

Business Studies for Computer  
Scientists,  
or  
"How to Start and Run a  
Company"

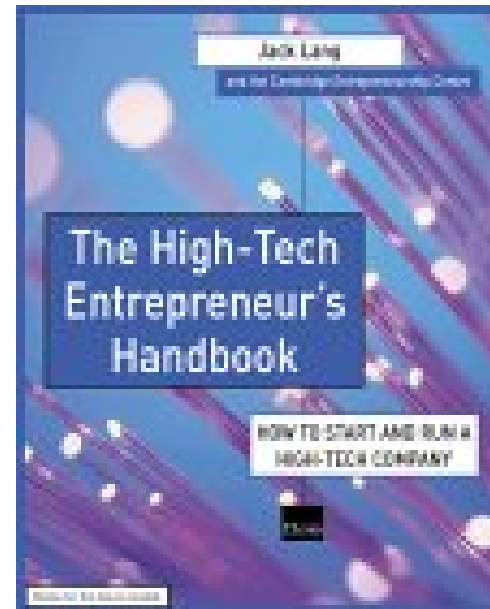
A course of 8 lectures

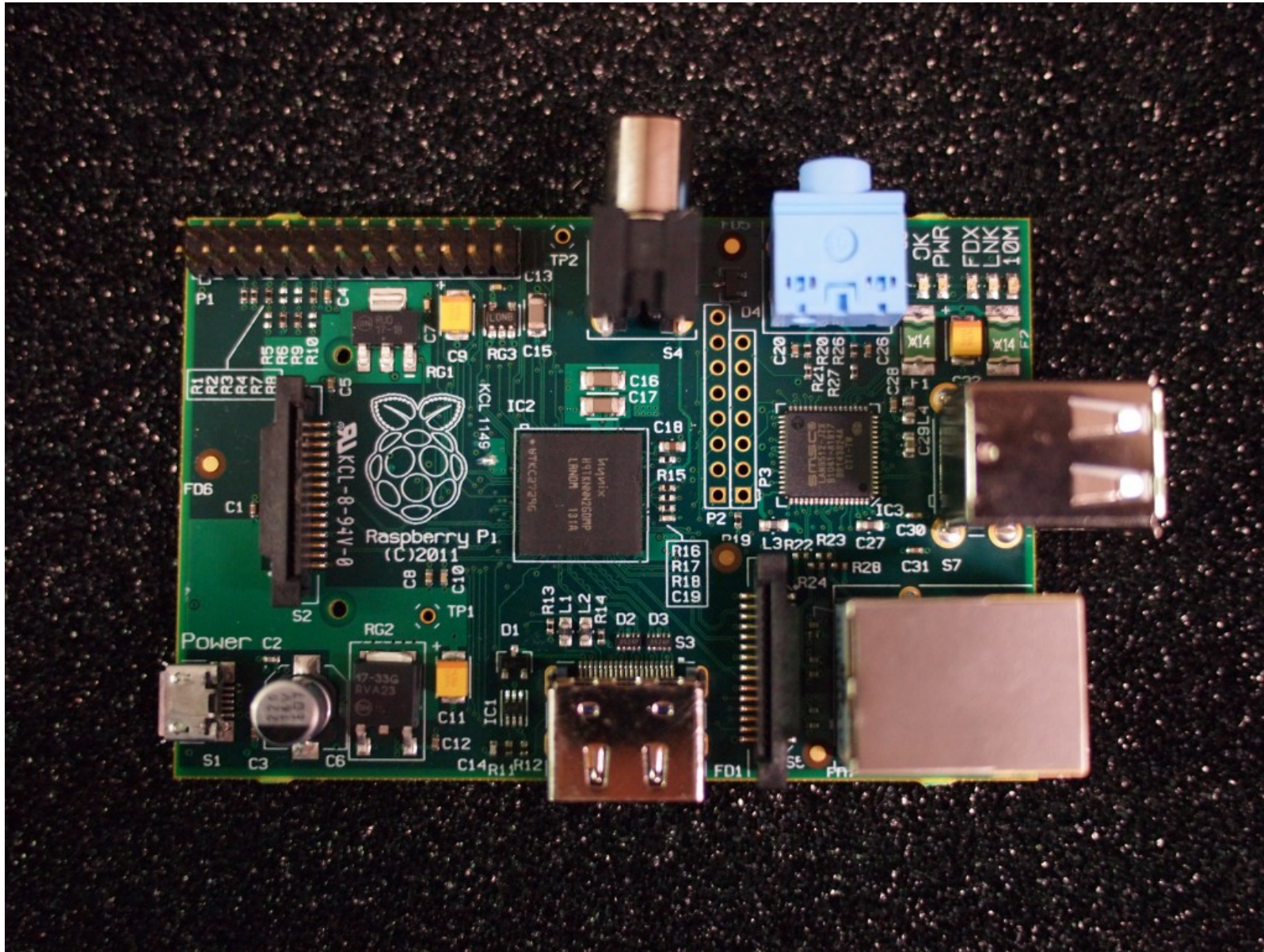
Jack Lang

# My Book

The High-tech  
Entrepreneur's  
Handbook  
[Jack Lang](#)

Paperback - 224  
pages (2  
November, 2001)  
FT.COM; ISBN:  
0273656155





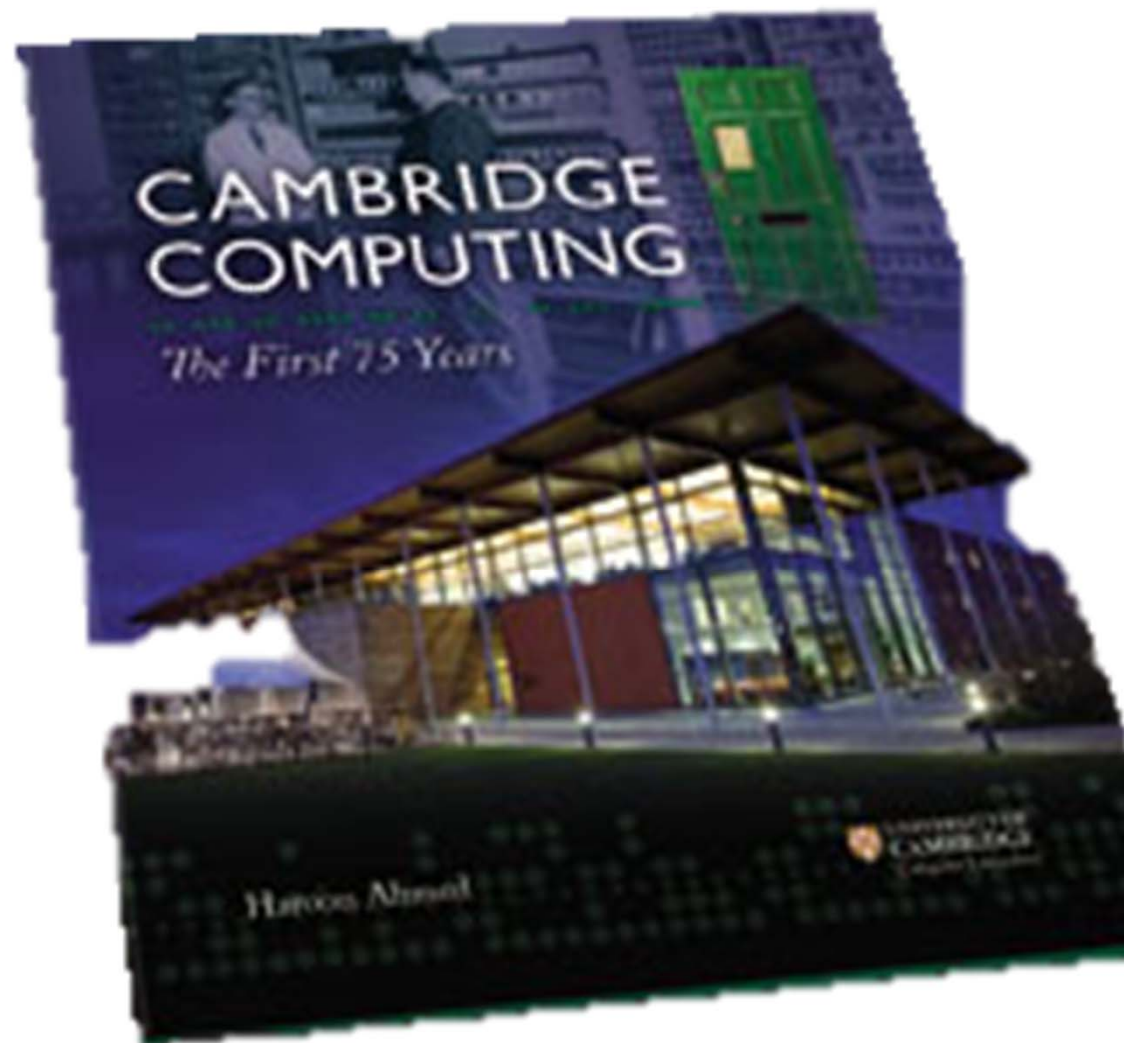
<http://www.raspberrypi.org>

# Cambridge Cluster

- About 2000 companies
  - Employing about 50,000
- Largest European cluster
  - 8% EU VC investment
- \$20 billion value created by Cambridge Alumni
  - Stanford \$1000 billion?
- Billion \$ market cap companies
  - ARM,
  - Virata,
  - CSR,
  - Autonomy,
  - Cambridge Antibody
  - Solexa
- Cambridge Angels

*Source: Cambridge Technopole Report*





[www.cl.cam.ac.uk/downloads/books/CambridgeComputing\\_Ahmed.pdf](http://www.cl.cam.ac.uk/downloads/books/CambridgeComputing_Ahmed.pdf)

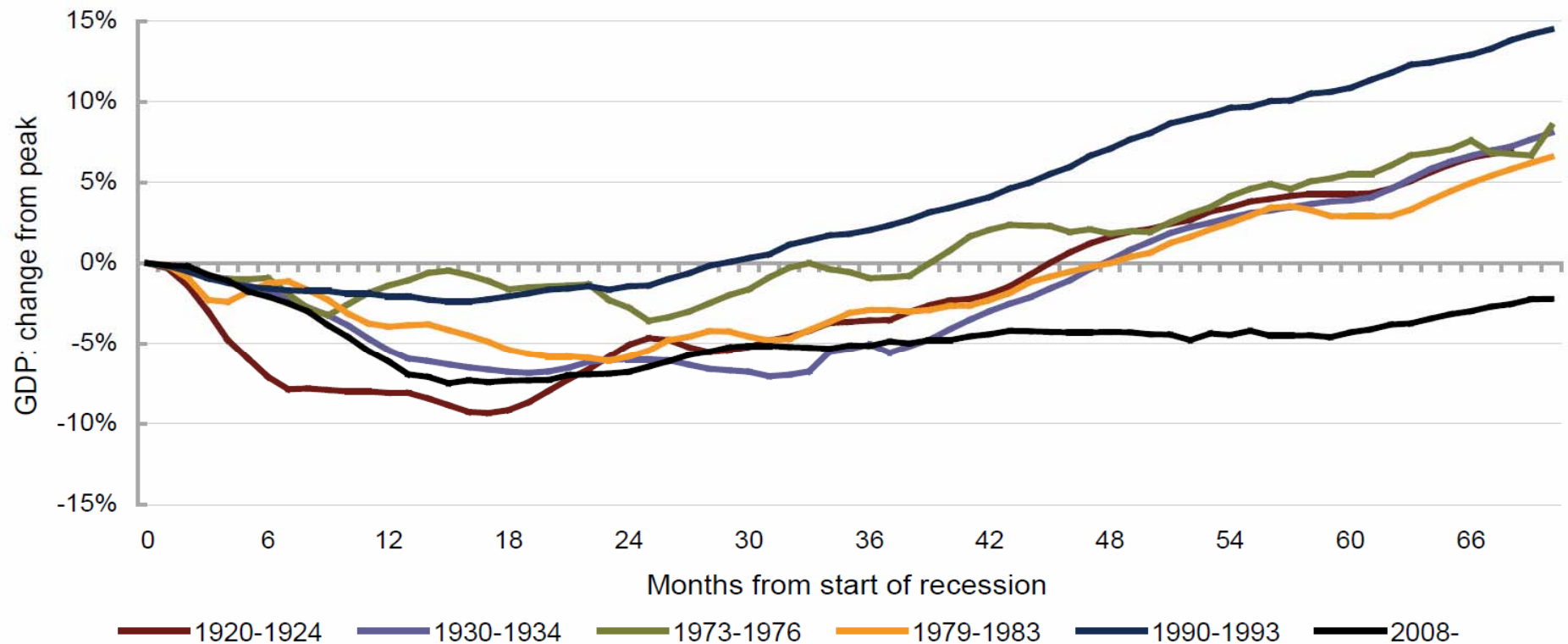


R.I.P.

