulk, general cargo/neobulk and container trade. The volume of commodities carried by each mode reflects the historic shares carried by each mode, at a commodity-specific and trade route-specific basis with adjustments made to maritime shares based on observed shifts in share between the types of maritime shipping. For container trades, the forecast tonnage volume is further translated into twenty-foot equivalent units (TEUs) through application of commodity-specific and trade route-specific stowage factors for twenty-foot and forty-foot containers and the mix of twenty-foot and forty-foot containers used on each trade route. (The full list of forecast trade concepts produced is shown in Table 3 of the Appendix.).

Forecast Range and Frequency

The history of our trade statistics starts from 1980 and extends to about a one-year lag from the current time. We forecast 20 or more years into the future, depending on clients' needs. Our forecasts are annual series, because the main historical trade data are reported as annual series. However, our supplementary trade data and exogenous macro economic data can be annual series, quarterly series, or monthly series. They are updated quarterly or monthly so we update our trade forecasts every quarter.

World Trade Methodology

Table 1. Global Insight World Trade Service Forecast Commodity Categories

Count	ISIC	Description
1	1A	Grain
2	1B	Oil Seeds
3	1C	Vegetables, Fruits and Eggs – Requiring Refrigeration
4	1D	Vegetables and Fruits - non-Refrigerated
5	1E	Cork and Wood
6	1F	Natural Rubber
7	1G	Cotton
8	1H	Other Raw Textile Materials
9	1I	Other Agriculture
Count	**ISIC**	**Descriptions (continued)**
10	2A	Stone, Clay and Other Crude Minerals
11	2B	Crude Fertilizers
12	2C	Ores and Scrap
13	2D	Coal
14	2E	Crude Petroleum
15	2F	Natural Gas
16	2G	Scrap
17	311A	Meat/Dairy/Fish Requiring Refrigeration
18	311B	Other Meat/Dairy/Fish
19	311C	Sugar
20	311D	Animal Feed
21	311E	Animal and Vegetable Oils

Count	ISIC	Description
22	311F	Other Food
23	313	Beverages
24	314	Tobacco
25	321	Textiles
26	322	Wearing Apparel
27	323	Leather and Products
28	324	Footwear
29	331	Wood Products
30	332	Furniture and Fixtures
31	341A	Waste Paper
32	341B	Pulp
33	341C	Paper and Paperboard and Products
34	342	Printing and Publishing
35	3511A	Organic Chemicals
36	3511B	Inorganic Chemicals
37	3512	Fertilizers and Pesticides
38	3513	Synthetic Resins
39	3521	Paints, Varnishes and Lacquers
40	3522	Drugs and Medicines
41	3523	Soap and Cleaning Preparations
42	3529	Chemical Products, nec.
43	353	Petroleum Refineries
44	354A	Briquettes and Coke
45	354B	Residual Petroleum Products

Count	ISIC	Description
46	355	Rubber Products
47	356	Plastic Products, nec.
48	361	Pottery, China etc.
49	362	Glass and Products
50	369	Non-Metallic Products, nec.
51	371	Iron and Steel
52	372	Non-Ferrous Metals
53	381	Metal Products
54	3821	Engines and Turbines
Count	**ISIC**	**Descriptions (continued)**
55	3822	Agricultural Machinery
56	3823	Metal and Wood Working Machinery
57	3824	Special Industrial Machinery
58	3825	Office and Computing Machinery
59	3829	Machinery and Equipment, nec.
60	3831	Electrical Industrial Machinery
61	3832A	Radio and TV
62	3832B	Semi-conductors, Electronic Tubes, etc.
63	3832C	Other Communications Equipment
64	3833	Electrical Appliances and Houseware
65	3839	Electrical Apparatus, nec.
66	3841	Shipbuilding and Repairing
67	3842	Railroad Equipment
68	3843A	Motor Vehicles

Count	ISIC	Description
69	3843B	Parts of Motor Vehicles
70	3844	Motorcycles and Bicycles
71	3845	Aircraft
72	3849	Transport Equipment, nec.
73	3851	Professional Equipment
74	3852	Photographic and Optical Goods
75	3853	Watches and Clocks
76	390	Other Manufacturing, nes.
77	399	Goods not classified by kind

