

Commodities: What price?
Capacity: When to invest?

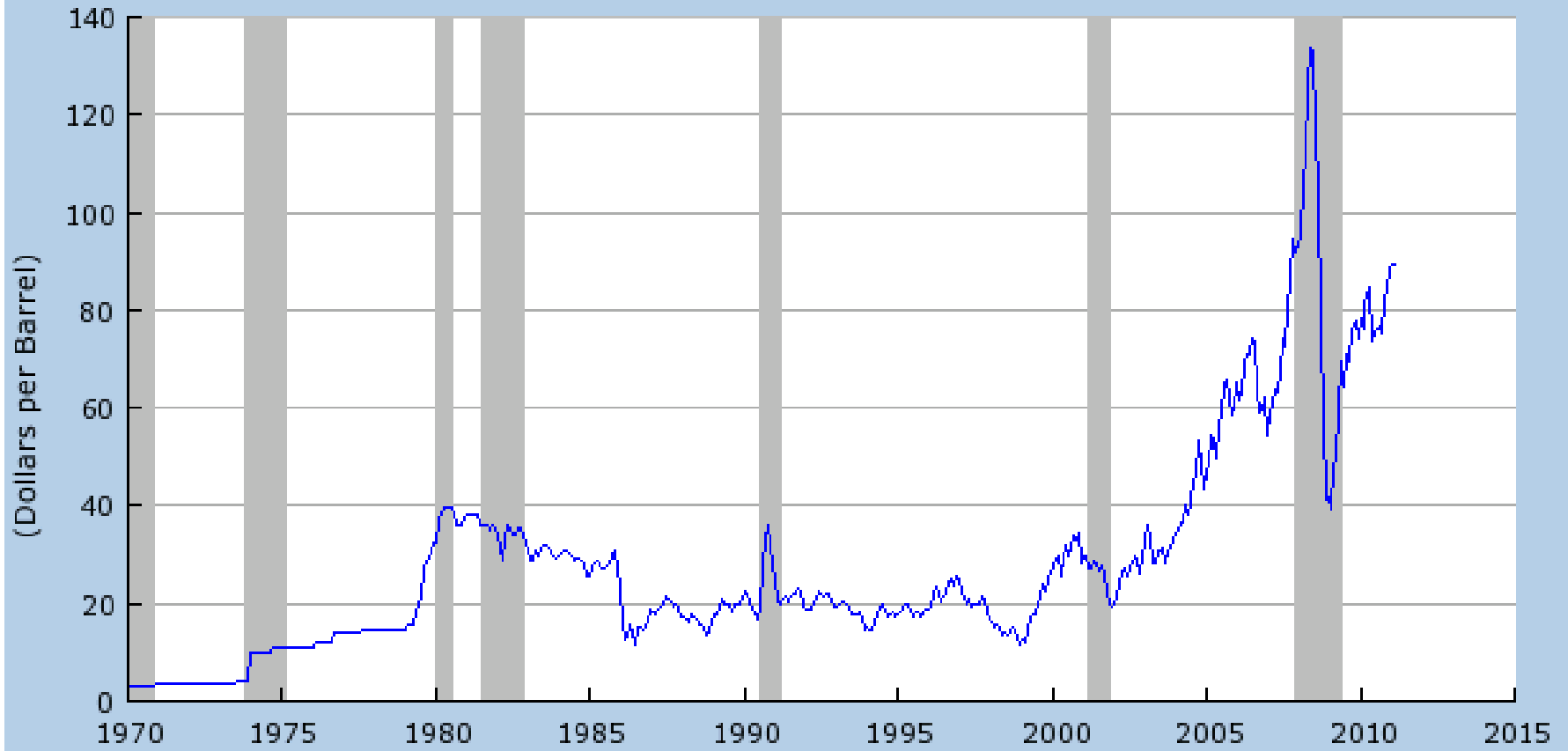
Raymond Monroe

5 Year Copper Spot



www.kitco.com

Spot Oil Price: West Texas Intermediate (OILPRICE)
Source: Dow Jones & Company



Shaded areas indicate US recessions.
2011 research.stlouisfed.org

If you've ever taken a course in environmental and/or resource economics you've heard the Hotelling's Rule story. Energy is an asset and with competitive markets (lots of firms, entry into and exit out of the market is easy, similar products) the asset price will rise at the rate of interest (as a proxy for the rate of return on alternative investments) over the long run (not the day to day fluctuations that we read about in the WSJ's [Commodities](#) Column). If the price rises above the rate of interest, firms will enter the market, supply will increase and prices will fall back to the long term trend. If the price rises more slowly than the rate of interest then firms will exit, supply will decrease and the price will rise back to the long term trend.

This is the fundamental problem in all of exhaustible resource economics, and it was first posed and solved by Harold Hotelling in 1931. This formulation is known as the **Hotelling Rule**, and predicts that prices increase at an exponential rate that is equal to the exchange rate. That means, in an economic sense, a mineral deposit in the ground has the same significance as a bond, and is in some sense interchangeable with such a financial instrument.

