Restoring US Prosperity and Some Comments on Israel

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Prosperity and Depressions are Relative Concepts

- US is 3,000% more prosperous now than it was in 1800
- US is 40% more prosperous than EU15, Japan, and Israel
- US is currently depressed 14% relative to its pre-2008 trend
  - Half due to productivity being below trend
  - Half due to market hours per adult being below average
  - Been depressed for 4.5 years
    - How much longer?

Modern Economic Growth

- Modern economic growth began first in England about 1800
  - And shortly thereafter in its offshoots and Western Europe
- Trend grow in real income per capita of leading industrial country about 1.8% per year last 150 years
  - Which means doubling ever 39 years
- This trend number is used when detrending time series throughout talk

Theme of Lecture

- There has been a revolution in aggregate economics
- The theory underlying the revolution has been a great success
- The theory has been tested through successful use
- There have been deviations from theory that have been resolved
- There are deviations that have not been
- Better measurement will identify other deviations
- This is the way theory progresses

What is Aggregate Theory?

It is Neoclassical Growth Theory

- Aggregate production function (Solow)
  - Solow cites Houthakker for underlying aggregation theory
- Aggregate utility function
  - Rogerson developed the underlying aggregation theory
  - Hansen introduced it into one-sector growth model
- Theory interacts well with the national accounts
  - It permits the use of both micro and macro statistics in selecting the economy to be used to answer the given question

What Do I Mean by Theory?

- Theory is a set of instructions for constructing a model economy to answer a given question (Lucas)
- A model is an ***instrument*** for using theory and measurement to draw scientific inference
- Neoclassical growth theory, like Newton's theory of the solar system and Dalton's atomic theory, is a theory in this sense

- Through the interaction of theory and measurement science progresses
- Measured deviations from theory lead to advancements in theory
- And better theory leads to better measurement

Using the Theory to Address a Question

- Step 1: Select the model economy
- Step 2: Specify the initial capital stocks
- Step 3: Compute the equilibrium path, given the aggregate production function residuals and policies

Comment:

Incorrectly assuming economic agents have perfect foresight generally has little consequence for the equilibrium path

Some of the Theory's Early Successes

- An early finding was that productivity shocks were an important contributor to US business cycle fluctuations in the 1954-1980 period (Kydland and Prescott)
- Another finding was that non neutrality of technological change with respect to consumption and investment goods (Greenwood, Hercowitz, and Huffman) was not important
- The finding that in worlds with transaction demand for money, monetary policy had only small real effects (Cooley and Hansen)