GOOD  
TIMES

# Historic Depressions UK GDP

Figure 1. The profile of recession and recovery



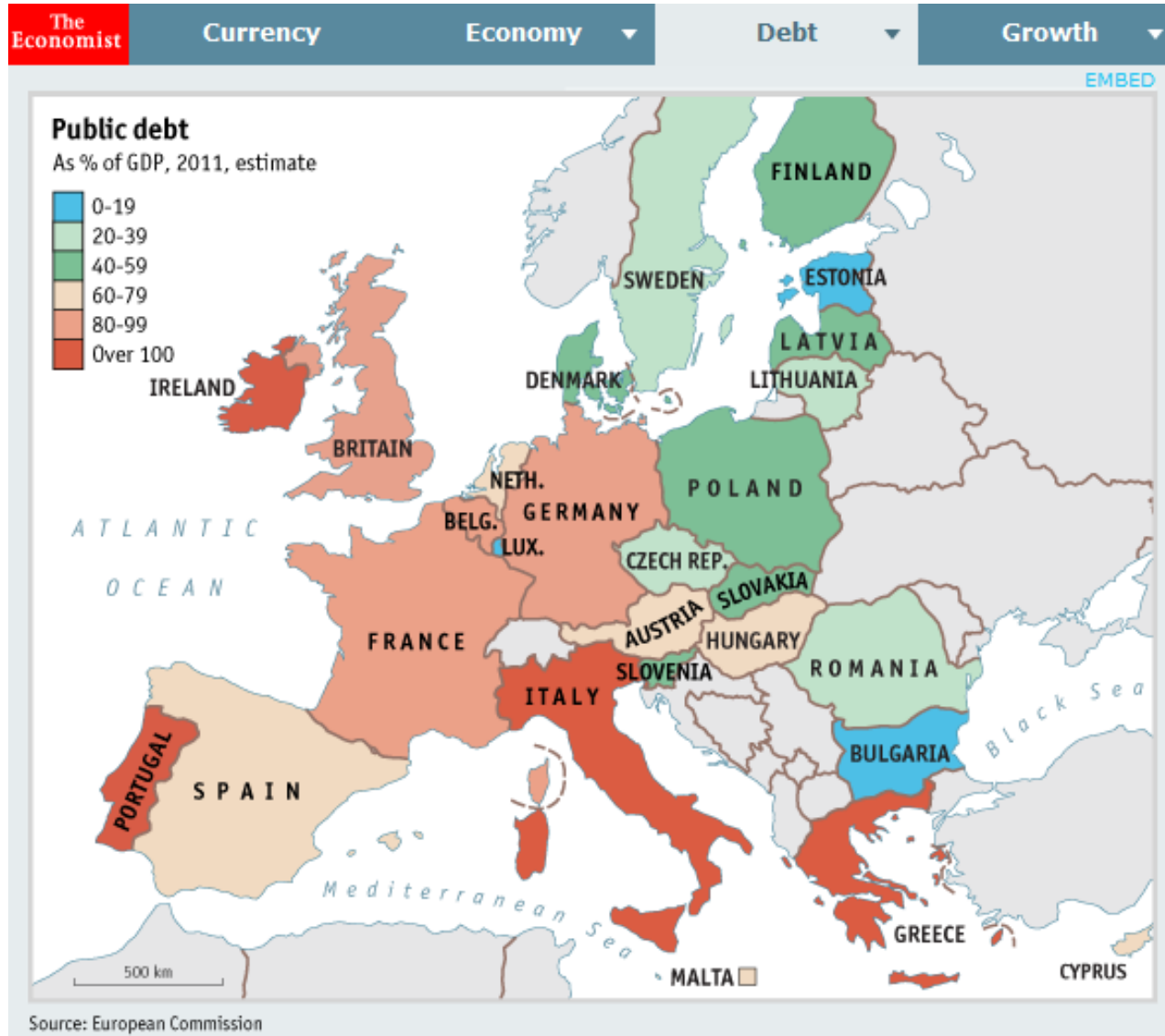
Notes: Calculated from centred three-month moving averages of monthly GDP, the effect of the miners' strike in 1921 is excluded from the 1920-1924 profile (the strike started on 31<sup>st</sup> March 1921 and ended on 28<sup>th</sup> June 1921).

Source: [www.niesr.ac.uk](http://www.niesr.ac.uk) accessed 01/01/2014

See also Reinhart and Rogoff "The Aftermath of Financial Crises"

<http://www.economics.harvard.edu/faculty/rogoff/files/Aftermath.pdf>

# Euro Debt



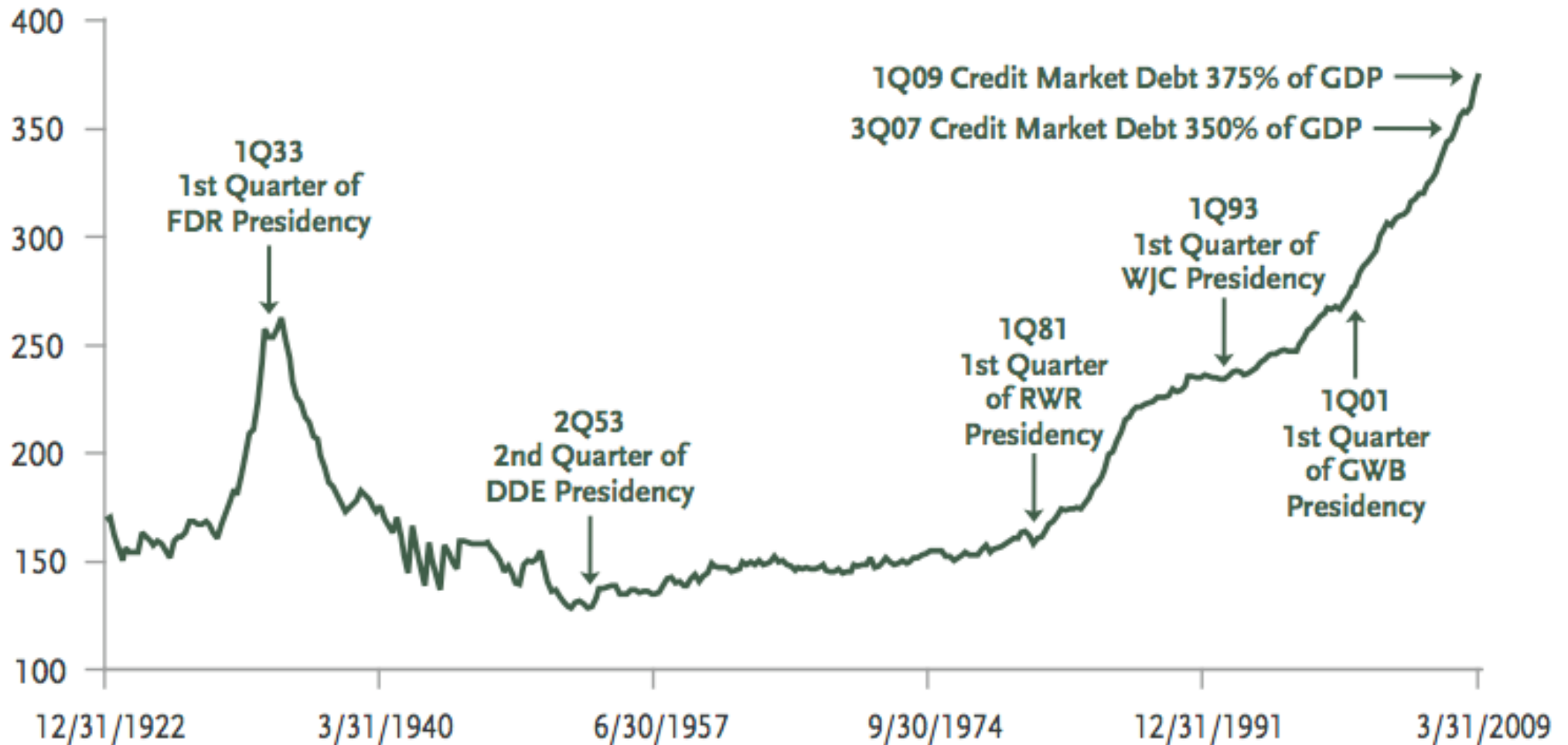


# Worst not over yet

- Slow, fragile recovery
  - But growth will come
- Cycle not complete until 2015 or later
- Real value halved
  - Bargains
- Bank defaults -> Government defaults
- Insurance and pension scheme defaults
  - No money for VCs (LPs default)
  - No exit routes for equity investments
- Social unrest, rise of dictators....

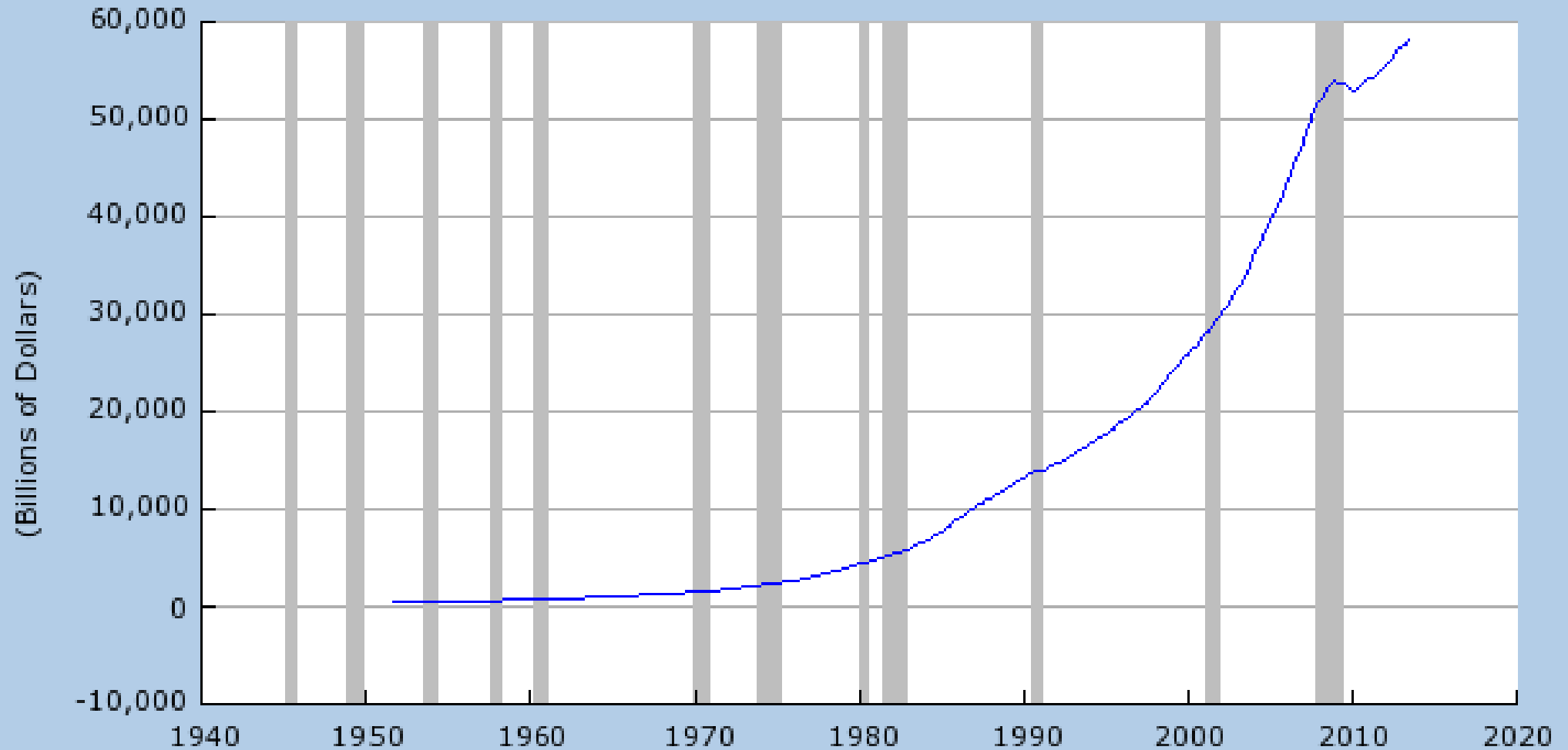
# The scale of credit in the US is hard to take in ... \$49 trillion ..... 3 1/2 US GDP

4Q 1922 – 1Q 2009



# US Total Debt

All Sectors; Credit Market Instruments; Liability, Level (TCMDO)  
Source: Board of Governors of the Federal Reserve System



Shaded areas indicate US recessions.  
2013 research.stlouisfed.org





Start with a standard Franklin - \$100 bill.



Get 100 of them in a nice pile – that's \$10,000.  
It would comfortably fit into your jacket pocket.



Put 100 of those nice, comfortable \$10,000 wedges together and you have yourself a cool \$1,000,000.

You could hide that in a rucksack without any trouble at all.



