Strategic Uses of Information 2

3. Signalling: Using an Informational Advantage

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A biological signal such as a pair of antlers actually must have a "cost", or deleterious effect on viability, if it is to be taken seriously (by the doe ♀, the potential mate).

Furthermore, the cost must be one that stronger stags can pay more easily than their weaker brethren.

The cost or handicap is a *guarantee of the honesty* of the display.

If there were no cost, then there would be rampant cheating, and observers would quickly learn to ignore the false advertising.
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∴ Compare "costly signalling" with "cheap talk."

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What if there is some action — *a signal* — that is costly to take and which is visible to the other party, which is more costly if lying than if telling the truth? Then the other party might see the action and infer truth telling.

Signalling unobserved attributes

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When signalling cannot occur — when information cannot be credibly communicated — markets don't function well, and inefficiencies occur. (See the sub-prime mortgage crisis.)

An inefficent outcome: although possible (with complete information), mutually beneficial trade does *not* occur.

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Can sellers signal quality?

Reputation, third-party credentials.

For insurance, medical checks compulsory.

But limited elimination of informational asymmetries.

Credibly?

Countersignalling: Reverse Snobbery?

(Reading 28 on "Signal Failure" from the *Economist*):

The job market:

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But now both Middle and Top types play cool ...

4. Education as a Signal

How could Sally signal her good car's quality?

Mike Spence, erstwhile dean of the Stanford GSB, shared the Nobel in 2001 for his research on signalling.

A *guarantee* or warantee is more costly for Sally selling a "lemon" than for selling a good car, and so can signal quality.

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***Signals* can overcome informational frictions, to reduce inefficiencies, but not always, or not always efficiently.**

Potential employees can use their *training or education* as a signal, especially if training is more costly for less competent students ...

A worker's unobservable quality

Betty the boss wants to hire Wally the worker, but can't tell (private info) whether Wally is:

- **highly productive (HP) or**
- **less productive (LP) before hiring him.**

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Q: Can Wally's educational level credibly signal his innate worth?

A self-confirming Bayesian equilibrium in beliefs:

Wally and Betty begin with *beliefs* about how to interpret signals, and equilibrium means that, after each acts on his or her beliefs, neither sees anything to indicate the beliefs are mistaken.

(See Bayesian equilibrium: D&Sk, 2nd ed. pp. 284, 3rd ed. p. 341; B&F Ch. 13)

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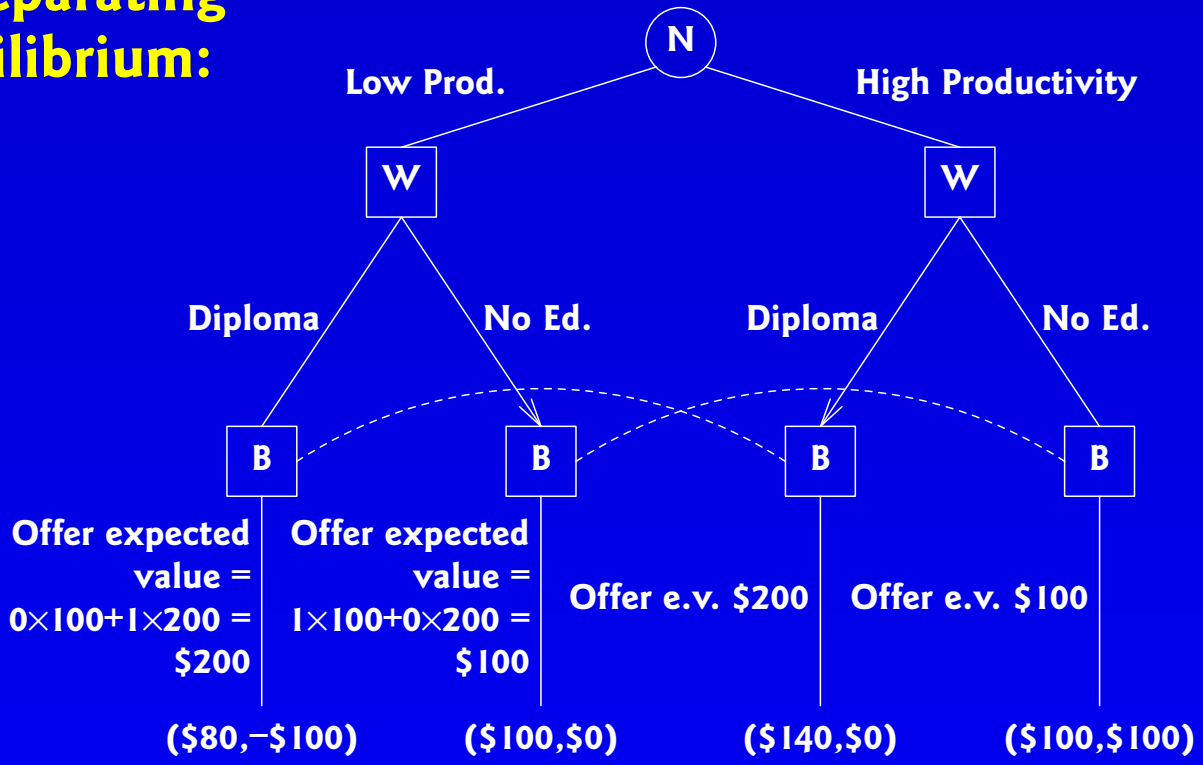
- **If Wally is LP and has no diploma, then he earns net \$100.**
  With the diploma LP Wally earns net \$200 − \$120 = \$80,
  ∴ education is unprofitable for LP Wally.