Another Success:
Understanding Japan's Lost Decade of Growth

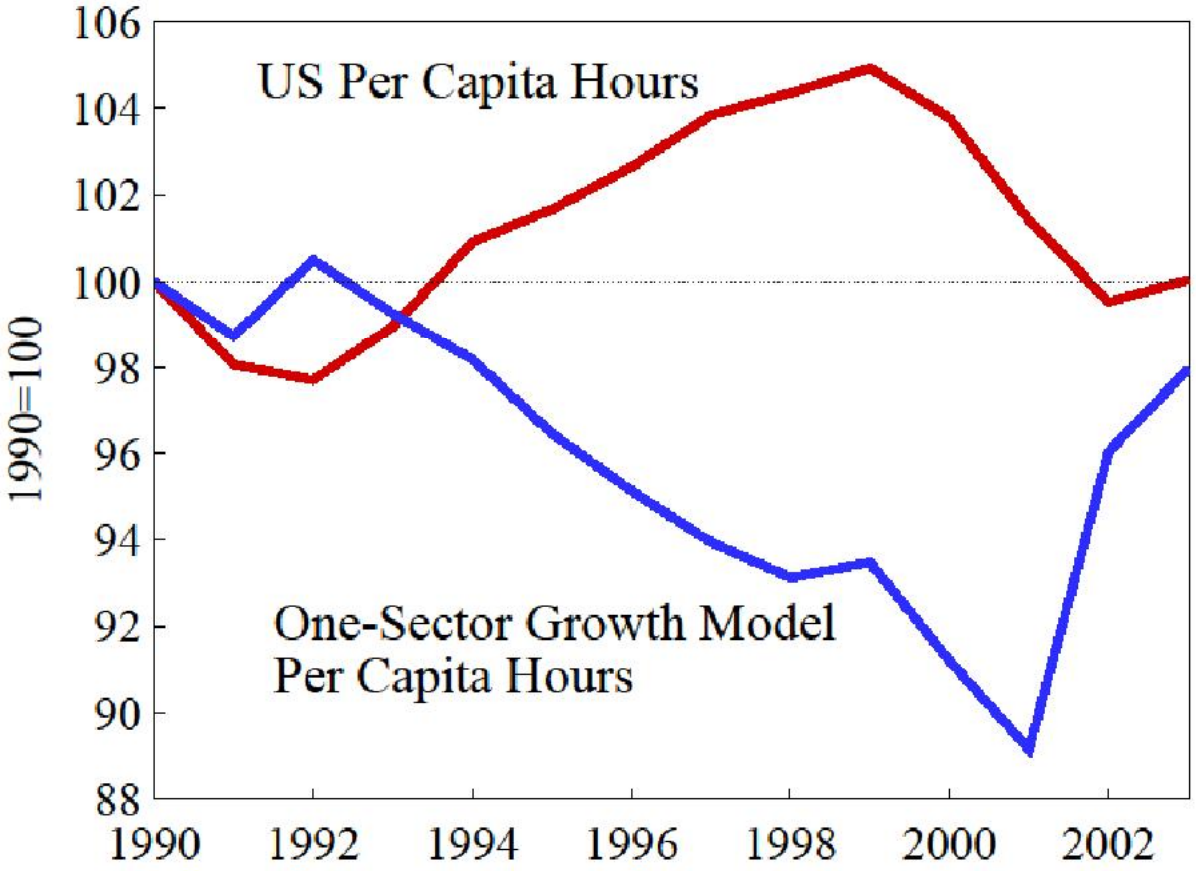
- In the 1990s Europe and the US experienced healthy growth
- While Japan lost a decade of growth 1992-2002
- Given the fall in Japan's TFP growth rate, the Japanese economy behaved as predicted by the one-sector growth model
- Hayashi and I found the problem was not financial as many guessed
- As soon as Japan shifted to a pro-productivity growth policy, output per working-age person again grew at slightly more than trend

The Puzzling 1990s US Boom: A Big Deviation from Theory

- Aggregate TFP and GDP/hour were low relative to trend
- Labor tax rates were rising
- Then standard theory, predicts a depressed economy

McGrattan and Prescott (2010)

Big Deviation From One-Sector Growth Model



Other Deviations

- Low accounting profits in a boom
- Low GDP/Hour in the boom
- Was it a case of animal spirits?

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NO !