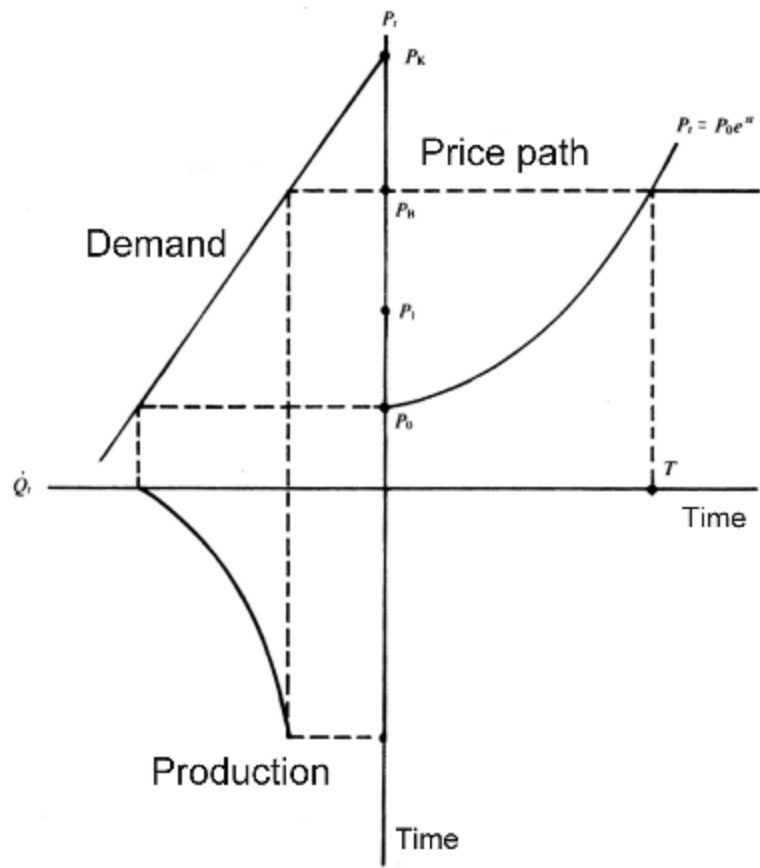
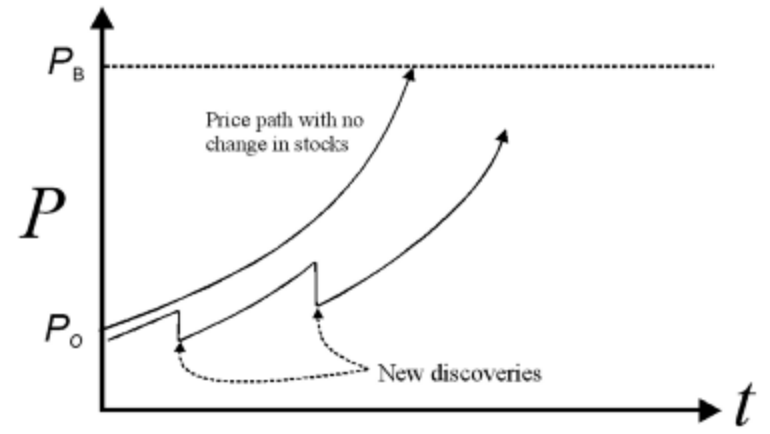
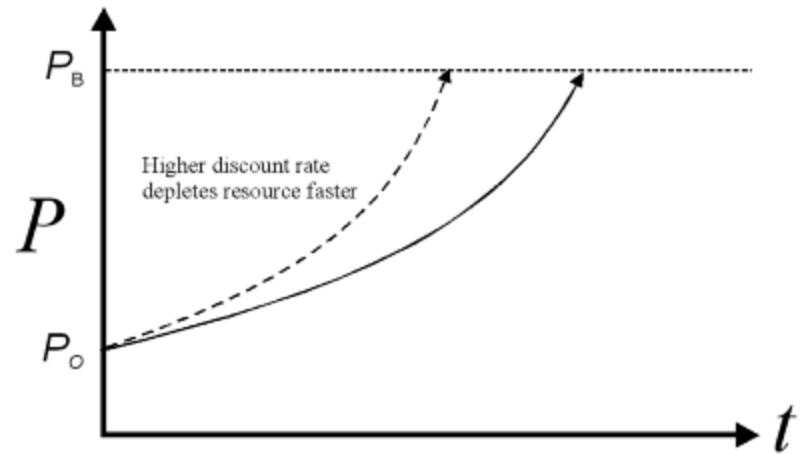
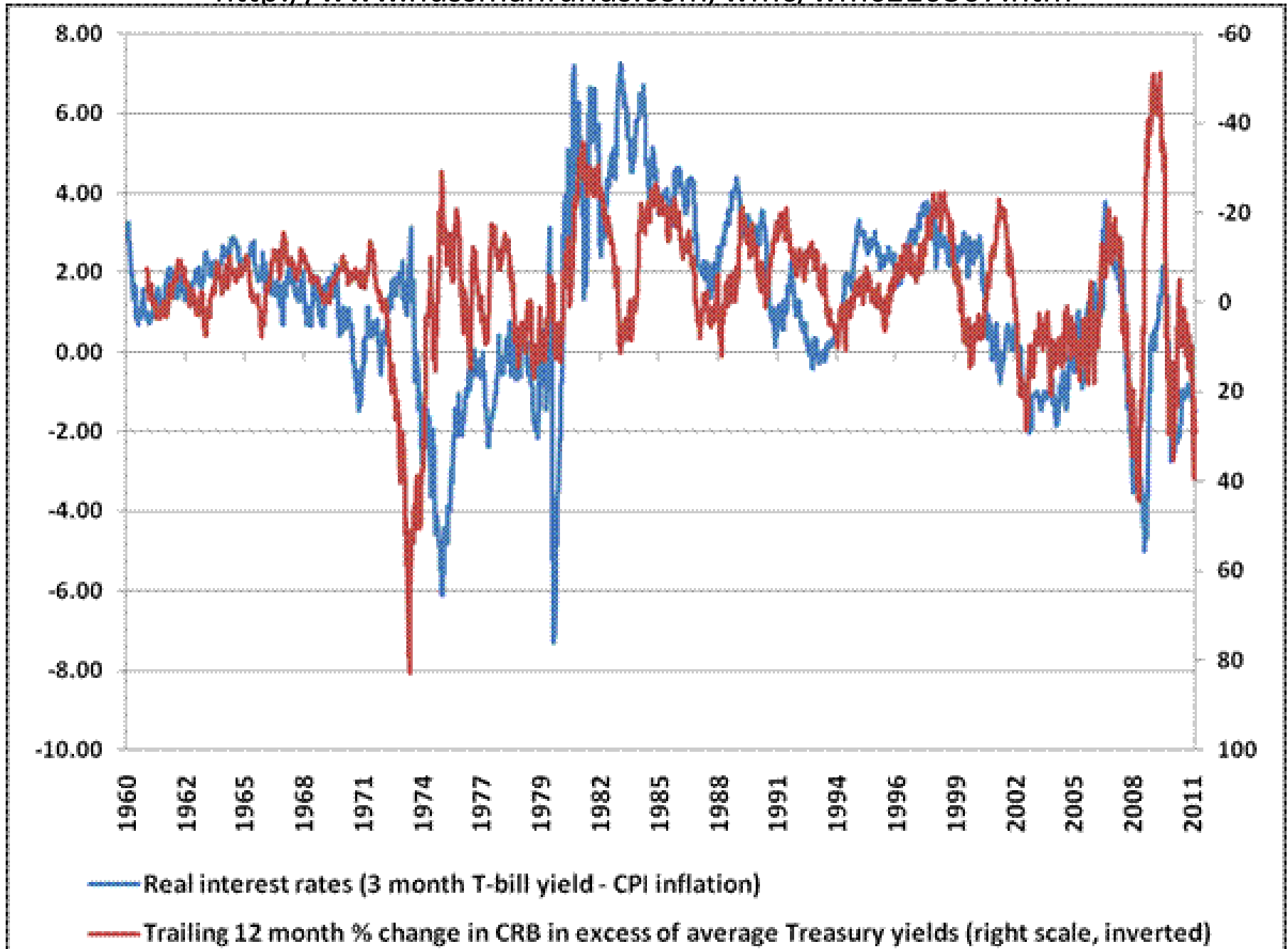
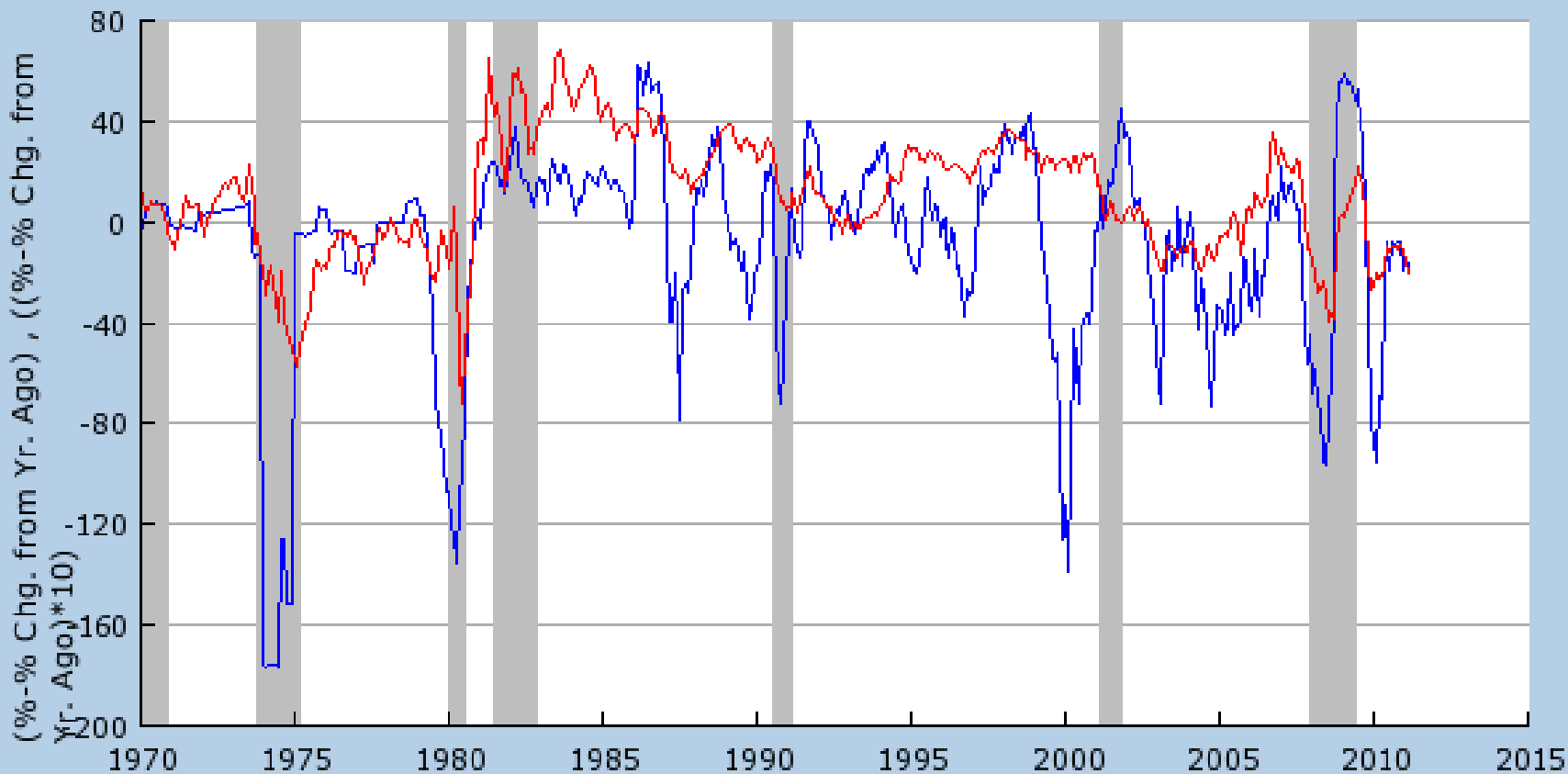


Figure 18.1 The Hotelling price path.





TB3MS-OILPRICE
(TB3MS-CPIAUCSL)*10



Shaded areas indicate US recessions.
2011 research.stlouisfed.org

— TB3MS-OILPRICE
— (TB3MS-CPIAUCSL)*10

<http://pragcap.com/the-blowoff-phase-of-a-bubble-tends-to-be-steep>

Is this time different?