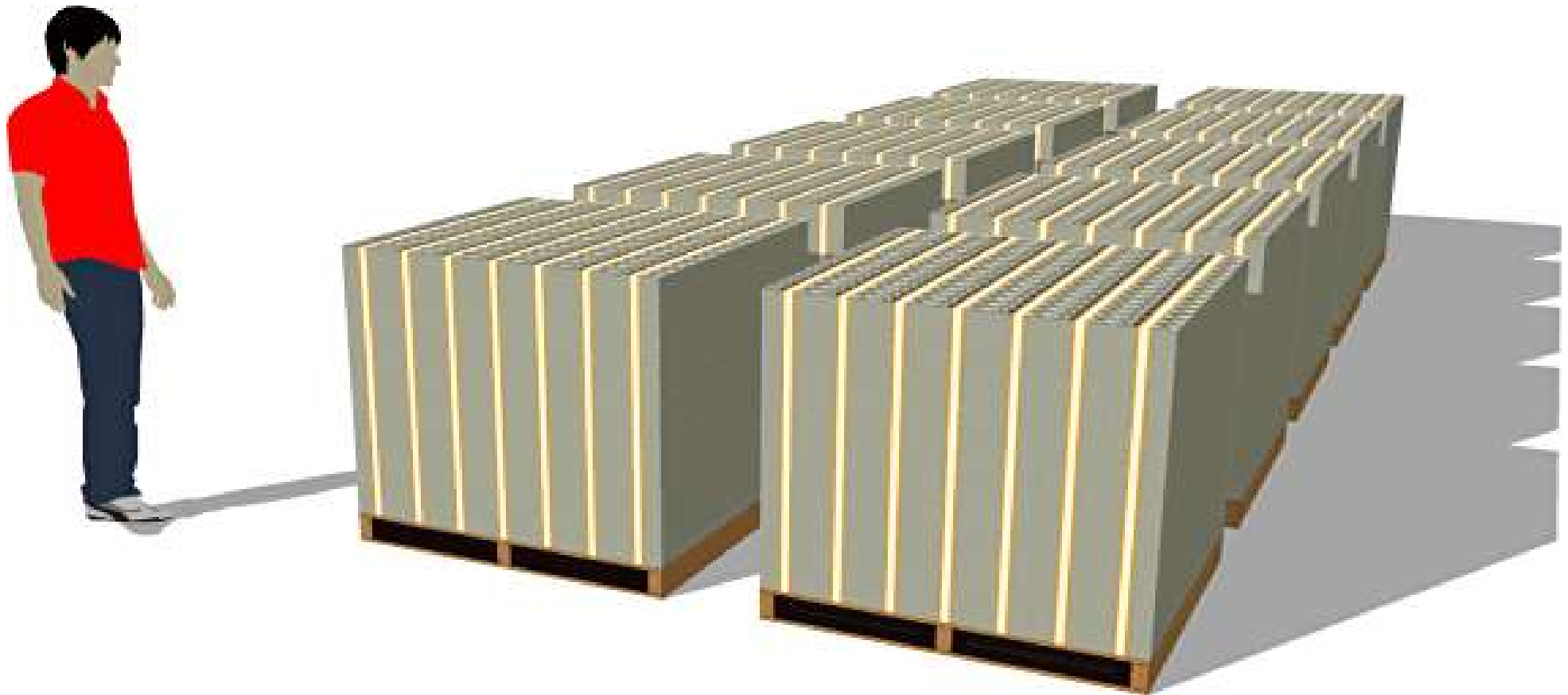
This is what \$100,000,000 looks like.

Now we are getting close to what we can all see is a real pile of dough. At least you need a pallet to get it about and a fork lift truck.

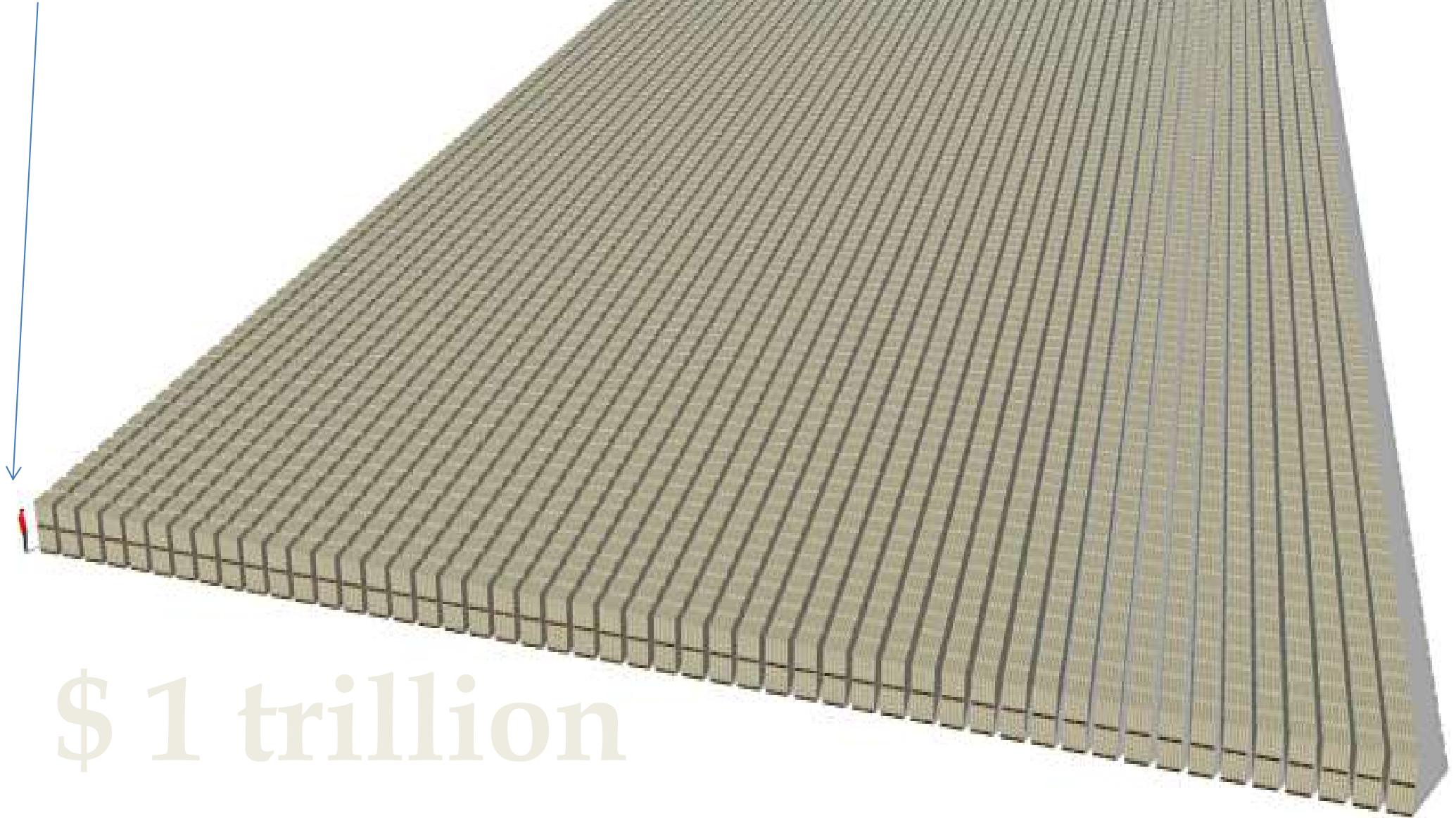




\$1bn is a respectable amount by any standards.  
This is what it would look like in \$100 notes.  
Can you now imagine what \$1 trillion looks like ?



Can you see yourself?

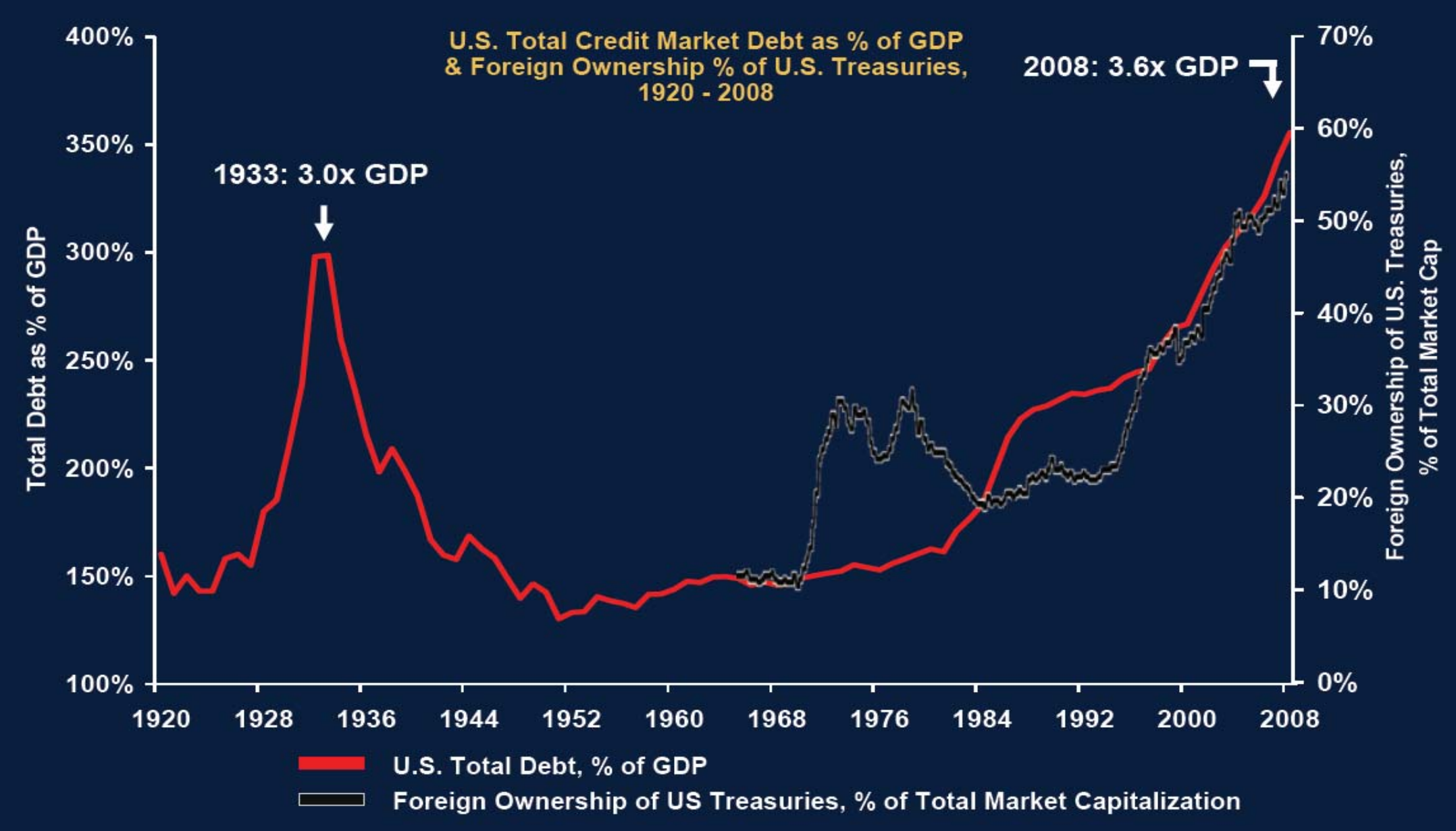


\$ 1 trillion

If you spent US\$1,000,000 each day from the day Jesus Christ was born until today, you would only have spent about US\$710bn, almost 30% less than the magic US\$1 trillion BUT the same as the TARP!



# Explosion in overall debt and huge dependence on foreign money inflows into the US to pay for it.



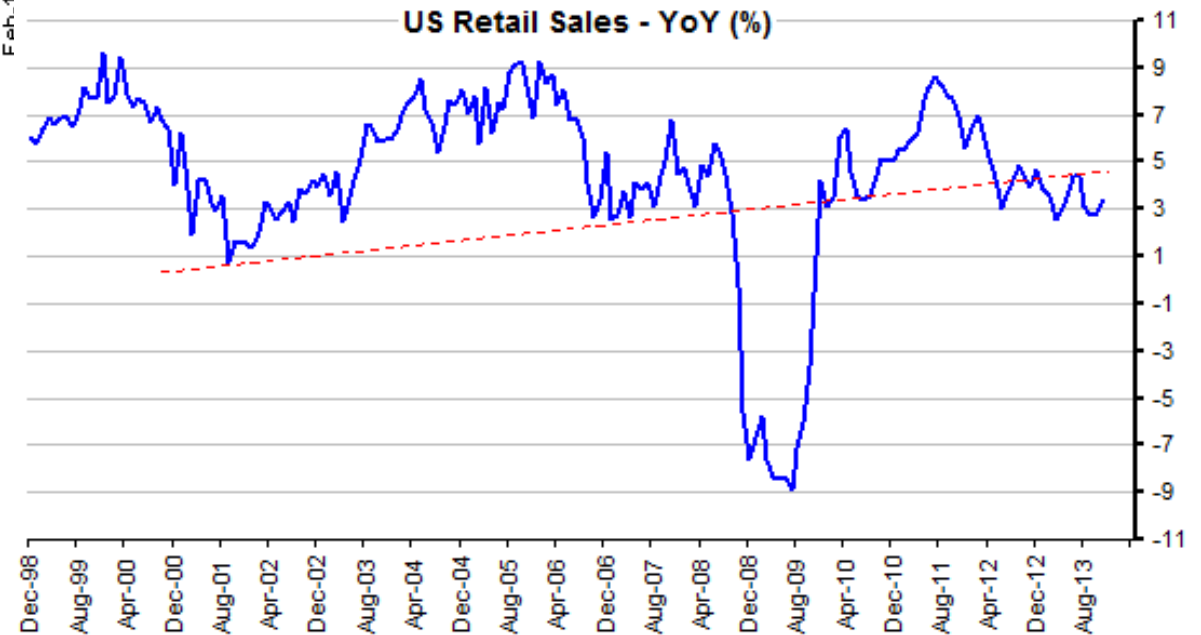
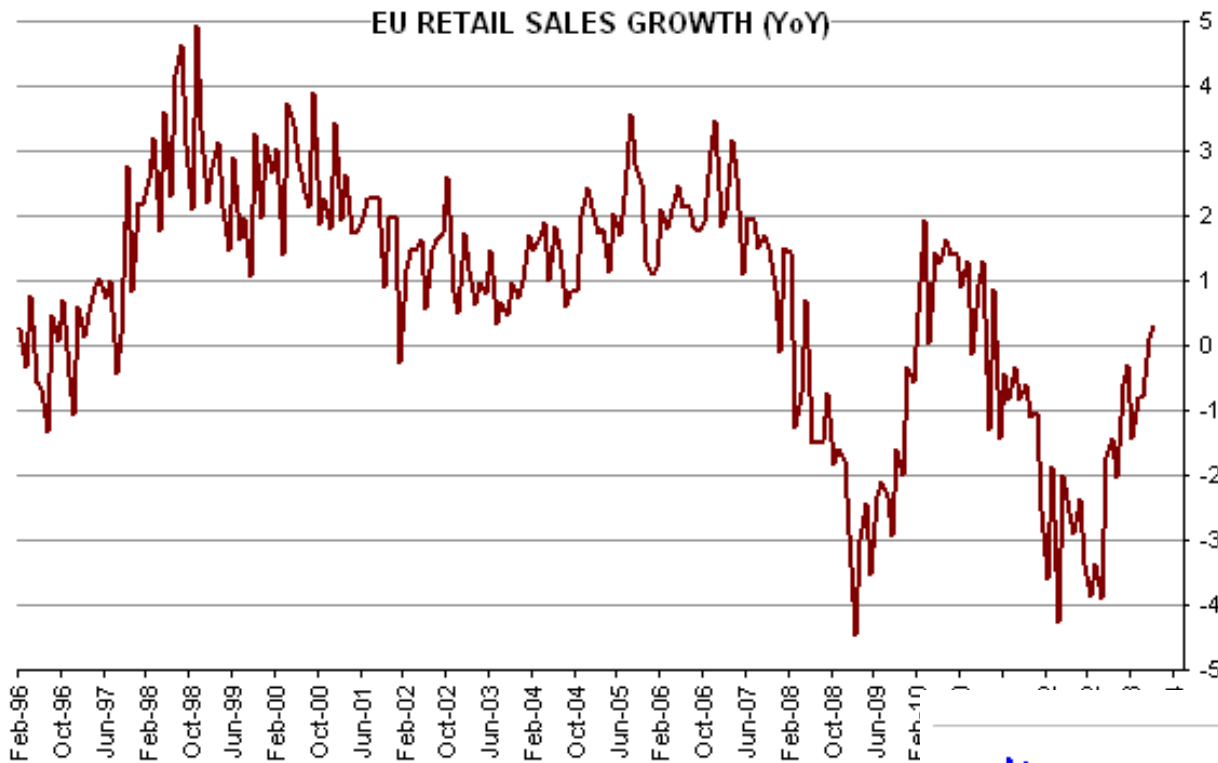
# Responses

