



“we have a problem folks.”

**Samuel Bodman, U.S. Energy Secretary
Address to CERA Week on Oil Supply, 2/14/07**

“Unfortunately, we are experiencing what seems likely to be the calm before the storm.”

Ben Bernanke, Federal Reserve Chairman, on demographics & aging - 1/17/07

“The usual argument in favour of globalisation, that it will make most workers better off, has not so far been borne out by the facts. Downward pressure on wages could continue for a long time.”

Economist Magazine on Globalization – 9/16/06

“What if we worked with our suppliers to take non-renewable energy off our shelves and out of the lives of our customers?”

Lee Scott, Chairman, Wal-mart on Sustainability, 2/1/07

“Our involvement in discussions with Wal-Mart helped to educate the retailer about plastics packaging enough to avoid a total ban.”

William Carteaux, President of SPI, 4/27/07



SES
PRODUCT DEVELOPMENT
& ENGINEERING

STRESS ENGINEERING SERVICES

Megatrends Affecting Plastics Manufacturing & What Molders Can Do

Innovative Plastic Symposium for Plastics

Stephen DeHoff
Staff Consultant
July 31, 2007



**“But one must know how to colour one’s actions and to be a great liar and deceiver.” –
Machiavelli, *The Prince*, Chapter 18**

**“In God we trust.
All others must have data”
An old Procter & Gamble saying**



Economic analysis of short-term wiggles is like trying to see a picture from looking at colored dots.



Long-term, fundamental trends have basic and simple relationships that are easy to see in long-term data.



Standing Back Brings Focus



Sunday Afternoon on the Island of La Grande Jatte, G. Seurat



Overview

- **The plastic industry developed and grew faster than GDP in a historically unique and highly positive economic environment**
 - Strong & rising economic growth rate and living standards
 - Historically (centuries) cheap energy & feedstock.
 - Strong population growth
- **Analysis of fundamentals suggests the future starting around 2015-2020 will be unlike ANY of our 230 year history.**
 - Energy supply likely becomes a much bigger problem and may cause very serious dislocations.
 - The U.S. economic growth rate has been, and will continue, slowly declining from energy, demographic, and globalization effects.
 - U.S. living standards will trend lower, perhaps sharply.
 - There is increased risk of a worst case economic collapse.



Overview

- **Domestic plastics growth may slow more than the economy generally**
 - It is connected directly to rising oil & natural gas costs
 - Manufacturing will continue to leave the U.S.
 - The single use convenience business model may be vulnerable to energy costs, global warming, and falling real incomes.
- **The good news**
 - There are 300MM+ Americans and 6B humans who need products.
 - Plastic has advantages over other materials that will continue to provide substitution and other opportunities.
- **While these outcomes are not certain, the time to start planning is NOW!**



Population Growth Followed Oil Growth

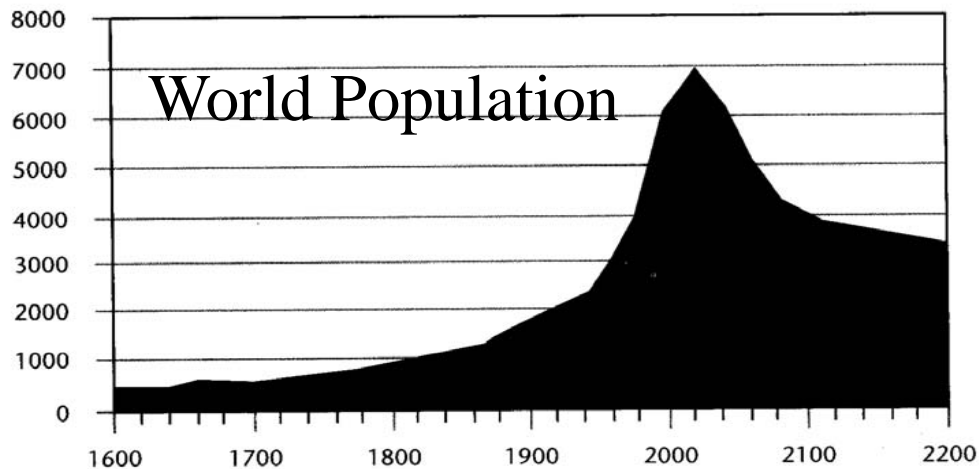


Figure 2. World population from 1600 to 2200, history and projection, assuming impacts from oil depletion, in millions (Source: C. J. Campbell)

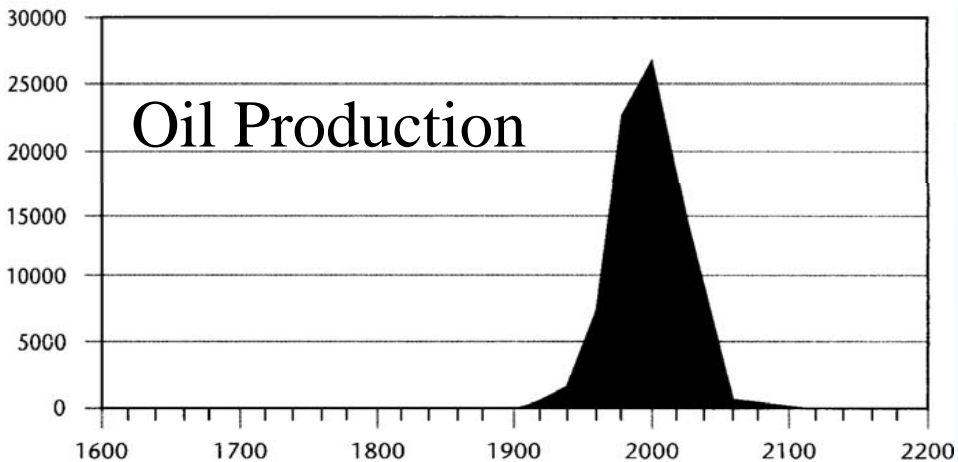


Figure 1. World oil production from 1600 to 2200, history and projection, in millions of barrels per year (Source: C. J. Campbell)

- We're here, plastics are here, and our economy has led the world for decades almost solely because of oil's cheapness & density.
- *“With high energy goes a high standard of living”*
- *“A reduction of per capita energy consumption has always in the past led to a decline in civilization and a reversion to a more primitive way of life” .*
- *Hyman Rickover, 1957*



Large Scale Economies Developed Substantially from Low Cost Transportation

- **Coal, then oil made transport increasingly cheap.**
- **Cheap transport permitted volume aggregation**
 - by expanding the geographic basis of product volume.
- **Lower prices increased demand and accelerated growth.**
- **Increasing transportation costs can also increase scale costs through dis-aggregation.**
- **Increased prices reduce demand and slow growth.**

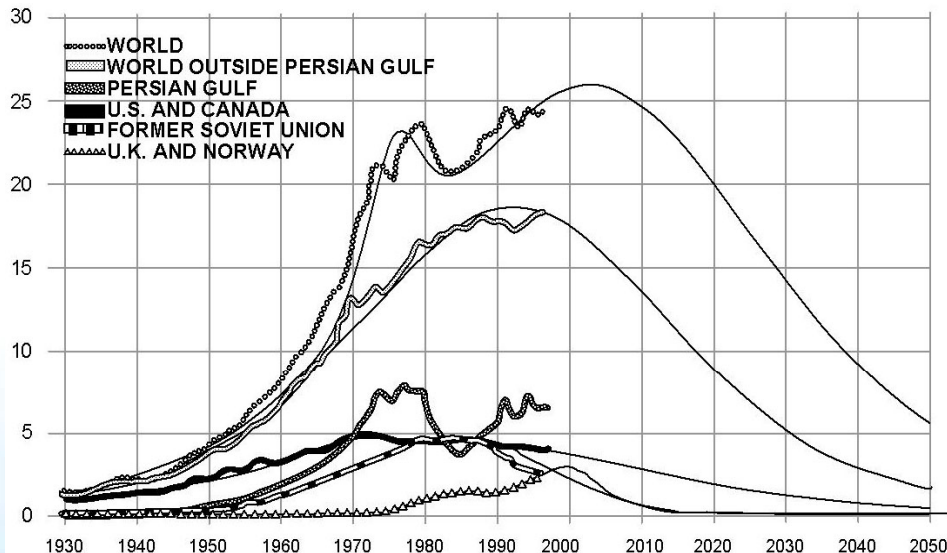


Three Ways for Oil Supply to Fail

- **It's far worse than most people realize!**
 1. Geologically-driven output rate peaking
 - 2015-2020 if supply stays at 2T barrels
 - 2030-2040 at 3T barrels.
 2. Lack of investment / Oil nationalization
 3. Geopolitical conflict
- **What are the chances of avoiding all three ways as supplies get increasingly tight?**



Peaks Are Flow Rate, Not Quantity!



| | Demand (MBPD) | Flow Peak (MBPD) | World Reserves (Trillions) |
|-----------|---------------|------------------|----------------------------|
| Current | 84-85 | 85-90 | 2 (proven) |
| 2020-2025 | 115-120 | 90-110 | 3 (so far not found) |

- 1957 Theory by M. Hubbert of Shell predicted 1971 U.S. oil output peak within 1 year.
- Today, only timing and “shape” are debated.
- Many predictions suggest an output peak between now and 2020.
- Lack of investment may cause a peak before geology does!
- Oil field peaking histories consistently prove economic insensitivity at 50-60% of reserves.
- Data so far seems to support pessimists and an early peak.



Oil/Energy Supply Debate

- **Belief in a near peak includes many credible people.**
- **Optimists argue a “plateau” vs. a “peak” but acknowledge demand still exceeds supply at a less severe rate.**
- **Biggest problem is transportation.**
- **Add serious underinvestment & nationalization**
 - International Energy Agency (IEA) shows global 2000-2005 \$340B increase in investment was 95% consumed by price increases for existing resources – only 5% increased exploration.
 - *“Its clear from the latest crop of corporate results that surging investment is not producing nearly as much oil and gas as expected. . . . Most of the majors are trimming their targets for the rest of the decade”* Petroleum Intelligence Weekly 2/12/07



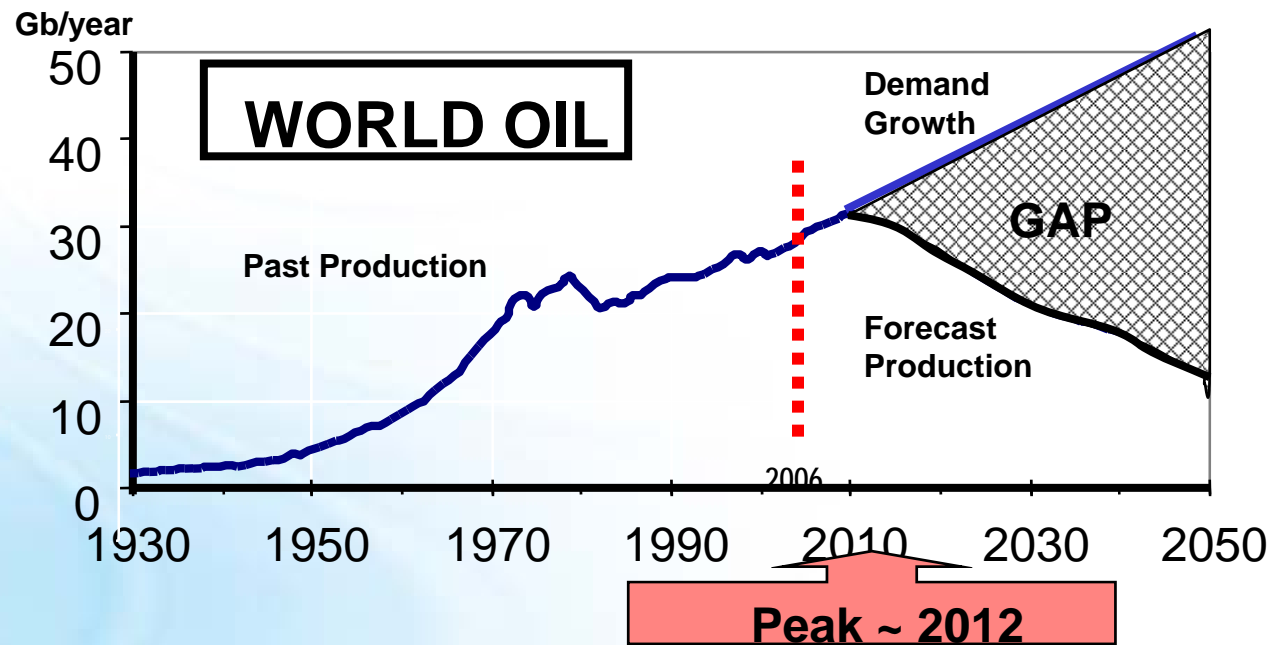
Unconventional Oil Won't Fix Flow Rate!