The Resolution of the Puzzle

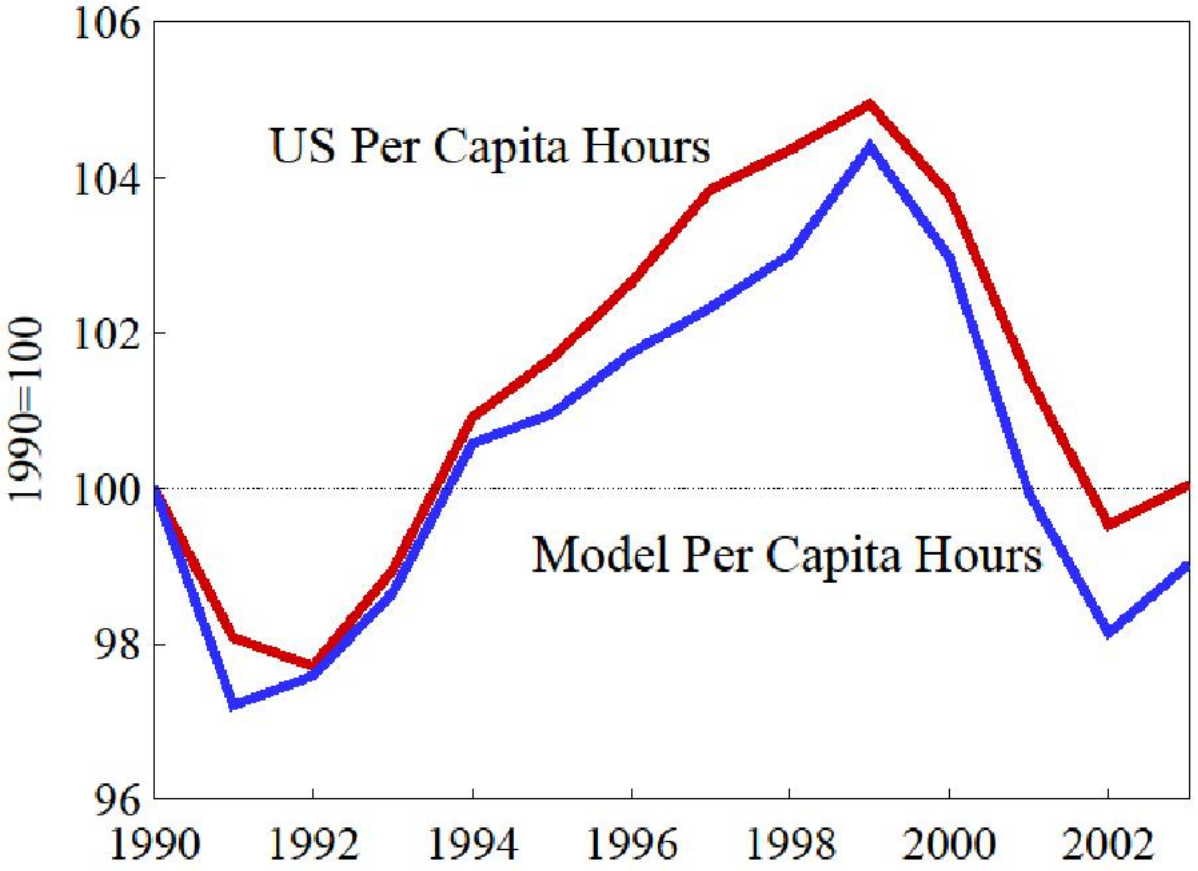
- With addition of intangible capital, observations are in remarkable conformity with theory
- All agree that intangible capital investment, most of which is not part of measured output, is big – probably as big as intangible capital stock
- The problem is how to incorporate intangible capital investment and stock in a disciplined way
- McGrattan and Prescott (2010) used the equilibrium condition that businesses equate after-tax returns on investments in measured and unmeasured investments to determine it
  - The key observations used are accounting profits

Other Hard Sciences Face this Problem

“Not everything that counts can be counted, and not everything that can be counted counts.”