At no time in the last 200 years have commodity prices risen as fast and as high as in the last decade without a sharp decline

— = PRICE OF ALL COMMODITIES
(10 YR AVERAGE RATE OF RETURN)

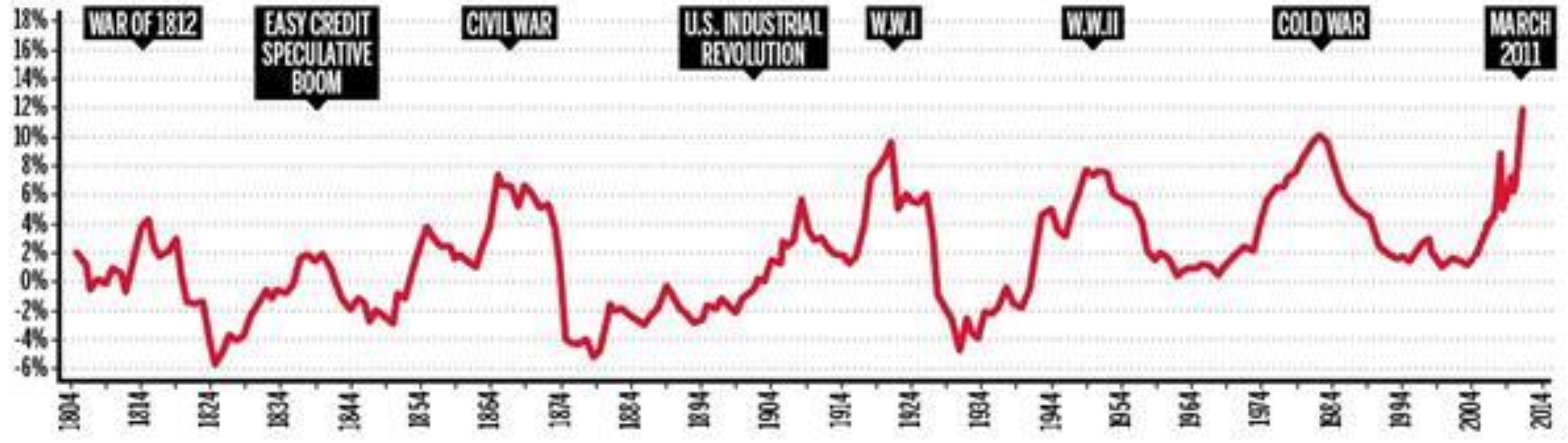
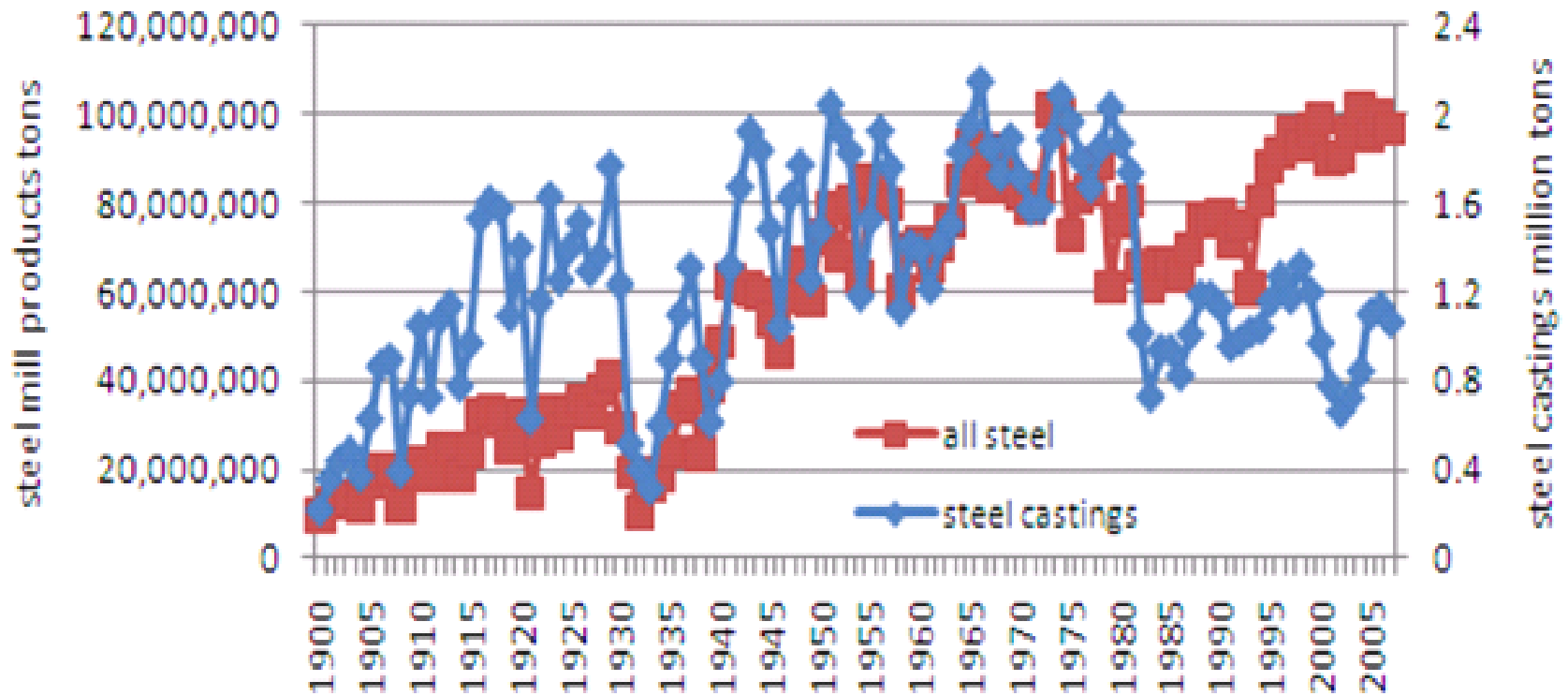
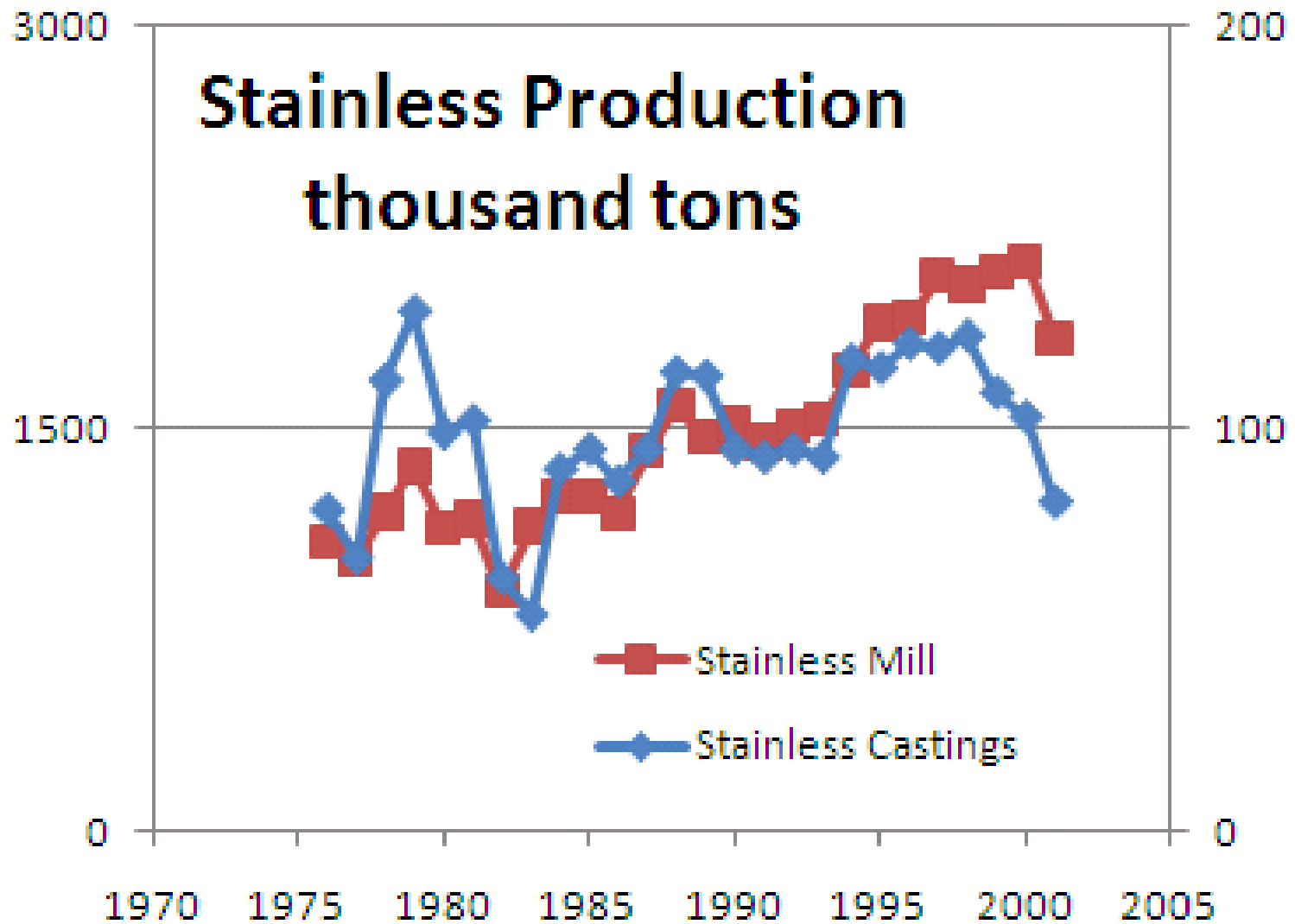