- **Unconventional oil (tar sands, etc) apparently has only 15-30% of the flow rate of conventional oil, assuming the energy necessary to heat it is available.**
- **But there's a lot that will last a long time.**
- **N. American natural gas is in worse shape than oil and a primary constraint on exploit of the Canadian resources.**



Views from A Recent Presentation

A CHINESE VIEW OF PEAK OIL



China aggressively securing oil supplies worldwide

Robert Bedzek to Australian group June 21, 2007. Mr. Bedzek co-authored U.S. DOE Study on peaking in 2005



Energy Alternatives

- **Alternatives all have significant issues for transportation which requires 1-2 decades preparation.**
- **Future has a more complex array of energy sources vs. today.**
 - This will cause a new body of complications in energy choices and management requiring energy flexibility.
- **Net, help at the margin but no real solution for a demand exceeding supply prior to 2020.**



Don't Let Near Term Improvements Fool You.

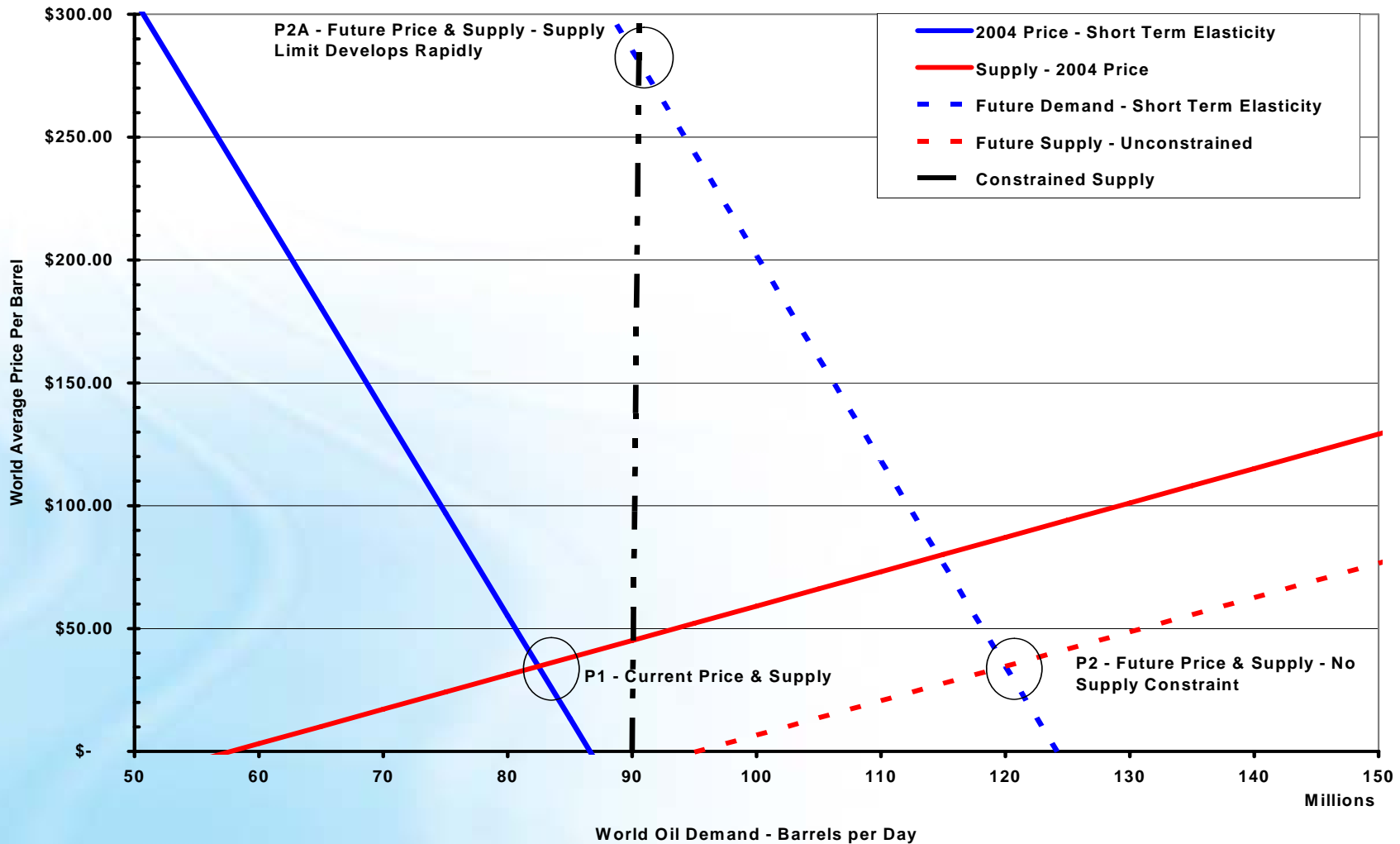
- *“ . . . we face a fundamental long-term problem. In the decades ahead, we do not know precisely when, we shall reach a point, a plateau, or peak, beyond which we shall be unable further to increase production of conventional oil worldwide. The underlying problem is that for more than three decades, our production has outrun new discoveries. More recent discoveries tend to be small with high decline rates – and are soon exhausted. By about 2010, we should see a significant increase in oil production as a result of investment activity now under way. **There is a danger that any easing of the price of crude oil will, once again, dispel the recognition that there is a finite limit to conventional oil. In no way do the prospective investment decisions solve the long-term, fundamental problem of oil supply**”.*

James Schlesinger, former Secretary of Defense, 1st Secretary of Energy, to the Senate Committee on Foreign Relations, November 5, 2005.



High Oil Prices Aren't Gouging

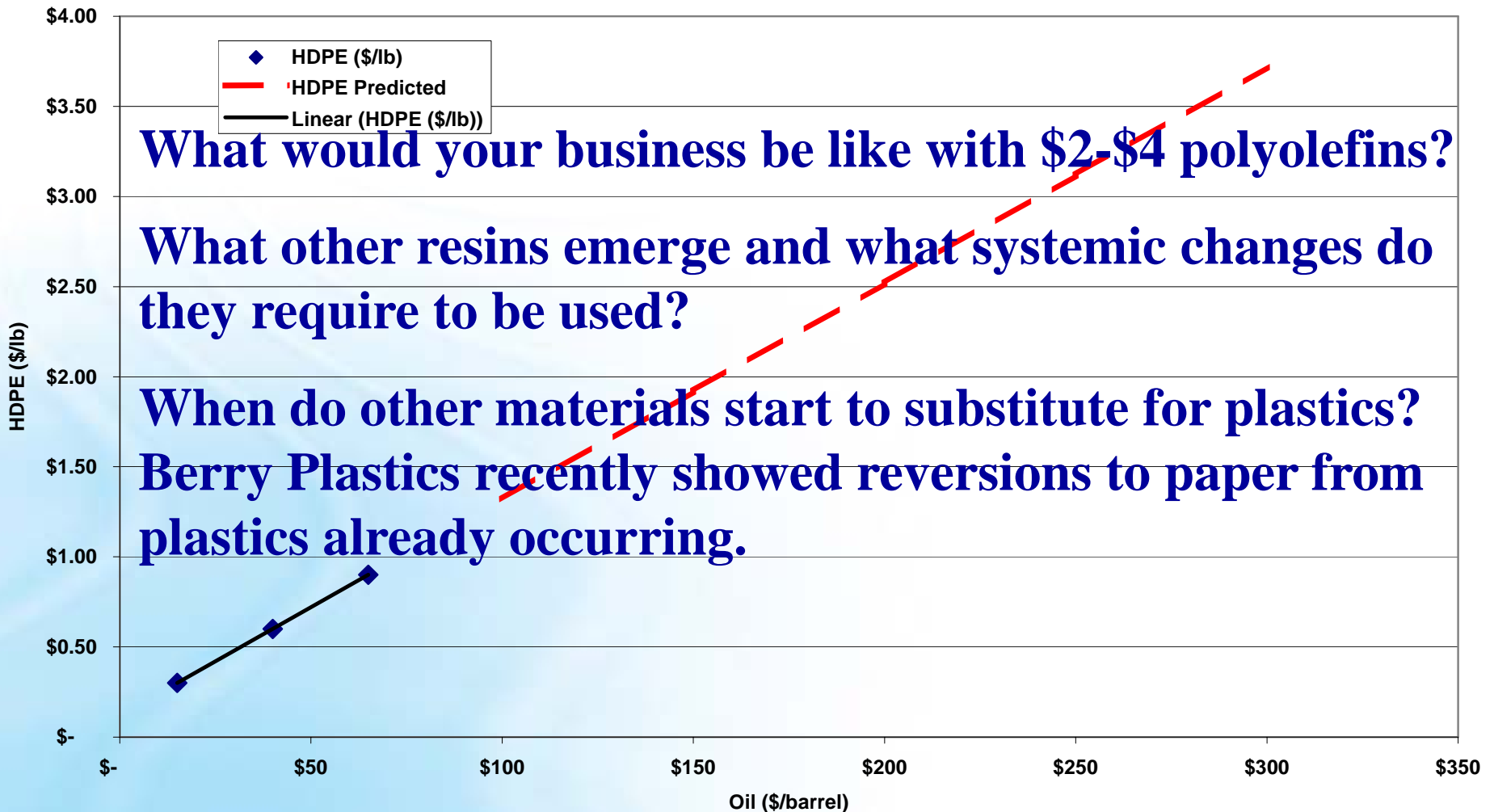
Simplified Crude Oil Demand & Constrained Supply Model - 90MBD





Energy Effect on Plastics

Oil vs. HDPE





What Might Really Happen in a Shortage?

- **How would these affect your business?**
 - Population shrinkage.
 - History has examples of population shrinkage from failed energy supply.
 - Manufacturing localization / Globalization reversal
 - **EXAMPLES ALREADY EXIST!**
 - Fragments manufacturing scale economies & further raises costs.
 - Wal-Mart sustainability scorecard rewards short transport distances!
 - Suppliers closer to their customers in smaller, more numerous facilities.
 - More bulk products & re-use, less throw away convenience.
 - Denser housing closer to work sites – re-urbanization.
 - Suburban house values may fall significantly.
 - More work from home.
 - Less tourism.



