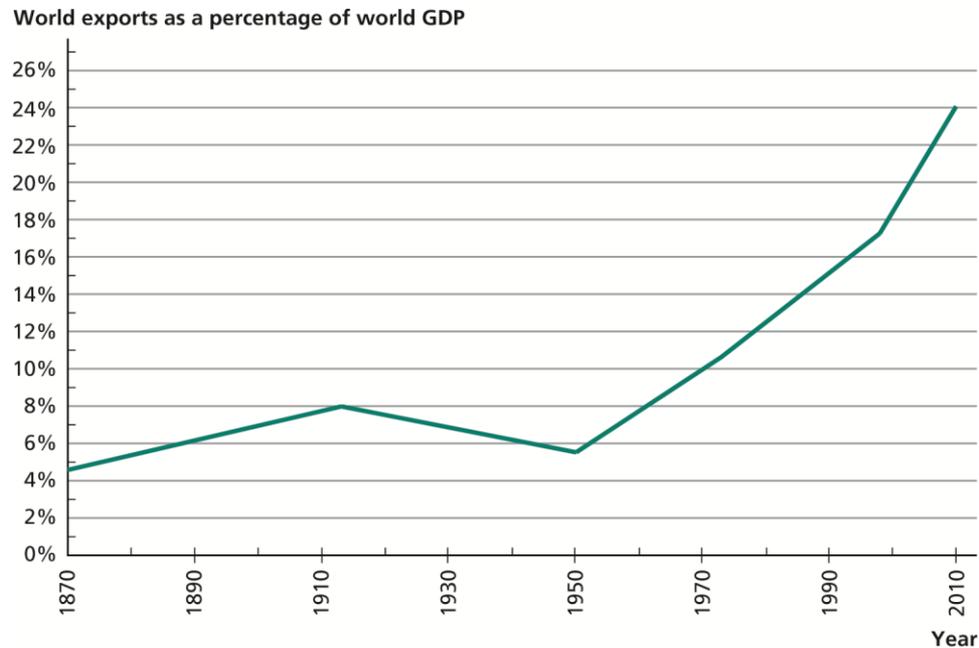


Trade and Growth

Trade and economic growth

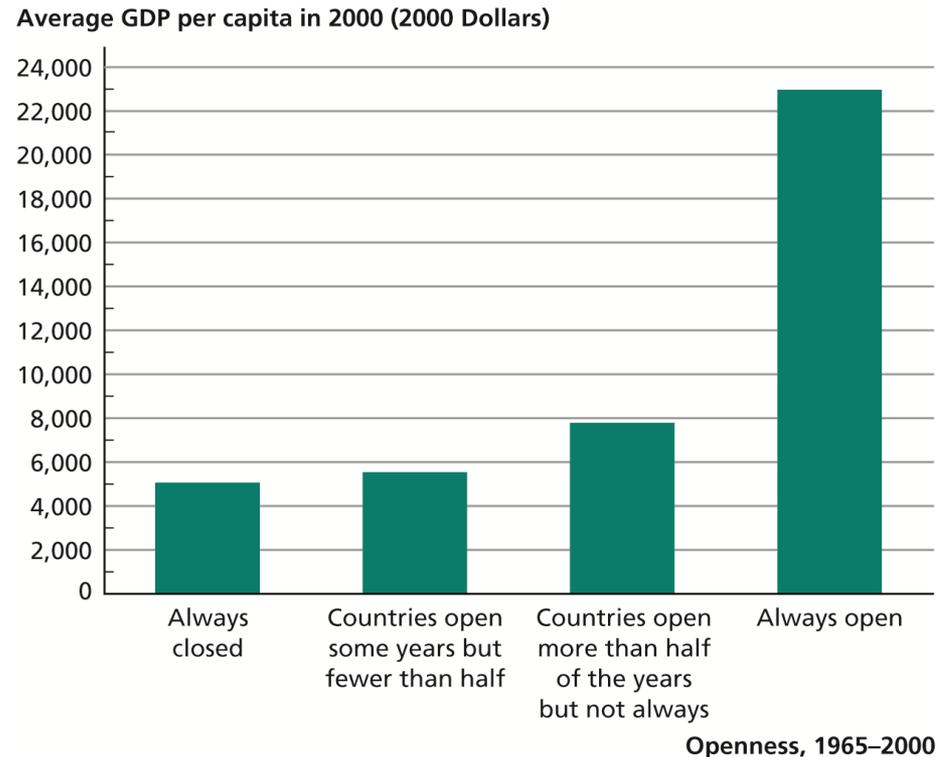
- Trade and the level of income: The standard theory of trade predicts that the level of national income increases with free trade because of:
 - greater specialization.
 - the effects of greater competition on productivity and output.
 - diffusion of knowledge
 - Elimination of duplicate research effort