- Conquest
  - Fail
- Inflation
  - Reference currency
- New sources of cash
  - QE
  - Cheap energy
    - Shale gas

# Stagflation

- Classical shock response (for e.g. 1971)
- Rapid inflation
- No increase in real output
- Economic/Government response
  - High interest (to control inflation)
  - Low taxes (to stimulate production)
  - Grants
- BAD
  - Savings, wealth, pensions
  - Current deficit; few projects
  - Weak dollar – fewer imports
- GOOD
  - Starting new projects

# Retail sales almost stopped overnight ....



<http://www.kshitij.com/fundamentals/funcharts/usretail.shtml>

# Shiller's Irrational Exuberance

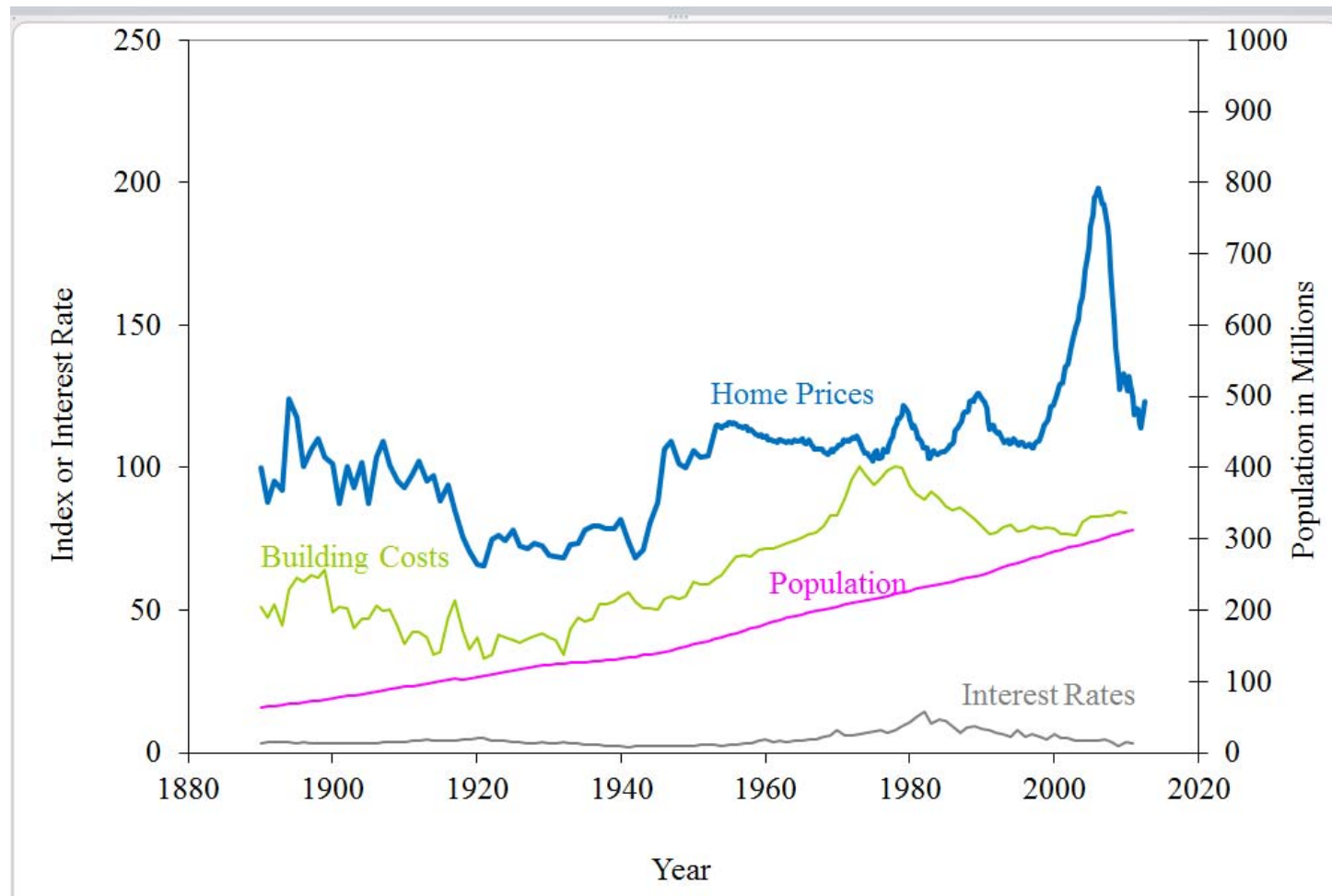
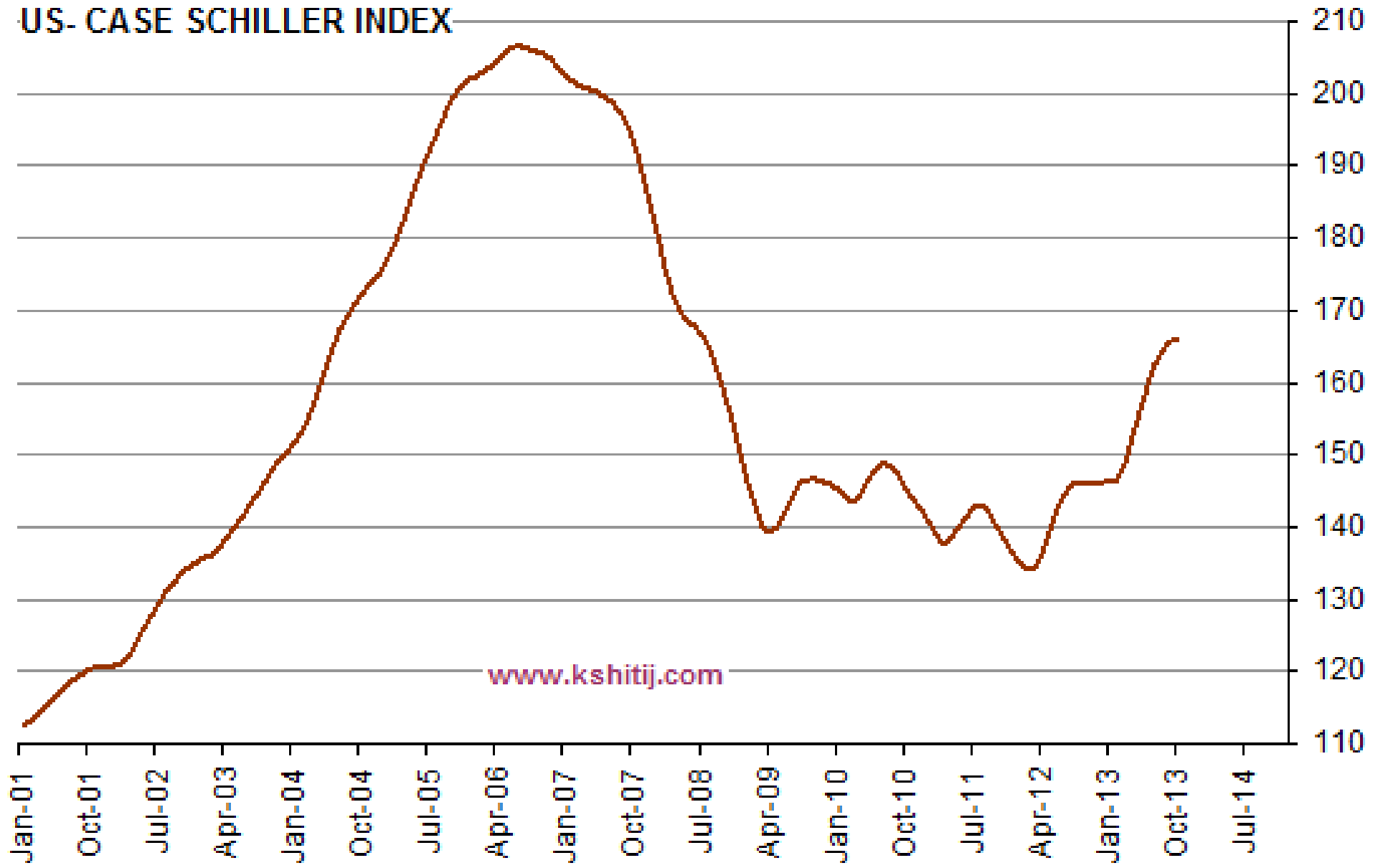


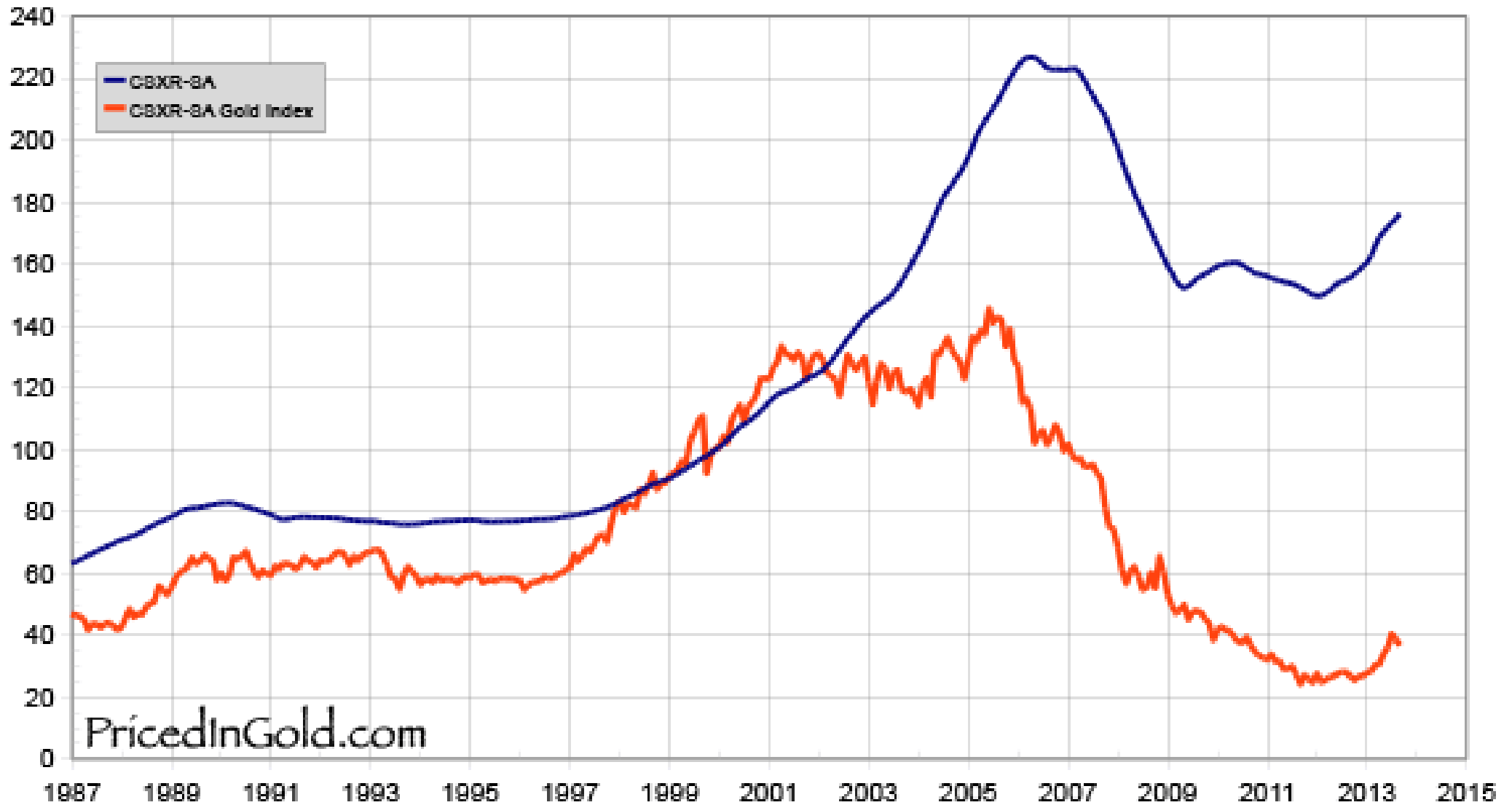
Figure 2.1 in Robert J. Shiller, *Irrational Exuberance*, 2nd. Edition, Princeton University Press, 2005, 2009, Broadway Books 2006, also *Subprime Solution*, 2008, as updated by author