Energy Conclusions

- *Oil supply growth may fail to keep up with demand growth in the relevant future. Risk management seems appropriate.*
- *Energy problems could become severe, causing foundational changes in social and economic structures. The weak are affected first.*
- *Expect the fundamental energy cost trend to be continually up, short-term wiggles excluded.*
- *Future energy supply will be more complex requiring flexibility and planning not required today.*
- *The most obvious, effective, and rapidly actionable strategy is to use less energy now to buy time for better solutions.*



Economics Overview

- **Multiple economic fundamentals, besides energy, are pointing at long-term slower U.S. growth and lower living standards.**
- **The domestic plastic industry will be strongly affected by these trends.**
- **Many, perhaps most, plastic companies have benefited from the lack of discipline inherent in a rapid growth environment.**



Economic Theory in 2 Powerpoint Slides!

**Beyond
“invisible hand” (Adam Smith)
and
“comparative advantage” (David
Ricardo)**



Economic First Principles

- **Gross Domestic or Gross National Product (GDP/GNP) growth is the broadest measure of economic well-being.**
- **Economic growth is mostly population growth plus productivity growth.**
- **The two most important input commodities are labor and energy.**
- **Market boundary condition principle means conditions at the boundary generally happen directionally to most of the market.**
- **History of the last 500 years shows world economic dominance is correlated with world energy supply dominance (Kevin Phillips)**



Less Publicized Economic First Principles from Classical Economists

- **Adam Smith & David Ricardo:**
 - Wages & profit are mutually exclusive.
- **Adam Smith:**
 - Economic decline favors profit causing profit's interests to not have the same connection to the general interest of society as wages and rent which rise and fall with the economy.
- **Adam Smith:**
 - High growth rates favor wages more than profit.
- **Adam Smith:**
 - Governments declare bankruptcy primarily through currency devaluation (inflation)



Economic Data Summary

- **Factors slowing future U.S. GDP Growth**
 - Slower Population growth
 - Lower % of population working (demographics)
 - workforce participation started shrinking in 2001 when the 1st boomers turned 55.
 - Possible Lower productivity growth from lowered investment as a result of less attractive U.S. market conditions
 - Globalization generates arguably growth-impairing income inequality for the U.S.
 - Societal debt & fiscal issues
 - Consumption reduction from demographic effects
 - High energy costs and loss of energy supply dominance
 - Restoring savings reduces consumption & growth



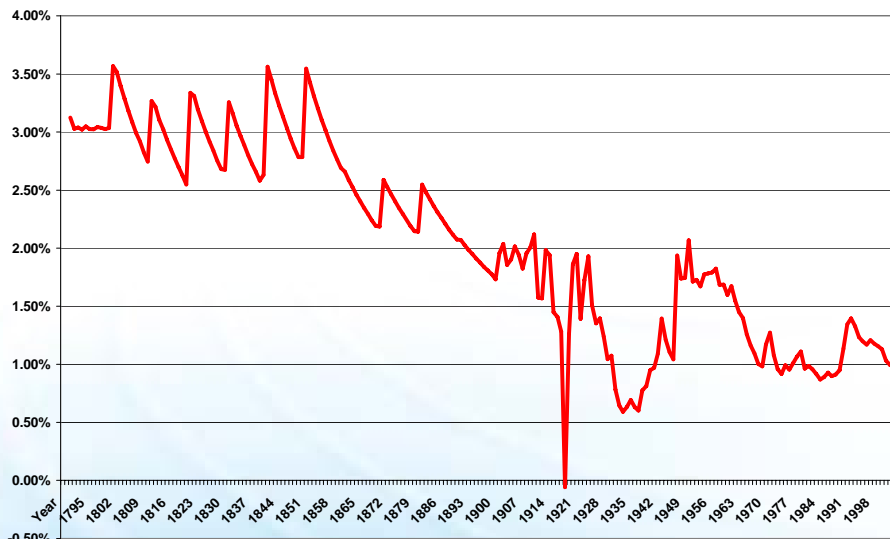
SES
PRODUCT DEVELOPMENT
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STRESS ENGINEERING SERVICES



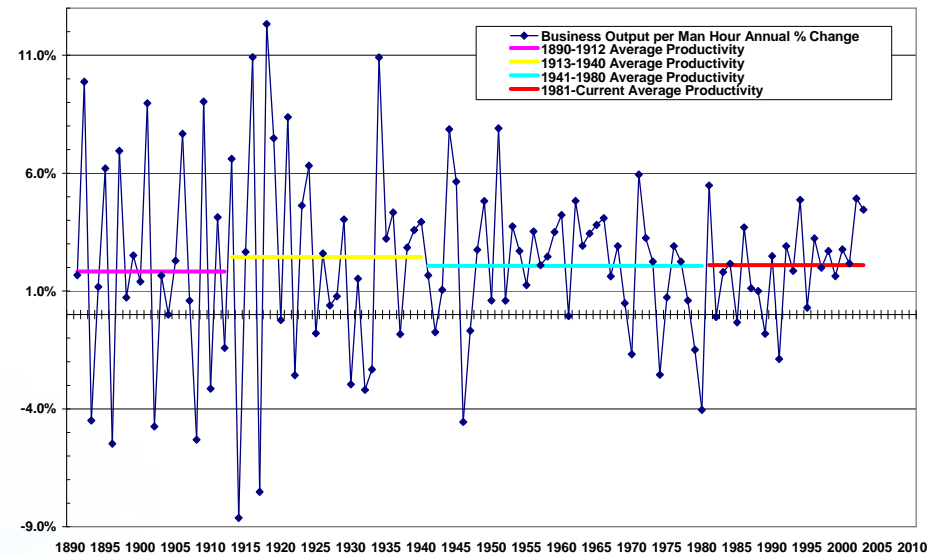
The Components of Economic Growth Potential

U.S. Population Growth Rate



- **Slow Population growth forces corporations overseas to find growth.**
 - Immigration is 100% of 1% population growth
 - Not making enough babies - Native birth rate equals replacement
 - Europe and Japan are worse – shrinking!

United States Productivity Growth Since 1890



- **Average Productivity growth of 2.1% is very stable and predictable over time.**
 - Recently high – above historic trend.
 - 2006 Nobel economist says it can't last.



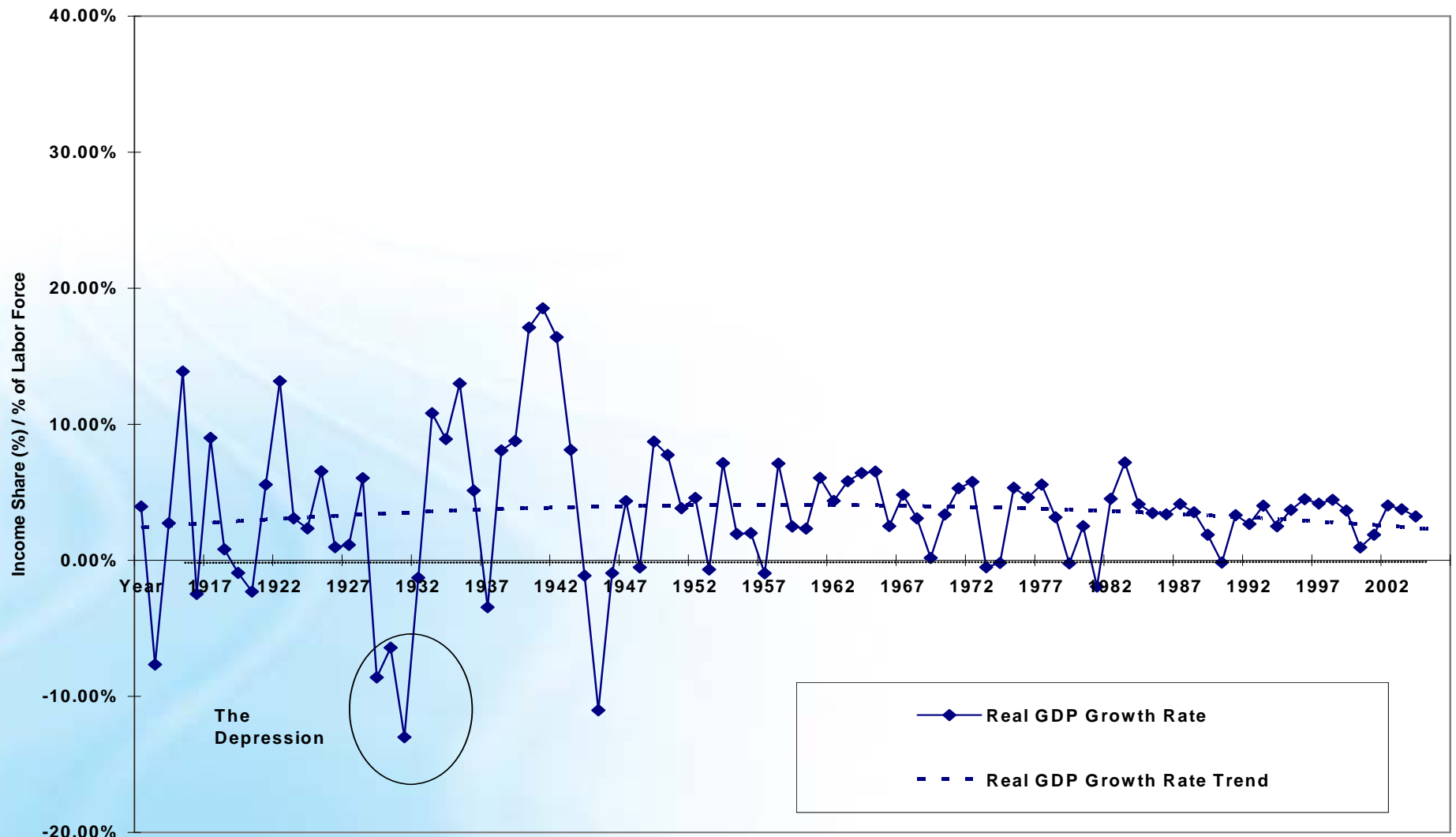
Economic Potential is Falling

- **Analysis of Economic Potential**
 - Population growth of 1% plus 2.1% productivity growth equals 3.1% economic potential.
 - Long-term data analysis shows 1% potential tends to yield about .7% in actual growth.
 - Average growth should reduce about 1% from today until fundamentals change.
 - My estimate is 2.2%
- **The Point: Economic potential has been but is no longer 3% or greater.**
- **Economist – 10/28/06:**
 - *“America’s speed limit is also dropping. It may soon be as low as 2.5% a year, by some estimates the slowest pace in more than a century”. “Any fall in America’s economic speed limit will have serious consequences.”*



