Economics 664: Empirical IO
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1 Lecture 1: September 1, 2005

1.1 Topic 1: Price Discrimination

- Price discrimination (PD) is when a firm sells the same good to different groups at different prices and this difference cannot be explained by a difference in cost. The difference must arise from some sort of market power. We define market power for our purposes as a firm that faces a downward sloping demand curve.

- There are three necessary conditions for PD to exist: 1) market power, 2) consumer heterogeneity, and 3) no arbitrage can be possible.

- There are 3 types of PD:

  - 1st degree: a firm charges a different price to all consumers and extracts ALL of the consumer surplus using nonlinear pricing.
  - 2nd degree: a uniform menu of prices (possibly nonlinear) is offered to all and the menu is designed so consumers self select into different groups (need IR and IC constraints). The firm has no way to distinguish consumers directly.
  - 3rd degree: a firm charges different prices to different consumers but uses linear pricing so it cannot extract all consumer surplus.

- Recall the monopolist's FOC:
$$\frac{P - MC}{P} = -\frac{1}{\epsilon},$$
or the firm's markup equals the inverse of the price elasticity of demand. The more downward sloping is demand, the more inelastic is demand, the lower is ϵ, the higher is the markup. As demand becomes increasingly flat (from the firm's perspective), the markup goes to zero.

- Since firms are better off under PD and consumers prefer a uniform menu of prices, the socially maximizing choice is ambiguous.

Borenstein 1991 RJE

- This is a paper on gas price discrimination. The motivation for the paper is to answer the question: "Can PD occur in a market that is fairly competitive?"

- Each gas station has some market power in their nearby locality. The tradeoff from the consumer's perspective is not "to buy or not to buy" but rather buy from A or buy from B.

- Facts: Define the margin for a gas station as the retail price less the wholesale price of gas. There are two types of gas: leaded and unleaded. The variable: MargDiff = unleaded margin - leaded margin was computed throughout the 1980's and it was seen that in 81-85, the margin was about 3 to 5 cents. It then rose to 6 cents in 1986 but then fell back to 5 cents in 1987 and 2 cents in 1989.

- How can we explain these changes in the margin between leaded and unleaded gas? One explanation is the cost of different types of gasoline changed over the period. Maybe it became more expensive to extract leaded gasoline for example. Maybe the introduction of credit cards for transactions effected the markets for the two types of gasoline differently.

- Another more plausible explanation is price discrimination. If the demand for unleaded gas becomes less elastic, ϵ falls so the markup rises on unleaded fuel. The data show that incomes of those using unleaded gas rose during the early 80's which would lead to this result. But what about the late 80's when the margin narrowed? The data show that this happened because leaded gas became less popular and was carried at fewer stations - availability fell. This increased the markup that firms could charge on leaded gas and hence the difference in the margins narrowed. Since it's not a cost story, but rather the relative elasticities driving the difference in margins, we have PD story.

- Key regression of the leaded margin less the unleaded margin on a constant, the availability of leaded gas, and the income ratio of those that use leaded to unleaded fuel. The coefficient on availability was negative and significant meaning that as the availability of leaded gas fell in the late 80's, the margin between leaded and unleaded gas narrowed. The coefficient on the income ratio was positive and significant indicating that when the relative incomes of those using unleaded gas versus leaded gas rose in the early 80's, the difference in the margins widened.

- One problem with the regression is the availability regressor which is proxied by the ratio of the dollar value of the volume of leaded gas to the volume of all gas available. Since there is a price in there, we may not have a very good instrument. Availability is really an endogenous variable. There could also be a sample selection problem.

2 Lecture 2: September 6, 2005

2.1 Price Discrimination in the New Car Market

- We have 3 papers this week measuring PD in the new car market. They all address the issue of racial and gender PD a bit differently and employ different methods. They also all lead to different results!
- It's important to note that we already know there is PD in this market but we would like to see if it of the illegal type (gender or racial). The car market is huge and interesting in its own right and it's one of the few markets where bargaining is an essential part of the buying process.
- The market is also unique because there are many layers including the dealer, manufacturer, and the financing firm which all may or may not price discriminate.

Ayres and Siegelman (AS) 1995 AER

- They do a field experiment in Chicago at the individual level. The same bargaining technique is used for 9 car models in a paired sample of one white male and one minority (white women, black women, and black men).
- Throughout the process, every negotiation price including the initial and "final" offer is recorded. It's not exactly final because they never actually purchase the car in the end.
- The result is that for initial offers by the dealer, white women receive offers that are 200 dollars higher than white men, while it's 450 for black women and 1000 for black men. As for final offers the numbers are 130, 440 and 1100 for the respective groups.
- There are several advantages to a field experiment including 1) more control over heterogeneity which allows you to isolate key variables of interest; 2) confounding variables (like the method of bargaining) can be controlled for; 3) and you can get a LOT of data on each observation (like every offer and counter offer).
- There are also disadvantages though including 1) it's very costly; 2) results in a small sample of observations which may not be representative; 3) and it's hard to make the experiment as close to reality as possible.

Goldberg (G) 1996 JPE

- She uses data from the CES (consumer expenditure survey) at a nationwide and household level. Since she cannot control for bargaining, there is sort of a black box. All car models are included and various trim levels are also accounted for. We only know the true final price of the car.

- The result is that she does NOT find any PD based on race or gender in the market. The black males only pay 274 dollars more on average but even this is not statistically significant.

- One way to explain the difference between G and AS is to note that the variance of the black male reservation prices is much larger than the white male. A dealer, facing a black male will start the bidding process higher in case he happens to be facing a black male way out in the right tail. In the AS study, we only have a one shot game and there is no reputation effects that might be better captured in the larger nationwide study. Usually during a bargaining process, information about the buyers type is flowing from the buyer to the dealer. But in AS, the bargaining strategies of a white male and black male were scripted, hence the distribution of initial and final offers is identical. In G, if initial offers were available, we might see the same distribution as in AS, but by the time the final offers are reached, the price paid is about the same for white and black males. The information about the buyers type has had a chance to reach the dealer and since the mean reservation prices are about the same, the final buying price for white and black males will be about the same.

- A couple disadvantages to the CES study include a LOT of noisy data. She has to impute a lot of information about buyer types and trim levels of cars that it makes it hard to believe the results are meaningful. The calculation of the dealer markup, as MSRP less final price is also probably not the best measure of dealer profits.

- Goldberg also runs quantile regressions on say the 10th and 90th quantiles of the empirical distribution to see if there is heteroskedasticity going on and she does see that at certain quantiles, her results are in line with AS while overall the result is that there is NOT PD going on based on race or gender.

Harless and Hoffer (HH) 2002 AER

- Finally, in this paper they use a better measure of dealer profits from the JD Power and Associates database. They again, find NO price discrimination based on GENDER, but they do not have enough information to determine if there is PD based on race.