Growth of World Trade 1870–2010



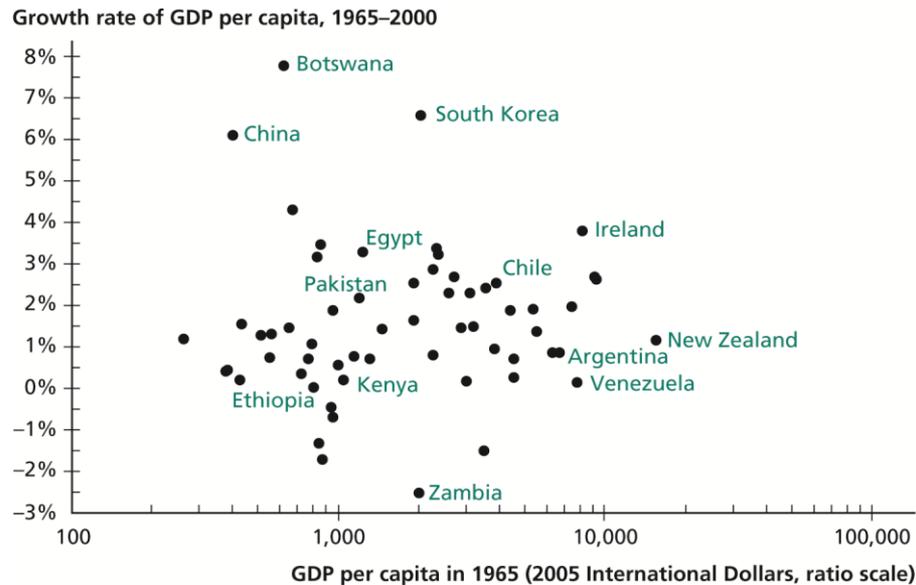
Sources: Weil (2013)

Relationship between Economic Openness and GDP per Capita



Sources: Sachs and Warner (1995), Wacziarg and Welch (2008).