GDP Growth Has Peaked and is Slowly Declining

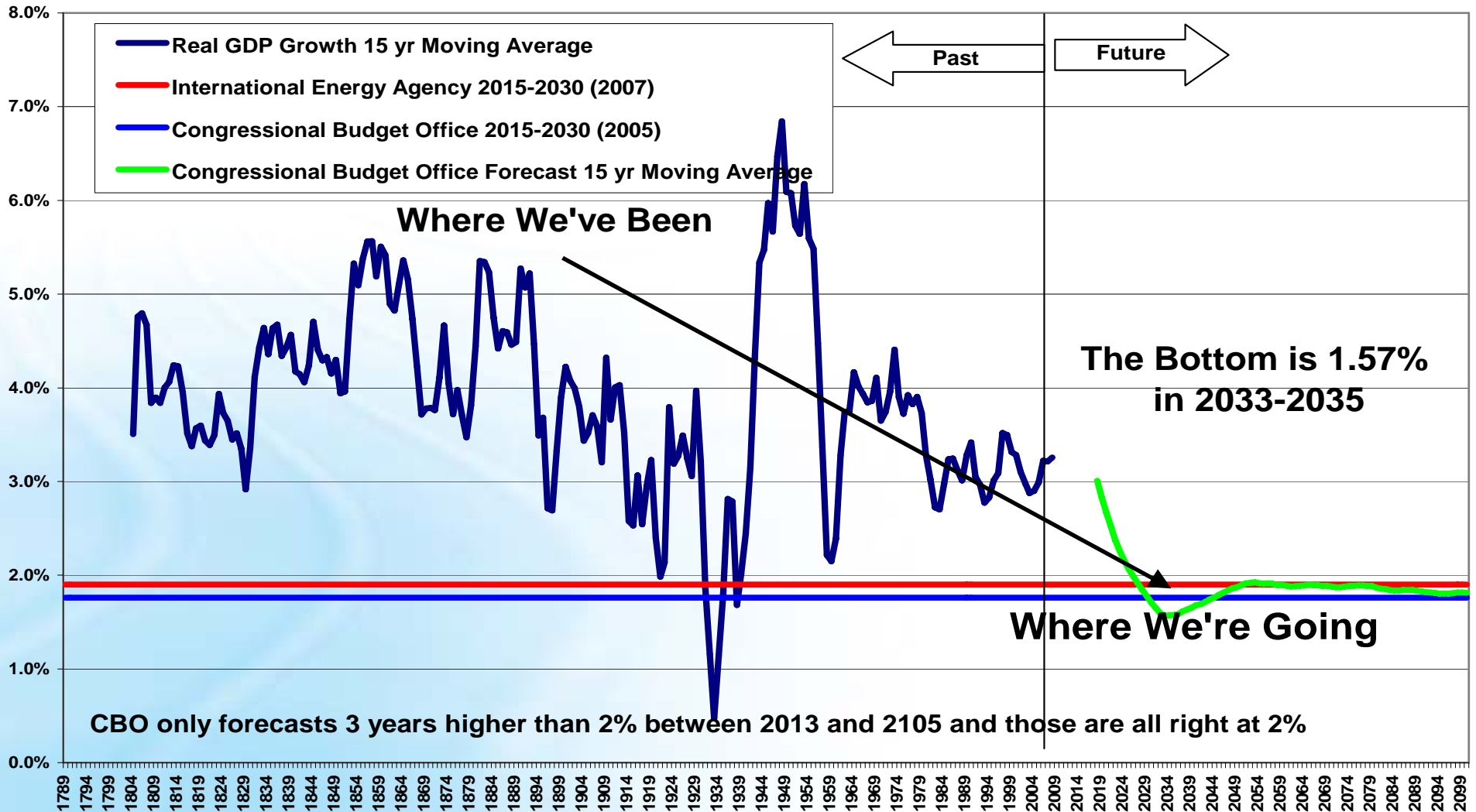
U.S. GDP Growth, Income Inequality, Union Strength, and Trade Balance





Our only experience at this GDP level was the Depression!

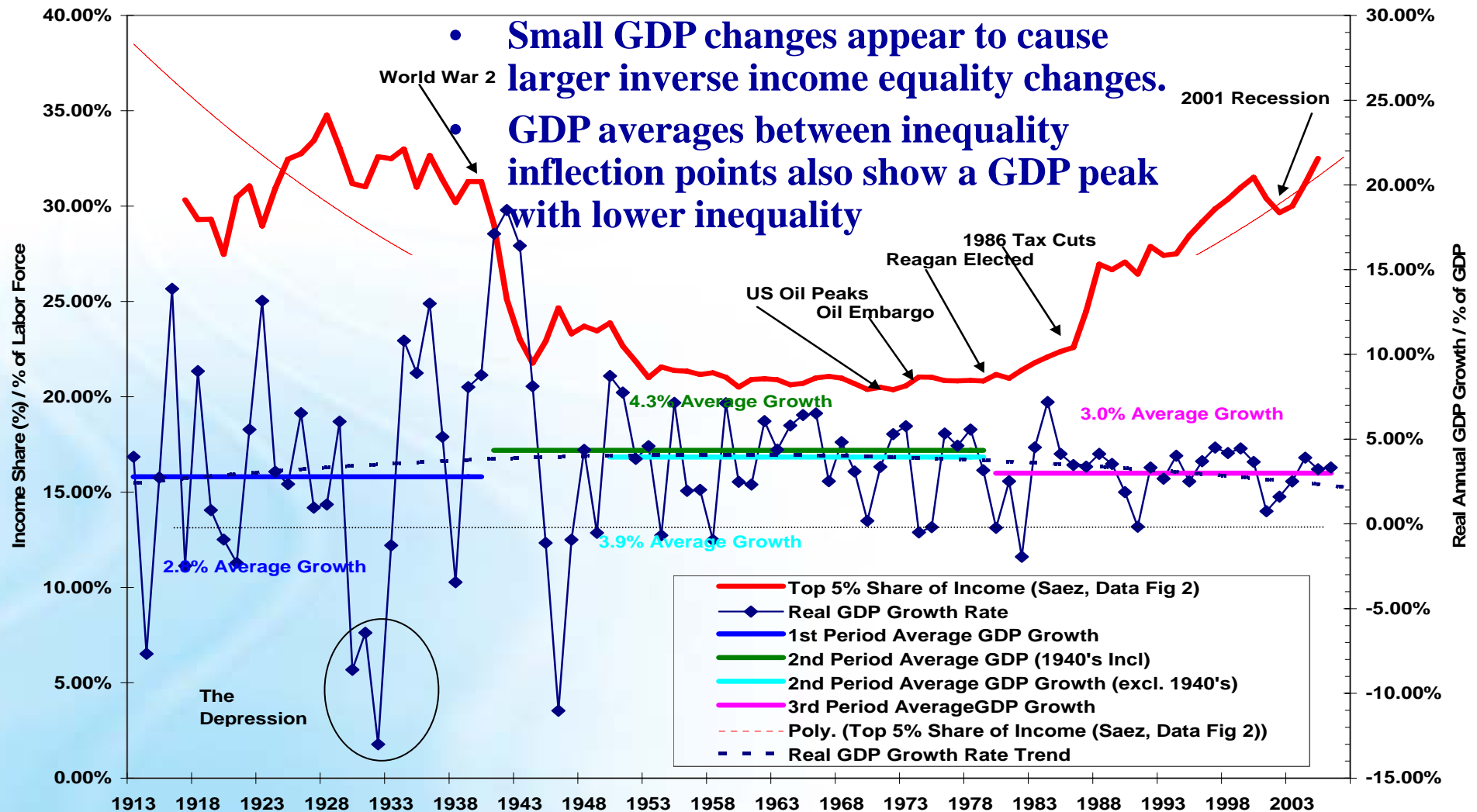
**U.S. Real GDP Growth History and Forecasts (1789-2100)
15 Year Moving Average**





Maximum GDP Growth Appears Correlated with Higher Levels of Income Equality Than Exist Today and Prior to WW2

U.S. GDP Growth, Income Inequality, Union Strength, and Trade Balance

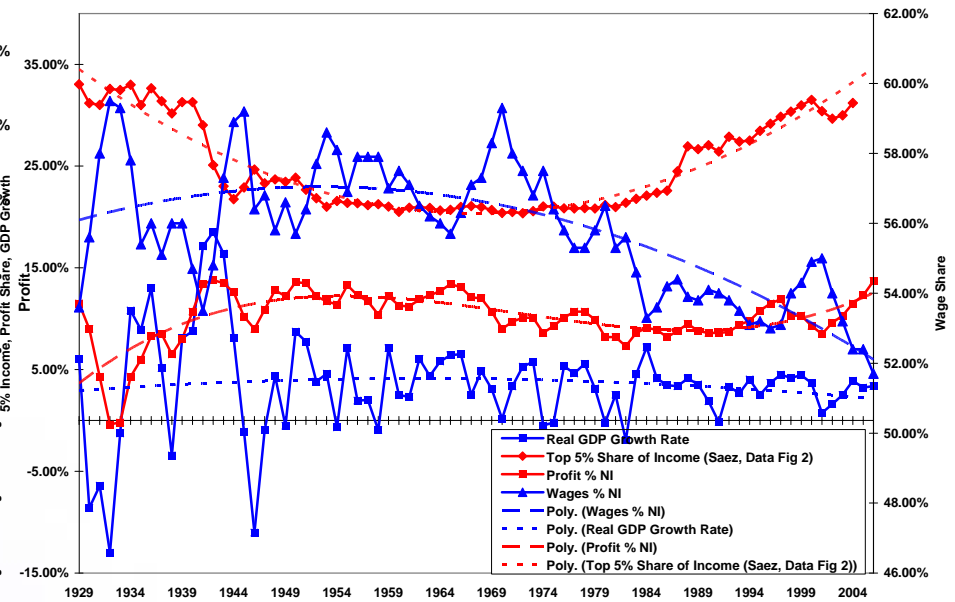
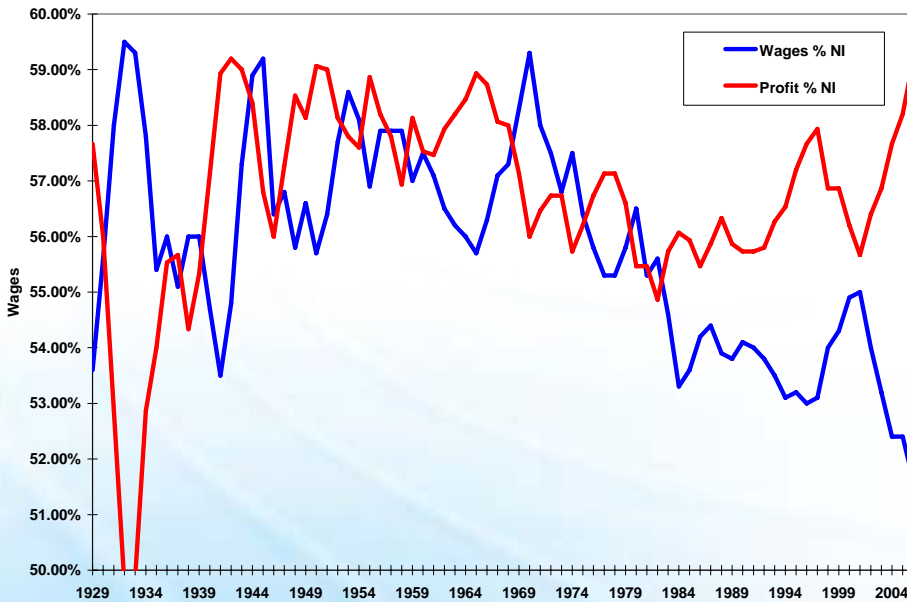