Note: nec – not elsewhere classified; nes – not elsewhere specified

Table 2. Global Insight World Trade Service Forecasting Countries/Regions

Count	Country Name	Count	Country Name
1	United States	41	Pakistan
2	Canada	42	Venezuela
3	Japan	43	Brazil
4	Germany	44	Argentina
5	France	45	Colombia
6	United Kingdom	46	Peru
7	Italy	47	Chile
8	Austria	48	Mexico
9	Belgium	49	Israel
10	Denmark	50	Saudi Arabia
11	Finland	51	United Arab Emirates
12	Greece	52	Egypt
13	Ireland	53	Kenya
14	Netherlands	54	South Africa
15	Norway		
16	Portugal	**Aggregate Regions**	
17	Spain	**Count**	**Region Name**
18	Sweden	55	Other Europe
19	Switzerland	56	Baltic States
20	Turkey	57	CIS West
21	Russia	58	CIS Southeast
22	Poland	59	Other Indian Subcontinent
23	Czech Republic	60	Other East Coast of South America

Count	Country Name	Count	Country Name
24	Slovak Republic	61	Other West Coast of South America
25	Hungary	62	Caribbean Basin
26	Romania	63	Other Central America
27	Bulgaria	64	Other Persian Gulf
28	Australia	65	Other Mediterranean Region
29	New Zealand	66	Other North Africa
30	China	67	Other East Africa
31	Taiwan	68	Western Africa
32	Hong Kong	69	Other South Africa
33	South Korea	70	Other Region
34	Indonesia		
35	Philippines		
36	Singapore		
37	Malaysia		
38	Thailand		
39	Vietnam		
40			

Table 3. Global Insight World Trade Service Forecast Concepts

Count	Concept
1	Nominal Value
2	Real Value
3	Airborne Nominal Value
4	Seaborne Nominal Value
5	Airborne Real Value
6	Seaborne Real Value
7	Airborne Metric Tons
8	Seaborne Metric Tons
9	Tanker Metric Tons
10	Dry Bulk Metric Tons
11	General Cargo/Neobulk Metric Tons
12	Container Metric Tons
13	Number of 20 foot Containers
14	Number of 40 foot Containers
15	Container Twenty-foot Equivalent Units (TEUs)
16	Over Land / Other Transportation Nominal Value
17	Over Land / Other Transportation Metric Tons
18	All Transportation Mode Metric Tons

Appendix D Global Insight Transearch Database

Global Insight Transearch Database

Building from the original TRANSEARCH, the national database of freight traffic flows that Reebie Associates (and now Global Insight, Inc.) created and has maintained and provided to the transportation industry for 18 years and drawing on its experience with custom database development, the team researched information needs and data sources in the government and commercial markets and the capabilities of state-of-the-art software. The results of the effort have been to make available a national county-to-county and zip code-to-zip code data product. Key user needs like currency of the data, its reliability, flexibility in terms of seeing details of the traffic composition or relatively broad data summaries, and affordability can be satisfied.

Issued annually, the data can cover all modes and commodities, including empty truck movements, international shipping, and truck shipments of non-manufactured goods. Features like external trip ends, vehicle miles traveled, gross ton-miles, and forecasts can be provided, and traffic routed along major modal corridors can be displayed.

The database maps commodity flows (2, 3 and 4 digit STCC) in short tons between geographic entities (states, counties, BEA's) by mode (rail car, rail intermodal, truck load, less than truck load, private truck, air and water) for current year and forecast years. All volumes shown in tons are in short tons, for 2005.

A variety of data sources are used to compile the database ranging from government agencies to private sector industry associations and the carriers themselves, as shown in Figure A3.1.

The data sources vary by the different modes of transportation. The primary source for railroad data is the Carload Waybill Samples gathered from about 4% of total rail car traffic. Global Insight, Inc. sources this data from the Surface Transportation Board. This data is compiled to provide both volumes and patterns of flow.

The primary source for waterborne commodity flows is the Waterborne Commerce Statistics compiled by the Army Corps of Engineers. This data tracks the flow of commodities along domestic lakes, rivers and canals, and is used to develop both volumes and patterns of flow.

Figure A3.1

TRANSEARCH DATABASE DATA SOURCES

Mode	Data Source	Agency/Organization
Rail	– Carload Waybill Sample	– Surface Transportation Board
Water	– Waterborne Commerce Statistics	– U.S. Army Corps of Engineers
Air	– FAA Airport Originating Tonnages – Airport to Airport Flows – Commodity Flow Survey – TRANSEARCH	– Office of Airline Statistics (DOT Form 41) – BTS Office of Airline Information – Bureau of Transportation Statistics – Global Insight, Inc.
Truck	– Carrier Data Exchange Program – TRANSEARCH – Annual Survey of Manufactures – Freight Locater Data Service – General Statistics for Verification – Commodity Flow Survey	– Global Insight, Inc. – Global Insight, Inc. – U.S. Census Bureau – Global Insight, Inc. – Industry Associations – Bureau of Transportation Statistics

The air data is compiled from four major sources. The first is FAA (Federal Aviation Administration) airport originating tonnages primarily from Form 41 reports and compiled by the Office of Airline Statistics (Federal). This source establishes volume estimates at airports. The second source is airport-to-airport (ATA) flows compiled by the BTS Office of Airline information. These data are used to establish flow patterns. The third source is from Commodity Flow Survey (CFS) data, used to define the commodity types. The fourth source is Global Insight's Transearch Database, which supplements the CFS data.