CHART SOURCE: HACKETT FINANCIAL ADVISORS, MACLEAN'S

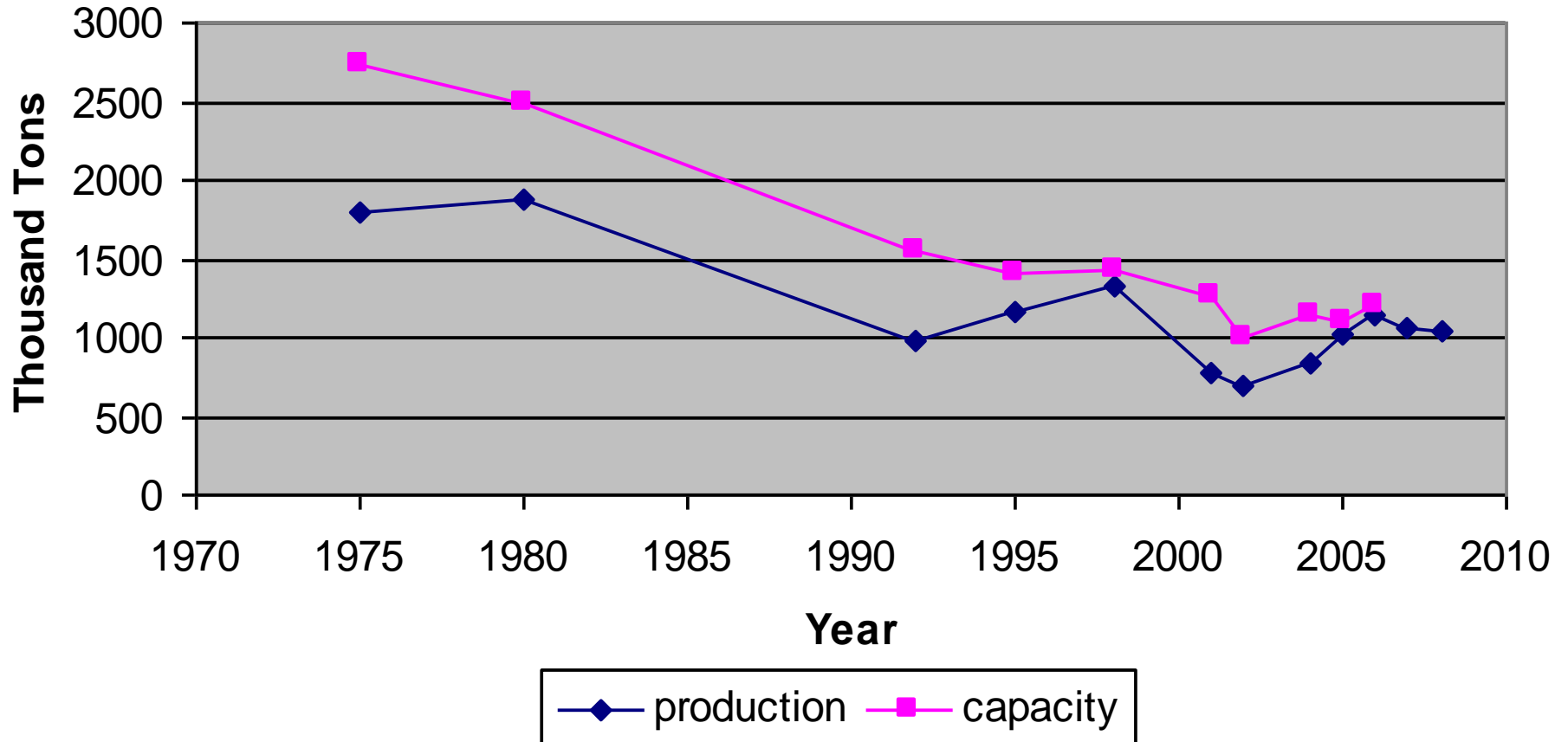
All Steel and Steel Casting Production in US