3 Lecture 3: September 8, 2005

3.1 Price Discrimination with MFC Clause and Broadway

Morton JoE 1997

- In this article, we exam the market for pharmaceuticals in relation to the government's Medicaid program. Prior to the legislation, the market featured significant PD and several insurance companies where getting large discounts on drug contracts while the Medicaid program was being charged a relatively high price.

- The government decided to implement a Most Favored Customer (MFC) clause where the lowest price offered by a drug company to any one buyer must be offered to ALL buyers if the company choose to participate. In return, that company was opened up to the demand from the Medicaid program which is a large player in the market.

- So the Medicaid program would benefit at the cost of others who would pay a higher price. The question is interesting because there are huge distributional consequences of such a policy. It's also interesting to ask what the overall welfare effects are of such a policy.

- On the supply side of the market we have patented drug companies (brands) that have a monopoly over the identical product but may still compete with close substitutes. There are also generic competitors that can enter the market after the patent has expired (17 years).

- On the demand side are insurance companies, hospitals, private buyers and Medicaid. Medicaid covers US residents on the welfare program and includes prescription drug coverage. This segment of the market has the most inelastic demand curve.

- The MFC clause stipulated that for a branded drug, Medicaid would pay

  $$min\{87.5\% \text{ of Average Market Price, Best Price Offered}\}.$$

  For generic drugs, Medicaid would pay 90% of AMP.

- The response to the MFC was for firms to raise their prices whether they were branded or generic. The costs of setting a low price to any one buyer would have been huge because they would be forced to offer that same price to all buyers. The price paid by Medicaid, on the other hand, fell so total government outlays on Medicaid also fell.

- The control group for the analysis was the "inpatient drug" which were not susceptible to the MFC clause.

- The result in terms of welfare is hard to quantify. Though Medicaid saves money, the average market price for most other players in the market has risen. Insurance rates may also rise?

- In any case, the MFC is one way to "solve" the PD problem.

Leslie RJE 2004

- Here we have PD (second and third degree) in the market for tickets to a Broadway play. The paper looks to address the welfare impact (both firm and consumer) of price discrimination.
- The model is structural which builds up from a utility function to a demand function for various quality of seats and then the parameters of the model are estimated by maximum likelihood or method of moments. Since in the past, the welfare effects (especially to the consumer) of PD has been ambiguous, a structural model might help us quantify the effects.
- Advantages of a structural model over a reduced form model: with reduced form, one set of results can be supported by two different functional forms. Since we have specified the structure (forms of utility functions, assumptions on dependence, etc), we really have only one story to tell. We just need to justify the structure.
- Disadvantages include justifying the structure! We need a lot of assumptions to build up the model and then must do robustness tests to see if our structure is correct.
- Important assumptions of the model:
  - (1) Distribution of income and tastes are independent. This seems unrealistic though a joint distribution would be hard to model so it may be the best we can do.
  - (2) The opportunity cost of buying via the TKTS booth is increasing in the consumer's income. Good assumption.
  - (3) The price of the seats is EXOGENOUS! The price is set on opening night and never changed throughout the run of the show. This is more a characteristic of the market than anything else, but in most markets we would think of the price as being endogenously determined.
- The author also does counterfactual experiments where he tries to test the welfare implications of the pricing behavior (uniform versus various types of PD).
- One interesting result is that uniform pricing actually does better than PD in some cases. We also see that setting the booth price at 30% off the full price yields higher revenues than making the discount 50%.

4 Lecture 4: September 13, 2005

4.1 Product Differentiation in a Discrete Choice Setup

Barry RJE 1994

- We have a market setup with different market segments having different demand curves and each of these curves are related (correlation between the segments).
- We seek to model the demand for a differentiated good. Prior to Barry, economists used a hedonistic approach by running a regression:

$$p = f(x) + \epsilon,$$

  where x contained a set of descriptive characteristics of the product. For example in a housing example, x might contain the number of rooms in the house, number of bathrooms, location, etc. Then:

$$p_x = \frac{\partial p}{\partial x},$$

  would be how much a buyer would be willing to pay for that particular component of the product. It's the marginal price of the characteristic.
- Then we can model the supply and demand system as:

$$D = f(p_x),$$

$$S = f(p_x).$$

  However supply and demand are very much linked (namely through price) so we have an identification problem.
- Barry said that every firm has a certain degree of market power due to their (slightly) differentiated products.
- So we have a discrete choice problem where consumers choose to buy one unit of some good and there remains the possibility of buying nothing (or an outside good). Suppose there are n goods. Then:

$$u_{ijt} = u(x_i, x_j, \xi_j) + \epsilon_{ijt},$$

  which says the utility of consumer i for product j is a function of the characteristics of the agent, (x_i), the characteristics of the good, (x_j), and the unobserved product characteristics, (ξ).
- The consumer maximizes u_{ijt} by choosing a product j.
- The advantages of this type of model is that we can use Aggregate data if we make a few assumptions, so the market share is enough to do the analysis. It also reduces the number of parameters to be estimated. In general you would have to estimate N^2 cross price elasticities which may not be feasible. By imposing a structure on the elasticities of demand, we can reduce the number of parameters we must estimate.

- One such structure is logit errors, which induces:

$$Prob(\text{agent chooses product } j) = \frac{e^{u_j(p_j)}}{\sum_{j'} e^{u'_j(p'_j)}}.$$

  Then total demand for product j is $D_j = N * Prob(j)$.

- With a simple logit, we make an assumption called IIA: Independent and Irrelevant Alternatives. This means, all else equal, if the price of a good goes up, you have an equal probability of choosing one of the other goods as long as they all have equal market share.

- Simple logit seems strong since it means if you were originally buying a honda, you might equally switch to a toyota or to a BMW. A better setup is called a nested logit where you can consider subgroups of products and then apply the simple logit within those subgroups. This is a way to control for the substitutability pattern that you think exists in the data. However, the "tree" you designate is arbitrary.

- So the structure of utility that Berry uses is:

$$u_{ij} = x_j\beta_i - \alpha_{(i)}p_j + \xi_j + \epsilon_{ij},$$

  with:

$$\beta_i = \beta + \rho_i.$$

  So the coefficient on x_j reflects the consumers different substitution effects.

- So the immediate problem with this type of model is the endogeneity of price. Therefore we need an instrument for price which is obviously correlated with price but uncorrelated with the errors (and other variables already in the model). So, to trace out demand, we need a supply shifter.

- On the supply side we have the usual setting where:

$$p = f(MC, \eta_j),$$

  or price is a function of the firm's marginal cost and the price elasticity of demand for that good. Thus marginal cost would be a good instrument. Also η_j depends on both x_j and $x_{j'}$, so $x_{j'}$ could also be a possible instrument.

- Finally, considering the use of aggregate data. The LHS of our regression is utility which clearly isn't observed. However, if we denote $s_j = prob(j)$, the market share of product j, we can back out the MEAN utility from the model as:

$$\delta_j = s^{-1}(s_j),$$

  and δ_j is your LHS variable.

