Recession Likely: Expect a Bend in Trend Lines

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Discussion Questions

1. What is the role of food with respect to the human body?

2. What is the role of energy with respect to the economy?
   - Examples: Coal, oil, natural gas, wood pellets, electricity
Energy consumption growth is surprisingly important.
The economic story I am telling is an updated one.
Economy operates under laws of physics in unexpected ways

Growth Rate in World Energy Consumption Divided Between Population & Living Standards

10 years ended; 8 years ended for 2018

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Low coal prices and depletion have led to a flattening of China’s coal
China is being forced to cut back on heavy industrialization

- Leading world economy into recession
#1 ENERGY CONSUMPTION ALLOWS THE ECONOMY TO GROW
Economy and humans are both self-organizing systems that grow

Leonardo Sticks Toy
http://www.rinusroelofs.nl/structure/davinci-sticks/gallery/gallery-01.html
Physics of “open systems” is a new field of study

- Ilya Prigogine received Nobel Prize in 1977
  - Study of systems that “grow”
- Widely applied outside of economics
- Economics – results are disturbing
  - Many past economies have collapsed
  - Likely in the future, too
Many types of self-organizing systems that grow

- Energy “dissipation” is required
  - Physics name: Dissipative Structures

- Other examples
  - Plants and animals
  - Stars
  - Hurricanes
  - Governments
  - The Internet
Energy is required for every part of GDP

- Modern agriculture
- Transportation
- Heat for any process
- Electricity for any usage
- Human energy is used, too
  - Teaching
  - Singing
#2 THE ECONOMY CONSISTS OF TODAY’S GOODS + FUTURE PROMISES
Today’s goods and services are easy to see

- Food
- Homes
- Vehicles
- Education
- Pixels on computer screen
- Computer programs
- Anything real thing we buy or make
Promises of future goods and services are harder to see

- Debt
- Money
- Prices of shares of stock or homes
- Government programs, like Social Security
- Insurance polices

- Indirectly, act like promises of future energy supplies
Promises of future goods and services grow faster than actual goods and services.

What could go wrong?

Promises of Future Goods and Services

(Debt, Bank Balances, Derivatives, Pensions, Asset Prices, Insurance Policies, Social Security Plans)

Actual Goods and Services

(Homes, Factories, Vehicles, Vacation Travel, Computer Programs, Pixels on Computer Screens)

Time
#3 ENERGY PRICES ACT STRANGELY: CUSTOMERS BUY FINISHED GOODS
Commodity prices behave peculiarly

- Bounce around a lot
  - Not much storage
- Short term – influenced by buyers needing commodity to use now
- Longer term – influenced by consumers’ ability to afford of finished products
  - Like cars, homes, cell phones
Energy prices fluctuate together; affordability of finished goods is key.
# 4 QUANTITY AND PRICE ARE DETERMINED BY PHYSICS
Producers believe that they can extract huge amounts of oil.

- If price rises high enough, say $300+ barrel.
The question is: How high will oil prices rise?

- Market prices are determined by physics
- Producers and consumers have opposite needs
  - Consumers want low prices, for affordable finished products
  - Producers tend to need higher prices, because of depletion
    - Can afford to use high-tech approaches if prices are high enough
Wages of *consumers* don’t rise in response to oil price spikes

- Recession sets in; average wages fall
Current problem is falling energy prices, due to inadequate affordability.
Low prices are a huge problem

- Lead energy producers to cut back on production
  - China coal
  - OPEC oil
  - US natural gas and oil from shale

- Makes reserves “disappear”
#5 SPIKING ENERGY PRICES LEAD TO RECESSION QUICKLY
Spiking energy prices lead to a need to cut back spending

Theory says oil price can increase—but our pocketbooks disagree
Central banks push back against high oil prices, too

- Raise interest rates
  - Cars, homes, factories become less affordable
- Oil and other energy prices drop
  - Pushes the problem back over to the energy producers
- Adjusting interest rates and debt levels become the primary financial tools
#6 LOW ENERGY PRICES LEAD TO COLLAPSE, SLOWLY
Central government of Soviet Union collapsed in 1991 with huge impact

Extraction of Eastern Europe, Caucasus and Central Asia, 1970-2017

Chart by MaterialFlows.net based on UN database
Prices too low for producers were a problem after 1981
Producers can tolerate low oil prices for a few years

- Exporters get their energy indirectly from tax revenue
  - Able to substitute borrowing for a while
- Eventually collapse, if prices too low
- Collapse of central government of Soviet Union occurred in 1991
  - Ten years after spike in interest rates
World has experienced low oil prices since 2014

- World can expect some collapses again
- Governments of oil exporters at risk
  - Venezuela
  - Nigeria, Congo, South Sudan
  - Saudi Arabia and other Middle Eastern exporters
- US shale oil companies at risk
#7 ECONOMY “MAKES A SMALLER BATCH,” IF ENERGY IS TOO LOW
Commodity producers extract less in response to low prices

- Economy responds by “making a smaller batch”
  - Like making a cake
  - Can substitute almond if vanilla is missing
  - But if flour is in short supply, need to make a smaller batch
OPEC has already cut back oil production

- China has also flattened coal production
- We should expect world economic growth to slow
- May lead to collapses of some central governments
  - Oil exporters and umbrella organizations especially at risk
- Wars also are possible
#8 TECHNOLOGY AND GLOBALIZATION CAN’T SAVE US
Affordability of finished goods is key to keeping prices up

- Highly paid workers can always afford goods they want
  - Examples: homes, cars, air conditioning
- Need to keep wages of non-elite workers from falling
  - Those without special training
  - Those who aren’t managers
Income shares of bottom 50% falling in key countries

Source: World Inequality Database. Wid.com
Growing use of technology works against affordability

- Improved technology requires that some people have special training
  - Highly skilled get more pay
  - Less left for other workers
- Robots replace some workers
- Highly paid employees often own the factories, machines
  - Leads to wealth disparity, besides wage disparity
Globalization works against affordability

- Some jobs move to China or India
- Wages for some jobs fall because of competition from low wage countries
Income disparity back at level of the Depression of 1930s

U.S. Income Shares of Top 1% and Top 0.1% Households – Incl. Capital Gains (1913-2013)

Source: Piketty & Saez – January 2015
#9 WE MAY SOON ENTER A PERIOD OF ECONOMIC CONTRACTION
Small dip in 2008-2009 corresponds to Great Recession
China has pulled the world economy forward, but it is losing this ability.
We may be hitting another very low energy growth period

- Or even a period of energy contraction
- Situation is unprecedented in modern times
  - Closest analogy is Depression of 1930s
- Major financial problems likely
  - Banks; pension plans; 2008 on steroids
- Already seeing reduced cooperation amongst nations
  - Also tariffs; radical politics
What seems likely for the economy

- **Recession problems**
  - Job layoffs (overseas first)
  - Debt defaults; derivative problems

- **Decrease in globalization**
  - Broken supply chains

- **More conflict within and between countries**
  - Possible governmental collapse
    - Especially exporters; agencies like EU
A few things insurance companies can expect

- More vacant properties
- Replacement parts not available
- More intentional damage to other’s property
- More businesses in distress financially
- Balance sheets of insurers adversely affected
  - Rating by A. M. Best may drop
A few things insurance companies can expect (Cont.)

- More frequent electricity outages
  - Some outages intentionally caused by power companies
- Governments don’t get around to fixing storm damages
  - US becomes more like Puerto Rico
#10 HOW MIGHT YOUR COMPANY BE AFFECTED?
Questions and Discussion