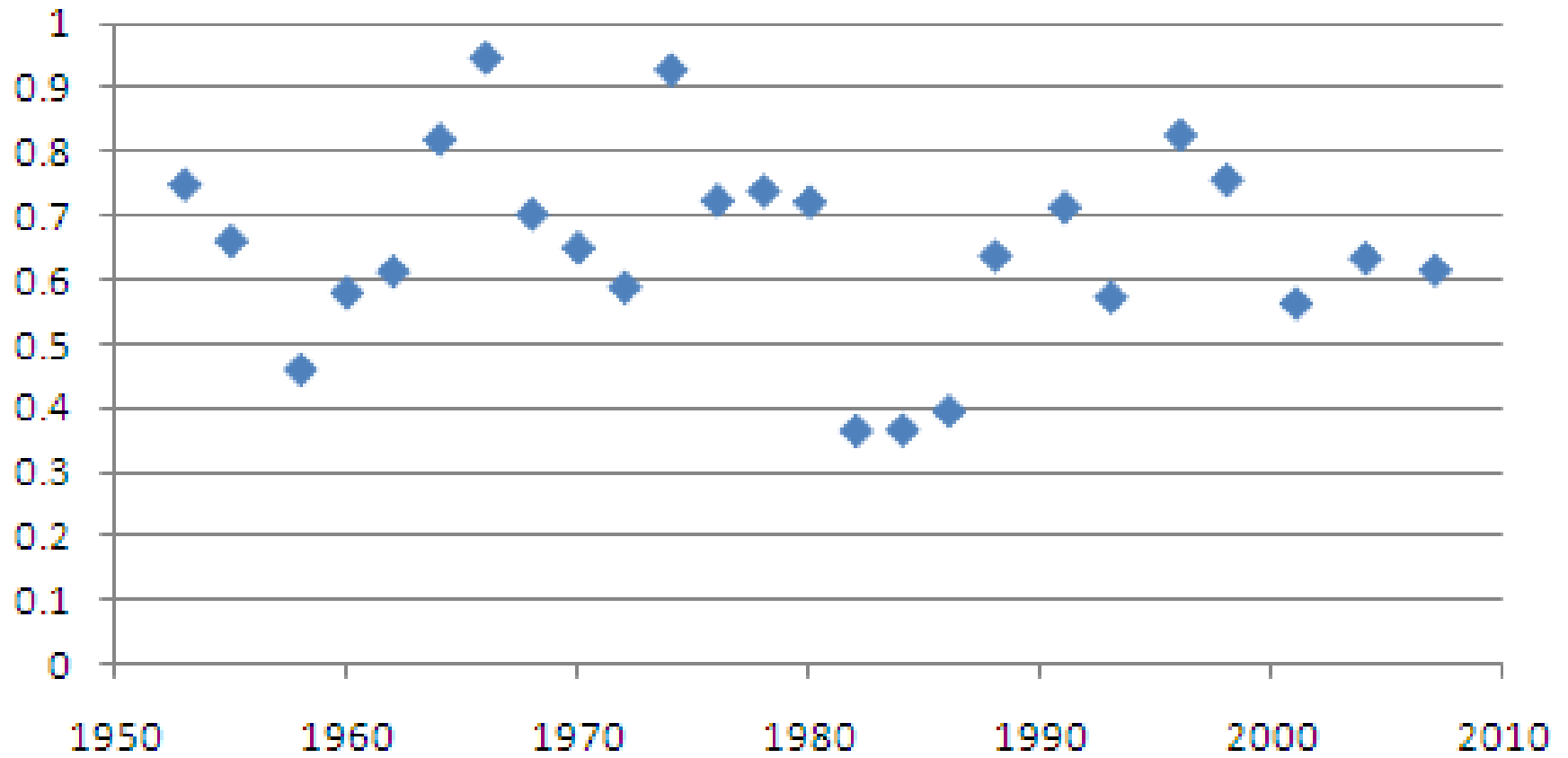


$R^2 = 0.38$ slope = 0.03

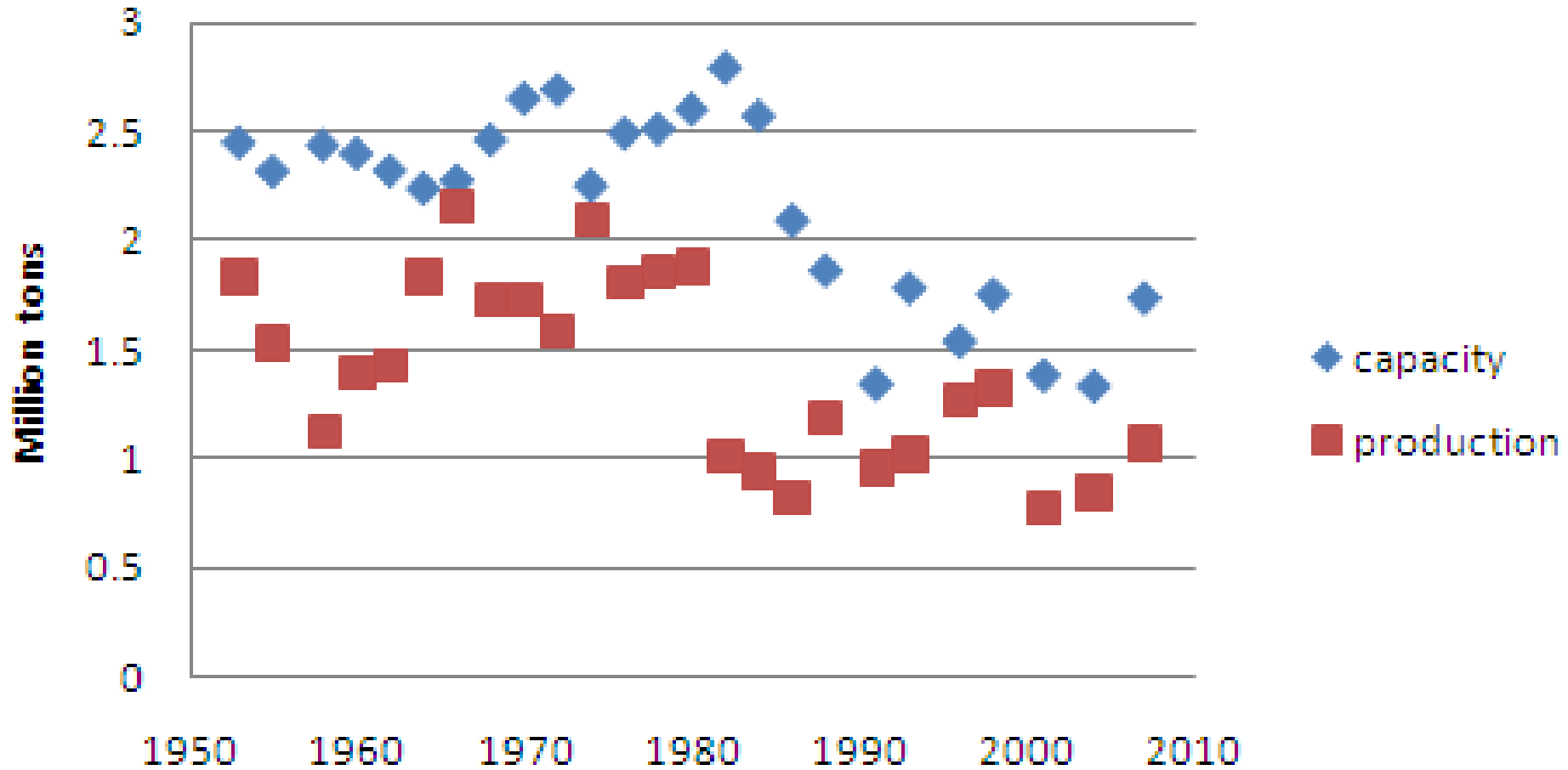
Steel Casting Capacity

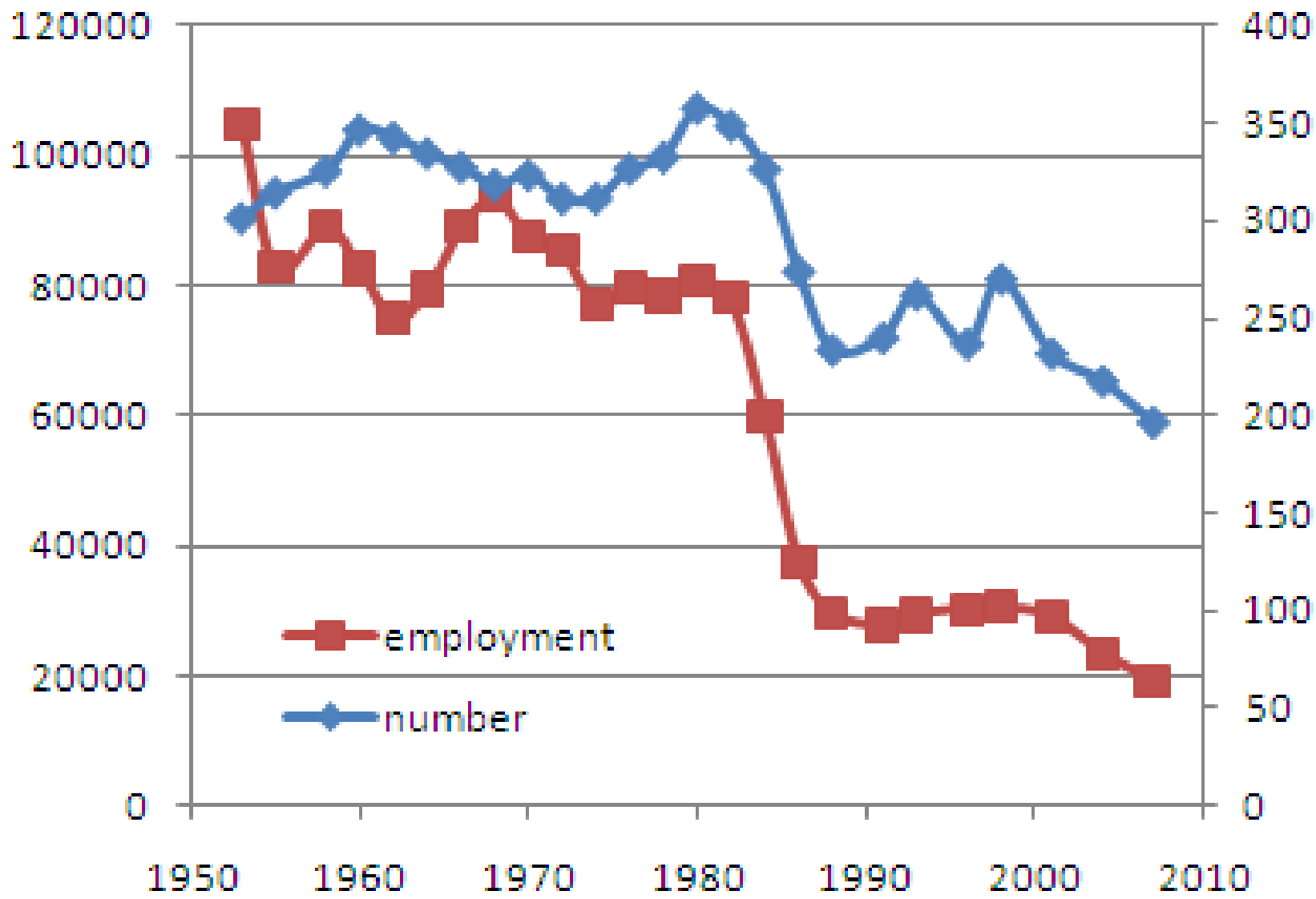


prod/cap

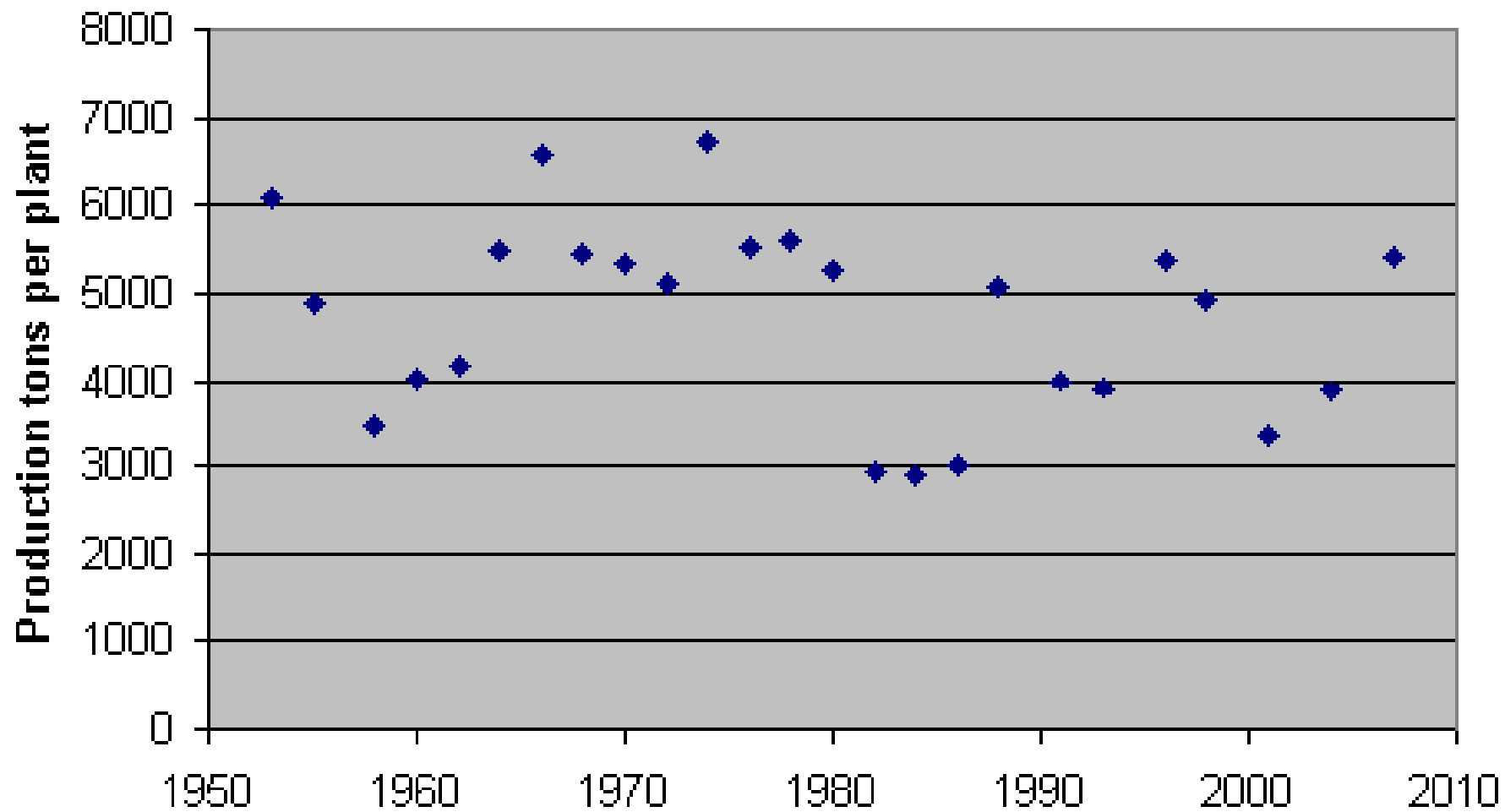


Capacity and production

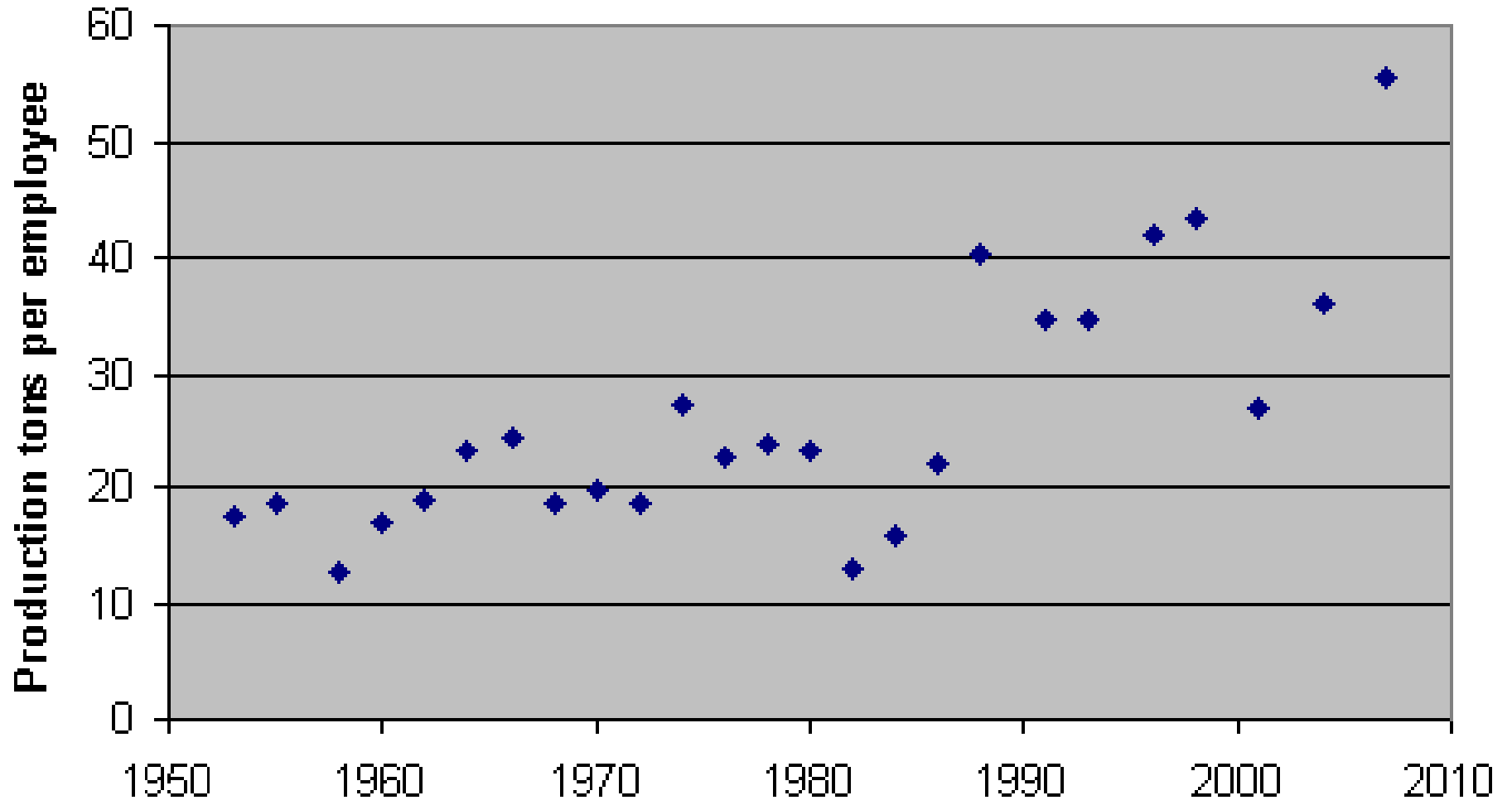




prod/number



prod/employee



Economic Trends in US

Capital Equipment Investment

15 to 40 years

- Excess Capacity
 - Prices stable or decline
 - Cost cutting required
 - Reduce inventory
 - Minimum staff
 - Low profitability
 - Liquidation of capacity
 - Low interest rates, inflation, inventories, lead times
 - Fewer captive operations
- Limited Supply
 - Prices increase
 - Production required
 - Inventory asset
 - Staff required