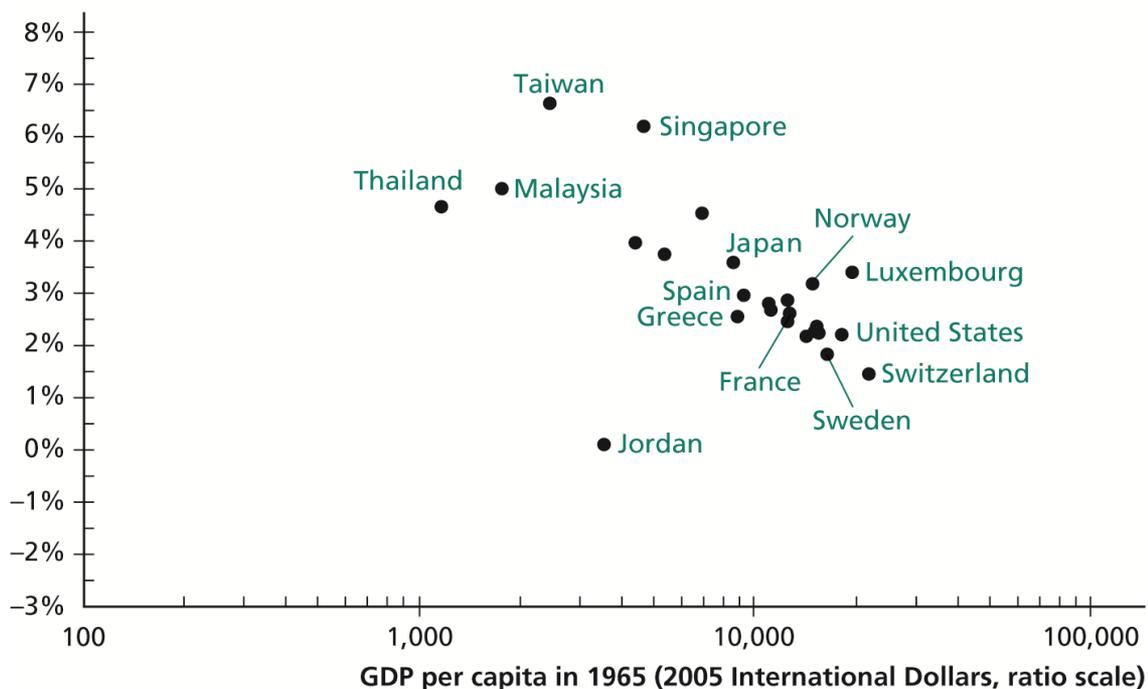
Growth in Closed Economies



Sources: Sachs and Warner (1995), Wacziarg and Welch (2008), Heston et al. (2011).

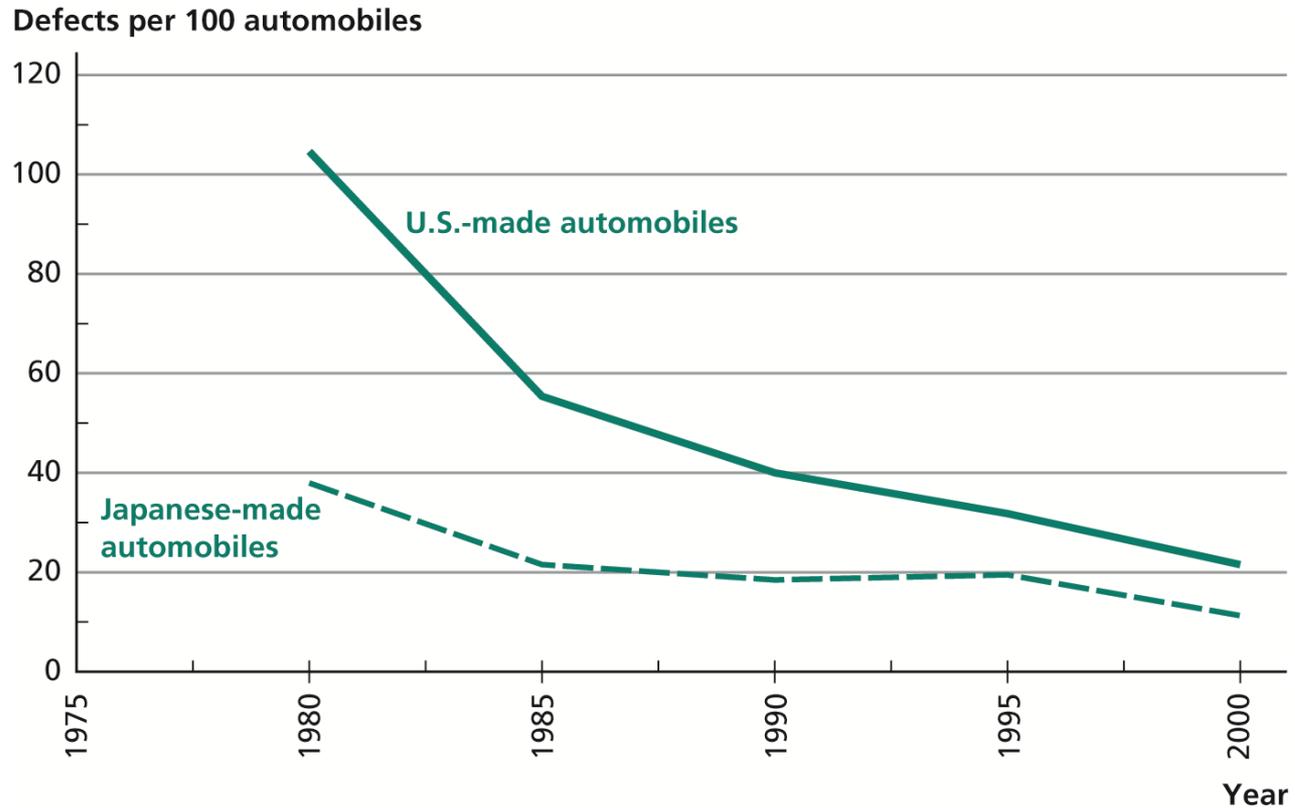
Growth in Open Economies

Growth rate of GDP per capita, 1965–2000



Sources: Sachs and Warner (1995), Wacziarg and Welch (2008), Heston et al. (2011).

