

Text

Hello everybody, we are pleased to present you an article from the Journal of Financial and Quantitative analysis, written by Albert Sheen: Do public and private firms behave differently? An examination of Investment in the Chemical Industry.

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Sheen received his PhD in finance from the University of California Los Angeles. Before attending graduate school, he worked as a research associate for Sanford C. Bernstein & Co. in New York and a consultant for McKinsey & Co. in Chicago.

Why choosing only one sector? Because it is necessary to compare these decisions on the same activity for the comparisons to be meaningful

Why the chemical industry? For several reasons:

- There is a sufficient number of players to carry out this study and especially with more transparent financial and decision-making data than elsewhere.
- The chemicals are homogeneous. Their composition is identical whether in one company or another. Avoid differences due to branding or product quality.
- The 2 biggest private companies in the United States are in the sample, Cargill and Kock Industries.
- In the case of commodity chemicals, market prices and quantities can be used to reveal the attractiveness of the investment

How it's done:

- The collection of a complete panel of U.S. production capacity by firm for seven commodity chemicals between 1989 and 2006. The evolution of production capacity will thus be taken as the measure of investment.

Further we also have some more information on the article itself, the slides show you a summary:

-title

-author

- Data set: Panel of US production capacity by firm for 7 commodity chemicals from 1989 to 2006. Sample of 128 firms with 52 privates

The content of our presentation is as followed, we will first start by the introduction of the article, which will be followed by data selection and the chosen that had been made by the author and the research design. Afterwards we will enlighten the empirical results followed by the mechanism and of course we will end our presentation with the conclusion. And critics.

## **I. Intro**

The problematic, the research question of this article is the following: If you take 2 firms, one firm is listed the other is not, so a public and a private firm that are operating in the same industry, will they invest in a different way?

To answer this question, we first need to better understand the benefits of being a private or a public firm. In the article, Mr Sheen differentiates public and private firms as followed:

Private: less subject to agency problems and protected against wall street analysts. But do not disclose financial statement, better aligned incentives lead to better decision-making.

Public: easier access to capital, better to capture positive NPV opportunities, hard to evaluate investment choices, on average public firm are larger, the separation of ownership and control. One other potential benefit of being public is obtaining capital at more attractive terms and being less financially constrained through access to equity markets.

Public firms can be subject to short termism which resumes in pressure. Going private then means less managerial decision-making control

The last point of both types of firms leads the study to two challenges and useful information that the author gives in its introduction:

#### Challenges:

- 1) First, it is difficult to see what private firms are doing as they generally do not disclose financial statements.
- 2) Second, it is hard, even with public companies, to evaluate a firm's investment choices.

Furthermore, this paper investigates two types of investment, first the increase in capacity, and secondly, acquisitions.

It introduces a new empirical approach that enables both equal visibility into public and private investment decisions and an empirical method to compare them.

The author implements the basic idea that it is better to open a new store when demand for its products is high than when it is low. Thus, profits are higher when a positive demand shock (higher prices and higher quantity demanded) hits the market. Similarly, negative demand shocks are associated with poor results.

## **II. Data description and research design**

Now, let's have a look at the used data set. The author consulted a consulting firm that is specialised in the chemistry sector. He selected data from 1986 till 2006. Of course, there are a lot of different chemicals but not all of them are considered because there were some requirements that needed to be fulfilled.

1. At least 1 private firm produced the chemical during the sample period 86 till 2006.
2. Capacity figures must be well defined.
3. Capacity cannot be switched between multiple products in response to shifts in market demand
4. The chemical must not be produced as the by-product of another process
5. Quantity and price data for the chemical must be available from sources

This leaves us with 7 chemical products

Then the firm, since we want to investigate the difference between public and private, both are taken into consideration and will be defined by the analysis of the shareholding. In addition, the firms are controlled for their size. Normally you would use revenues, but as they are not published for the private company, Sheen used an approximation, namely the number of employees was used.

Further I need to introduce 2 concepts. The first one is a brownfield expansion. A brownfield expansion can lead to capacity increases by capacity at a given plant that increases, so actually if capacity increases, the plant location also increases.

The second one is greenfield expansion, if we talk about greenfield expansion, a new plant is built so the production capacity is coded as a new location that doesn't belong to another company.

Then it is important to mention that joint ventures and cooperatives are excluded from the analysis, although their capacity is included in the totals. So, after all these requirements, Sheen obtained a data set of 128 unique firms which contains 76 public and 52 private firms.

You can see the overview in the slide.