 - New products and processes
 - Increases in capacity
 - Increases in interest rates, inventory, inflation, lead times
 - New captive operations

Steel castings grow more than 3% a year for a decade.

	Total tons	kg per capita	kg per capita industrialized
Steel 2010	1,244,200,000	191	300
Steel Castings	9,939,000	1.5	3
Steel 2020	1,900,000,000	250	53% increase
Steel Castings	15,200,000	2	34% increase

Costs as a percent of shipments

Type of Production	Materials	Labor	Energy	Cap-ex	Gross Profit
Foundries	48	28	5.0	3.7	17.6
Forging	56	22	2.3	2.9	17.3
Machining	39	35	1.6	4.1	18.8
Fabrication	48	25	1.7	2.6	21.0
Steel products from purchased steel	64	13	2.5	2.0	18.8

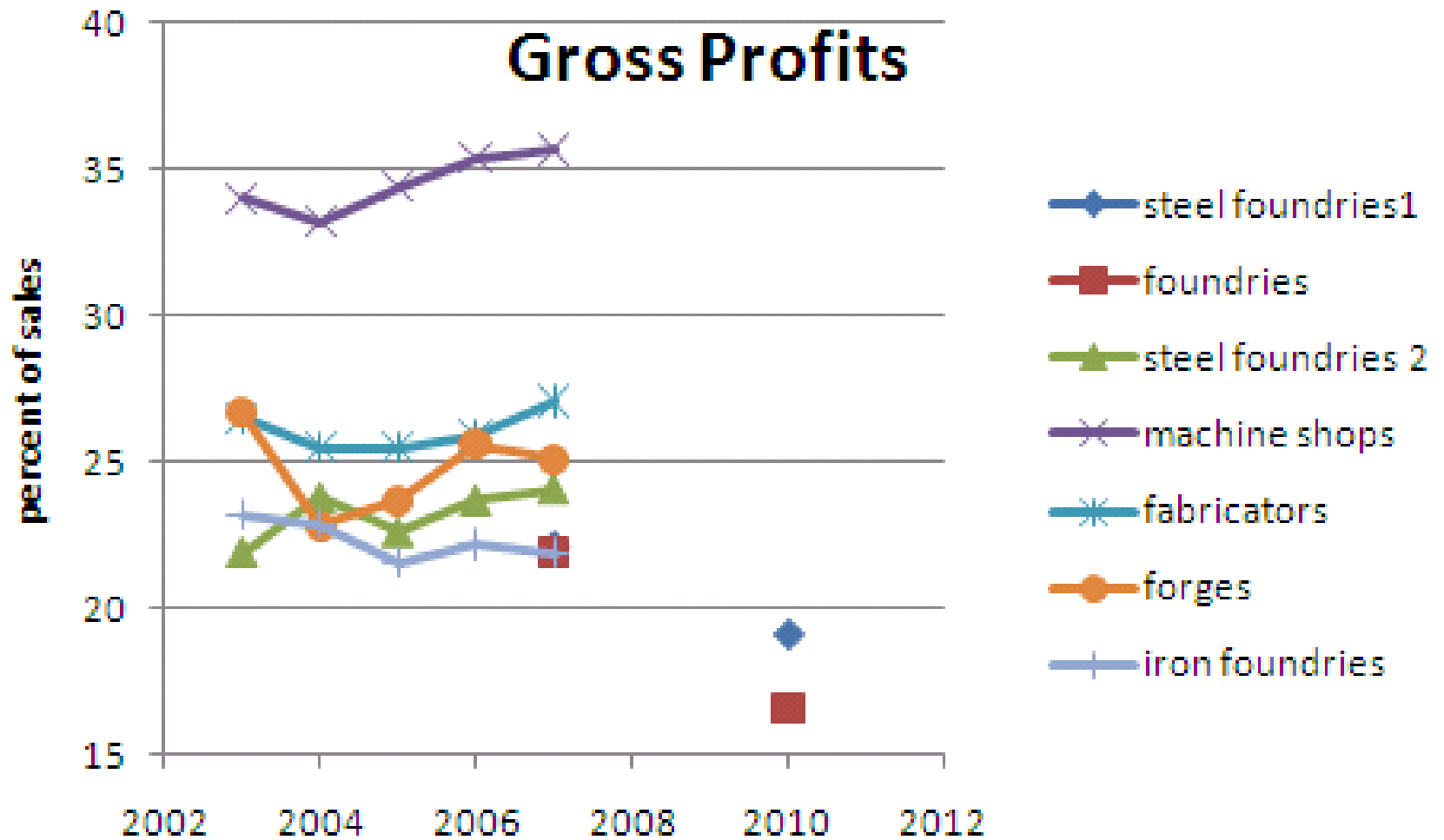
When do we invest?