- The next Barry paper will actually apply this method to real aggregate data and the paper by Goldberg will use individual level data but again using the same discrete choice model setup.

5 Lecture 5: September 15, 2005

5.1 More on Oligopoly with Product Differentiation

Barry RJE 1994 (B)

Goldberg Econometrica 1995 (G)

- In these two articles, we consider the welfare implications of a Voluntary Export Restraint (VER) that Japan imposed on their exports in the 1980s. The profits of Japanese, US, and other competing countries will be effected. Of course, CS of the end user will be affected by the changes in price and quality.

- (B) uses aggregate data to estimate the discrete choice demand model using the methodology outlined in the Berry paper from last week. (G) uses micro level data from the CES.

- We can ignore the government in this analysis since the revenues generated for them is zero. We might consider how much better a policy could have been in the form of a tariff which would have raised some government revenue.

- Consumers, by definition, will be made worse off because if we expect Japanese prices to rise, they may have to substitute away (or pay a higher price), which must (by a revealed preference arg) result in lower utility.

- US car makers will benefit from the VER because the restraint causes US prices to rise due to increased demand.

- We might expect the net welfare change was slightly negative or zero. It almost surely will not be welfare improving.

- So on the demand side, we again estimate:

$$D = f(x, p),$$

  where x is a vector of product characteristics. On the supply side, we have:

$$p = f(MC, Markup),$$

  where the markup includes the price elasticity and the nature of competition. The latter is not modeled but it refered to as the "conduct parameter." It could be important, but in practice, it is difficult to capture changes in strategic competition.

- The general method of both papers is to assume the same supply side so the markup is equal to one over the elasticity. If the VER has a price impact then:

$$\frac{p - (MC + \lambda)}{p} = -\frac{1}{\epsilon},$$

  will be the relevant rule where λ reflects the additional cost of the restraint.

- (G) uses the nested logit model of demand and employs a Hausman test to determine which cars to put in which branch of her tree. We have to assume IIA among the branches of any node, so after an exhaustive iterative procedure, (G) reached a sufficient level of bifurcations such that no further groupings could be made.

- (B) concludes that the VER had no effect in the early years (the constraint didn't bind) and then may have impacted price later on in some years. (G) finds an unambiguous price impace for both Japan and the US but never really says anything about the welfare implications. The difference in the two approaches is really on the demand side:

  - Goldberg: Nested Logit. All consumers have the SAME tree so the same subsitution effects between automobiles. Because she has better data, she can avoid making assumptions about the distributions of consumer tastes. Price is deemed exogeneous because the atomistic consumer does not effect the market. However, if all consumers have the SAME preferences for a certain automobile and these fixed effects change over time, the price exogeneity assumptions becomes important.
  - Berry: Random Coefficients. The tastes of the consumers, v_i, apply to all cars of a similar class (size and make for example). This allows for more flexible substitution patterns. However, we need to parameterize v_i (maybe normal), but he also assumes it is constant across years. He uses IV for price as it is assumed to be endogenous. The problem again is controlling for fixed effects which can't be modeled in aggregate data.

- So how can we explain the different results? One explanation might be that because (B) uses aggregate data, the average elasticity is constant over time. In reality, the elasticity during the time period was falling (as the economy was moving into a boom), so one over ϵ was growing. Thus (B) would overestimate the markup in the early part of the sample (hence the no effect result of the VER) and then would underestimate it later on. Thus the (G) results would be more appealing.

- A further extension of this work could involve using both micro and macro level data to estimate the demand model.

6 Lecture 6: September 20, 2005

6.1 More on Oligopoly

Petrin JPE 2002

- We use BLP methodology, but try to get around the usual difficulties with noisy micro level data.
- Whenever there is an introduction of a new product (like a minivan in this case), it is usually difficult to measure the welfare implications on both the consumer and producer side especially when the new good has no close substitutes already in the market. Minivans are thus unique because station wagons and SUVs are close substitutes. But with a new drug for instance, it may be harder. Thus this method is NOT a cure-all.
- We seek to answer two questions: 1) what are the welfare implications of the introduction, and 2) what is the value of the extra information he adds to the model.
- What do we expect? There might be welfare gains from the new product for those that actually switch to a minivan (for price or quality reasons) and there might be gains for those that don't switch but face lower prices due to more competition among substitutes.
- The price effects, however, are ambigious due to the dependence on cross price elasticities between products.
- We also must consider the first mover advantage and what that does to the competition. The first innovator might enjoy some market power for a while, while others catch up. For example, Ford was less inclined to enter the minivan market because they had a large market share in station wagons. Introducing a competing product would canabalize their own product line. However, they underestimated the huge demand for minivans over station wagons and missed the boat. Chrysler was the first mover and really benefited.
- Overall, we expect consumer welfare to rise and producer profits to be ambiguous.
- The results are that in 1984 the minivan was introduced and attained a tenth of the market by 1993. Using the standard random coefficients utility model of BLP, we estimate parameters that hold on average for the entire market, as well as idiosyncratic components. The main difference from BLP is the use of MICRO MOMENTS in addition to those used in BLP. For instance, the probability a family buys a minivan conditional on having 4 members in the family might be a moment. He tries to match these moments with the data as best as possible.
- The welfare gains are significant. Producer welfare is initially negative and then becomes positive in later years but the large positive consumer welfare gains make the net gains to welfare positive in all periods.

- Cereal Extension. Ginger also mentioned an aside to her own research on cereal companies. (Possibly a Field Exam type question). The cereal market is dominated by 4 big suppliers (General Mills, Kellogg, etc). Lately, there has been a move by the FDA to induce more whole grain cereal consumption as it is quite a bit better than say lucky charms. The big 4, however, did NOT introduce healthier, whole grain cereals into the market right away, but rather it was some of the smaller fringe firms that entered (innovated) first. Could it be they don't want to canabalize their other products which for the larger firms would be more costly? Are there cost considerations to producing the new cereal that the large firms do not want to face? Brand loyalty issues? This might be an issue to return to before the fields.

7 Lecture 7: September 22, 2005

7.1 Collusion

Porter BJE 1983

- Price setting is illegal in the US following the Sherman Act. The problem is with detection. If a cartel is established, it will be in the interest of all players to increase quantity or decrease price and make large profits. We thus introduce a punishment phase if a firm cheats the cartel. This could be cournot or bertrand behavior and typically the contract will also involve a length of time for the reversionary period. In equilibrium, no firm will find it optimal to deviate, though because of unobserved demand shocks, there will still be reversionary periods but they will surely be caused by unobserved shocks and not a deviation. The objective of the cartel is to maximize total profits, which means minimizing the frequency of reversionary periods. See the Green and Porter model.

- Empirically, it is difficult for us to detect collusive behavior. It's impossible to know what the collusive aggrements are and with the various combinations of pricing strategies, punishment phases, and types of punishment, detecting a group of firms who are colluding becomes very difficult.