— Albert Einstein

Theory with Intangible Capital Predict Observations



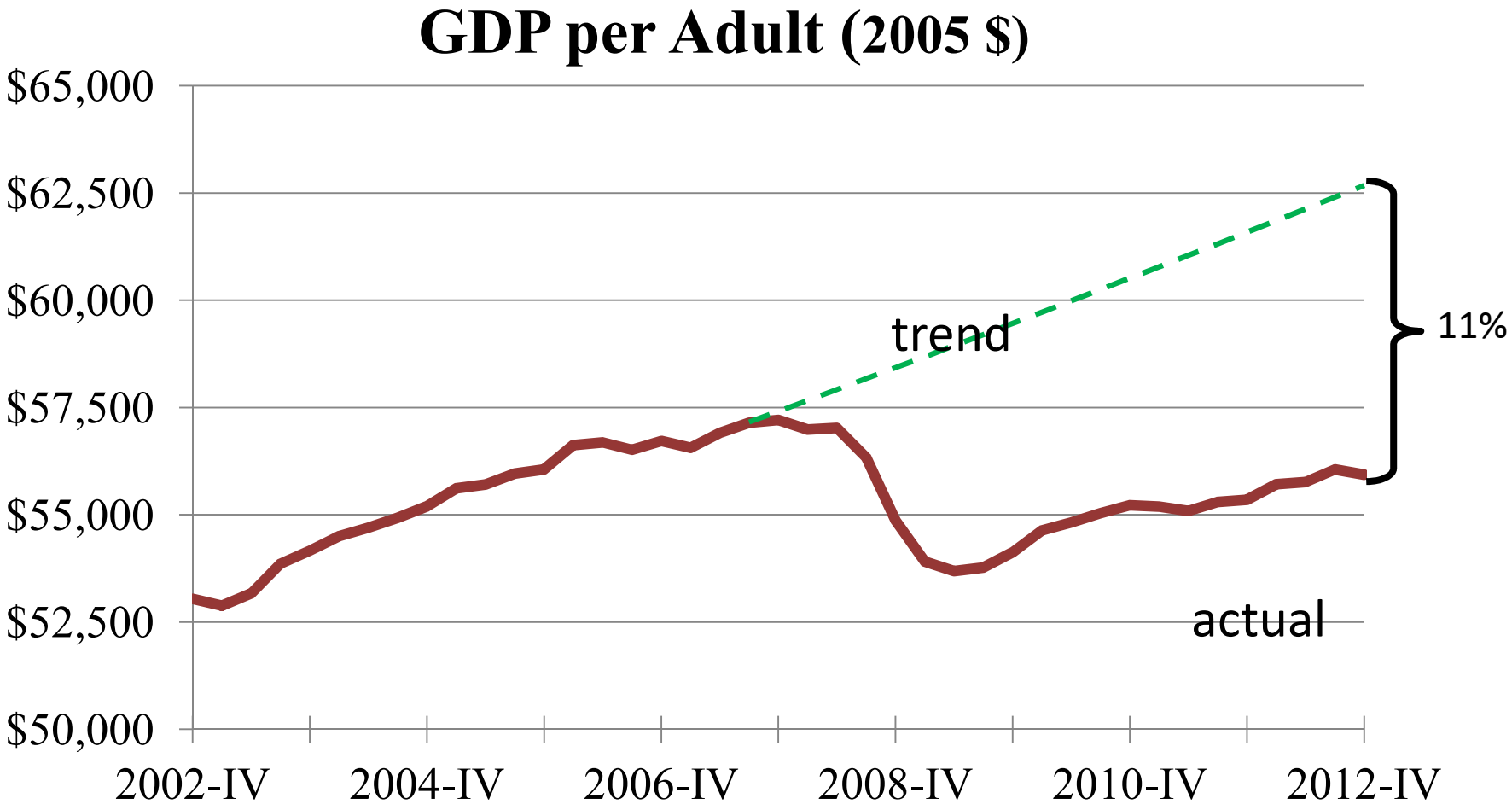
Matches in Other Dimension – No major Deviation from Theory

- Capital gains in Private Sector balance sheet (Flow of Funds)
- Income side of NIPA matched as well as product side

That Model Economy is Also Consistent with Current US Depression

- Technology change was strongly biased towards the production of intangible capital in the 1990s boom
- It was neutral in the 2007-2012 period
- The model says the primary reason for the current depression is below trend productivity growth
- Other factors are of some importance
  - Policy uncertainty (McGrattan, 2012, QJE)
  - Increases in tax rates and hidden subsidies
  - An over-building of residential housing

U.S. Has Been Doing Poorly Post 2007



Japanese Growth Miracle Puzzle

- It was at variance with the theory (Parente and Prescott, 2000)
  - Given productivity behavior the theory predicted more rapid growth than observed unless there were more capital, but not too much more
  - Intangible capital is of the right size, neither too big nor too small

Puzzle resolved

Implications for Financial Asset Markets

- The fundamental value of corporations, i.e sum of the value of their debt and equity:

$$V = q_T(\pi)K_T + q_I(\pi)K_I$$

q functions are the market value these productive assets

π is policy

K_T is tangible capital (capitalized)

K_I is intangible capital (expensed)

- The *q* functions for value under current US tax system is well below 1, being about 0.6 (From BEA Capital Accounts and Fed's Flow of Funds Accounts)

McGrattan and Prescott, RES, 2005

Corporate Equity Value/GNP Varied a Lot

	1929	1962	2000
Actual Value	1.67	.83	1.51
Predicted Value	1.78	.82	1.61

Why? Tax Rates Differed

Taxes	1925-29	1955-62	1987-00
On Distributions to Owners	.10	.45	.17
On corporate profits	.14	.46	.38

Reason for V/GNP Variation

- After-Tax Profits / GNP varied little

- The reason for the big variation in V / GNP is

variations in tax rates

- Intangible capital (including value of brands names, organization capital, patents) was crucial