- SFSA did a quick survey to try to see how much capital investment was required to increase capacity. For a steel minimill, a new site can be constructed for a cost of about \$350 per ton per year. The typical selling price of hot rolled coil, HRC, is currently about \$600 a ton. To add a ton of capacity to the steel foundry the costs ranged from \$600 to \$2,800 per ton per year. Most responses were from \$1,500 to \$2,000. It is interesting that the incremental cost of adding a ton of capacity seems to be related to the average selling price of the item.

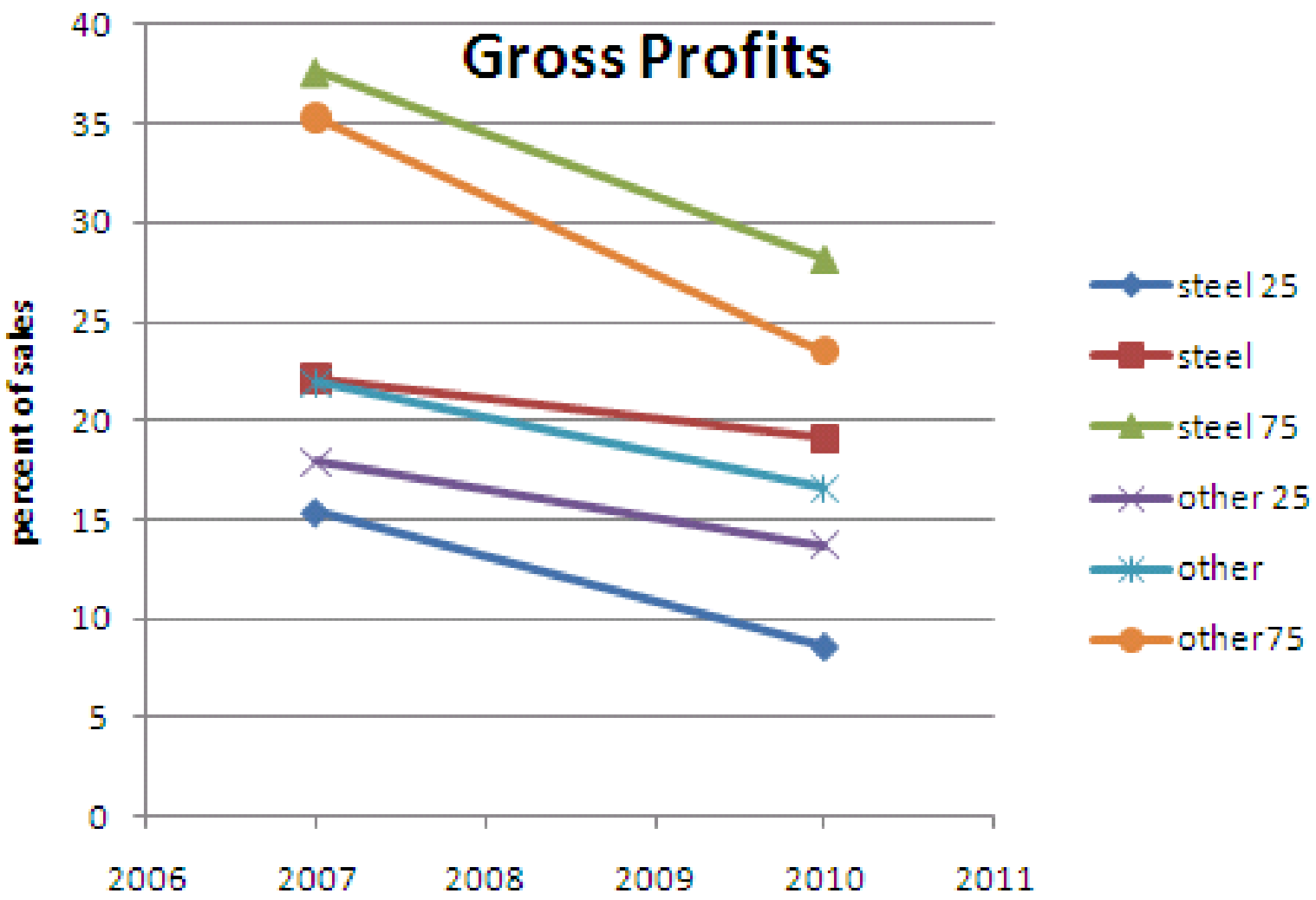
What about payback?

- We want a 3 to 4 year payback on new capital equipment .
- Payback for capital capacity expansion would be measured by the gross margin on sales.
- To get a 3 to 4 year payback on capacity we would then need a gross profit of 25 to 33%

Gross Profits



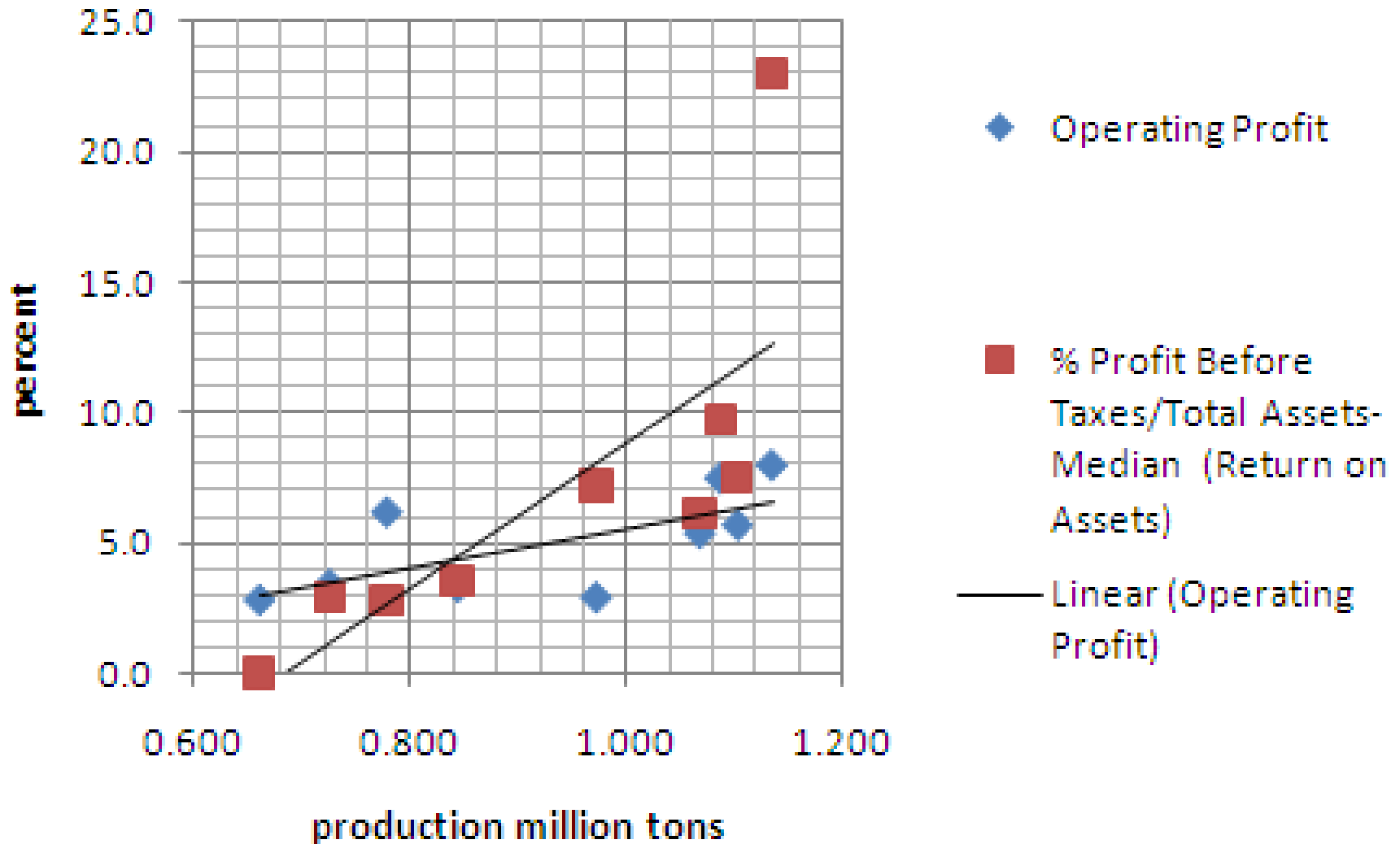
Gross Profits



What is the return compared to alternative investments?