Economic First Principles

Wages and Profit % of National Income

Profit & Wages % of National Income vs. GDP Growth and Top 5% Income Share



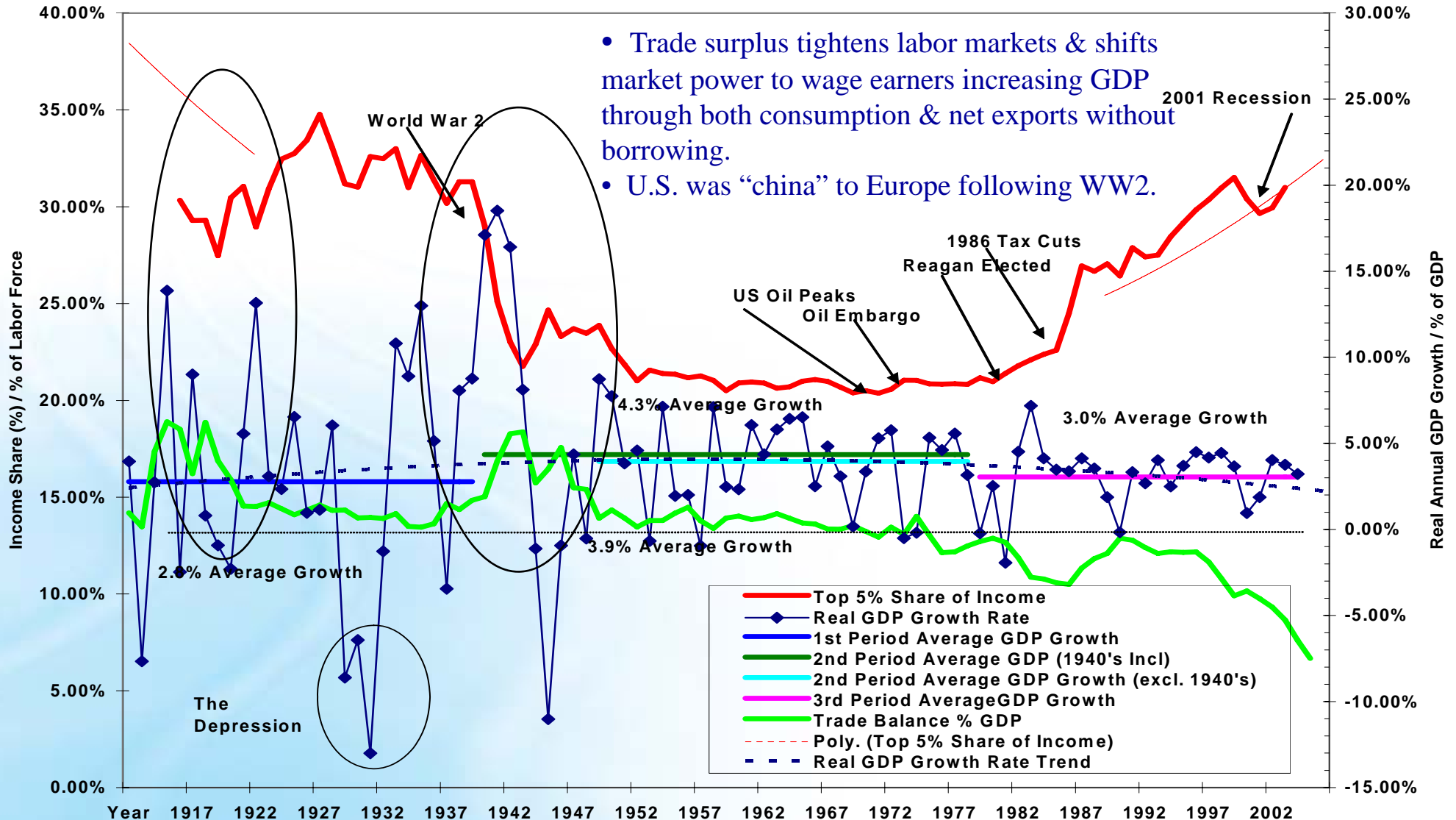
- **Smith & Ricardo: Wages & Profit are Mutually Exclusive**
 - Note almost perfect mirror image in movement

- **Smith: Profit is highest in economic decline, wages highest during growth**
 - Wages tend to follow declining GDP growth arc (Blue)
 - Profit tends to follow rising income inequality arc (Red)
 - Profit at highest (13.8%), wages at lowest (51.7%) points of National Income since 1929.



Trade Surplus Was Important to GDP Growth and Favorable Income Equality

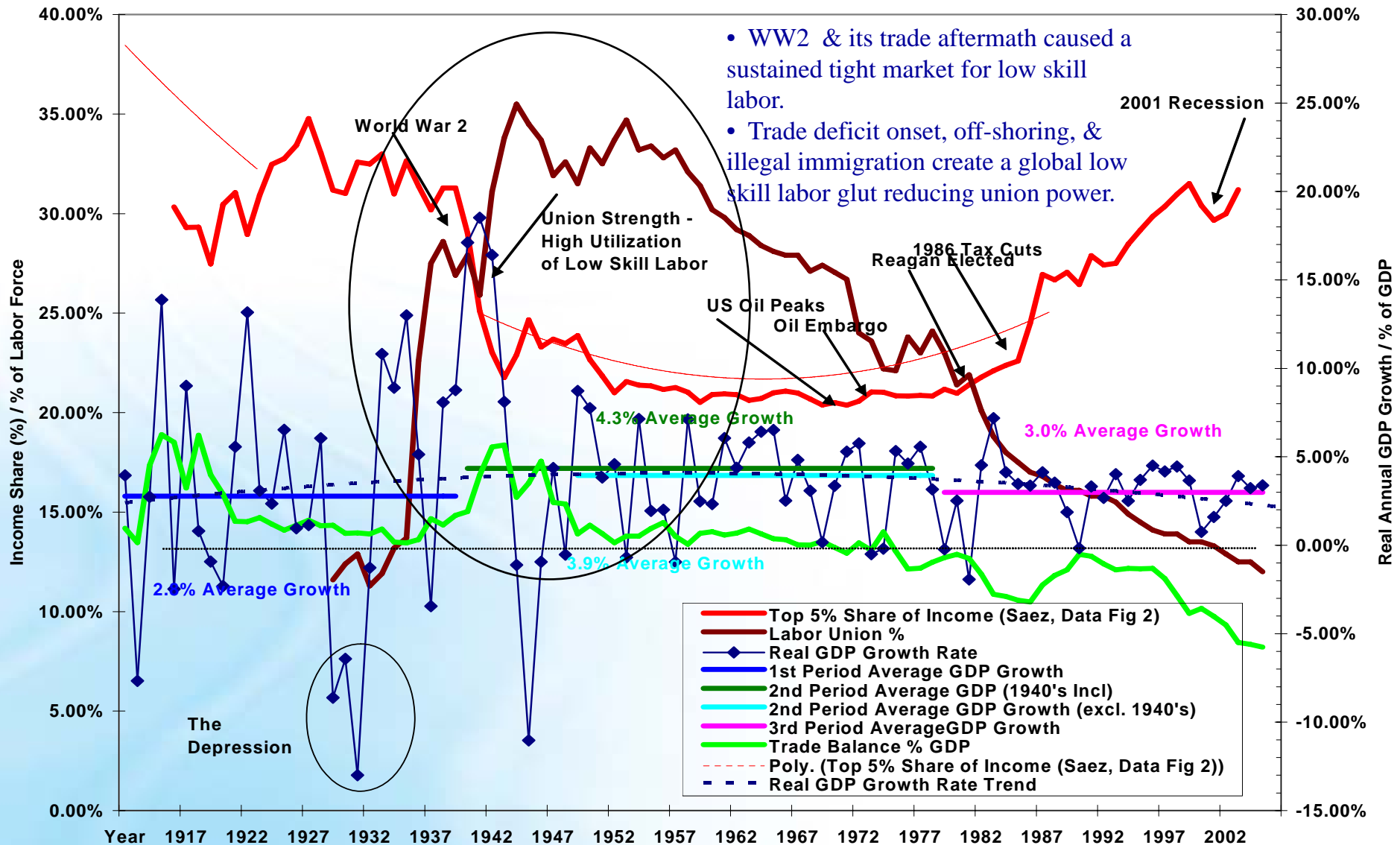
U.S. GDP Growth, Income Inequality, Union Strength, and Trade Balance





Labor Union Strength is Mostly a Function of Labor Market Balance

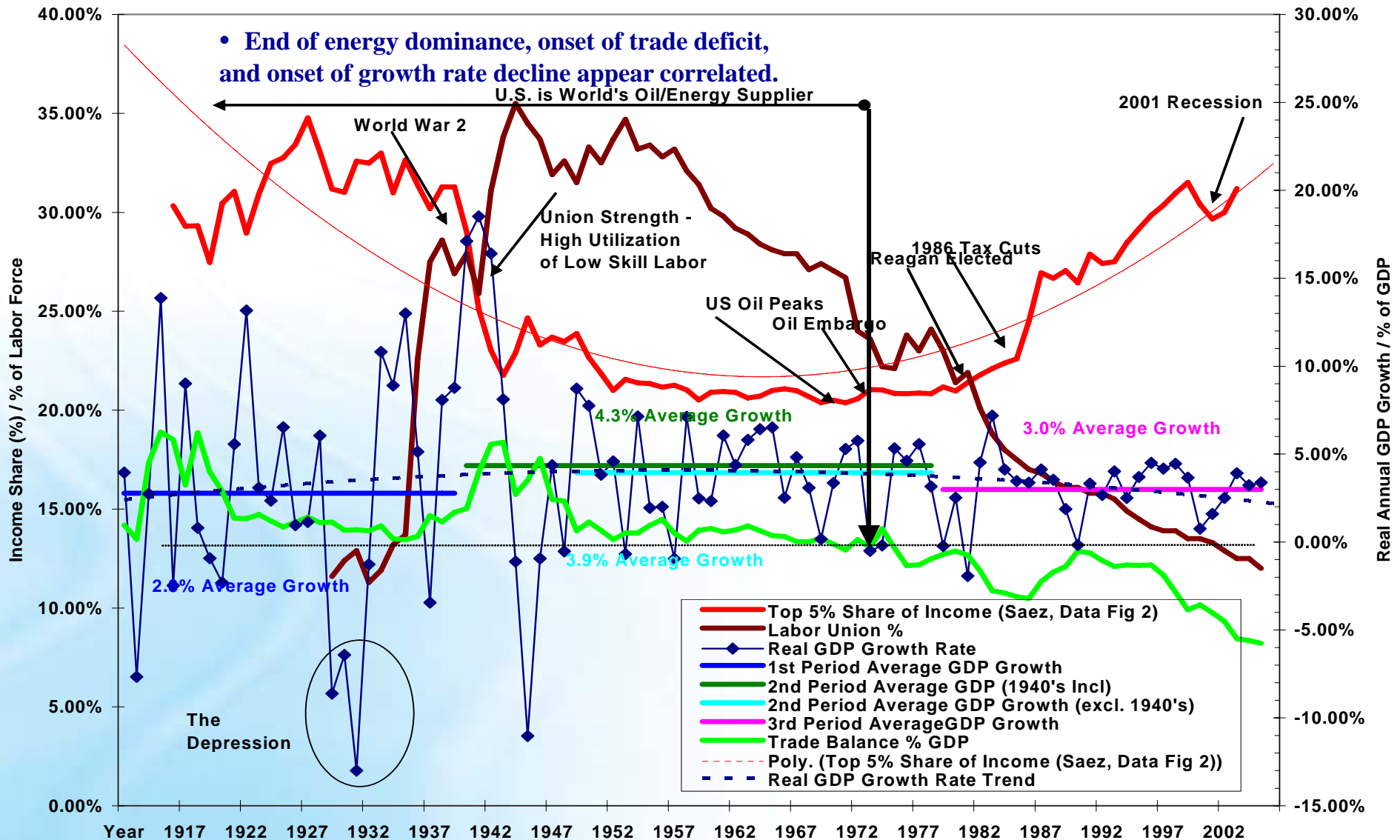
U.S. GDP Growth, Income Inequality, Union Strength, and Trade Balance





Energy Dominance Correlation with Trade Deficit and Falling GDP Growth

U.S. GDP Growth, Income Inequality, Union Strength, and Trade Balance





Optimal Conditions for GDP Growth?