Equity Premium Puzzle Resolved

- Found 1/3 smaller equity premium for after-tax returns
- Introducing intermediation costs accounted for another 1/3 of premium (Mehra and Prescott, 2011)
- The remaining 1/3, difference between government borrowing rate and household borrowing rate, must be due to the “liquidity” value of short-term government debt

Excess Volatility Puzzle of LeRoy-Porter and Shiller Strengthen

- Capital stocks and tax policies vary smoothly, which implies fundamental values vary smoothly
- There are large and persistent deviations from fundamentals
- There is strong regression back to fundamentals
- Hopefully someone resolves this long open puzzle of excess volatility and does it soon

The Great US Depressions of the 1930s

- Cole an Ohanian (2004) introduce cartels which give rise to **insiders and outsiders**
  - Methodologically a major advance
  - Cartelization policy accounts for much of the failure of the US economy to recover in the 1934-39 period
  - McGrattan (2012) established that increases in tax rates were also an important contributor to the US Great Depression
  - Our understanding of the Great Depression has advanced significantly, but is far from complete

There are Many Studies of Other Great Depressions of the 20th Century from the Theory's Perspective

- The Kehoe and Prescott (2007) volume has 16 studies of Great Depressions of the Twentieth Century, all using the single-sector growth model
- Fisher and Hornstein paper (2002) in that volume shows the setting wages too high led to the Great German depression 1928-1932

An Important Development

- Joines, Braun & Ikeda (2008) use the theory but with an OLG framework to correctly predict the falling Japanese savings rate well before it happened
- This along with micro studies of Imrohoroğlu, DeNardi, Klein and others were instrumental in the shift from using the dynastic family to the OLG framework
- Also instrumental in the shift was the increased computational power needed when using OLG structures
- McGrattan and I used the OLG with an aggregate production set having two output and three inputs. It is