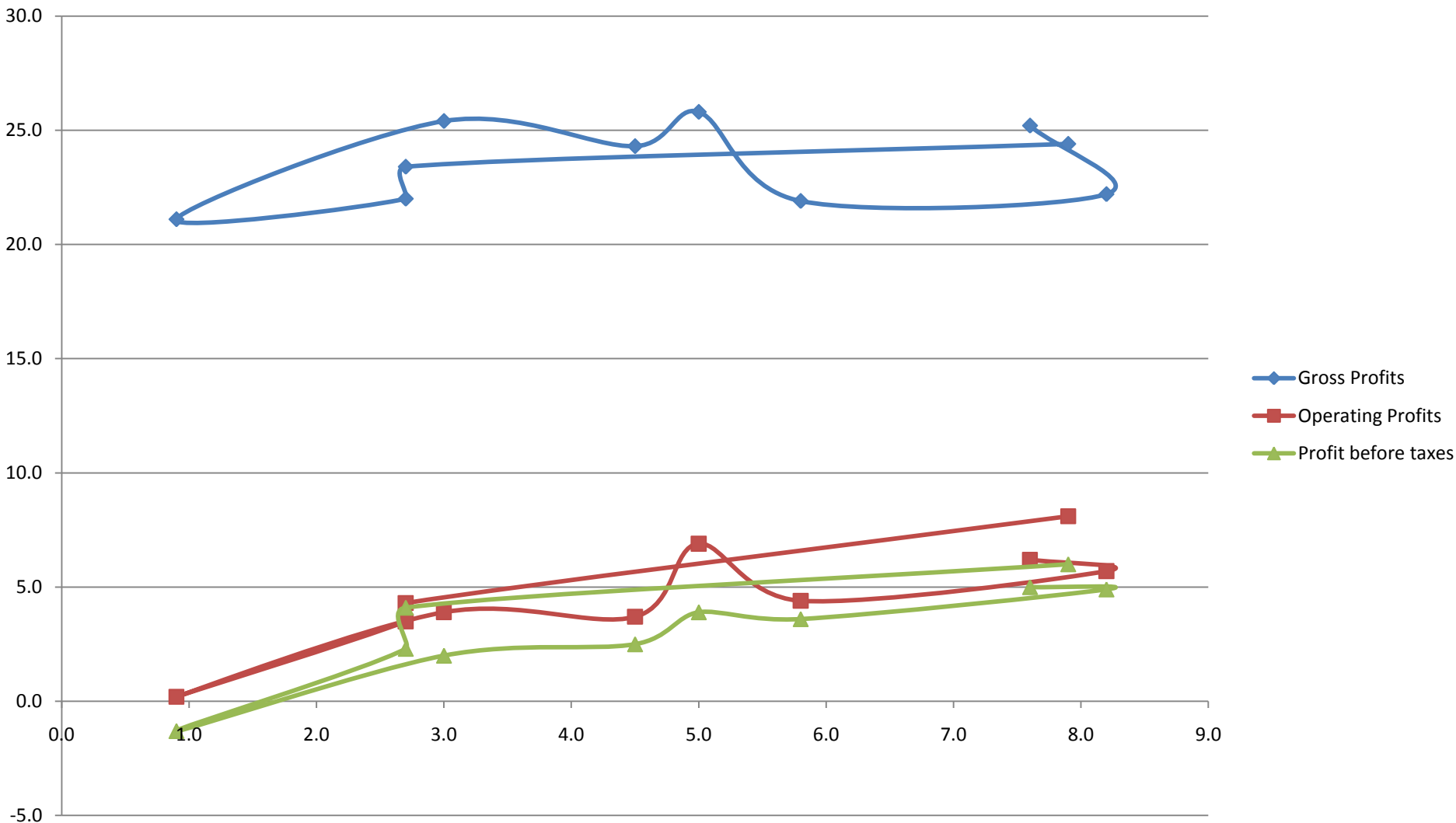
- If we look at capital investment for added capacity as an alternative investment, then it needs to meet a discount rate/investment return target. A typical level for discussion is 5% for either discount or long term investment return in real dollars.
- Operating profits for steel foundries had a median value of 5.4% with a range from 2.8 to 8% from 2002 to 2008.
- Lowering the discount rate, increasing the expectation of inflation, or reducing the expected returns of alternatives makes capacity investment more attractive.

Profits and Production

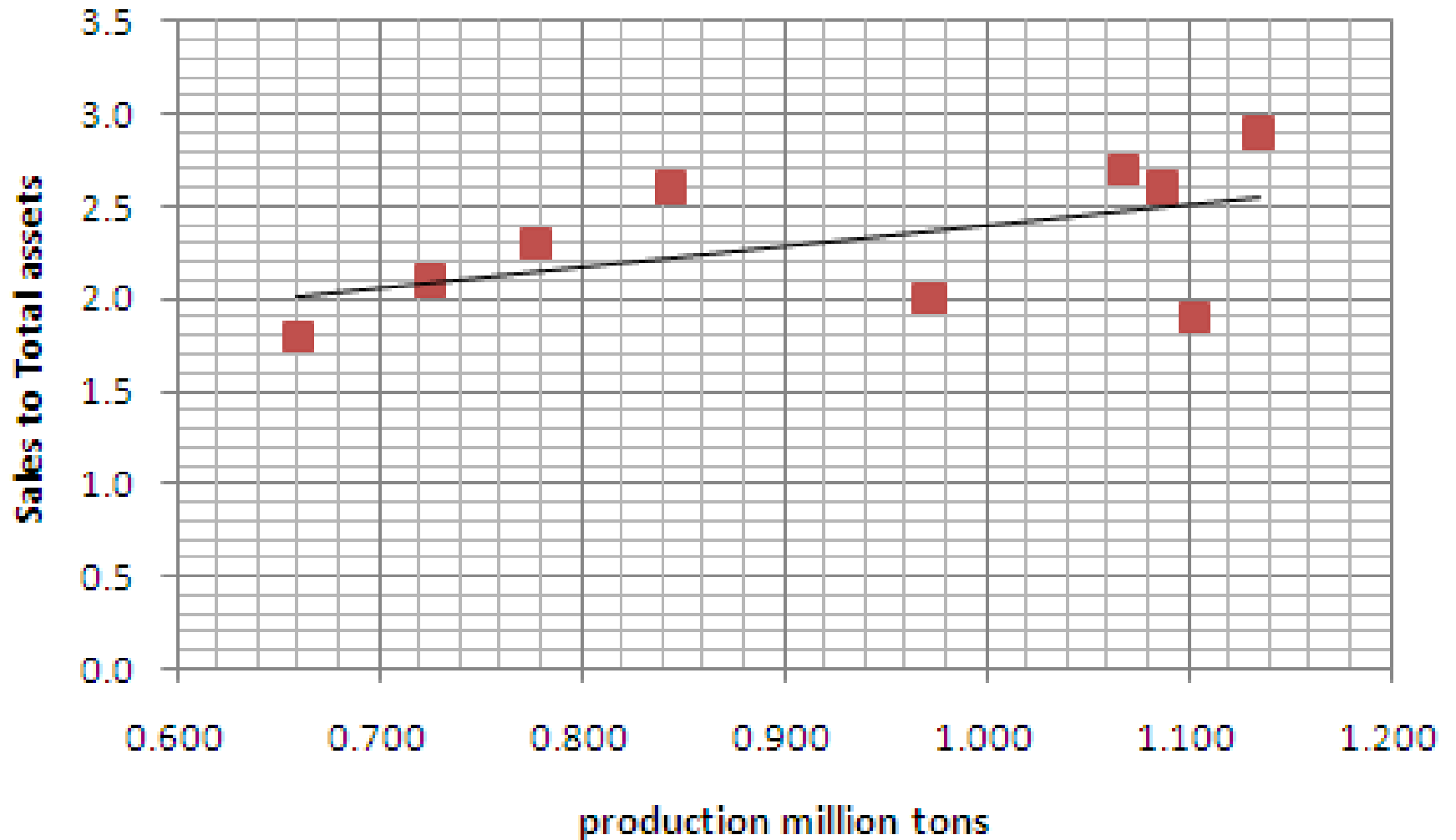


Profits v. ROA

steel foundries with assets \$2-10MM



Sales to Assets



Foundry Business Sales

- Foundries traditionally sell for about $\frac{1}{2}$ the annual sales volume.
- If the operating profits are about 5% of sales, then the price of the foundry needs to be discounted to achieve a reasonable return.
- For an investment return of 10% when the average operating profit is 5% then the selling price needs to be $\frac{1}{2}$ of annual sales.

When then to add capacity?

- If the cost of capacity addition is less than the selling price of the produced product then it may be time to add capacity.
- If in the prior example, capacity tons can be added for less than half the sales price then it is a good investment.

Thanks!
Questions?

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