# US- CASE SCHILLER INDEX

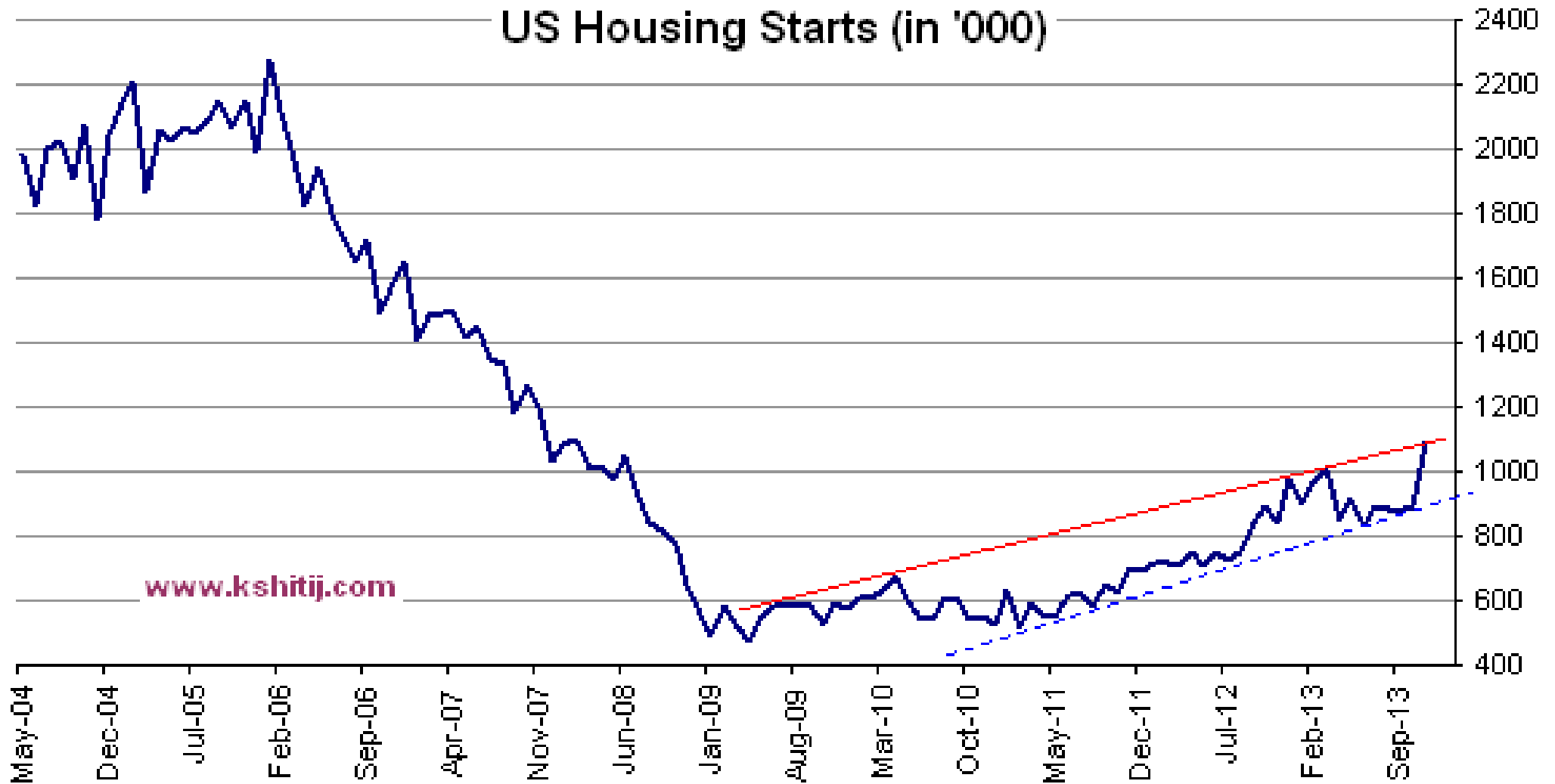


**Case-Shiller Home Price Index in USD and Gold**  
Monthly CSXR, Seasonally Adjusted, Jan-1987 to Sep-2013, Jan-2000 = 100



# Housing in doldrums

US Housing Starts (in '000)

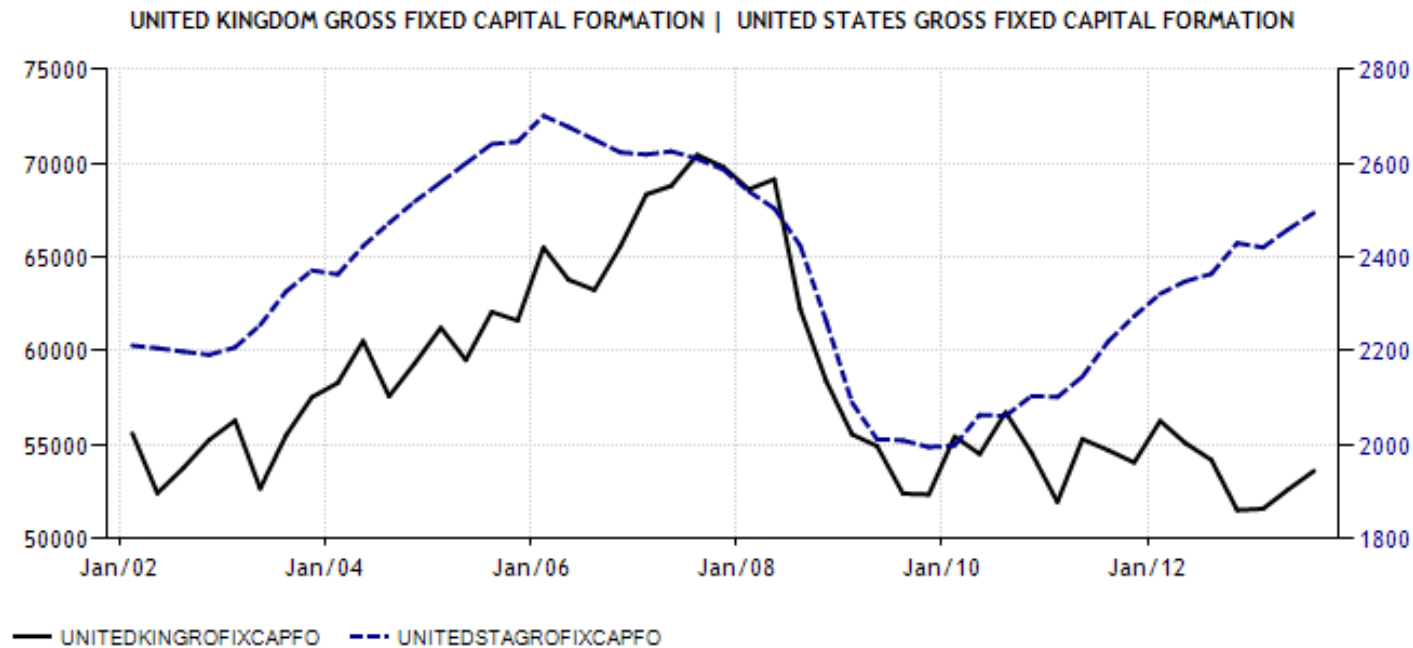


[www.kshitij.com](http://www.kshitij.com)

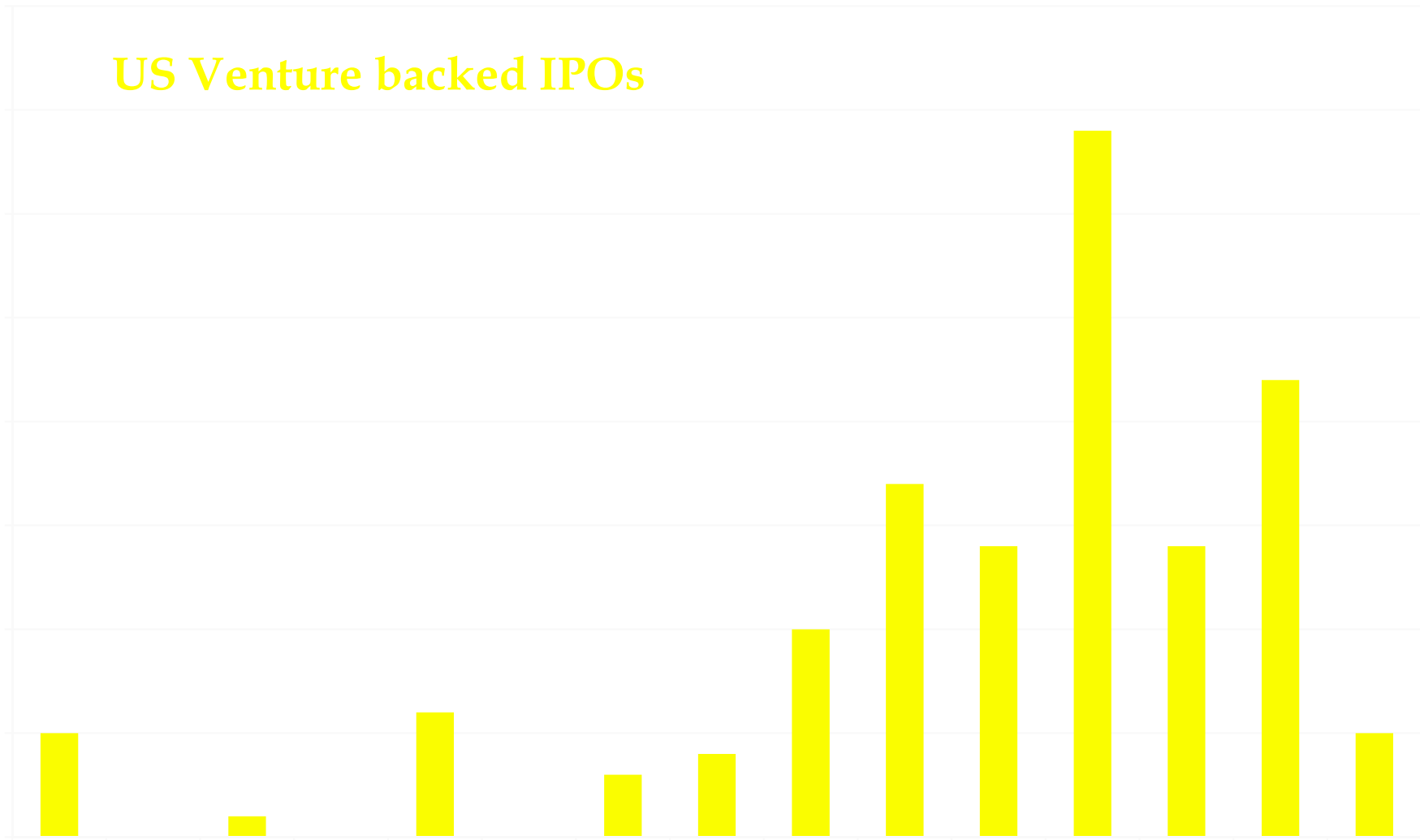
# Green Shoots ?