A separating equilibrium:



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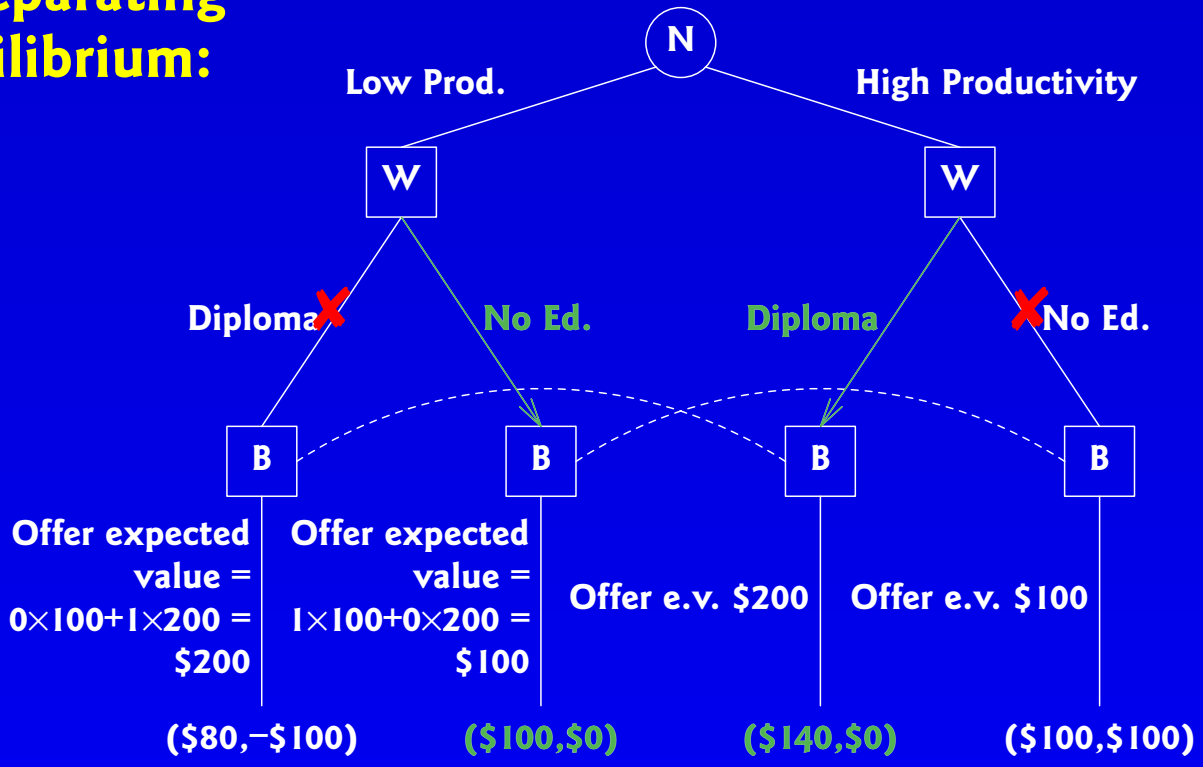

Education as Signalling with Separating. (W,B)

	High	Low
Productivity	$200	$100
Cost of Diploma	$60	$120

Betty's expectations are fulfilled, and so are Wally's.