While you might think that public firms are on average larger, there are significant private firms e.g. Cargill and Koch industries. In this table you can see that it is needed to control for firm size so that in the analysis we can separate the effect of being private firm the effect of being small. Also we see that the public firms on average hold a greater market share within a particular business. We see that the median for the public firm has 2,4% of the market, while the median for the private firm only holds 1,6% which is slight lower.

The demand for chemicals in this study is driven by mostly macro-economy and agriculture factors of course there are also some smaller other factors. At this moment, you might ask yourself the question: How can investment now be evaluated using capacity decisions? What is the link?

Well, in capital intensive industries, like chemicals, the timing of capacity increases is crucial. That is why Sheen implemented the simple intuition that it is best to bring on new capacity when there is a positive demand shock.

Positive demand shocks, so the demand curve will shift to the right, so price and quantity increase until a new equilibrium is reached. + *refer to image*

Similarly, negative demand shocks are to be avoided because new capacity is not needed if customers are reducing their purchases. The negative demand shock will lead to an equilibrium with lower prices and lower quantity.

Besides the demand, we also have positive and negative supply shocks. They have an indeterminate effect on the probability of the firm. + *add table and refer, don't explain every*

As you can see, the author opted for simplicity in his measurements, but as you know simplicity comes with trade-offs; The first one is that there is the potential to miss small shocks and that the fact that demand shocks could be measured and identified with error due simply to noise in prices and quantities.

*So with all this information we can go further to the results. Ernest the flour is all yours.*

### III. Empirical results

A. Now, we will move to Empirical results.

Firstly, let's look at the investment frequency and increment size. Across all 7 chemical products, on average, capacity construction appears every 11 years. There is an insignificant difference between public and private firms, where public firms build new capacity in 9,1% of firm-years and private firms in 9,5% of firm-years.

In addition, these expansions are small on average. For public firms the additional capacity represents 1,6% of total industry capacity, while for private firms it is slightly less.

Regarding investment frequency, there is no significant difference between public and private companies in terms how often they invest. The firm size does not affect the investment frequency as well. Considering all these variables, we can conclude that there is no difference in how much these 2 types of firms add when they do so.

PPT:

	Public	Private
Frequency of Capacity Construction, average	11 years	11 years
% of firm-years	9,1%	9,5%
Expansion size to total industry capacity, average	1,6%	1,1%
With Control Variables: Investment frequency	No difference	No difference
The firm size	No difference	No difference

B. The next part of results is Investment Timing.

Here we look for the differences in the response of public and private firm investment to the demand environment.

The author found that without considering the size of the firm public firms are more likely to invest prior to negative demand shock, while private firms tend to invest before the positive demand shock. Thus, we can say that public firms appear to be ill-timed, and private firms' capacity expansion arrive in a more attractive selling environment. In fact, before positive demand shock private firms are 5% more likely to increase capacity and 5% less likely to grow prior to the negative demand shock. By adding the firm size as control variable, the results remain the same. However, there is evidence that larger firms invest more efficiently.

PPT: Something like timeline

-----private firms (5% more likely)-----positive demand shock-----

Capacity expansion arrive in a more attractive selling environment

-----public firms-----negative demand shock----

Ill-timed

Firm size as control variable:

Results the same

Larger firms invest more efficiently

C. Now, let's look at investment method.

Capacity increases come in 2 forms: new construction and asset purchases.

Asset purchase has a significant impact on the investment-timing, and it mislead the interpretation of results shown before. The problem with asset purchases is that it is better for the company to buy a new asset when the prices are low. It usually happens when the industry anticipates a negative demand shock in the future. Thus, it seems more reasonable to grow through asset purchases prior to negative demand shock than to positive, as public firms usually do according to the results.

However, if we separate capacity increases via construction and via acquisition. Public firm construction remains mistimed.

It is worthy to mention that in case of acquisition private firms invest prior to the positive demand (when the price of acquisition might be higher).

In addition, there is one more variable as industry utilization or in other words by what extent firms utilize their capacity. Here, we also have a difference, where private firms do acquisitions when capacity is tight (thus, prices are low), while public firms do the opposite.

PPT:

	Public		Private	
	Build	Acquire	Build	Acquire
Positive Demand Shock	less	less	more	more
Negative Demand Shock	more	more	less	less
Industry utilization High	less	more	more	less
Industry utilization Low	more	less	less	more

#### IV. Mechanisms

Another important finding of this study is the difference in how the public and private companies make their decisions about capacity increase. The author focus on how time-to-build delays and potential overextrapolation of past demand shocks can interact with access to capital.

