The Inforum *LIFT* Model: Analysis of Illegal Immigration

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Inforum Interindustry-Macroeconomic (IM) Models

• Combine input-output structure with econometric equations in a dynamic and detailed framework.

• Like a CGE: Contains detailed industry structure and bottom-up accounting.

• Like an (macro) econometric or VAR model: Parameters estimated from actual data. Portray dynamic evolution of economies over actual time periods.

• Lift (Long-term interindustry forecasting tool) is 97 sector flagship model. Under continuous development and use for over 30 years.

• Iliad - detailed 310 sectors.

• International System: BTM bilateral trade model, IM models for all major trade partners including China.
**LIFT: Inforum’s Model of the U.S. Economy**

*LIFT* stands for **Long-term Interindustry Forecasting Tool**.

*LIFT* is an interindustry-macro (IM) model.

- **Sectoral detail** for production, prices, jobs, consumer spending, foreign trade and factor income (wages, profits, depreciation, etc).

- **Macrovariables**. Many, such as GDP, net exports, the unemployment rate, and the aggregate price level are aggregates of the underlying industry forecasts. Other macrovariables such as the savings rate and interest rates, complete the model.

*LIFT* is particularly useful in addressing questions involving interactions between industries, as well as the interplay between industry and macroeconomic relationships.
The *LIFT* Philosophy

**Bottom-up**
Aggregates are summations of detailed industry results.

**Consistent**
The NIPA and IO frameworks ensure consistency. The patterns of expenditures by industry affect employment by industry. Prices reflect unit costs of materials, labor and other factor income (profits, depreciation, indirect taxes, etc.)

**Econometric Relationships**
LIFT is based on empirically estimated relationships, using detailed historical data, based on long time-series.

**Dynamic**
LIFT models economy year by year. The time path of response is important. Many equations use distributed lags, so effects of shocks build up and decay over time. Input-output coefficients change over time, in response to estimated trends or exogenous assumptions.
The Major Components of *LIFT*

**Input-Output Tables**

Input-output tables provide the accounting identities that define sectoral output and prices.

**The Product Side**

The expenditure side of the model is comprised, by industry, of final demand components production in constant dollars, hours worked and employment. \( q = Aq + f \)

**The Nominal Income/Price Side**

The income price side is comprised by industry of 13 types of factor income (value added). Prices are consistent with value added and intermediate materials cost. \( p' = p'A + v \)

**The Accountant**

The Accountant calculates numerous aggregates of industry detail, NIPA identities, (such as the government surplus or deficit, personal and disposable income) and interest rates.
Recent Studies Using LIFT

Impact of Container Trade Interruptions - CBO
Impact of High Natural Gas Prices – Department of Commerce (ESA)
Impact of Currency Fluctuations – Department of Commerce (ITA)
Sustainability of Long-term Projections - Centers for Medicare and Medicaid Services
Static & Dynamic Effects of Trade Liberalization – Manufacturers Alliance
The Digital Economy 2000/2005 - Department of Commerce (ESA)
Impact of Asian Crisis on the U.S. Industries - Manufacturers Alliance
Impacts of Defense Expenditures - Department of Defense
Force Mobilization Capabilities - Institute for Defense Analysis
Local Impacts of Electricity Deregulation - National Rural Electrical Cooperative Association
China in the WTO - U.S. Government
Effects of Slow Growth in Japan - U.S. Government
Clean Energy and Jobs - Center for a Sustainable Economy
Immigration Analysis

• In many ways, quantitative analysis of immigration is similar to looking at free trade.

• Static comparative advantage: Does immigration’s impact on relative prices enhance a more efficient distribution of (global/national) resources?

• Dynamic impacts: Does immigration help induce productivity enhancing “x-efficiencies”? (economies of scale, competition, monopoly power erosion, etc.)

• Other enhancements that are hard to quantify: Diversity, quality, flexibility, opportunity, technology dispersion.
Illegal U.S. Immigration as Special Case

LIFT Simulation:

• Assume that 7.2 million workers are deported for labor force over 2007. With dependents, population falls by 12 million.