Quality of U.S.- and Japanese-made Automobiles



Source: "Are Today's Cars More Reliable?" *Consumer Reports* 66(4) (April 2001), p. 12.

Empirical Estimates

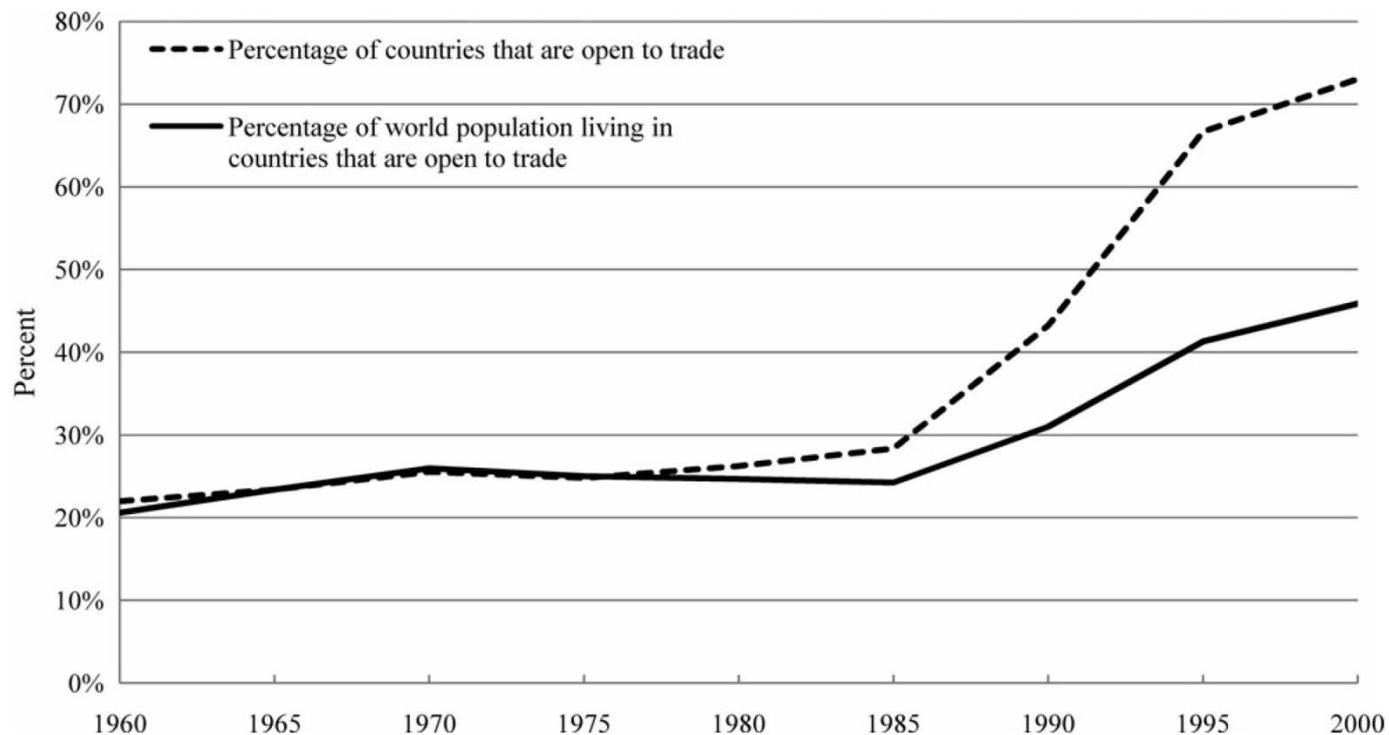
- Cannot simply regress level of income (y) on degree of openness ($x=y$).
- Problem of simultaneity: Rich countries tend to trade much.
- Rich countries may also follow more free market policies.
- Empirical studies try to deal with this issue. In general, they find that trade openness seems to have strong effects on income but there are problems of statistical significance.

Wacziarg and Welch (2008): Trade Liberalization and Growth, *The World Bank Economic Review*, Vol. 22, No. 2, pp. 187–231.