# Investment returns US but not UK

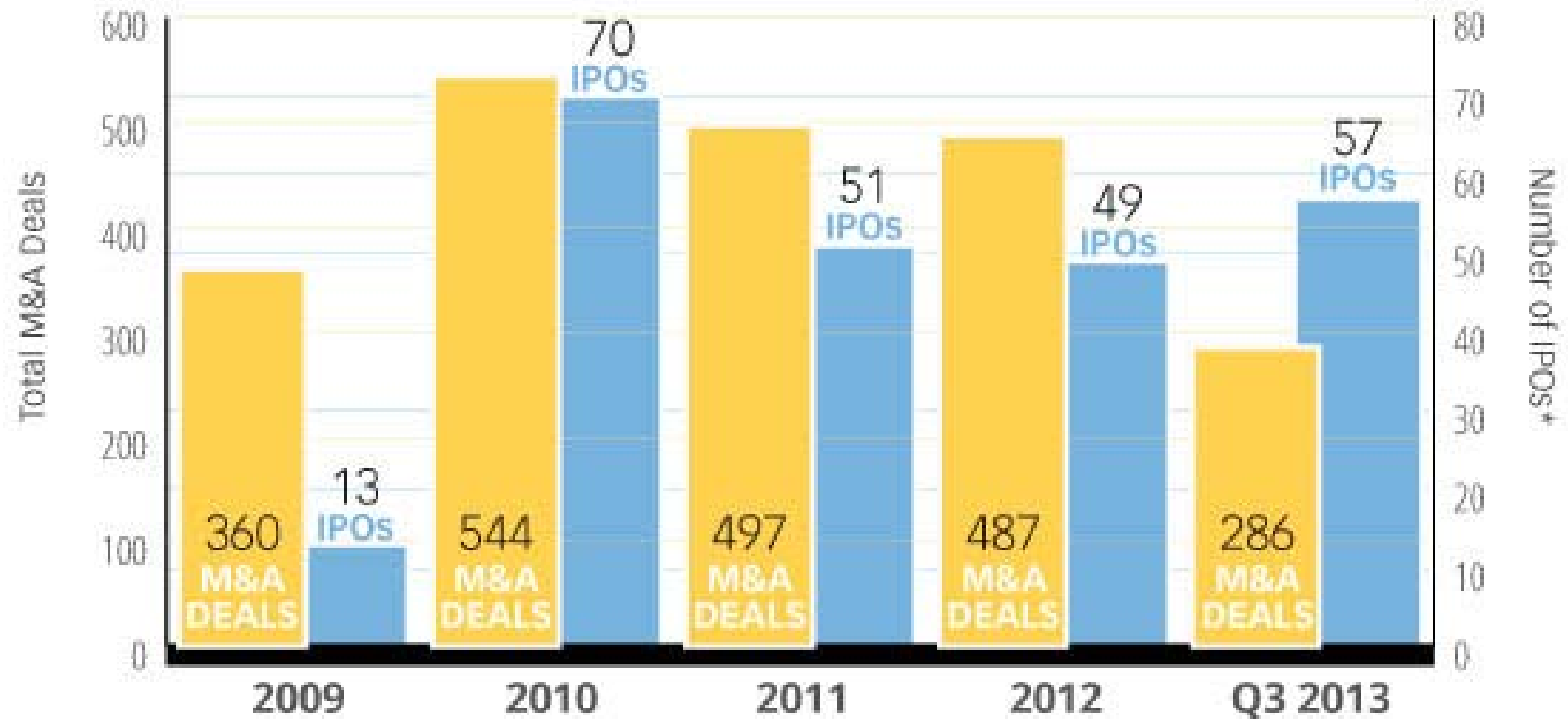


# Occasional Exits



Source: <http://finance.yahoo.com/news/Ventured-Backed-IPO-Activity-iw-4001796996.html?x=0>

## Venture-Backed Exits By Year 2009 – Q3 2013



Source: Thomson Reuters and National Venture Capital Association

\*Includes all companies with at least one U.S. VC investor that trade on U.S. exchanges, regardless of domicile.

# BDI/Gold

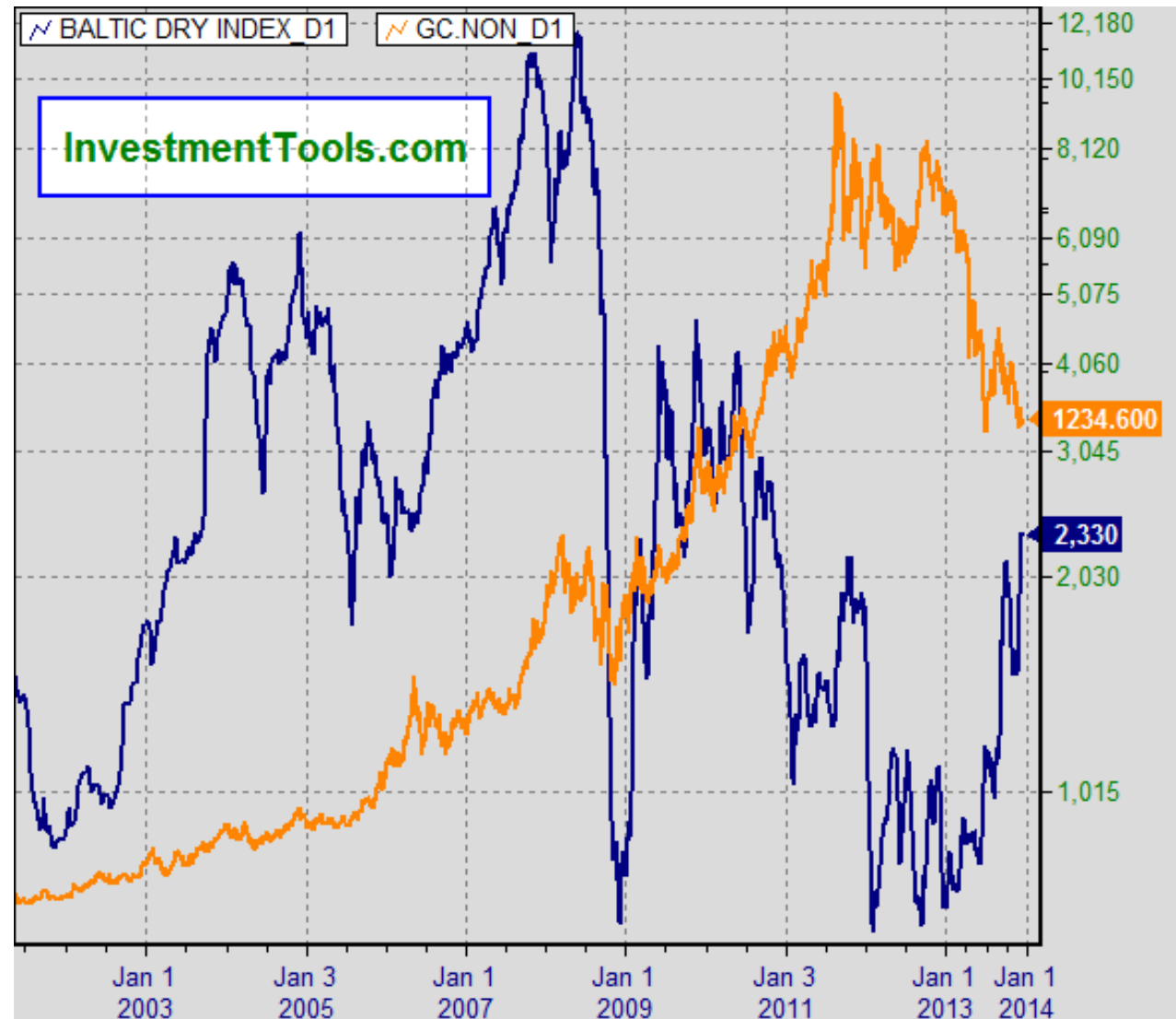


Chart created with NeoTicker EOD © 1998-2007 TickQuest Inc.



# BDI and Soybeans

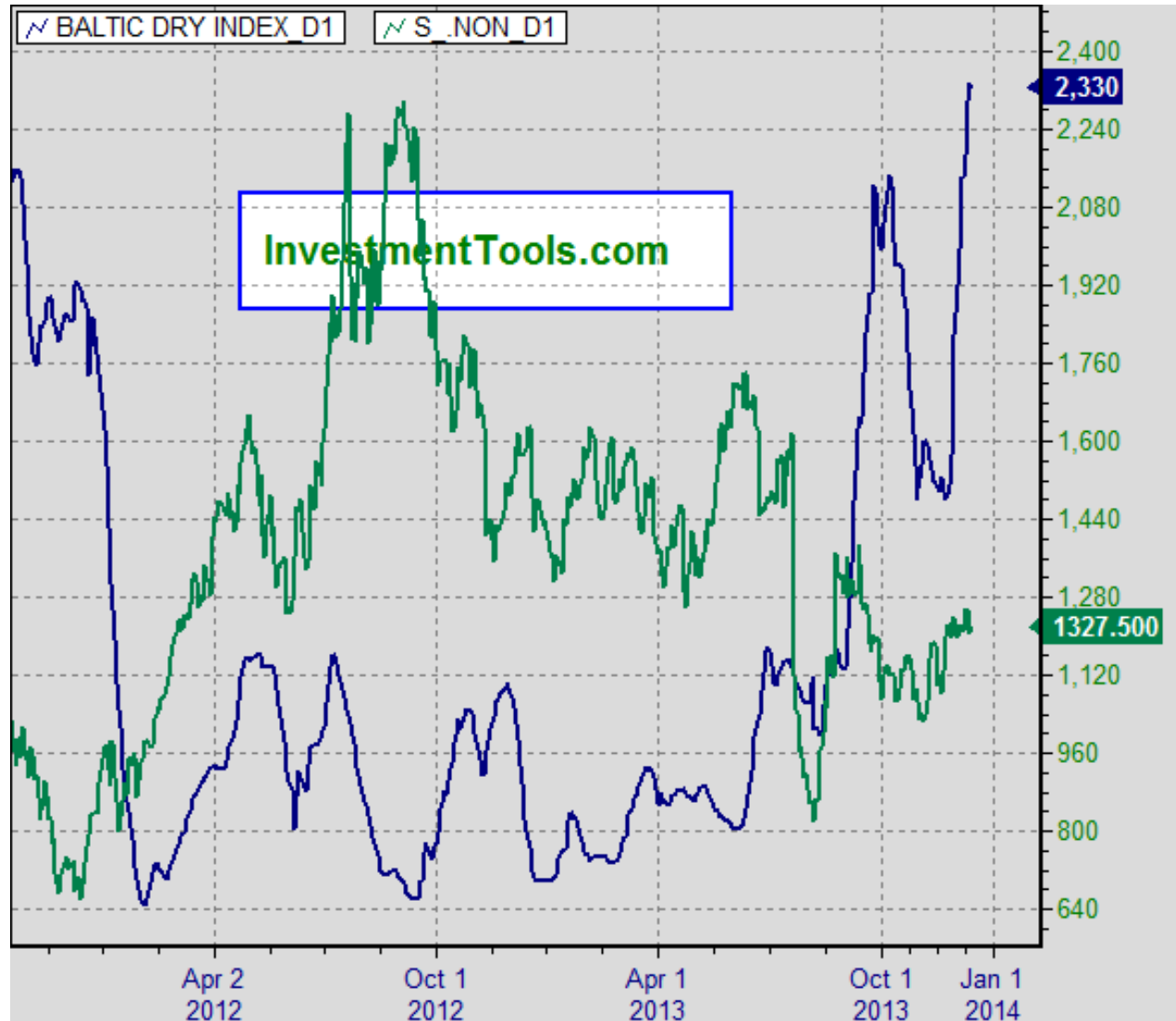
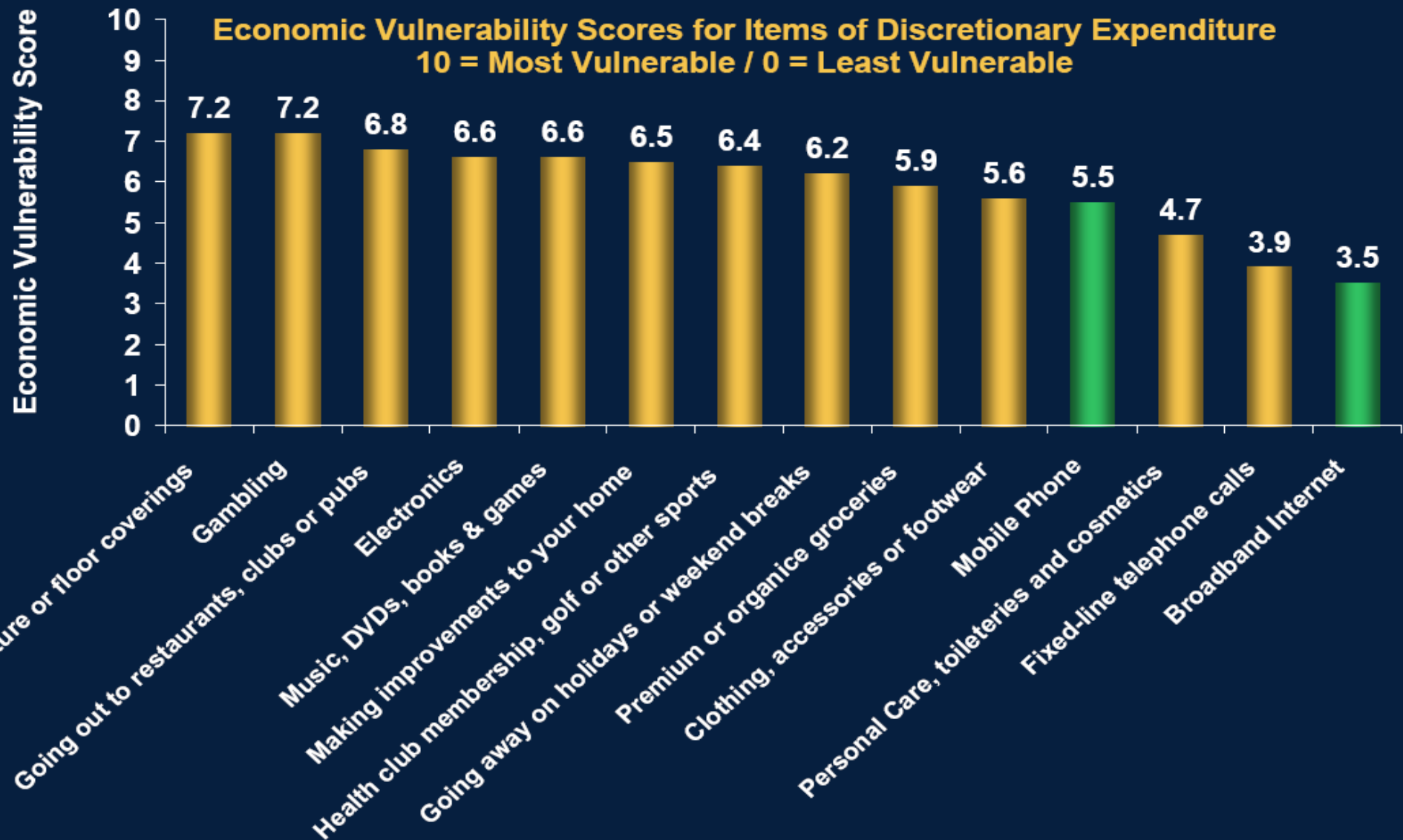


Chart created with NeoTicker EOD © 1998-2007 TickQuest Inc.