- The data may show periods of high price and low output and other periods of low price and high output. But is this collusion or is it simply supply and demand interacting?

- So what are some testable implications? Could look for a certain length of punishment phase. Could also check just how deep are the punishments and how high are profits when firms cooperate.

- In the Porter paper, the regression is static. There are no lagged variables so it's difficult to model the dynamic nature of the game. He is simply looking to explain the supply and demand analysis and see if some of the errors are larger than others, which might be driven by collusive behavior and not demand shocks.

- Demand side:
$$log(Q_t) = \alpha_0 + \alpha_1\ log(p_t) + \alpha_2\ log(L_t) + u_{it},$$
where α_1 measures the price elasticity of demand and should be less than -1 since a monopolist always produces on an elastic portion of the demand curve. Also, α_2 should be negative as it measures the influence of competition for the rail industry by the shipping industry. If the lakes are open, this should reduce the quantity demanded for the railroad operators.

- On the supply side, we have:
$$log(p_t) = \beta_0 + \beta_1 log(Q_t) + \beta_2 S_t + \beta_3 I_t + u_{2t},$$
where we expect $\beta_1 > 0$, $\beta_2 < 0$ measures firm entry, and $\beta_3 > 0$ measures the effect on price of cooperative behavior.

- The problem is that I_t is unobserved and β_3 is our key variable. Thus, Porter employs the EM algorithm where he estimates the demand system above without the I_t term. Assuming the errors are iid standard normal, we should see residuals that look bimodal if there is a significant difference in price when there is collusion happening. The idea is that the other variables are picking up all the demand and supply shocks so the collusion parameter should reflected in the error term.

- Porter concludes that there was some kind of collusive behavior happening in this industry, but the method is questionable. Next week, Ellison will address the assumption that the errors are standard normal.

8 Lecture 8: September 26, 2005

8.1 Collusion

Ellison RJE 1994

- Ellison takes the model by Porter (last lecture) and adds firm level data to allow for a dynamic structure to be introduced. He tries to detect the type and length of the punishments that occur in the railroad cartel that Porter studied.
- He assumes AR(1) errors which mean the probability of a reversionary period occuring tomorrow is dependent on if firms cooperated or not today.
- He tries to test the implications of the Green/Porter (GP) model against the model by Rotemberg/Saloner (RS). GP predicts that while there will be periods where the cartel breaks down, it will only be due to unanticipated demand shocks as the equilibrium strategy of all firms is to cooperate. In RS, they predict that it is observable shocks to demand that cause the breakdowns as it is more profitable to deviate if demand is high and there is a large market to capture. It's important to note that it is a dynamic prediction and not static: RS say that cheating is more attractive if the expectation of future demand relative today is low.
- The indicator of a collusive breakdown is again I_t which is assumed to be Markov.
- The estimated elasticity is now -1.8 which seems more plausible as monopolists must be operating on an elastic portion of their demand curve (Porter found otherwise). From this he backs out the conduct parameters and finds that using this model, firms, when they cooperate, are acting much more like a monopoly than Porter found.
- In determining if GP or RS is more correct, the author finds evidence in favor of GP: regime shifts in cooperation seem to be caused more by unanticipated demand shocks then by something observable.
- Ellison then goes on to test the RS model by adding a boom indicator to the model which should negatively effect the price (ie, lead to a breakdown of the cartel) if the RS model is correct. The results are not supportive of the RS model.
- Finally, Ellison looks for secret price cutting in the data by consider a kernel density plot of the residuals from the regression. It does appear to be bi or tri-modal which might point to some secret price cutting (if the rest of the model was picking up all other anticipated and unanticipated demand fluctuations), but it's impossible to know if we are really picking up price cutting or some other effect that has been omitted from the model.

9 Lecture 9: September , 2005

9.1 Production and Cost Functions

Christensen JPE 1976

Evans AER 1984

- Is it more efficient to have a monopoly dominating an industry or many competing firms. If the there are sufficient returns to scale (economies of scale or scope), then a natural monopoly ensues and the gains in efficiency from having one giant firm may outweigh the gains to competition.

- This makes the regulation of monopolies an interesting question. If we do regulate, how do we do so? A constant markup over cost? But what if costs are not truthfully reported?

- So in these two papers we consider the electric power market and then an indivdual firm (ATT) in the communications market.

- In both papers, we assume the firms face the same translog cost function. They face differing demand in their respective markets, so this makes their quantity produced vary (and we assume it is exogenous).

- In Christensen, the graphs are the key thing. He estimates that the number of firms operating near the min of their average cost curves greatly increases in 1970 compared to 1955. The market also became more concentrated. He finds the cost curve fits the data INCREDIBLY well and makes us wonder if something is wrong because it fits too well!

- In Evans, we only have one firm (ATT) so we have data across time instead of data across a cross section of firms. If the cost function is subadditive, $C(\sum q_i) < \sum C(q_i)$, we might find that a monopolistic giant is better than a bunch of smaller firms.

- He proxies for technological change using a variable reflecting the lagged R and D expenditure. This might be a little problemsome.

- The result is to reject subadditivity so it seems that ATT did not decentralize enough during this time and it would have been optimal to spin off their long distance business for example.

10 Lecture 10: September 29, 2005

10.1 More on Production Functions

Olley Econometrica 1996

- We are concerned with how the distribution of productivity (ω) has changed over time in the telecom equipment industry. Is deregulation optimal in terms of productivity or competition enhancing?
- Gains from productivity can come from a general technological improvement due to more innovation from firms (possibly due to increased competition) or just from the reallocation of inputs within firms. Maybe closing down unproductive plants or using more capital in production.
- There are two problems we seek to avoid:
  - (1) Sample bias. In most previous studies, they use a "balanced panel" of firms which means they had to exist in all time periods of the sample, otherwise they were dropped. This positively biased all the coefficients because "only the strong survive."
  - (2) There is also a simultaneity problem. The input decisions (capital and labor) are based on a firms productivity and these all appear on the RHS of the equation.
- We relieve the sample bias by including the whole sample! This may only work in this industry because there are NOT a lot of strategic complementarities.
- Consider the following production function dependency:

  $$y = f(L, K, A, \omega, \eta),$$

  where L, K, and A, depend on ω. Thus we need to model ω from the observables with:

  $$\omega = \omega(K, A, i),$$

  where i is investment. It seems plausible that investment and productivity are positive related. So run:

  $$y_t = L_t\beta_L + K_t\beta_K + A_t\beta_A + poly(K_t, A_t, i_t).$$

  This gives us an estimate of β_L, however we can't separate the effects of K and A directly because they appear twice. Thus we use survival probabilities:

  $$P_{t+1} = Pr(\omega_{t+1} \geq \underline{\omega}_{t+1}|\omega_t) = f(i_t, K_t, A_t).$$

  So from this, comparing various functional forms, we can estimate ω by inverting this probability model. Hence, we have:

  $$y_{t+1} = f(L_{t+1}, K_{t+1}, A_{t+1}, \omega_{t+1}(P_{t+1}, \omega_t(i_t, K_t, A_t))).$$

Which we can write:

$$y_{t+1} = \hat{\beta}_L L_{t+1} + \beta_K K_{t+1} + \beta_A A_{t+1} + poly(\hat{P}_{t+1}, y_t - \hat{\beta}_L L_t - \beta_K K_t - \beta_A A_t).$$

So we run NLLS on this and estimate β_K and β_A noting that we are restricting them now to be the same (as they appear twice in the equation).