- **Data seem to suggest optimal conditions for maximum GDP growth more along the lines of 1950-1980 conditions.**
 - Population & productivity growth both need to be strong.
 - Energy dominance enhances trade position.
 - A net trade surplus in goods and/or services increases labor demand relative to supply, tightens the labor market, and shifts money to wages putting more purchasing power in more hands.
 - More money & purchasing power in more peoples' hands increased GDP through consumption without borrowing & reduced savings simultaneous with heavy investment in public infrastructure.
 - Current growth is heavily dependent on borrowing, a negative savings rate, reduced infrastructure spending and increasing public asset sales.
 - Trade deficits, particularly in “wage goods” expand the labor supply and shift money from wages to profit slowly reducing purchasing power and consumption for the bulk population, decreasing growth or increasing borrowing.
 - Small numbers of very high income consumers simply cannot fully offset the consumption of many people, each with less money.



Recipe to Improve GDP Growth

- **Increase Population & Workforce**
 - Increase immigration (short-term boost)
 - Delay retirements (short-term boost)
 - Increase birthrate (long-term boost)
- **Increase productivity to improve output**
- **Reduce imports, increase exports**
- **Decrease inequality to sustain or increase consumption**



Economic Conclusions

- **Data analysis of long-term U.S. GDP elements observed over time supports the economic principles of A. Smith and D. Ricardo.**
- **Modern U.S. GDP growth reached a peak in the 1960's and has been declining since at a slowly accelerating rate.**
- **U.S. GDP growth is going to continue to slow and become more like Europe for as much as the next century (if we can believe forecasts that far).**
- **Slow growth isn't the end of the world – Europe didn't die!**



Economic First Principles & Globalization

- **David Ricardo explains Wal-Mart in 1817:**

- *“It has been my endeavour to shew (show) throughout this work, that the rate of profits can never be increased but by a fall in wages, and that there can be no permanent fall of wages but in consequence of a fall of the necessaries on which wages are expended. If, therefore, by the extension of foreign trade, or by improvements in machinery, the food and necessaries of the labourer can be brought to market at a reduced price, profits will rise. If, instead of growing our own corn, or manufacturing the clothing and other necessaries of the labourer, we discover a new market from which we can supply ourselves with these commodities at a cheaper price, wages will fall and profits will rise; but if the commodities obtained at a cheaper rate, by the extension of foreign commerce, or by the improvement of machinery, be exclusively the commodities consumed by the rich, no alteration will take place in the rate of profits. The rate of wages would not be affected, although wine, velvets, silks, and other expensive commodities should fall 50 per cent, and consequently profits would continue unaltered.*

Foreign trade, then, though highly beneficial to a country, as it increases the amount and variety of the objects on which revenue may be expended, and affords, by the abundance and cheapness of commodities, incentives to saving, and to the accumulation of capital, has no tendency to raise the profits of stock, unless commodities imported be of that description on which the wages of labour are expended.” - Political Economy & Taxation, Chapter 7



Is this a legitimate comparative advantage?





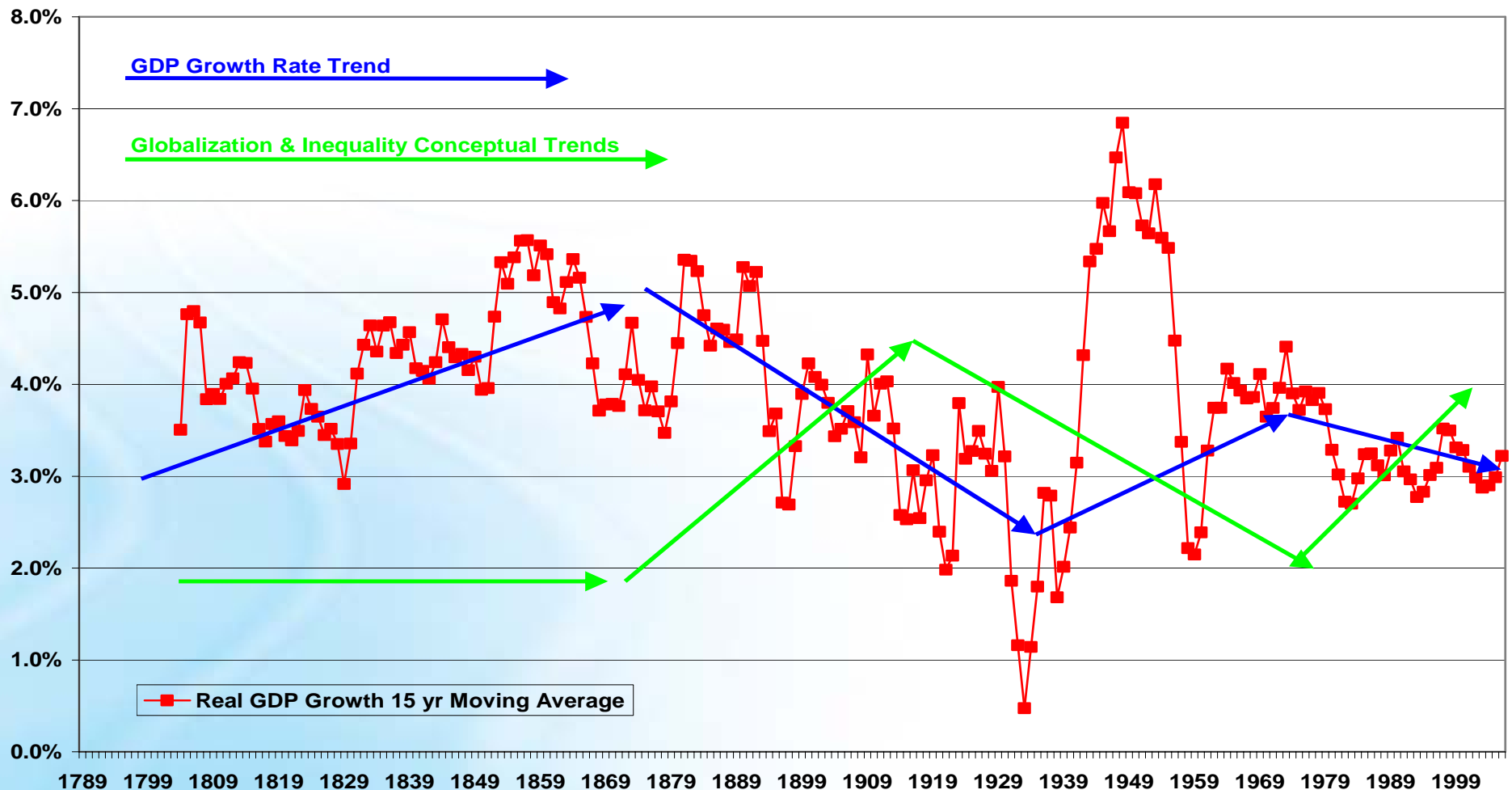
Globalization History

| | U.S. GDP Growth Rate Trend | U.S. Income Inequality Trend | Transport Costs and Trade Barriers |
|--|---|---|---|
| 19th Century Globalization (WW1 ended) | Falling | Rising | Falling |
| Current Globalization | Falling | Rising | Falling |



Globalization Reduces GDP Growth

Globalization vs. U.S. GDP Growth History





Globalization Data Summary

- **Globalization**
 - IS helping millions of people in other countries.
 - **DOES** reduce wages by expanding the labor supply.
 - **DOESN'T** create unemployment.
 - **DECISIONS** often exclude full consideration of costs.
 - IS an averaging process from which the broad U.S. population cannot benefit for decades or more outside of intervention.
 - **REQUIRES EVERYTHING FREE** to distribute benefits quickly and broadly.
- **All elements aren't free and never will be. Therefore, benefits flow to the free and costs to the inflexible elements.**



Globalization Data Summary

- **Facilitating access to future growth is the more compelling reason CEO's dictate China and India to their supply organizations.**
 - Many low cost arguments are vulnerable
- **A service economy arguably carries a lower average wage than a manufacturing economy**
 - Services add less value and have less potential to improve productivity. (Baumol's Disease).
 - Results in rising real prices that steadily lower demand putting additional downward pressure on wages.
- **Globalization allows multi-national corporations to escape or prevent rising labor costs from a demographically falling domestic labor supply**



From “Fear of Off-Shoring”

- **30-40 million U.S. jobs are exposed to globalization through electronically-deliverable services that will effect higher education more than low.**
- **Not all exposed jobs will leave.**
- **More education is increasingly not a defense against globalization.**
- **Only personally-delivered services are truly safe but most are low wage by definition. Only a few are high wage**

“What will everyone else do?”

(Alan Blinder, former Fed Vice-Chairman – Fear of Offshoring - 2005)



Calls for Government Intervention

– Economist – 9/16/06:

- “The usual argument in favour of globalisation, - that it will make most workers better off – has not so far been borne out by the facts. Downward pressure on wages could continue for a long time.”
- “Governments may need to redistribute the benefits of globalisation more fairly through the tax and benefits system.”
- “If real wages continue to stagnate and no compensation is forthcoming, political support for globalisation may fade and the vast gains from the biggest economic stimulus in world history will be lost.”

– Financial Times – 12/14/06:

- “Sensible government policy can cushion the negative impact of globalisation.”
- “In the developed nations, the welfare state needs to support workers who bear the brunt of the adjustment using progressive taxation and retraining initiatives.”

– Foreign Affairs Magazine – July/Aug 2007 (Matt Slaughter, White House Council of Economic Advisors 2005-2007, co-author)

- “Averting a protectionist backlash is in the economic and security interests of the United States.”
- “The time has come for a New Deal for globalization – one that links trade and investment liberalization to a significant income redistribution that serves to share globalization’s gains more widely”.



Globalization Data Summary

- **The week of June 18, 2007, the new French President and the German Chancellor succeeded in removing the language in the proposed European Union Treaty continuing commitment since the 1957 Rome Treaty to “free and undistorted competition” possibly signaling an end to the EU commitment to free trade. (6/26/07 Chicago Sun-Times via the Hudson Institute, 6/28/07 Economist)**



**The once-aligned interests between citizens, countries, and employers
are disconnecting.**

It will be necessary in the future to choose between them.

What will we choose?

Adapted from “The World is Flat”, Thomas Friedmann

“I will make only one basic point in my testimony: In this new era of globalization the interests of companies and countries have diverged. In contrast with the past, what is good for America’s global corporations is no longer necessarily good for the American people. What is good for America’s global corporations is no longer necessarily good for the American economy” (italics are the authors)

**Ralph Gomory, ex-head of research for IBM, Head of Alfred P. Sloan Foundation.
Testimony to U.S. House of Representatives Committee on Science and Technology – June 12, 2007**



Globalization Conclusions

- Trade is desirable and can profoundly benefit society BUT
- Globalization cannot and will not distribute its benefits broadly on its own except in the very long-term.
- Workforce flexibility is the best counter-strategy but probably requires government action (redistribution?) to accomplish.
- Multinationals going overseas reduce their need for and their interests in U.S. economic growth making the domestic task harder. Many already get more profit growth outside the U.S.
- A major energy failure could reverse globalization by making transport costs too high but would impose even higher other costs.
- The U.S. domestic plastic manufacturing industry is very exposed to these dynamics and that exposure can be expected to increase.



U.S. Fiscal & Demographic Issues

- **Facts:**

- Every war in U.S. history has resulted in an inflation problem (Adam Smith: Governments declare bankruptcy via inflation).
- Moving negative national savings back to positive **REQUIRES** slowed growth from reduced consumption.
- U.S. wealth accumulation will slow from a 1975-2003 rate of 4.2% annually to 1.8% between 2003-2024 (McKinsey)
- Federal government spending is headed from 20% to 30% of GDP requiring significant tax increases or very large spending cuts. Taxes today are 17-18% of GDP.
- Currency risks from slowed growth and high societal debt.