Their findings:

- Evidence on the time paths of economic growth, physical capital investment, and openness around episodes of trade policy liberalization.
- Over the 1950–98 period, countries that liberalized their trade regimes experienced average annual growth rates that were about 1.5 percentage points higher than before liberalization.
- Postliberalization investment rates rose 1.5–2.0 percentage points, confirming past findings that liberalization fosters growth in part through its effect on physical capital accumulation.
- Liberalization raised the average trade to GDP ratio by roughly 5 percentage points, suggesting that trade policy liberalization did indeed raise the actual level of openness of liberalizers. However, these average effects mask large differences across countries.

FIGURE 1. Openness to Trade, 1960–2000 *Note:* Openness is defined according to the Sachs and Warner (1995) criteria. Sample includes 141 countries.



Source: Authors' analysis based on data described in the text.

Source: Wacziarg and Welch (2008)

TABLE 3. Replication of Sachs-Warner Cross-sectional Regressions

Variable	(1) Growth 1970–89	(2) Growth 1989–98	(3) Growth 1970–80	(4) Growth 1980–89	(5) Growth 1989–98
Real GDP per capita (t)	-1.5929 (4.89)	-1.150 (1.95)	-1.292 (2.83)	-1.397 (3.84)	-1.261 (2.13)
Sachs-Warner openness dummy variable(1970–89 or 1990–98 periods)	1.9845 (3.87)	0.136 (0.21)			
Openness status based on liberalization dates (t)			1.387 (1.86)	2.574 (4.17)	0.521 (0.84)
Secondary-school enrollment rate (t)	0.8059 (0.68)	4.689 (2.43)	0.169 (0.10)	1.822 (1.40)	4.872 (2.52)
Primary-school enrollment rate (t)	1.4003 (1.65)	1.381 (0.86)	2.455 (2.01)	-0.139 (0.11)	1.616 (0.99)
Government Consumption to GDP ratio ($t, t + X$)	-0.0844 (3.02)	-0.063 (1.32)	-0.005 (0.19)	-0.065 (2.51)	-0.059 (1.26)
Number of revolutions per year ($t, t + X$)	-0.4359 (0.58)	-0.986 (1.08)	-1.238 (1.12)	-0.211 (0.21)	-1.030 (1.13)
Number of assassinations per capita per year ($t, t + X$)	0.0296 (0.13)	0.483 (1.56)	0.276 (0.94)	0.188 (0.54)	0.473 (1.54)
Deviation of the price level of investment (t), as in Sachs-Warner	-0.1709 (0.53)	-0.734 (1.24)	-0.476 (0.99)	0.350 (0.87)	-0.721 (1.23)
Gross domestic investment/ real GDP ($t, t + X$)	0.0757 (2.64)	0.051 (1.01)	0.076 (2.02)	0.103 (2.30)	0.040 (0.76)
Extreme political repression (from Sachs-Warner)	-0.6974 (1.66)	0.165 (0.28)	-0.907 (1.47)	-0.780 (1.51)	0.224 (0.38)
Population density ($t - 10$)	0.0006 (0.90)	0.0009 (1.40)	0.001 (0.60)	0.001 (0.87)	0.001 (1.49)
Intercept	12.2482 (4.87)	7.752 (1.81)	9.334 (2.84)	10.635 (3.86)	8.288 (1.92)
Adjusted R^2	0.546	0.211	0.35	0.53	0.32
Number of observations	91	89	99	97	89

Note: Numbers in parentheses are t -statistics. The beginning date of each period (1970 in columns 1 and 3, 1980 in column 4, and 1989 in columns 2 and 5) is denoted by t . ($t, t + X$) denotes the average computed between dates t and $t + X$ ($X = 20$ in column 1 and 10 in columns 2–5). The dependent variable is defined as the real annual per capita growth rate of GDP in the relevant period.

Source: Authors' analysis based on data described in the text. Growth, income, and investment data are from Heston, Summers and Aten (2002).