- Finally, estimate:
$$\hat{\omega}_t = y_t - L_t\hat{\beta}_L - K_t\hat{\beta}_K - A_t\hat{\beta}_A.$$

- This method makes the estimates of the beta coefficients more reasonable.

- Policy implications: should we deregulate this industry? Is it productivity improving? The authors find that the deregulation was productivity improving by inducing a reallocation of capital to more productive plants (they find NO general increase in productivity or an increase in the efficiency of the allocation of inputs).

- Again, this method may not apply to an industry that has a lot of strategic interactions.

11 Lecture 11: October 4, 2005

11.1 More on Production Functions

Benkard AER 2000

- The article considers learning, forgetting and spillovers in the aircraft production industry. While there may be classic learning going on in the production of the planes, there also may be forgetting, due to skilled labor turnover and just pure forgetting. There also may be externalities in the production of one airplane that spills over into the production of other airplanes.

- We discriminate learning from forgetting using the dynamic structure of the data. Lots of learning a long time ago may be forgotten eventually.

- We can find spillovers by looking at production efficiency when only one plane is produced versus when many planes are produced.

- The learning/forgetting function is specified as:

$$E_{2t} = \delta E_{2,t-1} + q_{2,t-1} + \lambda q_{1,t-1}.$$

  So δ reflects forgetting, λ reflects spillovers and the $q_{2,t-1}$ term is learning.

- Learning is sometimes called "dynamic economies of scale." Learning shifts down the cost curve, it does NOT move us along the cost curve.

- Learning, forgetting, and spillovers all affect optimal efficiency of a firm's production and employment decisions. If there is significant learning which is costly, it might make sense to allow an industry in its infancy to be highly concentrated, allow for learning effects, and then fragment later on once the benefits of competition become larger.

- The results of the analysis find $\delta = 0.95$ and $\lambda = 0.70$ and both are very significant. Learning is estimated to be about 35 percent so doubling the output will result in a proportional reduction in cost of about a third.

12 Lecture 12: October 6, 2005

12.1 Firm Entry and Exit

Sutton - Sunk Costs and Market Structure - Chapter 3

Bresnahan RJE 1992

- First some history of this literature. In the 1950s, the concentration was on the Bain Paradigm which states that firm structure implies firm conduct which in turn implies firm and industry preformance. The prediction was that profits in all industries, no matter what the structure, should be zero in the long run.
- A typical regression at this time would have had profitability on the LHS and industry structure on the RHS.
- Critics (Chicago School) came forward and said this can't be right because structure is NOT exogenous. Concentration could also be driven by efficiency arguments (economies of scale). Just because you see a correlation between profitability and concentration doesn't mean that there's a reason for antitrust officials to step in.
- Then some people tried to add efficiency parameters to their models to capture the firm heterogeneity. This still left a lot of endogeneity questions.
- In the 1980s we had a lot of game theoretic models which opened the door for many many structures and outcomes and basically concluded that just about anything is possible.
- Along came John Sutton. He tried to make this coherent by consider a 3 stage game. First firms decide to enter or not, then they choose some endogenous level of sunk costs (advertising for example) and in stage three, firms would price compete. The keys to the model are the market size (S), the degree of price toughness, and the level of Endogenous Sunk Costs (ESC). Sutton assumes these are truely exogenous, but clearly one could make a case otherwise.
- Without ESC, it is simple to see that as S gets larger, for a given level of fixed costs, the industry can support more and more firms. So eventually concentration should be driven to zero along with profits as the market becomes large.
- So now introduce ESC. When the market is small, the gains to advertising for example might not be that large but eventually for some critical level of S, firms start engaging in a fixed, sunk cost of advertising and vertically differentiate their product from their competitors. As the industry grows, firms continue to advertise but because the advertising escalates, we get a lower bound on the concentration of an industry which is bounded away from zero. It's not that the same firms always win, but it's just that only so many firms can be sustained by the market. Non-Convergence Result. Concentration does NOT become fragmented, but instead we reach some critical level of concentration and then things are stable.

13 Lecture 13: October 11, 2005

13.1 Firm Entry and Exit

Berry Econometrica 1992

- How imporant is airport presence in determining the probability of entry and exit. There might be a cost savings to adding a route to an airport where you already have planes flying out of.
- The story might be driven by efficiency (less costly to have more concentration) or by market power (firms like to control an airport and set higher prices). We would need data on price and cost to determine which is which. Since we only have entry and exit data, we won't be able to determine which story is correct. More importantly, we can't determine if the concentration is welfare improving or damaging.
- The decision to enter a "route" will be an indicator variable for us which says that the airline must think entry is profitable. We are also interested in the strategic interactions of firms since this market is oligopolistic.
- Factors which may influcence entry and exit include:
  - (1) Market size / toughness of price competition.
  - (2) Firm specific factors (cost and productivity).
  - (3) Number of potential entrants in a market.
  - (4) Firm hetergeneity in product attributes.
- Since the number of firms present is endogenous in explaining profitability and exogenous in determining the level of profits, we have a problem. We need to decide how N is determined. The order or entry and exit becomes important. Use simulation techniques to estimate $E[N]$.
- We are interested in two margins:
$$\frac{\partial \pi}{\partial\ city},$$
$$\frac{\partial \pi}{\partial\ N}.$$
  We expect the first, measuring the impact on number of firms in a market of an increase in city (the presence in the first period at one or both of the end points of the route), to be positive. The second, measuring the profitability of firms as the number of airlines on a route grows to be negative. The data backs these up.
- We still can't tell the efficiency versus monopoly power story so we can't be sure of the welfare effects of having concentrated routes.

14 Lecture 14: October 13, 2005

14.1 Firm Entry and Exit

Bresnaham/Reiss JPE 1991

- The paper deals with entry and exit decisions in concentrated markets. How does an additional firm affect market conduct (toughness of price competition).
- We do not have price data but can look only at the market size and the number of firms in the market to determine the effects on price competition of additional firms.
- The Monopolist's profit function might be:

  $$\pi_m = (p_m - avc_m)S - F_m.$$

  Setting this equal to zero allows us to find the smallest number of consumers needed to support a single firm in a market:

  $$S_1 = \frac{F_m}{p_m - avc_m}.$$

  We can do the same thing for duopoly, triopoly, etc:

  $$S_2 = \frac{F_d}{p_d - avc_d}.$$

  Where S_2 measures the per firm market size required for a duopoly to ensue.
- The authors then consider the ratio of S_2 to S_1, S_2 to S_3, etc. For example, if $\frac{S_2}{S_1} = 1$, then we might assume that all firms have the same fixed costs, avc, and price competition does not change as the market grows. Thus, to sustain a doubling of firms, we just need to double the number of consumers. If $\frac{S_2}{S_1} > 1$, then entry by the second firm is relatively more costly which may be due to a barrier to entry created by the monopolist.
- If the toughness of price competition falls with entry of firms, then we should see the ratio, while initially high and above one, then fall gradually down to one.
- The result: post entry competition increases at a rate that decreases with the number of incumbents. Most of the increase in competition comes with the entry of the second or third firm.