Aggregate Production Set

$$GDP = C + X_T + G = F_1(K_{T1}, K_I, L_1)$$

$$X_I = F_2(K_{T2}, K_I, L_2)$$

Labor input: $L = L_1 + L_2$

Tangible capital input: $K_T = K_{T1} + K_{T2}$

Intangible capital input: K_I

Comment 1: GDP measured; X_I unmeasured

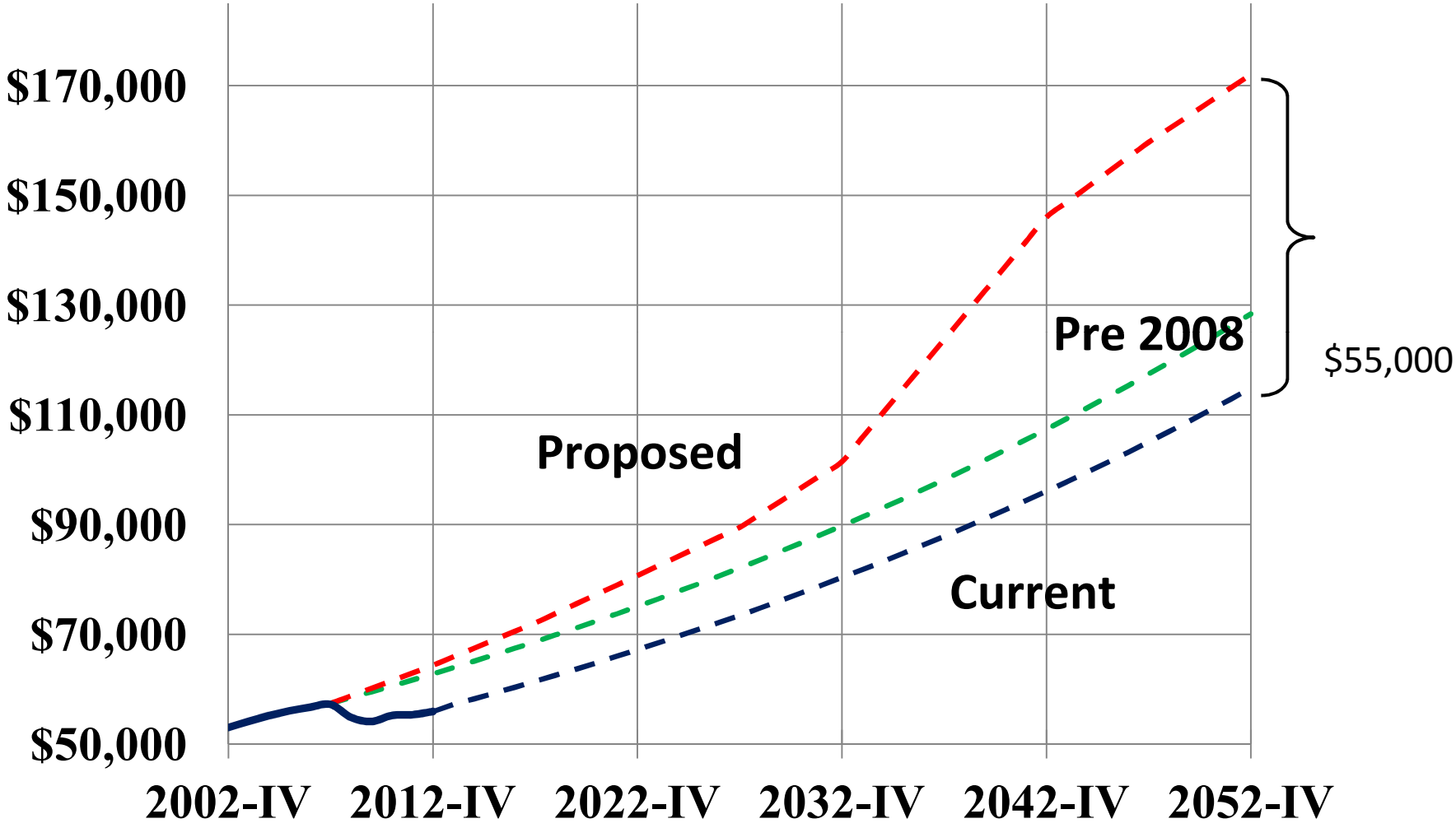
Comment 2: Usual laws of motion for capital stocks

What Should USA do to Restore Prosperity

- Return to pro-productivity growth policies
- Get rid of all capital income tax

What would have happened

What Would Happened Subsequent to 2007-IV for Three Policy Regimes – GDP per Adult (2005$)



Principal Results

- All birth-year currently-alive cohorts and future cohorts better off
- Big increase in household sector's net worth
  - Some due to larger balanced growth K/Y
  - Most due to increase in q = V/K, where V is the market value of business equity; from about 0.6 to 1.0
- We constraint government debt to be small given limited ability of governments to honor its promises
- We rule out lump sum taxes

Behavior of After-Tax Real Return on Capital

- Real after-tax return on capital stays near 4% during the transition
  - As it has been since 1929, the first year for which there are US national income accounts
  - This is calculated using the national income and capital accounts (BEA)
  - It is after-tax capital income divided by the capital stock, which includes consumer durables and inventories as in Kydland and Prescott
  - It also includes what IRS calls land, government capital, and intangible capital

US National Accounts are Being Improved

- Beginning 2013-III, an important part of intangible capital will be included in GDP
  - Advances in theory lead to advances in measurement
- Prior to this change, about the only element of intangible capital investment included in GDP was computer software
- When using our model will have to subtract these additions from GDP and and add them to intangible capital investment

- Key was shifting to mandatory savings for retirement
  - And annuitization of the mandatory saving when retired
- In so far as taxable income is equal to consumption, the US Income Tax System is currently close a consumption tax system
- Most people are on margin between receiving labor income when earned and paying taxes and deferring receipt of labor income and payment of taxes when retired