The trucking data process is more complex and comes from a wide variety of sources developed over the course of 20 years. However, there are four primary sources. The first is a data exchange program Global Insight has with motor carriers, which is used to estimate patterns and volumes. The second source is a variety of industry associations (timber, plastics, chemical, automotive, etc.), which provide overall volume information for the respective industry sectors. The third major source is from the Annual Survey of Manufacturers, primary employment and output data by industry, distributed at the state and local level. This data maps production and consumption of commodities and is used to calibrate the trucking flows. The Freight Locater data service is a database of industrial facilities and their exact location. This data supplements the previously mentioned sources to help calibrate the flows of goods between specific geographic entities.

Transearch Data Issues and Limitations – Reebie Associates recently developed a finer detailed version of its Transearch database in an FHWA sponsored project known as the Intermodal Freight Visual Database. It breaks down origin and destination market areas to the county level and is compatible with GIS applications. It has been incorporated into Transearch, with its most current base year as 2003. This database (a version developed especially for this project based on Transearch 2001 County-level data, indexed to 2002) based on commodity and geographic performance patterns.

For this study, Transearch data were identified at varying levels of detail. It is generally understood that large databases of this kind are never perfect, and Transearch is not an exception to the rule. It is, however, the best available source of its kind in the cognizance of the study team. Transearch is in use by virtually all major U.S. railroads and by more than a hundred motor carrier companies and several container shipping lines and air cargo carriers. State and federal planning agencies, as well as port authorities, equipment suppliers, investment banks and judicial and regulatory bodies also use it.

Transearch reports provide a broad picture of freight traffic movements in the United States. Various publicly available sources, as well as Global Insight's proprietary motor carrier data exchange information, are used in the development of the Transearch database. Understanding the nature of particular sources when using Transearch data is important to interpret the information correctly. The following guidelines should be helpful in gaining that understanding.

Freight Rehandled By Truck From Warehouse and Distribution Centers Is Identified as STCC 5010 and Referred to as Secondary Traffic at a 4-digit STCC level or STCC 50 at a 2-digit STCC level. Many of these types of facilities handle a wide range of different types of commodities, and outbound shipments may also be of mixed consists. For example, shipments from a supermarket chain distribution center are likely to contain a broad range of packaged food products and other consumer items.

The Truck Portion of Truck/Rail Intermodal Activity Is Shown as STCC 5020 at a 4-digit STCC level or STCC 50 at a 2-digit STCC level. This activity includes two segments: the truck shipment, by trailer or container, from true origin to the intermodal railhead, and from the intermodal railhead to final destination. The Rail Intermodal mode reveals the origin and destination points on the rail system, not the ultimate origin and destination.

STCC 5030 Is Used to Identify the Truck Drayage of Air Freight Traffic at a 4-digit STCC level or STCC 50 at a 2-digit STCC level. Both the true origin to airport and airport to final destination are included. Origins and destination for movements classified in the air mode are airports. Volumes that are transloaded from one aircraft to another are not shown at the transloading point.

Large Portions of Today's Intermodal (TOFC or COFC) Traffic Are Reported In Non-Commodity Categories. Commercial arrangements in the railroad industry have fostered the use of "third parties" such as consolidators and forwarders. Such traffic typically is labeled as "Freight Forwarder Traffic", "FAK" (Freight: All Kinds), or "Miscellaneous Mixed Shipments". The specific commodities moving under these arrangements are not identified in the public use data sources.

Shipments Made Up Of Several Commodities Will Be Credited To The Dominant Commodity. This occasionally occurs in the commodity identification of rail shipments. In these instances, the tonnage attributed to the predominant commodity is greater than it should be, and the other commodities in the shipment are understated.