15 Lecture 15: October 17, 2005

15.1 Firm Entry and Exit

Berry JoE 1999

- "Excessive entry can result when two conditions hold: first, entrants' products are substitutes for existing firms' products, so that entry steals business from incumbents; second, average costs are decreasing in output."
- Paper considers the radio broadcasting market to address this issue. Is there excessive entry?
- We seek to answer the question of whether the share of the population listening to a format grows as stations enter the market.
- Method of moments estimator.
- "Ignoring the value of programming to listeners, we find that free entry into U.S. radio broadcasting causes a welfare loss of over 40 percent of the size of the current industry revenue. We can rationalize the number of stations under free entry as optimal if the value of programming is about 15 cents per hour of listening."

16 Lecture 16: October 18, 2005

16.1 Firm Entry with Endogenous Product-Type Choices

Seim - Unpub - 2005

- Here we have horizontal differentiation of products and firm entry decisions together. We consider not only if a firm should enter but WHERE it should enter. Geographic location of video retailer is our horizontal differentiation.
- With more entry of firms, we might expect the degree of price competition to be less tough than under homogenous goods due to competition on the differentiation margin.
- According to Bresnehan, we might expect the entry ratio to be around 1. Ie, a doubling of market size means that twice as many firms can be sustained.
- In general, we have a reflection problem where my choice depends on yours and yours depends on mine. This creates correlation between my error and the RHS variables in my profit equation. We seek to determine the extent of the strategic interaction as compared to just common errors between firms.
- One way to address this is through nash equilibrium concepts ... ie, what we see in the market must constitute a NE. However, this induces a number of constraints on the profit equations and if there are more than a few options for firms, this type of estimation becomes computationally burdensome.
- This paper also faces a reflection problem which they deal with by imposing a few assumptions:
  - (1) Firms chooce optimal locations based on their expectations of the profitability of their competitors.
  - (2) The profit function of the firm is linear in their competitors location.
  - (3) All firms are identical except for their idiosyncratic cost structures. Ie, 2 of my competitors will have the same probability of choosing a given location.
  - (4) Errors are modeled according to an extreme value distribution.
- There are two types of errors which we are picking up in the data: market level data (some locations will feature couch potatoes and others will be athletes thereby affecting the demand for video tapes). And the other is firm specific errors: given two similar markets, some firms enter and some do not (this could be managerial skills, etc).
- The choice of a location by a firm will be faced with two competing tensions. One is by locating in a population center you face a large population but many competitors. Two is locating a ways away from competitors but also facing a smaller population. These effects may offset each other.

- Table 4 presents the results. The gamma coefficients clearly show that the presence of an additional competitor close by affects profits more than an additional distant competitor.

- The solid line in figure 5a shows that the number of stores per 10,000 consumers is about constant. Here we just have a fixed layout geographically. The points are the predicted number of firms due to the additional geographic variation. More firms can enter as the market grows because there are more opportunities to differentiate your product. Figure 5b accounts for increased population far from your store has less of an effect compared to growth in your immediate region.

17 Lecture 17: October 20, 2005

17.1 Auction Theory

Hendricks and Porter - AER - 1988

- How does asymmetric information affect optimal bidding strategies and revenue for the seller?
- Since non-neighbors do not have any more information than the neighbors, increasing the number of competing non-neighbors will not affect the bid by a neighboring firm. However, we should see a neighbor's bid increasing in the number of neighbors to a tract. Since we don't, we might suspect collusion between neighbors.
- Notes from Sutton.
- The design of auctions is crucial and the application of game theory to auctions has been very successful. Consider the auctioning off of Oil tracts in the sea.
- A tract is defined as some geographical area in the water where there might be an adjacent tract that is already producing oil. Since it is very possible that the oil reserves below the sea are connected, the current owner of the adjacent oil tract will have superior information about the tract that is up for auction. Suppose there is one insider in the adjacent tract that knows exactly the value of the tract that is up for sale. The other bidders, the outsiders, do not know the true value of the tract.
- If the outsider bids too high, above the true value, then he might get an unprofitable tract. However, though it might seem that just not bidding is an optimal strategy for the outsider, it turns out that it is not. Consider if only the insider bids on the new tract. He will of course bid very low knowing that he will automatically win. But the outsiders would have a dominate strategy of bidding just above the insider and winning the tract. Thus, in a NE, the outsiders MUST bid.
- Results. They studied the data to test predictions as follows:
  - (1) profits of the informed player greater than zero.
  - (2) profits of the uninformed player equal to zero, as we showed above in the NE.
  - (3) Profitability of the tracts, considering that an informed player will never place a bid if $v < 0$:

$$E[\pi = v - b|\text{Uninformed Player Wins and Informed Player Does Not Bid}] < 0.$$

$$E[\pi = v - b|\text{Uninformed Player Wins and Informed Player Does Bid}] > 0.$$

$$E[\pi = v - b|\text{Uninformed Player Wins}] = 0.$$

- Indeed the data back up all these claims.

18 Lecture 18: October 25, 2005

18.1 Auction Theory

Haile - AER - 2001

- We consider auctions with resale markets (timber).
- The possibility of resale changes the bidder's valuations/behavior and affects the expected revenue of the auction.
- An INCREASE in the number of bidders in a private value auction does not affect valuations. It decreases valuations in a common value auction through the winner's curse. In auctions with resale, there are two effects:
  - (1) The expected surplus to the winner in stage one from selling in stage two is higher. This is the seller resale effect. It should increase the willingness to pay of a bidder in stage one.
  - (2) The opportunities to lose in stage one and then buy in stage two (from a previous winner) is smaller. This is the resale buyer effect. It should also increase the willingness to pay of a bidder in stage one.
- We compare "use-value" to the value of winning an auction, the later incorporating the possibility of resale.
- The number of bidders in the model may be endogenous so the author uses IV for that variable.
- Conclusions back up the idea that the possibility of resale increases bidder's willingness to pay.
- "I find evidence that bidders' valuations are higher when the option value of selling in a resale market is high and the option value of buying in the resale market is low."
- "This empirical result is found in both of the geographic regions studied, and a change in policy regime that was expected to reduce the importance of resale leads to an attenuation of this effect in both regions."
- A resale opportunity:
  - (1) implies bidders' valuations are endogenous and potentially dependent on the selling mechanism.
  - (2) introduces new options for sellers who might encourage or discourgage an active secondary market.
  - (3) can introduce signaling as a component of bidding strategies at sealed-bid auctions.
  - (4) can lead to a reversal of standard results ranking auctions by expected revenues.