Path to Prosperity

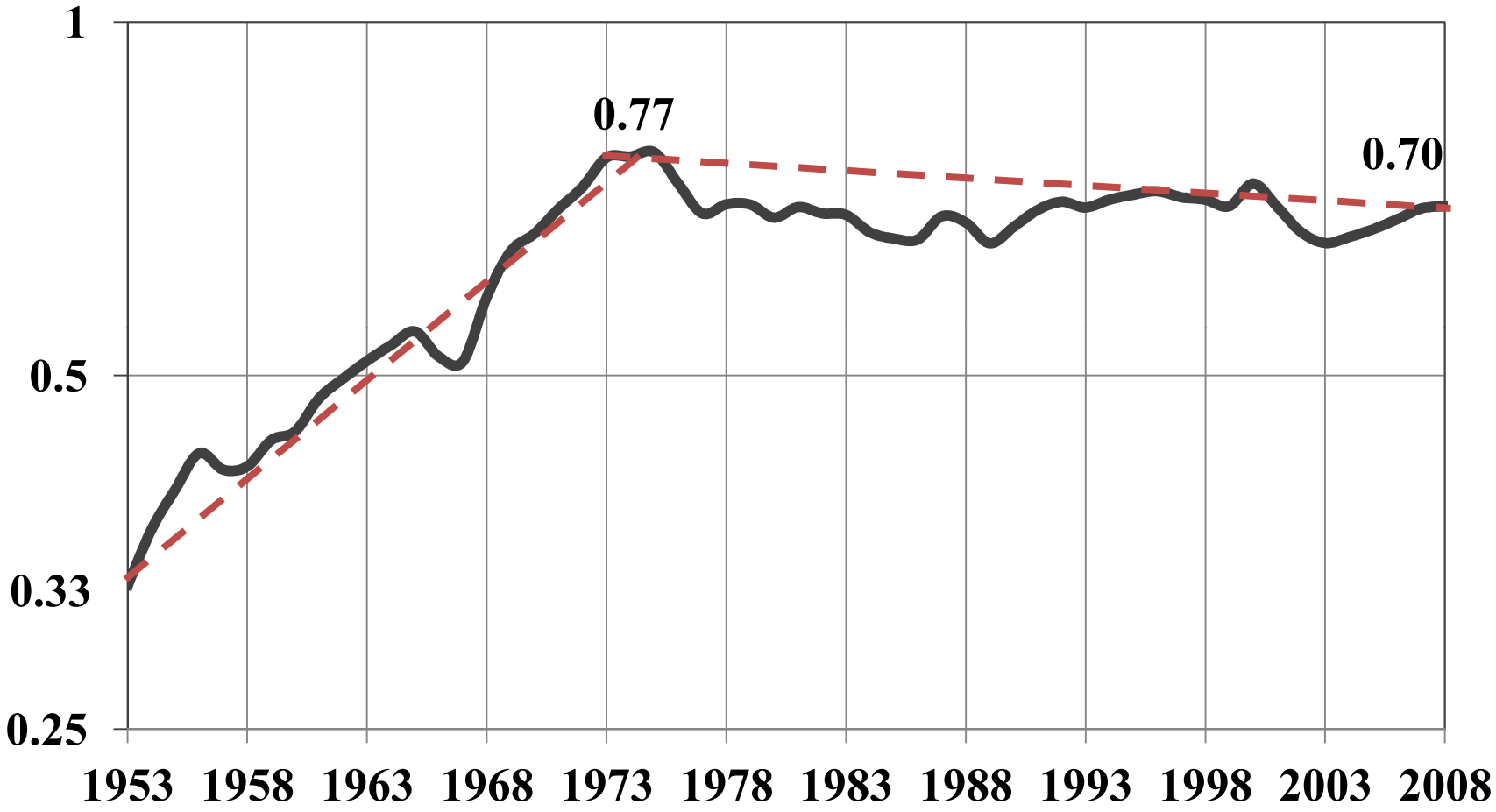
- McGrattan and I use the OLG framework with intangible capital to predict the consequence of a reform in the tax system
- The capital stock including “land”, inventories, consumer durables, intangible capital and publicly owned capital
  - increases K from 5.7 annual GNPs to 7.2 GNPs
- Actuarial tables are used

What About Israel?