To Provide Maximum Product Identification, Commodities Are Shown At the Greatest Level of STCC Detail For Each Code. Truck data is available and shown at the 4-digit level for the manufacturing sector. Rail data, however, can be shown at 5-digits. Because of the desire to include the greatest amount of detail possible, commodities in a traffic lane may be identified at different levels of detail for each mode. When this occurs, tonnages shown at the more detailed levels should be combined with those displayed at the more aggregate levels to gain a complete picture of modal share for the commodity. All freight traffic flow information in the study is expressed at the 4-digit STCC commodity code level, or consolidated to a 2-digit, or no commodity detail level.

Tonnage Data in Each Cell Should Be Used as an Indicator of Relative Value—since many of the sources for traffic flow information use sample data. Consequently, the more specific the definition of a particular flow, the greater its sampling variability. The more aggregated the definition of the Geography/Mode/ Commodity combination, the more reliable the results.

State-To-State Movements Of “Primary” Freight At The 2-Digit STCC (or SIC) Level Provide The Best Picture Of Primary Freight Moves In The Data Base. Analysts and planners, however, want and need more disaggregate pictures of the flow activity. Not all of the data used in Transearch comes into the process beneath the state level or with more than 2-digit commodity/industry classification.

Appendix E Global Insight Business Demographics Model

Global Insight Business Demographics Model

Global Insight's business demographics forecast contains a consistent set of historical statistical estimates and forecasts for businesses in the country. The statistics include the number of business establishments, employees, and sales by industry. Industry aggregation levels include the sub-sectors and the 4-, 5-, and 6-digit classifications in the NAICs codes. The model specifically forecasts variables at the county and ZIP code level. Other geographic levels are created by combining, aggregating, or splitting data from these levels. All business demographics modeled databases are designed to meet two key criteria. First, they must reflect economic activity that is consistent with actual information available at these two levels of geography. Second, they must also agree with published values for national and state employment, establishment and sales data.

The table below lists the business demographic concepts included in the model.

<u>Business Demographics Coverage</u>

Number of Employees	**Business Size Segments***
Total	1 to 4 Employees
By Industry	5 to 9 Employees
By Occupation Group*	10 to 19 Employees
By Geographic Area	20 to 49 Employees
By Business Size*	50 to 99 Employees
Self-Employed*	100 to 249 Employees
Number of Business Locations	250 to 499 Employees
By Industry	500 to 999 Employees
By Business Size*	1000 Employees or More
By Geographic Area	Self-Employed
Industry Segments	**Geographic Segments**
2-Digit SIC Code	Nation
3-Digit SIC Code	Census Regions
4-Digit SIC Code	States
Custom Aggregations*	Metropolitan Areas
	Counties
	ZIP Codes*
	Congressional Districts*
	Client-Specified Territories*

* Typically undertaken as custom deliverable based on a client request.

The following discussion describes the data and estimation techniques utilized in the BDM.

Data

Every forecast must start with at least one observation of activity at the level of geography in which we are interested. This observation, generally collected by a government agency, is treated as an "actual" measurement of all of the economic activity within a given geographic area. In fact, this observation is also an estimate of activity. The government surveys a percentage of employers within the region and then imputes the value for the region as a whole from this sample. As with any estimate, these "actual" observations may deviate from the "true" actual. However, as the size of the geographic area increases, so too does the accuracy of the estimate. This occurs due to the law of averages, or the fact that as we add more local area estimates together, the odds of an error above the true actual being matched with an error below the truth increase, making the final result more accurate (i.e., unbiased). It is for this reason that the sum of our county level forecasts will always add up to a measurement or an estimate of state and national level activity.

The following data sources were used as a basis for our first round model of county employment and establishments. County Business Patterns (CBP) data provides us with a series of county level employment and establishments from 1980 to 2002 at the four-digit SIC code (six-digit NAICs) level of detail. This data serves as our starting observation of "actual" activity for most sectors of the economy. The CBP does not contain data for the government or agriculture sectors. Government data is obtained from the Bureau of Labor Statistics, and the agriculture data is obtained from the Census of Agriculture. Data from the Bureau of Labor Statistics (BLS) is the basis of Global Insight's national and state level macroeconomic forecasting services. These forecasts are available at the two-digit SIC code level of detail for counties, and at the one-digit level of detail for MSAs. Forecasts provided by these services serve as the national and state level constraints on our county level forecasts. The counties will always add up to the state, and the states will always sum to the nation. In this way we will always be consistent with widely accepted levels of economic activity while also ensuring that county estimates are a valid measure of local activity.

Estimation Techniques

Employment and the Number of Establishments

The description of modeling methodology is broken into two sections. First, the modeling of employment and the number of establishments are discussed, followed by a description of the estimation of output.