We already saw in the previous part that capacity increases arrives when demand is weakening, hence industries with time-to-build delays can make investment mistakes.

As capacity construction requires 1 or 2 years, this is the window of past performance that precedes decisions to build new capacity that arrives. When it comes to adding capacity, firms will build when demand is high, not low.

Therefore, to sharpen the test, the author limits past demand shocks to those that are big, positive shocks (BIGP SHK). “Big” here is defined as 4% growth in both demand and price. Column 2 shows that firms indeed increase capacity after they see a large, positive shock. The author then split investment into two principal categories build and acquire, respectively for building new capacity, and for acquisition of another company. As the table shows in column 3 and 4, firms are more likely to build new capacity when a big shock hits the markets.

	ALL 1	ALL 2	ACQUIRE 3	<u>BUILD</u> 4
DEM_SHK <sub>t-2,t-1</sub>	0.008 (0.62)			
BIGP_SHK <sub>t-2,t-1</sub>		0.094*** (2.66)	0.018 (0.92)	0.077** (2.14)
PRIV × BIGP_SHK <sub>t-2,t-1</sub>				
FIRM_SIZE × BIGP_SHK <sub>t-2,t-1</sub>				
PRIV				
No. of obs.	1,964	1,964	1,964	1,964

But what about the difference between a public and a private firm ?

Columns 5 and 6 show that private firms appear less likely to invest in response to previous shocks. Public chemical firms are thus more responsive than private firms to past positive shocks

	ALL 1	ALL 2	ACQUIRE 3	BUILD 4	BUILD 5	BUILD 6
DEM_SHK <sub>t-2,t-1</sub>	0.008 (0.62)					
BIGP_SHK <sub>t-2,t-1</sub>		0.094*** (2.66)	0.018 (0.92)	0.077** (2.14)	0.101** (2.37)	0.284* (1.84)
PRIV × BIGP_SHK <sub>t-2,t-1</sub>					-0.073 (-1.42)	-0.117* (-1.89)
FIRM_SIZE × BIGP_SHK <sub>t-2,t-1</sub>						-0.020 (-1.20)
PRIV					-0.031 (-0.34)	-0.028 (-0.31)
No. of obs.	1,964	1,964	1,964	1,964	1,964	1,964

## V. Conclusion and Critics

The presentation comes to an end, before leaving, we have sum up the main ideas that the study tackles:

### 1) Size and frequency

Private and public size and frequency of investment are quite similar in the chemical industry. private firm invest differently than public firms:

However, private firm capacity increases appear better timed: Private firms are more likely to increase capacity during a positive demand shock. Thus, private firms tend to line up more strongly with this demand shock measure and are more profitable than their competitors.

Private firms are more likely to strategically choose to build when industry utilization is high and acquire when utilization is low.

## 2) Why these differences?

Among public firms, those that best align with this investment model (of demand shock), are more profitable than their competitors.

Result: Private firms are more likely to open capacity during positive demand shocks, while surprisingly public firms are more likely to open capacity during negative demand shocks. But this behavior may be common in the chemical sector and other cyclical industries because they need large capital expenditures.

Explanation: Greenwood and Hanson's model looked at this in the maritime sector of bulk cargo handling and transportation, and we see that high ship earnings are associated with high investment but also with lower capital returns.

Reason 1: Why? Companies believe that high returns will continue in the future and expect a quick return on investment, whereas building a new capacity is time consuming and there are deadlines to meet, and competitors to consider.

In the chemical industry it is the same, a new production capacity is 1 to 2 years, and Greenwood and Hanson note that the chemical industry like the bulk shipping industry has boom and bust cycles and can be comparable.

Thus, the chemical companies in the sample would consider changes in demand based on the past to invest in new production capacity. This behaviour is more common in public companies than in private companies.

Reason 2: Private companies could better spread investments over time because of the reduction of agency problems (conflict of interest between different parties and thus a misalignment of interest).

Critics: The plan of the article is very clear, however we noticed that he is presentation the results of the study in his introduction. Thus, the conclusion of his results was already known at the beginning of the reading. To be a little critical on the empirical results, we argue that they are quite difficult to understand.

It does not consider the final products, but in fact contracts are linked between companies and the power relationships in obtaining these contracts, which can impact the evolution of demand and production, are not really considered. in the study.

The author relies on other articles to validate his hypotheses. However, as a reader of this article, we cannot know if the other articles make sense