- Rapid catch-up until 1953-1973
  - From 33% of industrial leader to 77%

- The Israel economy lost some ground 1974-2007
  - From 77% to 70%

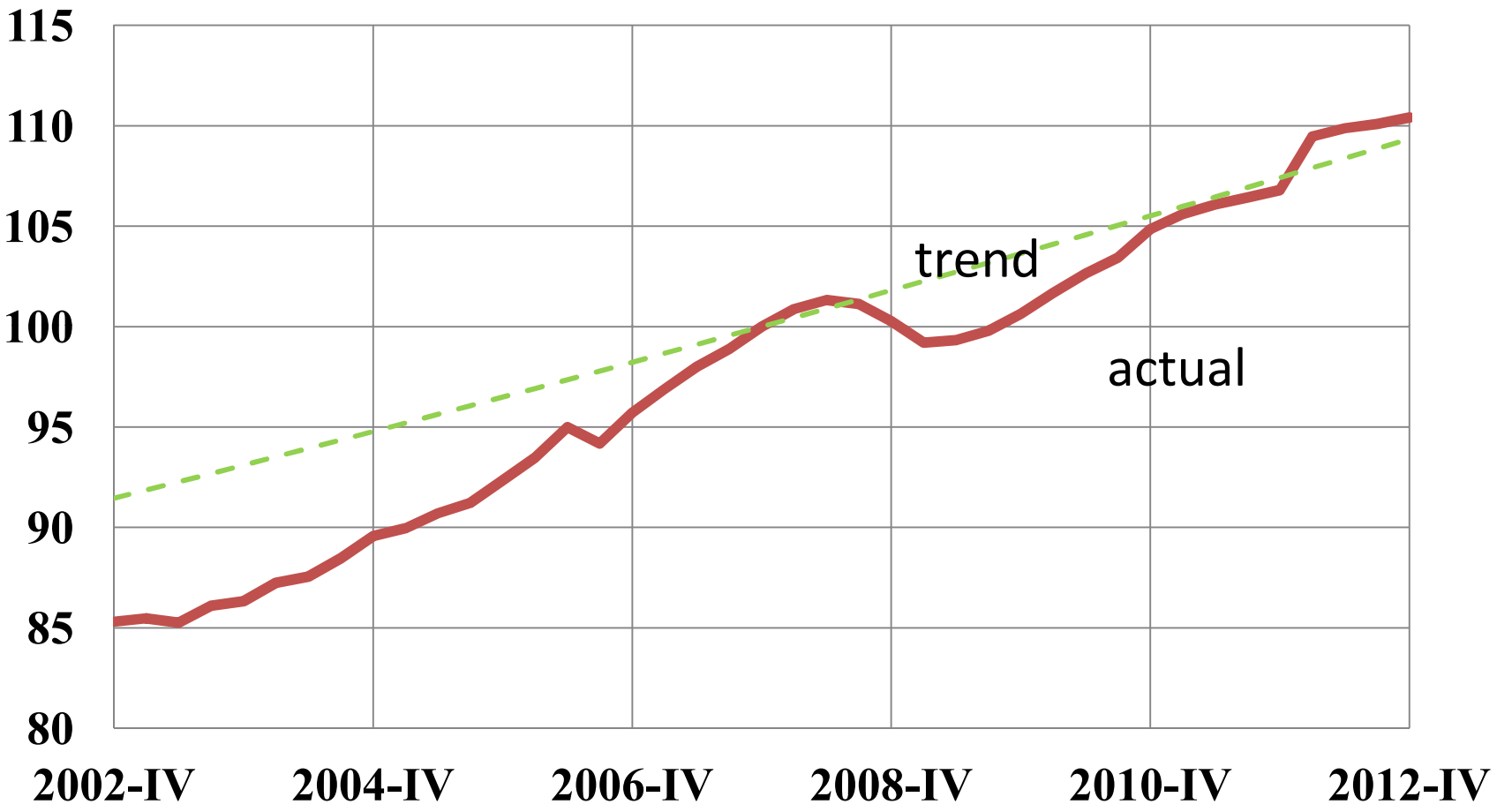
GDP Per Capita Relative to Advanced Industrial Countries Trend



How Has Israel Been Doing Post 2007?

- Small recession
  - Decreased less than 4% relative to pre-2008 trend
  - US fell 11%
- Subsequent to short recession relatively rapid recovery back to pre-2008 trend
  - No recover in US

Israel GDP per Adult (2007-IV=100)



Conclusion

- Incredible progress is being made
  - There are other recent successes, e.g. “Technology Capital and the Current Accounts”, McGrattan and Prescott 2010
- Aggregate economic theory provides guidance in selecting policy regimes with better outcomes from the perspective of the people