Ben Bernanke Speeches on Demographics

– October 4, 2006 & January 17, 2007

- **Demographics will lead to a reduction in living standards that is partly unavoidable.**
- **The current course of little to no saving causes a per capita consumption decrease of 14% in future generations & sharply decreases economic activity from higher taxes.**
- **Restoring savings to 4% now shares the demographic costs equally over generations and reduces the future consumption loss to 4%, but reduces growth today by reducing consumption today.**
 - Fed Research Results (*A Primer on the Macroeconomic Implications of Population Aging, Sheiner, Sep. 2006*)



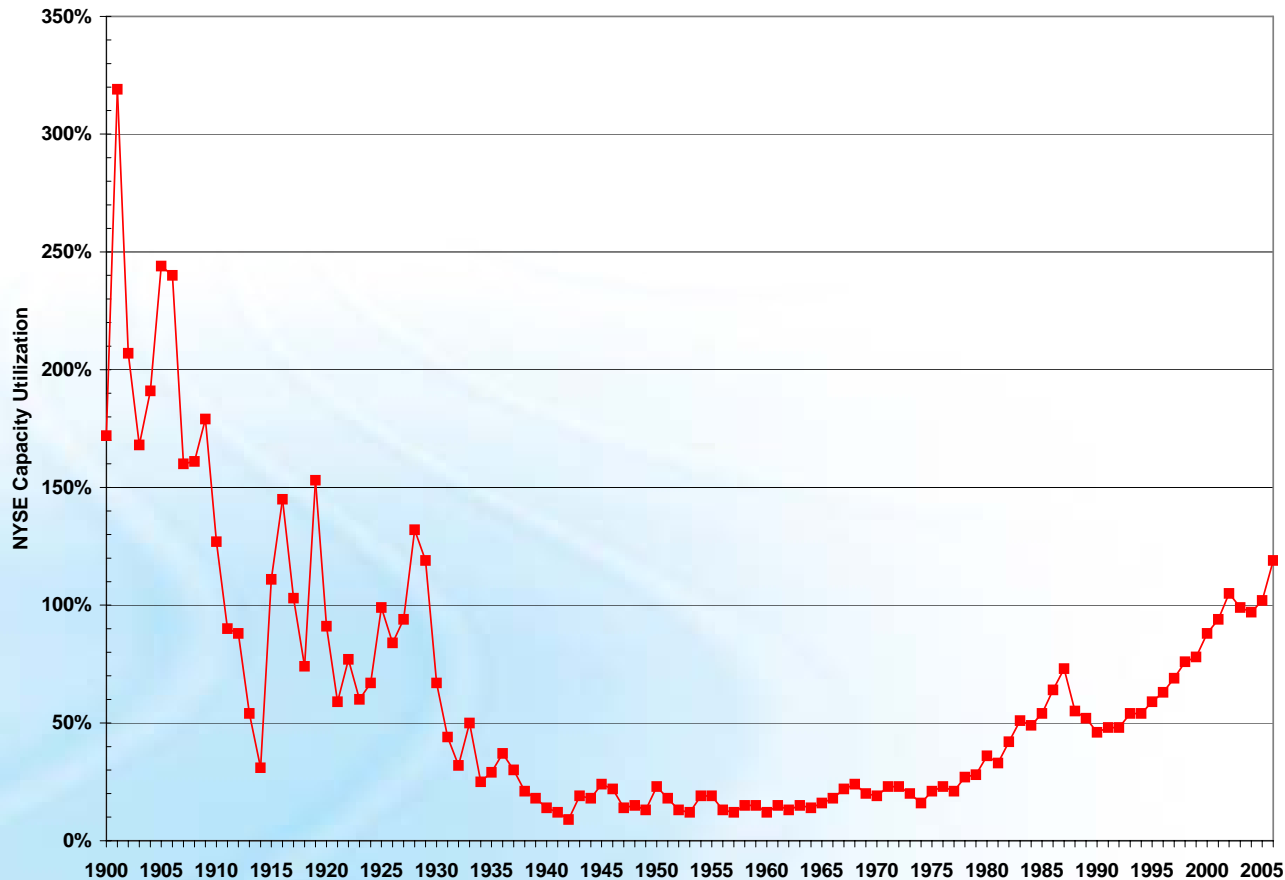
U.S. Fiscal & Demographic Issues

- **Less money to spend than we think?**
 - Boomer retirement savings demand may have driven stock market rise & boomer aging may cause it to fall.
 - Jeremy Siegel, Wharton, argues for a 40-50% fall in stock values from a boomer shift to selling and a lack of buyers unless the Asians purchase “most of the U.S. corporate sector” or retirement is delayed by 10 years on average. (Wall Street Journal, Business Week, Economist)
 - L. Kotlikoff made a similar argument regarding need for Asian purchase of U.S. assets in a July 2006 St. Louis Federal Reserve Bulletin article titled “Is the U.S. Bankrupt?”
 - My ‘back of the envelope’ analysis to test this theory:



Stock Market Balance Was Low for Decades

NYSE Capacity Utilization History



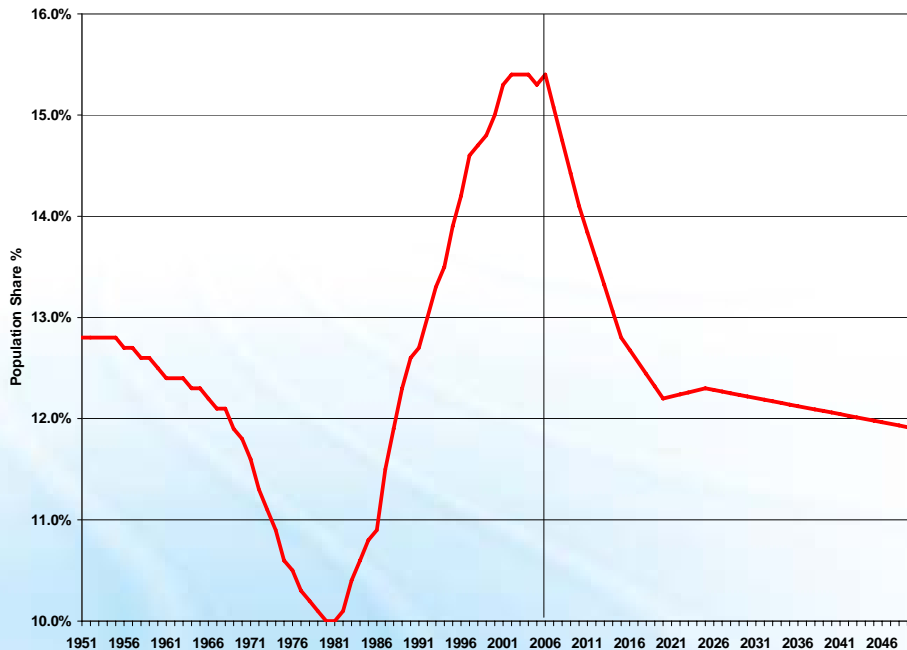
NYSE Historic Turnover: NYSE Fact Book

- **DID YOU KNOW** stocks sold vs. stocks available (utilization) was a very low 15-30% from 1929 until 1980?
- Stock prices primarily followed earnings during this period.
- Explains lower stock returns prior to 1980 well.
- What would your prices be at 15-30% capacity utilization?