Wacziarg and Welch (2008)

- The econometric specification:

$$\log y_{it} - \log y_{it-1} = \alpha_i + \beta LIB_{it} + \varepsilon_{it}$$

- y_{it} is per capita income in country i at date t
(or investment, or openness defined as
(exports+imports)/GDP)
- LIB_{it} is a binary liberalization indicator

TABLE 5. Fixed-Effects Regressions of Growth, Investment, and Openness on Liberalization Status, 1950–98

Item	(1) 1950–98	(2) 1950–70	(3) 1970–90	(4) 1990–98
<i>Dependent variable: Growth</i>				
Liberalization	1.417 (5.05)	0.611 (1.29)	1.787 (3.11)	2.547 (2.39)
Number of observations	4,936	1,728	2,312	1,116
Number of countries	133	108	112	133
Adjusted R^2	0.05	0.03	0.04	0.04
<i>Dependent variable: Investment rate</i>				
Liberalization	1.937 (9.06)	2.545 (7.57)	1.237 (2.91)	0.762 (2.16)
Number of observations	5,078	1,844	2,321	1,140
Number of countries	136	110	117	136
Adjusted R^2	0.04	0.10	0.11	0.02
<i>Dependent variable: Openness</i>				
Liberalization	5.531 (7.42)	2.302 (1.89)	4.097 (3.74)	-1.803 (0.83)
Number of observations	5,078	1,844	2,321	1,140
Number of countries	136	110	117	136
Adjusted R^2	0.22	0.02	0.14	0.08

Note: Numbers in parentheses are robust t -statistics. Regressions are based on the specifications in equations (1)–(3). All regressions include time and country fixed-effects (estimates not reported).

Source: Authors' analysis based on data described in the text.

Microeconomic analysis

- Plant-level data sets: Effects of trade policy on production, employment and technological performance of firms.
- Bi-directional relationship between productivity and exports.
- Efficient producers tend to become exporters. But trade also improves productivity.

Some prominent findings in the literature:

- Bernard and Jensen, 2006:
- Industries experiencing relatively large declines in trade costs exhibit relatively strong productivity growth.
- Low productivity plants in industries with falling trade costs are more likely to die.
- Relatively high productivity non-exporters are more likely to start exporting in response to falling trade costs
- Existing exporters increase their shipments abroad as trade costs fall.
- Productivity growth within firms in response to decreases in industry-level trade costs.

Some prominent findings in the literature:

- Tybout, 2003:
- Mark-ups generally fall with import competition.
- Import-competing firms cut back their production levels when foreign competition intensifies.
- Trade rationalizes production in the sense that markets for the most efficient plants are expanded. Large import-competing firms tend to simultaneously contract.
- Exposure to foreign competition often improves intra-plant efficiency.
- Firms that engage in international activities tend to be larger, more productive, and supply higher quality products.

Case study: Labor market polarization: trade or technology?

- Globalization has been blamed for rising inequality, both within and across countries.
- Overall, the empirical evidence for these claims are rather weak. There are modest effects on a macro level. Other factors, in particular technological change, tend to be more important.
- However, in some industries, the effect of trade on employment and wages can be large.

Autor, Dorn and Hanson (2015): Untangling Trade and Technology: Evidence from local labour markets, *The Economic Journal*.

Autor, Dorn and Hanson (2016): The China Shock: Learning from Labor Market Adjustment to Large Changes in Trade, NBER Working Paper No. 21906.

Their main findings:

- Labour markets in the U.S. whose industry composition exposes them to rising Chinese import competition experience significant falls in employment, particularly in manufacturing and among non-college workers.
- Labour markets susceptible to computerisation due to specialisation in routine task-intensive activities instead experience occupational polarisation, but do not experience a net employment decline.
- Trade impacts rise in the 2000s as imports accelerate, while the effect of technology appears to shift from automation of production activities in manufacturing towards computerisation of information-processing tasks in non-manufacturing.

Main findings (cont.):

- China's emergence as a great economic power has induced an epochal shift in patterns of world trade.
- Simultaneously, it has challenged much of the received empirical wisdom about how labor markets adjust to trade shocks. Alongside consumer benefits of expanded trade are adjustment costs and distributional consequences. These impacts are most visible in the local labor markets in which the industries exposed to foreign competition are concentrated.
- Adjustment in local labor markets is remarkably slow, with wages and labor-force participation rates remaining depressed and unemployment rates remaining elevated for at least a full decade after the China trade shock commences.
- Exposed workers experience reduced lifetime income. At the national level, employment has fallen in U.S. industries more exposed to import competition, as expected, but offsetting employment gains in other industries have yet to materialize.

- Angus Deaton and Anne Case (2017): mortality rate for whites 45 to 54 years old with no more than a high school education increased by 134 deaths per 100,000 people from 1999 to 2014.
- Better understanding when and where trade is costly are key items on the research agenda for trade and labor economists.
- How can the economic benefit of less tariffs and barriers to trade be better explained to the people?