# Broadband is the least likely expense consumers will cut back on ...

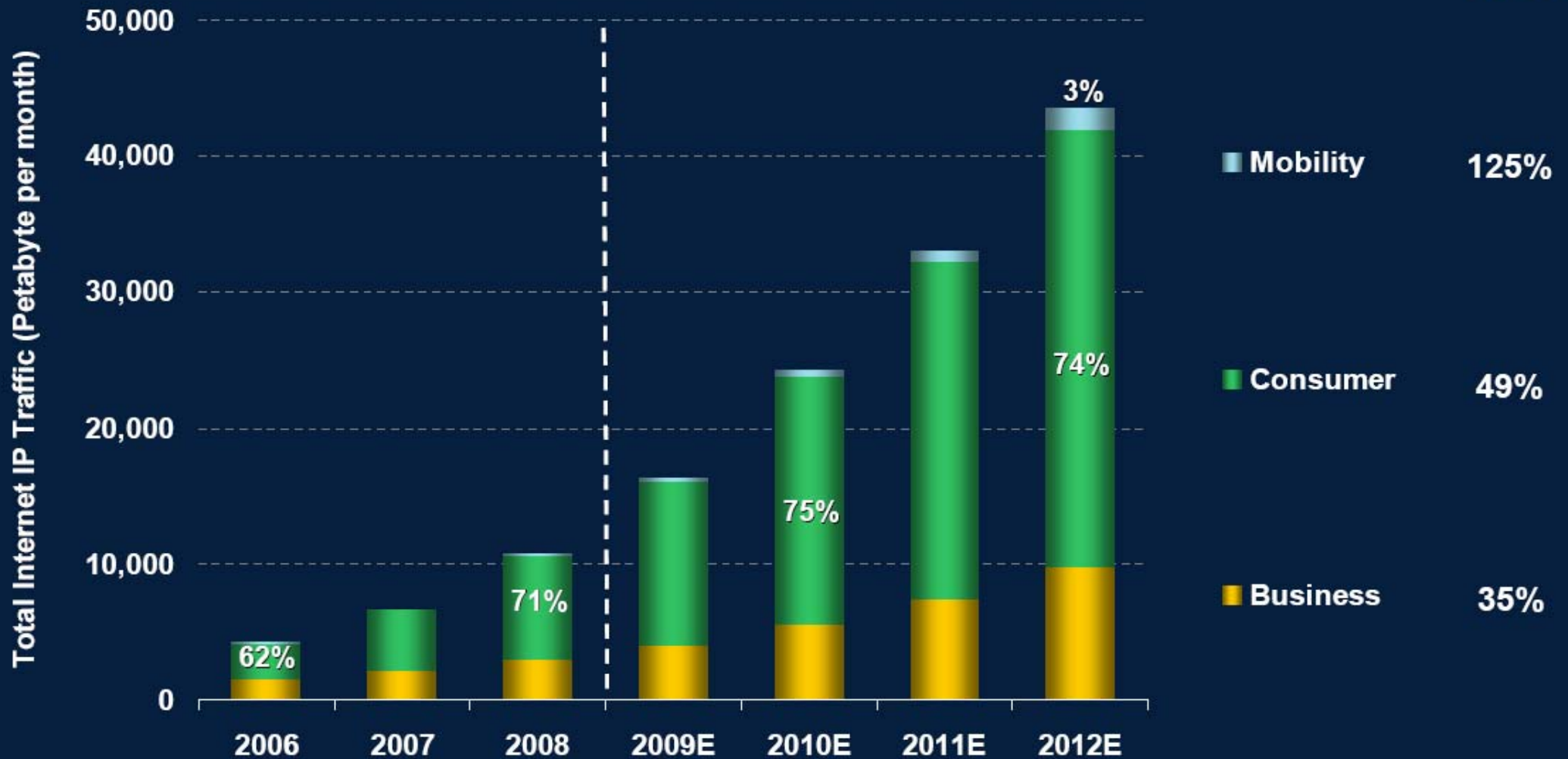


Note: In 9/08, 8,000 consumers in the UK, France, Germany and Spain were asked to provide a score to assess the likelihood that they would cut back on a particular area of expenditure. 10 = extremely likely to cut back; 0 = not at all likely to cut back.  
Source: Execution Primary Research, quoted in UK Ofcom's "The International Communications Market 2008" report, p. 39.

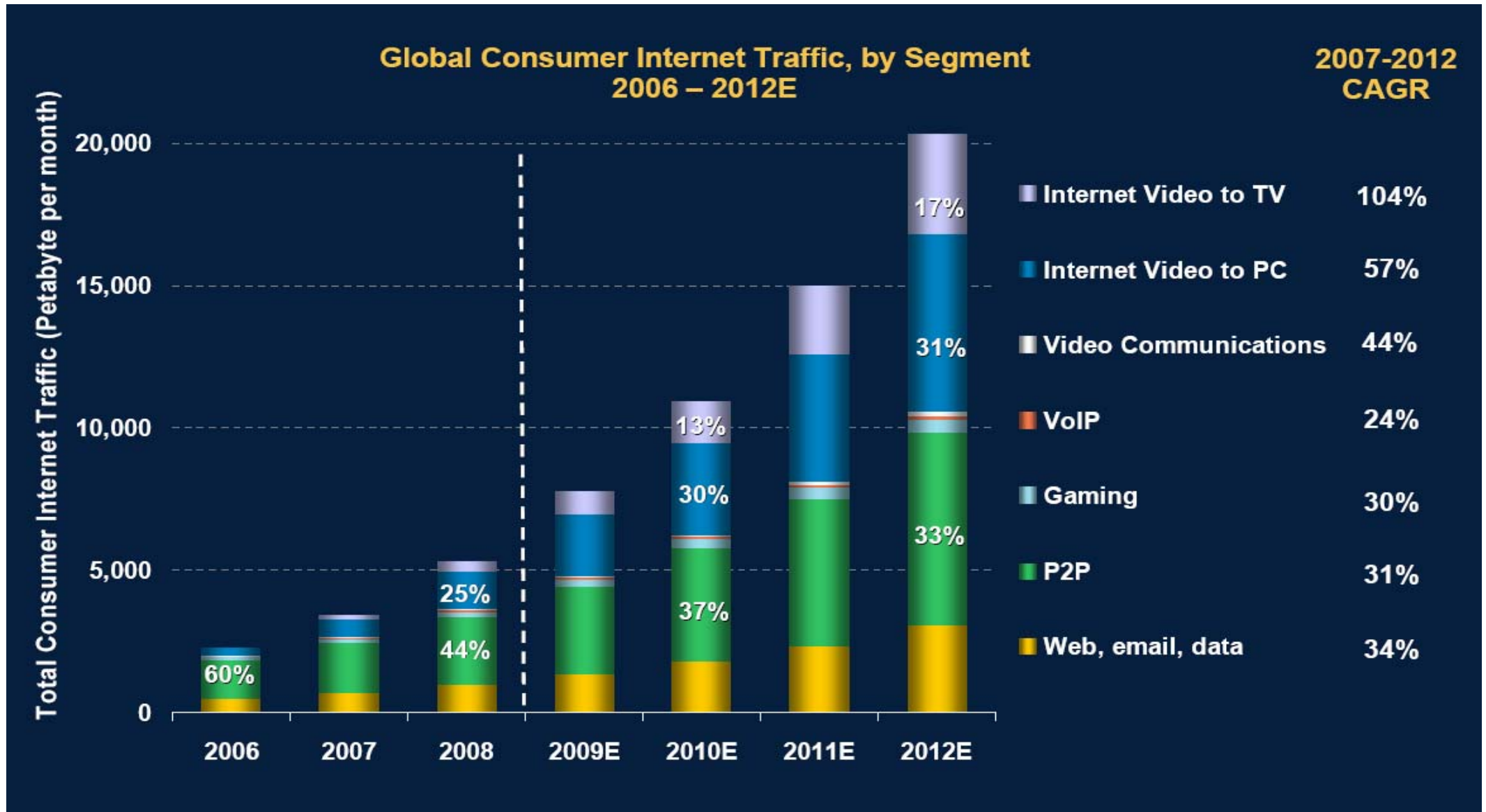
# Internet traffic will continue to grow whatever ...

Global Internet Traffic, by Type  
2006 – 2012E

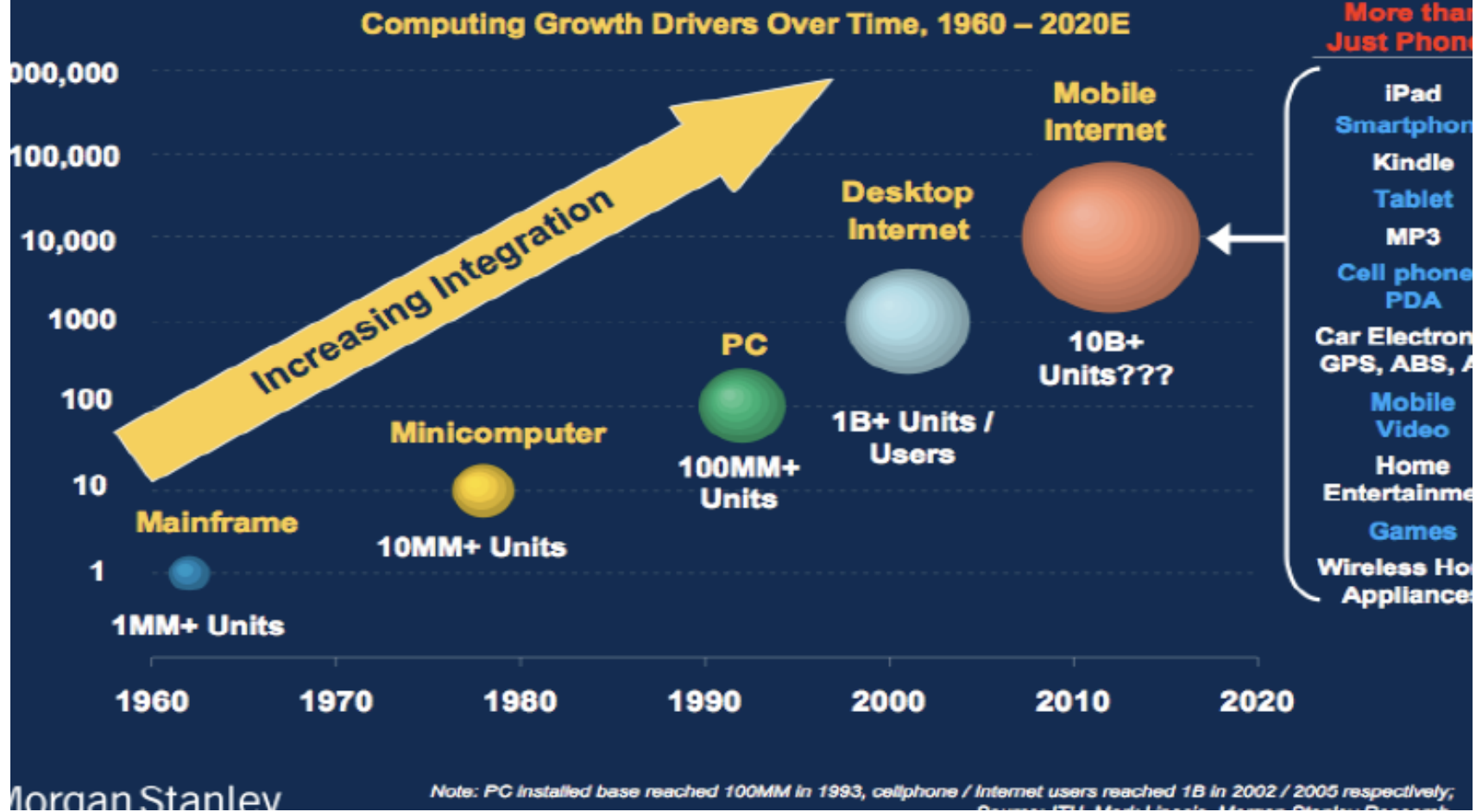
2007-2012E  
CAGR



# Opportunity exists everywhere if you are smart enough



New = Reduce Usage Friction Via Better Processing Power + Improved User Interface + Smaller Form Factor + Lower Prices + Expanded Services



# Outline Synopsis

1. So you've got an idea...
2. Money and Tools for it's management
3. Legal aspects, contracts and copyright
4. People: How to organise a team
5. Project planning and management
6. Quality, maintenance and documentation
7. Marketing and Selling
8. Growth and Exit routes

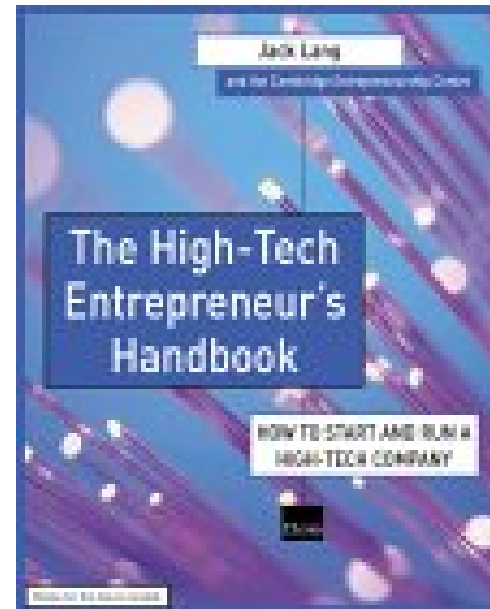
# Reading list

The High-tech  
Entrepreneur's  
Handbook  
[Jack Lang](#)

Paperback - 224  
pages (2  
November, 2001)

[FT.COM](#); ISBN:

0273656155



Students will be expected to be able to use Microsoft Excel and Microsoft Project

# Reading list

- *Lecture 1: From idea to Business Plan*
- Cambridge Enterprise *Starting a Technology Company: A guide for University staff and students*  
Also online at <http://www.enterprise.cam.ac.uk/building/starting.html>
- Carter, M. (2004). *It's all cobblers! The one book to read before starting a business*. Cirencester: Management Books 2000.
- Rogers, E.M. (2003). *Diffusion of innovations*. London: Free Press.
- Segal Quince Wicksteed (1985). *The Cambridge phenomenon: the growth of high technology industry in a university town*. Cambridge: Segal Quince Wicksteed.