Like many of the Global Insight models, the underlying technique of county level estimation is the "Top-Down Bottom-Up" model. "Top-Down Bottom-Up" methodology relies on using all of the information available to us at any given time. First, county level data is employed to determine the trend of data in a particular county. Both trending and sharing techniques are used here to create an independent forecast of employment and establishments.

To begin, a first round forecast is calculated using CBP county level data. Employment and the number of establishments for each industry as defined by government four-digit SIC (or six-digit NAICs) codes are estimated by use of a five-year moving average of historical growth rates (from this point any description of procedures to estimate employment also applies to establishments). This forecast is independent of any information at the state, MSA, or national levels, and returns a unique growth path for each of the nation's 3,141 counties.

Next, a second level forecast is calculated using estimates provided in the first round. Over the period 2002 to 2030, employment in each county for every four-digit SIC code is recalculated as a percentage of the first round estimated total for that four-digit industry. The resulting series represents the relative movement of employment within the county relative to that at the state level, and to employment in other counties within the state. In other words, is employment in industry X in county Y growing faster, slower, or in step with its counterpart at the state level or in the next county. Next, an estimate of employment levels is made by apportioning the forecast state level employment for that industry to each county based on its share of first round estimated employment.

At this point we introduce data for over 300 Metropolitan Statistical Areas (MSAs) in the United States. In an iterative procedure, the county level forecasts are adjusted until the estimates solve for both the state and MSA. A brief description of this procedure follows. Estimates calculated by allocating state level data to the counties are summed to either the MSA to which the county belongs or to a "rest of state" variable. Those counties that comprise each MSA are aggregated into a summed MSA variable. From this, each county's share of MSA employment is calculated, and this share is used to allocate MSA employment to the counties. All of the MSAs in a state are then summed, and subtracted from the sum of the counties for each state. This value, the remainder of employment within each state but not in an MSA, is then allocated to the "rest of state" counties based on their share of the "rest of state" variable calculated above. This process continues until a number of criteria are met or the process fails to achieve a stable solution after five iterations.

Output

Output by industry on national level is obtained from Global Insight's Industrial Analysis Service. Industry output (sales) is measured in current dollars and is available for all the four-digit SIC code detail. The Global Insight Industrial Analysis Service includes forecasts of constant dollar output and the corresponding price indexes for each of the industry sectors. Nominal dollar output is obtained as identities.

Constant dollar output is estimated as a function of total demand from the input/output block, cyclical variables, and a time trend. The functional form used imposes a unitary elasticity on the demand term, which embodies most of the explanatory power in the relationship. The additional non-demand terms are included in the equations to explain the pattern not well accounted for by the input/output model and its demand indicators – cyclicality and technological change.

National output by industry is transformed to regional measures by using region specific productivity measures from Global Insight's Regional Service. In addition, the share of employment by industry is used to allocate output to sub-regional geographies.

Data sources include the following: Economic Census, Department of Agriculture, Census of Mining, Annual Survey of Manufactures, Census of Transportation, FCC Statistics of Common Carrier, and Census of Services.

Business Transactions Matrix (BTM)

Information on inter-industry purchases is provided from Global Insight's Business Transactions Matrix. Our primary data source for the Business Transaction Matrix is the latest Bureau of Economic Analysis (BEA) input/output tables. This data is released every five years as the benchmark input-output accounts of the U.S. The industrial breakdown generally follows a standard four-digit SIC (six-digit NAICs) detail for the manufacturing sectors, and three- or two-digit SIC (generally four-digit or three-digit NAICs detail) for the non-manufacturing sectors.

Global Insight employs a modified RAS algorithm to forecast changes in the input-output coefficients over time. The chief merits of this method are twofold: its minimal data requirements, and the support of studies that have found the accuracy of the RAS method to be superior to other non-survey coefficient adjustment techniques.

The modified RAS method requires two sets of data: the direct coefficient matrix of an input-output table for an initial year *t* and a column vector of sectoral gross outputs in year *t+1*. Given these sets of data, an iterative adjustment procedure is applied to the direct coefficient matrix, which yields an adjusted coefficient matrix for year *t+1* that is consistent with the ratio of intermediate input to output and the gross output measures of that year.

Once the input-output matrix forecast estimation is complete, purchases by industry and county can be determined. National use factors (defined as purchases by industry *j* from industry *i* per employee in industry *j*) are calculated, and then multiplied by the number of employees in industry *j* by county from the BDM, resulting in an estimation of purchases by industry *j* from industry *i* in each county.

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