19 Lecture 19: October 28, 2005

19.1 Vertical Relationships

Joskow - AER - 1987

- Vertical relationships can range from anything between spot markets (no contracts) all the way to long term contracts and vertical mergers.
- The decision to sign a contract versus buying on the spot market or merging, all depends on transaction costs.
- Consider the classic example of Fisher Auto Body and GM in 1919. Fisher signed a long term contract with GM and agreed to make specific investments into the parts required for GM cars and GM agreed to only buy parts from Fisher. The problem is that these types of contracts are ALWAYS incomplete ... you can never plan for all possible contingencies. Once the contract is signed, both firms are locked in and face a potential hold-up problem: a contingency may arise and one firm may want to take advantage of the other firm or break the contract. Fisher and GM signed a 10 year contract where GM agreed to buy parts at 17 percent over variable cost. In the mid 1920's the automobile market took off and suddenly it became cheaper for GM to buy parts from other competing firms who had innovated. Fished kept using labor intensive (expensive) production technologies because they knew they were locked in with GM. Eventually, in 1926, GM bought out Fisher.
- So we could look at the decision to contract or not, but in this paper we consider the decision of how LONG to sign a contract in the coal market.
- The Williamson type model of asset specificity notes three types of relationship specific investments that might lead to longer term contracts:
  - (1) Site Specificity: Mine-Mouth Plants. Contracts signed where the coal mine and buyer were located at the same site will tend to sign longer contracts.
  - (2) Physical Asset Specificity: Geographic location of the coal mines. The western coal mines were further apart and less substitutable so they should sign longer contracts than mines in the east.
  - (3) Dedicated Asset Specificity: The quantity of coal contracted for. If Q is higher, the contract might tend to be longer. Note: usually contracts are negotiated over length and quantity so there might be an endogeneity problem here.
- The empirical analysis backs up all hypotheses.

20 Lecture 20: November 1, 2005

20.1 Vertical Relationships

Baker - AER - 2003

- We consider "Make or Buy" decisions by firms. Incentives and other agency problems are a key determinate.
- We want to align interests as much as possible and at the smallest cost.
- Internalizing the input may not eliminate the agency problem.
- Grossman and Hart said that when complete contracts cannot be written, there is an incentive problem so you should sell the residual rights to the agent or create some kind of "pay by performance" scheme.
- Holmstrom and Milgrom said that the job design is also crucial. The whole firm may not be the sum of its parts so selling off the rights to an agent may not be optimal.
- In this paper, we consider the decision to either "make": use your own fleet of trucks for shipping or to "buy": hire out the shipping duties of the firm.
- The principal is clearly the shipper and the agent is the driver or carrier service that you hire. Agency costs arise from misaligned interests between the (P)rincipal and (A)gent.
- Drivers may be prone to shirking, driving slowly, taking breaks, etc. There is also the issue of "back-loads", or filling the truck on the return trip. If the driver also unloads the truck, this further complicates the incentives and makes monitoring difficult.
- With firms that use private carriages, they often make frequent short trips that are more service intensive. For firms that contract out their shipping, they are usually shipping long distances and don't require the driver to unload the truck. It is hard to say which of these will have lower agency costs but we assume that what we see in the data is optimal ... ie, firms know the agency costs associated with each scheme and have choosen wisely.
- So now we introduce technologies: on-board computers. There are two types:
  - (1) Trip recorders. A cpu records the driver's behavior (speed, stops, etc) which is available to the carrier or shipper at the end of the haul. This reduces the monitoring costs of driving but should not affect the services the driver may or may not supply. So we really don't have a predictable change in the make or buy decision for firms that use this technology. It should reduce the agency costs for both private carriage and for-hire services. The model however predicts that Trip recorders should increase truck ownership because they reduce the agency costs more for service intensive routes. Not sure why.

- (2) Electronic Vehicle Management Systems (EVMS). These are sort of real-time gps enabled systems which allow the carrier or shipper to talk to the driver while he's on the road so it helps with both coordination and incentives. It's great for finding back-hauls. For-hire carriers benefits the most from this type of service so the adoption of EVMS should lead to less of an increase in ownership of trucking fleets or possibly even a reduction. This is because coordination gains make for-hire firms more attractive and the incentive gains make truck ownership more attractive.

- The results are good but because of the causation problem (what causes what?), we can't say much more than that private fleets and trip recorders are positively related, as are for-hire carriers and EVMS.

21 Lecture 21: November 3, 2005

21.1 Referee Report

Syverson - Unpub - 2005

- See Referee Report. The paper consider the preemptive pricing practices by incumbent firms in the airline industry prior to Southwest Airline's pending (but likely) entry.
- The main problem is causation. Does preemptive pricing result from threatened entry, or is Southwest's decision to enter dependent on their expectations about how much price competition they will face. Major endogeneity problem.

21.2 Franchising

Brickley - JFE - 1987

Lafontaine - RJE - 1992

- Why is franchising popular? Economies of scale in advertising, bargaining with suppliers, training, etc. It also makes it possible to expand operations quickly.
- What do you lose with a franchised industry? Possibly the scope of differentiation because most franchised products are highly standardized.
- What are the issues driving the decision to franchise? Definitely agency costs on both ends due to moral hazard and adverse selection issues. The franchisee wants to know what the franchisor will provide in terms of advertising, training, image, and other inputs into production. The franchisor wants to make the product as consistent as possible so monitoring is important to ensure the highest quality. There is an externality from the brand that must be maintained. Need also to eliminate the free-riding problem present especially with non-repeat business (eg, a fast food outlet at a freeway exit).

22 Lecture 22: November 7, 2005

22.1 Product Innovation

Bresnahan - RJE - 1997

- New products expand a consumer's choice set. The new product may be vertically or horizontally differentiated. This paper concerns only the demand side response of the introduction the 386 computer chip by a selection of firms including IBM, Compaq, etc.
- They consider the effect of branding and being on the frontier of the technology on a consumer's level of utility.
- The supply side is NOT modelled.
- This model is still only static so the dynamic nature of competition is not picked up by this discrete choice BLP type model.
- The result is that branding matters more than frontier technology to consumers. They find that there is a lot of market segmentation for both branded and frontier products: ie, a branded product is not very substitutable from a consumer's pov with a non-branded product.

23 Lecture 23: November 8, 2005

23.1 Product Innovation

Trajtenberg - JPE - 1989

- Missed Lecture.
- Seek to equate the magnitude of innovations to the welfare gains they generate.
- This paper considers the supply side unlike the last paper by Bresnahan.
- Discrete Choice - multinominal logit estimation.
- The estimated flow of social gains from innovation is used to compute a social rate of return to R and D.
- Data on CAT scanner introductions into hospitals.