# Reading list 2

- *Lecture 2: Money and tools for its management: raising the cash*
- Dyson, J.R. (2004). *Accounting for non-accounting students*. 6th ed. Harlow: Financial Times/Prentice Hall (or any basic accounting book)
- Varian, H.R. (2003). *Intermediate microeconomics: a modern approach*. 6th ed. New York: W.W. Norton.
- Shapiro, C. and Varian, H.R. (1998). *Information rules: a strategic guide to the network economy*. Boston, Mass.: Harvard Business School Press.
- Useful websites:
  - <http://www.bvca.co.uk>
  - <http://www.etrade.co.uk>
  - <http://www.londonstockexchange.com/en-gb/>

# Reading List 3

- *Lecture 3: Setting up and legal aspects*
- Manser, P. and Walker, S. (2002). *Tolley's start-ups: law and business handbook*. Croydon: Butterworths Tolley.
- Institute of Directors (1985). *Guidelines for directors*. 3rd ed. London: Director Publications.
- Useful websites:
  - <http://www.delphion.com/> (was the IBM patent search site)
  - <http://www.patent.gov.uk/> (UK Patent office)
  - <http://www.jordans.co.uk/> (company formation agents)
- [http://www.solicitor.net/powers\\_and\\_duties.asp](http://www.solicitor.net/powers_and_duties.asp) ( there is a lot of good stuff on that site)

# Reading List 4

- *Lecture 4: Project Planning and Management*
- Townsend, R. (1971). *Up the organisation: how to stop the corporation from stifling people and strangling profits*. New York: Knopf.
- Brooks, F. (1995). *The mythical man-month*. Boston, Mass.: Addison-Wesley Pub. Co.
- Useful software: Microsoft Project.

# Reading List 5

- *Lecture 5: Prototype to Product*

- Moore, G.A. (1998). *Crossing the chasm*. Oxford: Capstone.
- Moore, G.A. (1998). *Inside the tornado*. Oxford: Capstone.

- *Lecture 6: Standards, Quality, Documentation and Maintenance*

- British Standards Institute (2000). *Quality management systems: fundamentals and vocabulary*. ISO 9000:2000 London: British Standards Institute.
- British Standards Institute (2002). *Information security management: specification with guidance for use*. BS 7799-2:2002 London: British Standards Institute.
- <http://standards.ieee.org/>
- .

# Reading List 6

- *Lecture 7: Marketing and Selling*
  - Jeff Cox, Howard Stevens (2001). *Selling the Wheel: Choosing the Best Way to Sell for You and Your Company*. Pocket Books ISBN: 0671033107.
- *Lecture 8: Growth, exit and Futures: places to look for new businesses*
  - Raymond, E.S. (1999). *The cathedral and the bazaar*. Sebastopol, CA: O'Reilly
  - Alvin Toffler (1973). *Future Shock*. Pan ISBN: 0330028618.
  - Vernor Vinge, Marvin L. Minsky (Afterword), James Frenkel (Editor) : *True Names: and the Opening of the Cyberspace Frontier* (2002) Tor Books ISBN 0312862075

# 1. So you've got an idea...

Introduction

Why are you doing it?

What is it? defining the product or service; types of company

Who needs it? an introduction to market analysis

How? Writing the business plan

Futures: some emerging areas for new computer businesses

# One of you will become a Billionaire

- Most will be millionaires
  - And need to be
    - Pension issue
      - Say household income of £50K @ 4% -> £1.25M
      - Inflation for 40 year @ 3% -> x 3 -> £3.75M
      - House, etc say £250K -> 750K
      - Total £4.5M
- You won't save £4.5M from a salary
  - Trading
  - Starting an Enterprise

# Why?

## Why now?

- Because I can: available time and resource
- Just graduated, or made redundant and nothing else to do
- Brilliant idea or market opportunity

## Why me?

- Barriers to market entry
  - What have you got to make it through?
    - Expertise, resource, relationships
- Barriers to competition
  - What stops others doing the same thing
    - IPR, network effect, niche
- Unique advantages

## Know yourself

- Know your motivation so you can motivate others
  - What counts as success?



# Never a better time to start than NOW

- Money
  - Cambridge Angels, Cambridge Capital....
- Support
  - St Johns, Cambridge Enterprise....
- Infrastructure
  - Banks, lawyers, accountants
  - Office space
- People
  - Cambridge Network, mentors...
- Government
  - EIS Tax relief, TSB Awards, SFLGS/ Enterprise Finance Guarantee....
  - Princes Trust
- Society attitude
  - OK to lose,
    - “Better to have loved and lost than never loved at all”
- “Dare to Begin” (Horace)
  - Nothing will be attempted if all possible objections must be overcome (Samuel Johnson)

# Why are you doing it?

- Wealth generation
  - You need £5M by the time you retire, for a modest lifestyle
- Better toys
- Make a difference
  - Social consequences
    - Generation of employment
    - Death of the nation state
- Fun or profit?
  - Lifestyle or high growth?
    - Funding
    - Eventual size?

# An Entrepreneur is...

- Someone who starts a project without having the full resources or knowledge
  - Estimate, guess and gut feel
  - Risk taking
    - Market risk
    - Technology risk
    - Financial risk
- Value accrues as risk lessens
  - Guesses replaced by justified facts
  - As development progresses and market established
  - Transition from intangible hopes to reality and cash-flow
  - Risk lessens, hence value increases

# Example

- (Almost) Risk Free return, eg Bank:
  - say 5% or P/E 20
  - after 1 year 100 ->105
- Invest in companies, say 30% chance of failure:
  - After 1 year average return is  $0.7*(100+x)$  where  $x$  is the IRR
  - For equivalent return  $0.7(100+x) = 105$
  - $x=50\%$

# High Profit vs High Growth

- High Profit
- Lifestyle
  - Restaurant/shop
- P&L
- Organic Growth
  - 20 years
- Debt finance

- High Growth
- Sell the Company
  - Chain of Restaurants/shops
- Balance Sheet
- Investment
  - Exit route
  - 5 years
- Equity
- BUT
  - Fairy Godmothers now extinct
  - Raise enough cash to get to get to profitability and survive

# Investor Criteria for a business

- **Market**
  - Global sustainable under-served market need
- **Technical**
  - Defensible technological advantage
- **People**
  - Strong management team
- **Financial**
  - Believable Plans
  - 60% IRR

# Market Need

- Largest risk factor: everything else is process or resource
- Who needs it?
  - Why?
    - Why do they need yours??
      - What are they doing now?
      - How much is it worth to them?
    - How is it sold, or advertised?
      - Routes to market
      - Alliances
      - Branding
  - Under served need
    - Competition
    - What other solutions?
  - Sustainable or one-shot wonder?
  - Growing market
    - Global potential

Global  
Sustainable  
Under-Served  
Market Need



# Market: Who loves ya?

FAB: Features Advantages Benefits

– Feature:

- This chip uses a double super-helical fooglefarg

– Advantages:

- Less Power
- More speed

– Benefits:

- Cheaper
- Smaller
- Works better in marginal conditions

Batteries last longer

Your friends will be envious



**Techie  
Speak**



**Customer  
Speak**

# Defensible technological advantage

- IPR
  - Patent
  - Copyright
  - Trademark
- Defensible technological leadership
  - against well-funded competition
  - Niche Market share

# Strong management team

- You can't do it all by yourself
  - “Small” project >10 person-year
  - Team building
  - 1:3:10 rule
- Alliances
- Recruit experience
  - Financial Director
  - Sales & Marketing
- Training & experience
  - Merchant bank/Management Consultancy
  - MBA

# Senior Team

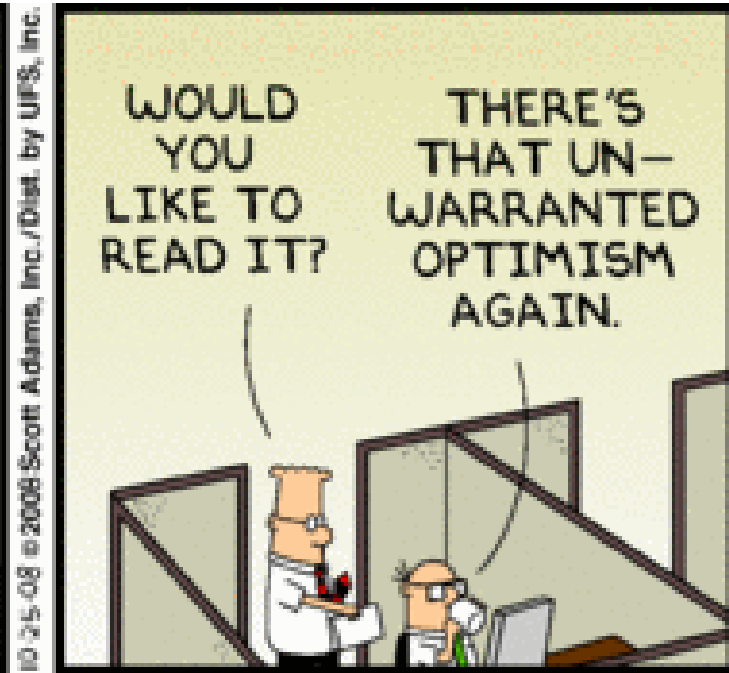
<i>US</i>	<i>UK</i>	
<b>Chair</b>	<b>Chair</b>	<b>Senior figure; Old wise head Experience and contacts; Major dispute resolution; part-time</b>
<b>CEO</b>	<b>Managing Director</b>	<b>Finding money; Investor relations; Style setting; Keeping the peace</b>
<b>CFO</b>	<b>Finance Director</b>	<b>Accounts etc. Office management; Administration, Legals, Quality control</b>
<b>CTO</b>	<b>Technical Director</b>	<b>Inventing new things; development</b>
<b>COO</b>	<b>Production Director</b>	<b>Running the factory and distribution</b>
<b>VP Marketing</b>	<b>Marketing Director</b>	<b>Deciding what and how to sell; pricing Marcoms; Market information</b>
<b>VP Sales</b>	<b>Sales Director</b>	<b>Selling; CRM;</b>

# Believable Plans

- Business Plan
- Development Plan
- Marketing plan
  - Adverts, mail shots, web-sites
- Sales Plans
  - Distribution, Direct Sales
- Quality Plans
- Financial Projections
  - Budget
    - 60% IRR
      - Pay back financing in third year

# How? Writing the business plan

- Business plan describes what you want to do
- BVCA Handbook
- KISS: Keep It Simple and Stupid!
- Write for the target audience
  
- Business Plan Competitions – Cambridge £1k and Cambridge £150K
  - Cambridge University Entrepreneurs Society (CUE)
    - [www.cue.org.uk](http://www.cue.org.uk)



www.dilbert.com  
scottadams@aol.com

10-25-08 © 2008 Scott Adams, Inc./Dist. by UFS, Inc.

# Writing the Business Plan

Executive Summary and funding requirement

1. Concept

2. The Market

3.1 Global market size and need

3.2 Sustainability

3.3 Competition

3.4 Marketing plans

4. The Team

4.1 CEO

4.2 CTO

4.3 CFO

4.4 VP Sales and Marketing



# Writing the Plan - 2

5. The technology and its IPR

6. Summary of plans

6.1 Development plans

6.1.1 Methodology

6.1.2 Milestones

6.2 Marketing

6.3 Sales and distribution

6.4 Quality and industry standards

7. Financials

# Writing the Plan - 3

Appendices:

Financial model

Key staff

Letters of support

Correspondence re IPR

Full development plan

Full marketing and sales plan

Examples and brochures