• Wages rise and employment reduced most dramatically in most affected sectors (using Pew study): Agriculture, Food, Construction, Hospitality, Apparel, Domestic, etc.

• These are relatively low-productivity positions (~1/2 avg).

• Domestic demand (consumption, construction, trade) adjusted accordingly.
Macro Fixes

Fixes to Macro Variables

• Reduce population and labour force.
• Reduce personal transfers to foreigners.
• Reduce spending on schools.
• Increase money supply.
• Reduce consumption spending.
• Reduce employment of domestic servants
Vector Fixes

Fixes to Vector Variables

• Slower aggregate investment growth.
• Higher imports of non-oil goods and agriculture.
• Less Residential and Nonresidential Construction.
• Less employment and higher wages in affected industries: Construction, Hotels, services.
• Lower consumption of affected products: Hotels, Restaurants, Domestic services, Personal services, Food.
Comparative “Static” Results

Short-term (through 2010):
- Abrupt adjustment creates trauma (potential recession).
- Lower investment (housing particularly hit).
- Higher wages, inflationary conditions.

Long-term (through 2020):
- Adjustment to lower levels of employment and GDP
- Higher labor force participation
- Higher aggregate productivity (reallocation of labor to more productive sectors)
- Mildly higher income per capita (for remaining population).
Difference in GDP Growth (static)

growth (percent)

baseline

alternative (static)

pcb.gdpN pca.gdpN
Difference in GDP level (static)

percent difference

2005  2010  2015  2020

-4.00  -3.00  -2.00  -1.00  0.00
Difference in GDP inflation (static)

difference in inflation rate
Difference in Labor productivity and GDP per capita (static)

percent difference

GDP per capita

labor productivity

2005 2010 2015 2020

2.00

1.50

1.00

0.50

0.00

-0.50

pdaprod t  ap
A new economy?
Intensified competition induces “creative destruction.”

Globalization
Market liberalization
Technological change
Immigration

Economic growth
Low inflation
Full employment

Investment + new mgmt techniques + training + greater effort = productivity increases (TFP)

Competition
**X-efficiencies** are TFP enhancing factors not accounted for in typical comparative static exercise.

X-efficiencies of immigration:

- Larger labor force encourages economies of scale (construction, leisure).
- Erosion of monopoly power (unions) and other rent-seeking behavior (taxis).
- Lower relative wages increases investment in technology enhanced capital (FDI).
- Competition in labor market induces harder and longer work (especially by natives).
- Immigrants have important embedded qualities (risk-taking, creative).

**Implies very significant distributional consequences.**
Assume X-efficiencies go away with the illegal immigrants: “Dynamic” results

Reduce productivity growth across economy, particularly in most effected sectors (construction, services) *The magnitude of this improvement is speculative (with trade we often find some estimates).*

Immediate shock is similar, but in intermediate to long term:
- GDP doesn’t “heal,” it is significantly lower in long term.
- Higher inflation entrenched longer.
- Exports less competitive.
- Lower aggregate productivity.
- Lower income per capita.
Difference in Labor productivity
(static vs. dynamic)

percent difference

static

dynamic: loss of x-efficiencies

pdaprodt  pdcprodt
Difference in GDP level (static vs. dynamic)

percent difference

static

dynamic: loss of x-efficiencies
Difference in GDP prices (static vs. dynamic)

Dynamic: loss of x-efficiencies

Static
Difference in GDP per capita (static vs. dynamic)

- Static line shows a gradual increase over time.
- Dynamic line, labeled "dynamic: loss of x-efficiencies," shows a decrease over time, indicating a loss of efficiencies.

The graph illustrates the comparison between static and dynamic economic conditions over the years 2005 to 2020.
Conclusion

The Bad:
• Effects of reducing illegal immigration are hard to determine.
• Quantitative results depend heavily on assumptions.

The Good:
• Many questions remain unanswered, and so much work remains to be done.