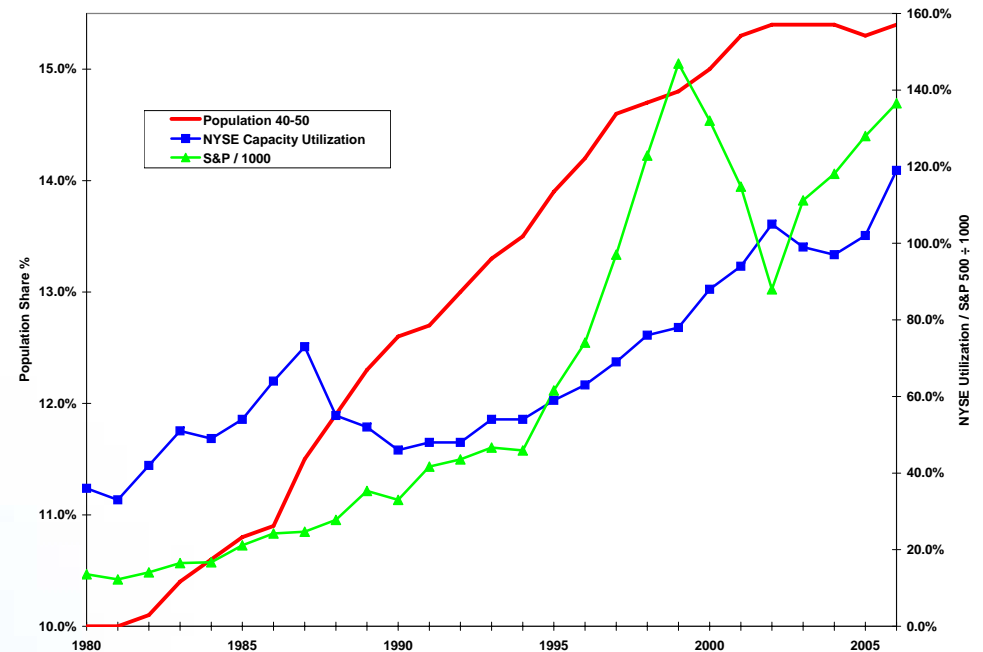


Growing Demand = Growing Prices

Population 40-49 Population Share



40-49 Population Share vs. NYSE Capacity Utilization and S&P500

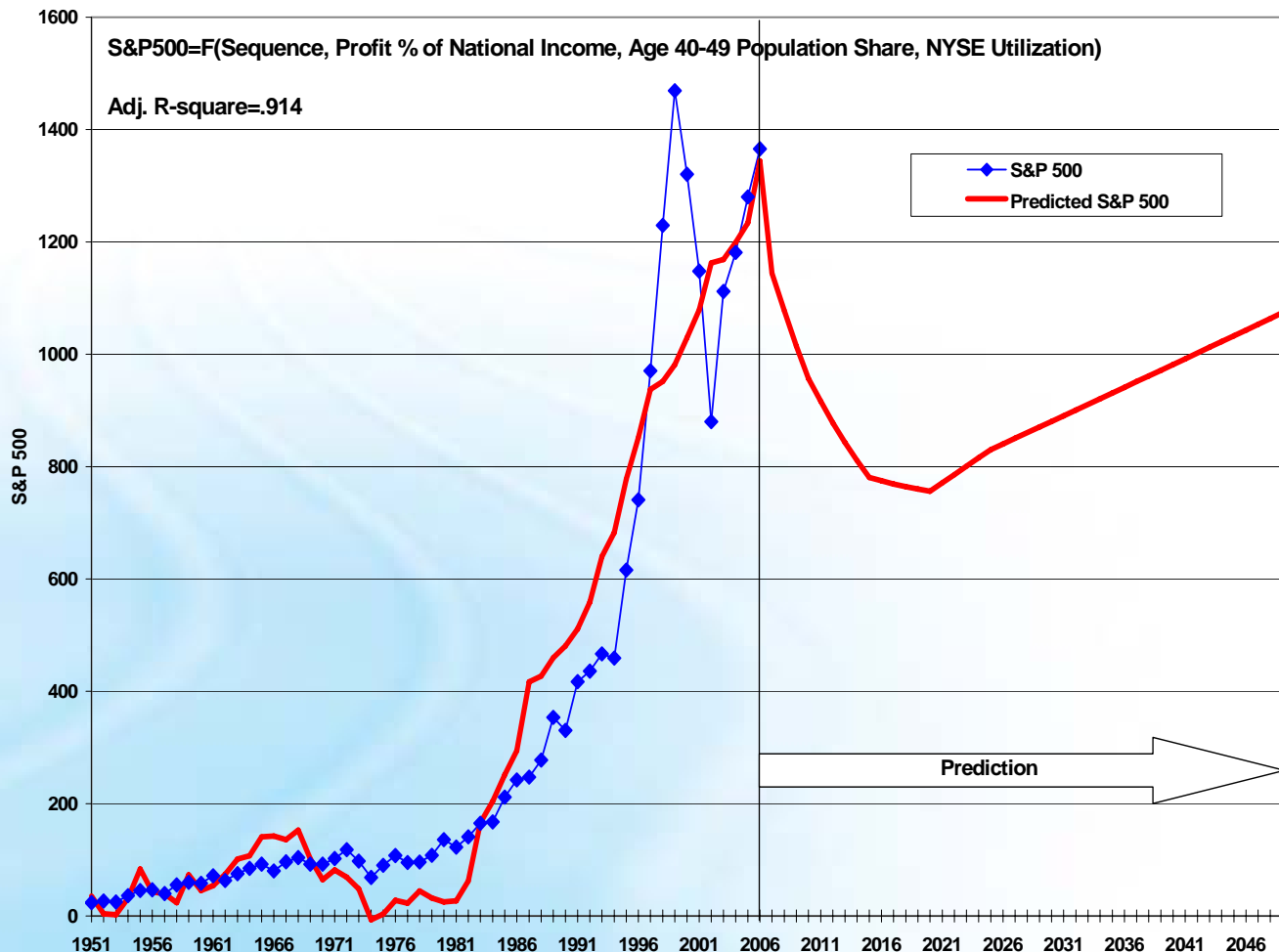


- **Age 40-49 Population Share**
 - Initial retirement saving years
 - Stable to Declining from 1950-1980
 - 2006 is end of demographic peak!
- **Did Boomers Increase Demand?**
 - Utilization follows demand
 - Prices follow utilization
 - Coincidence?



Less Money to Spend? – This Model Supports Siegel!

Do Aging Boomers Mean a Declining Stock Market?
A Demographic Directional Trend Model



- **36-47% estimated reduction consistent with J. Siegel claims!**
- **Boomers fundamentally changed stock market capacity utilization.**
- **Primary stock price driver appears to have shifted from earnings to demand growth.**
- **An alternate source of demand and/or reduction in stock supply maintains utilization and breaks link to Boomers.**



Sustainability Data

- **SPI has claimed talking Wal-mart out of a TOTAL BAN on plastic packaging. (April 2007)**
- **25% of Wal-Mart buyer bonuses are based on their suppliers' scorecard results!**





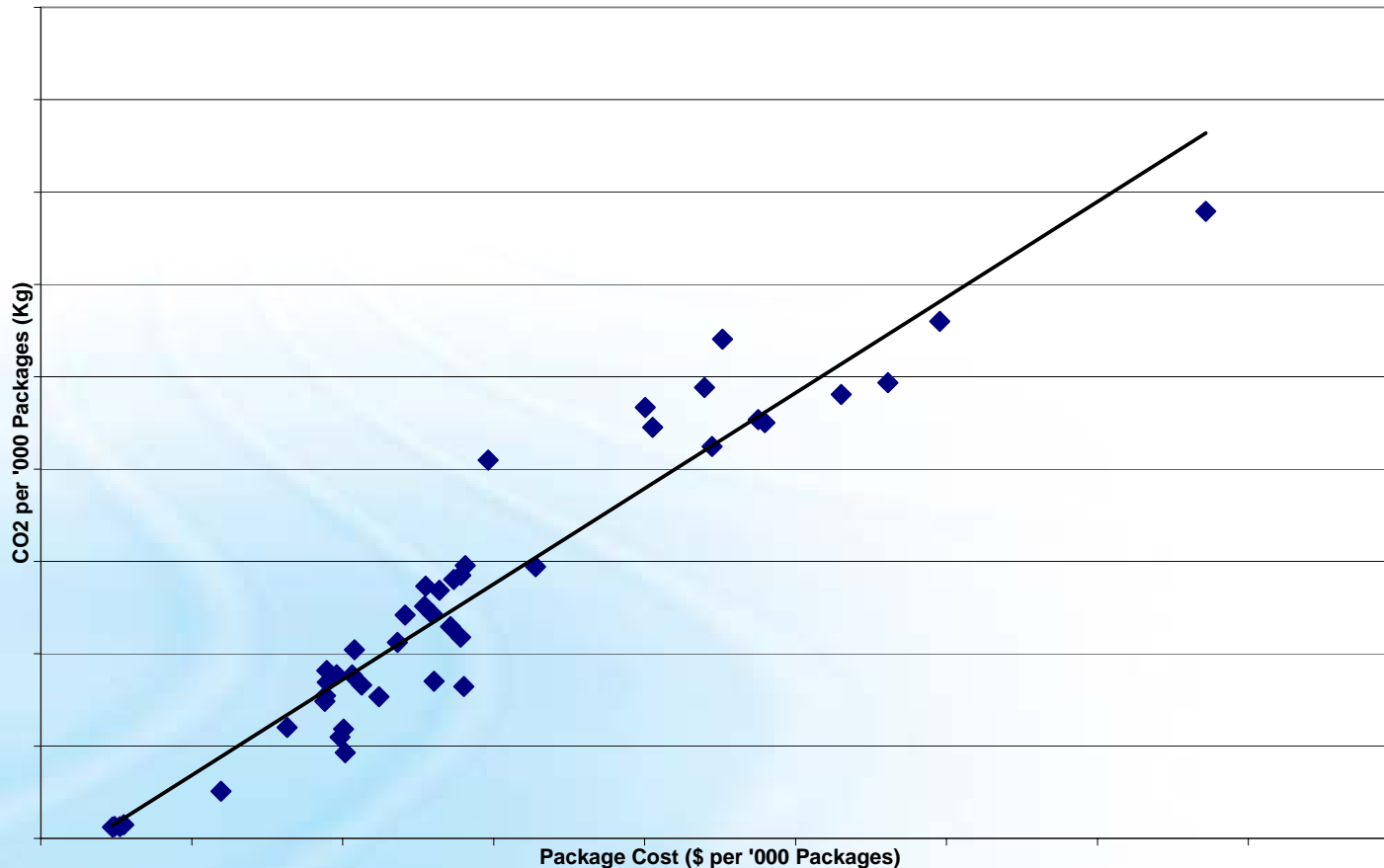
Sustainability Data

- **Challenges to bottled water are appearing to go with plastic bag bans and recycling requirements.**
- **PET and HDPE have CO₂ disadvantages vs. glass and aluminum, depending on details of recycling.**
- **46% of existing and 45% of planned world ethylene capacity is at high risk for flooding from global warming. (Lehman Bros.–Feb. 07)**



CO2 Reduction MUST Shrink Packaging

CO2 vs. Package Cost



- Package cost and CO2 are positively correlated because material use and cost are positively correlated.
- Tweaking aside, less CO2 results only from reduced material consumption which also reduces cost.
- Therefore, reducing CO2 by definition must shrink the packaging industry or reduce its growth.



Conclusions for U.S. Molders

- The tolerant, high growth, low energy cost environment in which the U.S. plastic industry developed and prospered is going away.
- There is *NO DATA* in our collective experience for the more difficult conditions into which we are *PROBABLY* moving.
- Strategic shifts in thinking and organization will be required for future success.



Change = Opportunity!

**Individual companies can prosper against
the trends!**

Maybe the trends can be changed!

The creativity of humans is inestimable!



What Should Molders Do

- ***Don't get protectionist*** – its too late – the horses are already out of the barn.
 - Rapid introduction of trade barriers would create more severe problems.
 - Re-introduction of a more closed economy would have to be done very slowly over 20-30 years to avoid large issues, the same rate at which trade has been opened, and would experience powerful resistance
- ***Do support more balance in trade relationships*** – we are being played for chumps by some trading partners.
 - Our market is still the most attractive on earth, although this is beginning to change.
- ***Do support improved workforce flexibility measures***
 - Covering transition costs (relocation, retraining, short-term compensation) from globalization benefits would also aid better decisions to globalize
 - Portability of worker security & employability (healthcare, pensions, retraining, relocation)



What Should Molders Do

- ***Go where the growth is!*** Don't be only a domestic manufacturer.
 - Growth, new product development, etc. will occur more in Asia than here.
 - Future corporate strategic product development is likely to be more focused on a young and growing Asian population than now older Americans and Europeans.
- ***Think twice about long-term capital investments*** dependent on current energy costs and economic growth rates if the payout is much beyond 2015.
 - Smaller plants & smaller machines closer to customer may be the future compared to current large plants with large, high throughput equipment, and long shipping distance.
 - Wal-mart scorecard rewards short supply chain distances!
- ***Get strategic about acquiring or being acquired.***
 - Low growth rates and continued globalization will accelerate consolidation and force out the inefficient.
 - Get purchased by Asians? – That's where the money is!



What Should Molders Do

- ***Get very serious about productivity*** – raise the 2.1% average.
 - You can't control population growth, you can influence productivity.
 - Molders overall leave 30% on the table through wrong molds, machines, overweight parts, etc.
 - How do you compete with overseas sources with a 30% handicap to start?
- ***Innovate!*** **Develop niche products requiring IP and protect the IP.**
 - Think carefully about helping your corporate customers teach your Chinese competitors how to do what you do for their gain.
 - The Chinese can't yet do effective high cavity/high throughput injection molds but buyers would love for them to learn.
 - YOU combine technology with their low wages and pocket the money here.
- ***Invest in energy, resin, and feedstock flexibility, and use less.***
 - Bio-based resins will start making real sense at around \$100 per barrel oil.



What Should Molders Do

- *Evaluate product strategies carefully to determine opportunity areas. Examples:*
 - Don't be in simple, low tolerance products – this is an area of direct competition.
 - Healthcare, products designed for the aging are just getting started.
 - Electronic consumer devices are mostly electrical in cost and almost impossible to compete with China since electrical is almost all manual labor.
 - All or mostly plastic devices allow competition on molding throughput economies combined with freight, to possibly offset the assembly labor advantage.
 - Replace another large steel use.
 - A director of the Rocky Mountain Institute recently said that the largest SUV's made of composites would have the fuel economy of today's best hybrids.
 - Something like 98-99% of the energy is used to move the car, not the cargo.
 - Estimated accident protection would be increased by a factor of 12.



What Should Molders Do

- ***Think about businesses not based on single-use disposable products. Tap water may return.***
 - Financial and political pressure from high energy costs and falling purchasing power could undermine many current convenience products.
- ***Start considering overseas resin sources.***
 - The best prices for the largest buyers closely follow import prices to the U.S. and are received by buyers actively considering overseas sources.
- ***Do the total cost math for your customer – many products going overseas are cheaper here but buyers don't get it.***
 - Many buyers are not discriminating about when foreign sources are cheaper in total and when they are not.
 - Don't rely on the buyer to get this right – its your business being injured.
- ***Retire later***
 - Maintains workforce size and GDP, and reduces dis-saving



MOST IMPORTANT

- This picture is **NOT certain** but appears likely!
- Focus on identifying and pursuing the new opportunities and not on the loss of the tolerant, fast growth past.
- Change has always created new opportunity and new money to be made.

Go find it!



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