24 Lecture 24: November 10, 2005

24.1 Product Innovation

Schmidt-Dengler - Unpub - 2005

- Here they focus on the dynamic nature of product innovation on the demand side. The decision is not just to adopt or not, but when.
- The author tries to quantify the dynamics of entry along with the dynamics driven by the nature of competition.
- There are two incentives by the firms to adopt the new technology (Hospitals adopting MRI machines in this example). One is the stand-alone incentive which just measures your own marginal benefit and marginal cost of buying the new product. The other stems from competition considerations and is divided into two categories:
  - (1) Business Stealing: innovating will take customers away from my competitors and bring them to me.
  - (2) Preemption: innovating early will postpone innovation by my competitors (since the cost of innovation is falling over time and the profits from innovating fall with the number of innovators), and thus I get to enjoy monopoly rents for longer.
- The model proposed is a Duration model (Green chapter 20).
- There is an endogeneity issue with the number of firms that have already adopted influencing my decision to adopt.
- The authors find strong business stealing effects but not much evidence of preemption.

25 Lecture 25: November 15, 2005

25.1 Network Effects

Rysman - RES - 2004

- Network externalities (N.E.) means that the willingness to pay of consumers depends on how many others are already in the network. A two sided market is a market that sells to two different groups and those groups are somehow linked through feedback effects. Eg, a radio station selling content to consumers and ad space to producers. Eg, the yellow pages publishers giving away the directory to consumers and selling ad space to producers. Eg, internet search engines.
- Note the price in one market need not be zero!
- There are clear concerns regarding N.E. in antitrust cases. If the N.E.'s are large enough, it might make sense NOT to break up a monopolist.
- There are also conjestion issues. Having a single yellow page publisher where ALL advertisers are in the same book reduces the chance that any single advertiser gets a call.
- So how many yellow pages publishers is optimal? What price should the publisher charge to the advertisers as a function of consumer usage ? What is the surplus to advertisers, publishers, and consumers? If there is more than one directory, which to use?
- The authors finds that the N.E.s are strong but not so strong to overcome the competitive effect. Ie, break up the monopolies.

26 Lecture 26: November 17, 2005

26.1 Information and Advertising

Ackerberg - RJE - 2001 (Reduced Form)

Ackerberg - Unpub - 2002 (Structural)

- We try to distinguish between the various types of advertising. These include:
  - Informative: ads that reveal information about the brand or simply existance.
  - Signaling of quality: it's costly to run ads so there must be a lot of confidence in the product that "if you try it, you'll buy it."
  - Prestige effects: I'll buy it because Michael Jordan buys it.
- If most ads are informative, we might think they are welfare improving, but if a majority are prestige type ads, they are probably a social waste.
- How can we distinguish the two apart? Well, inexperienced users should be more affected by informative advertising while ads that target prestige, or try to be persuasive, should influence both inexperienced and experienced users equally.
- See G-26.1. Informative ads will have decreasing returns while persuasive ads should have about constant returns.
- So we either do a reduced form regression of sales on ads, and an interaction term with experience or we can model the way that informative and prestige based ads effect utility directly. Both methods find that informative ads affect sales significantly among the uninformed, while prestige ads have little effect.

27 Lecture 27: November 21, 2005

27.1 Asymmetric Information: Adverse Selection

Genesove - JPE - 1993 (Used Cars)

Jin and Kato - Unpub - 2005 (Baseball Cards)

- **Definition** Adverse Selection: In a market where buyers cannot accurately gauge the quality of the product that they are buying, it is likely that the marketplace will contain generally poor quality products. Adverse selection was first noted by Nobel Laureate George Akerlof in 1970.

- **Definition** Moral Hazard: The risk that a party to a transaction has not entered into the contract in good faith, has provided misleading information about its assets, liabilities or credit capacity, or has an incentive to take unusual risks in a desperate attempt to earn a profit before the contract settles.

- Generally, we think of the problem when the informational asymmetry exists prior to contract to be Adverse Selection, and when the asymmetry exists after the contract, it is called moral hazard.

- How to deal with informational asymmetries depends on the type of good you're dealing with. Consider 3 types:

  - (1) Search goods: these are goods for which searching sufficiently, ie shopping around, will completely alleviate the informational problems before the actual purchase. New cars might be an example. Search costs are an issue though. Policy: reduce search costs.
  - (2) Experience goods: goods for which the informational asymmetry is only alleviated with experience – you must buy and try. It may take more than one experience. Food products are the clear example. Policy: money back guarantees or warantees or free samples.
  - (3) Credence goods: goods for which even after experiencing them, you still don't know their quality. Medical advice quality is the clear example ... death might be a signal though (!) Policy: force licensing of docs to, at the very least, cut out the really bad ones.

- Who should solve the informational asymmetries? Governments, the market, etc ? Does it need to be solved?

- In Genesove's paper, we have Adverse selection in the used car market (Lemon's problem). New car dealers have an incentive to manage their inventories so they have a higher cut off price than used car dealers. Both sell only their worst cars, but the average quality of used cars sold by new car dealers is somewhat higher than the quality of used cars sold by used car dealers.

- In the paper by Jin and Kato, they contribute to the literature by examining the effect of introducing a mechanism that alleviates the informational asymmetry. This leads to more market segmentation of the graded and ungraded trading cards. Six main hypotheses:
  - (1) The average quality sold in the online ungraded segment is lower than the ungraded retail segment.
  - (2) The average quality sold in the retail ungraded segment is lower than the online graded segment.
  - (3) Most graded cards are sold online.
  - (4) More cards are graded after the internet appears.
  - (5) A general downward shift in the graded population occurs after the internet appears.
  - (6) The retail market shrinks after the internet appears.

28 Lecture 28: November 22, 2005

28.1 Asymmetric Information: Moral Hazard

Chevalier - JPE - 1997

- Moral hazard (MH) occurs when the interests of the (P)rincipal and (A)gent are not aligned. The P may recieve a noisy signal of the A's actions but cannot observe, say effort, directly. The P will attempt to reduce this with a tailored contract.

- The contract needs to be based on observable and verifiable outcomes. Thus we might have:
$$wage = f(outcomes),$$
which induces:
$$effort = f^{-1}(wage).$$
If this effort is not optimal (not what the P would have choosen himself) we have a MH problem.

- This paper focuses on MH regarding investors (principals) and mutual fund managers (agents). The fund managers may want to manipulate portfolios by taking excess risks near the end of the year to increase flows of investment into the fund next year. This may not be inline with the investor's preferences who just want to maximize return.

- The key graphs are on pg 1177, figures 1 and 2. There is a region where it is in the interest of the fund managers to engage in risky behavior because the upside rewards are large and the downside costs are small. So we get some fund managers who are slightly behind the market trying to "catch-up" and those that are ahead trying to "lock-in".