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Q: Will Wally obtain a diploma?
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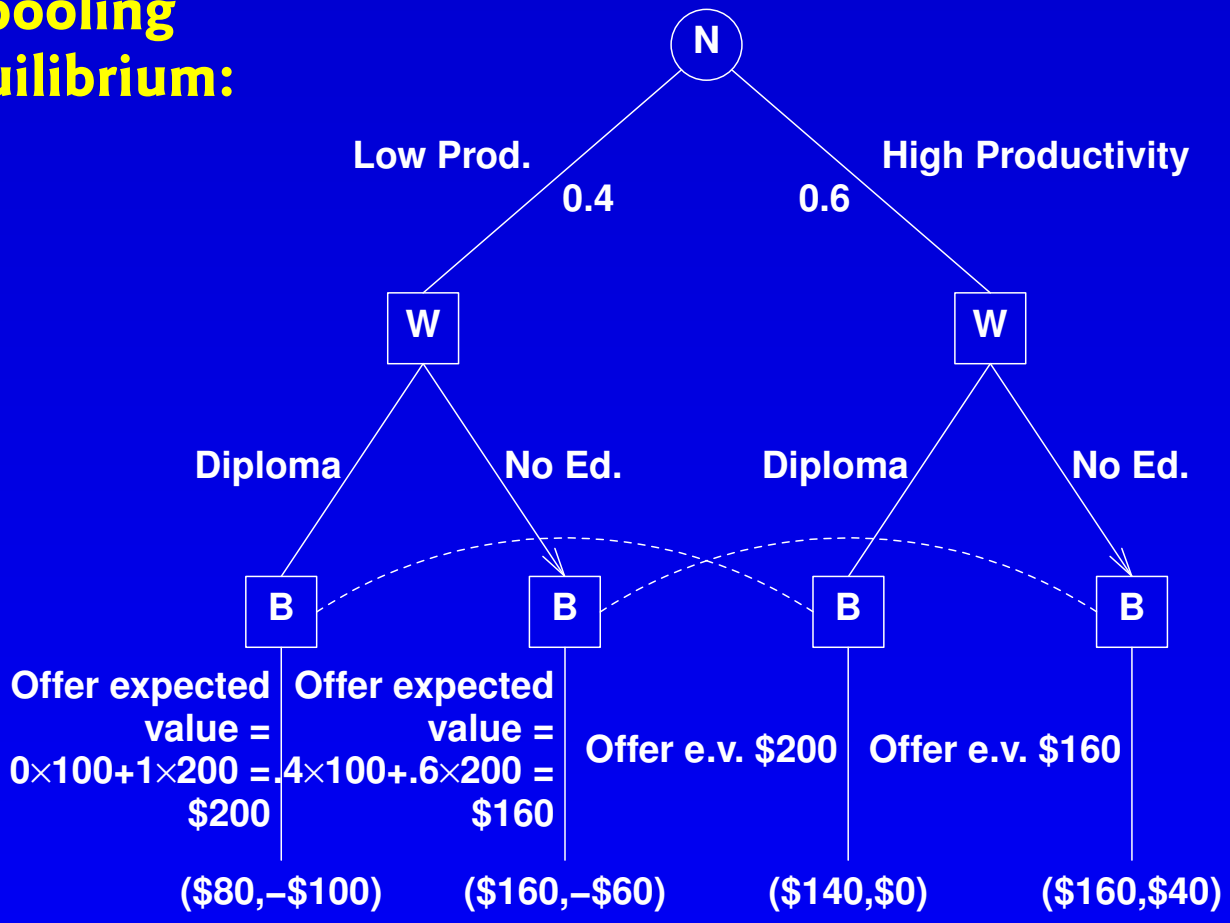

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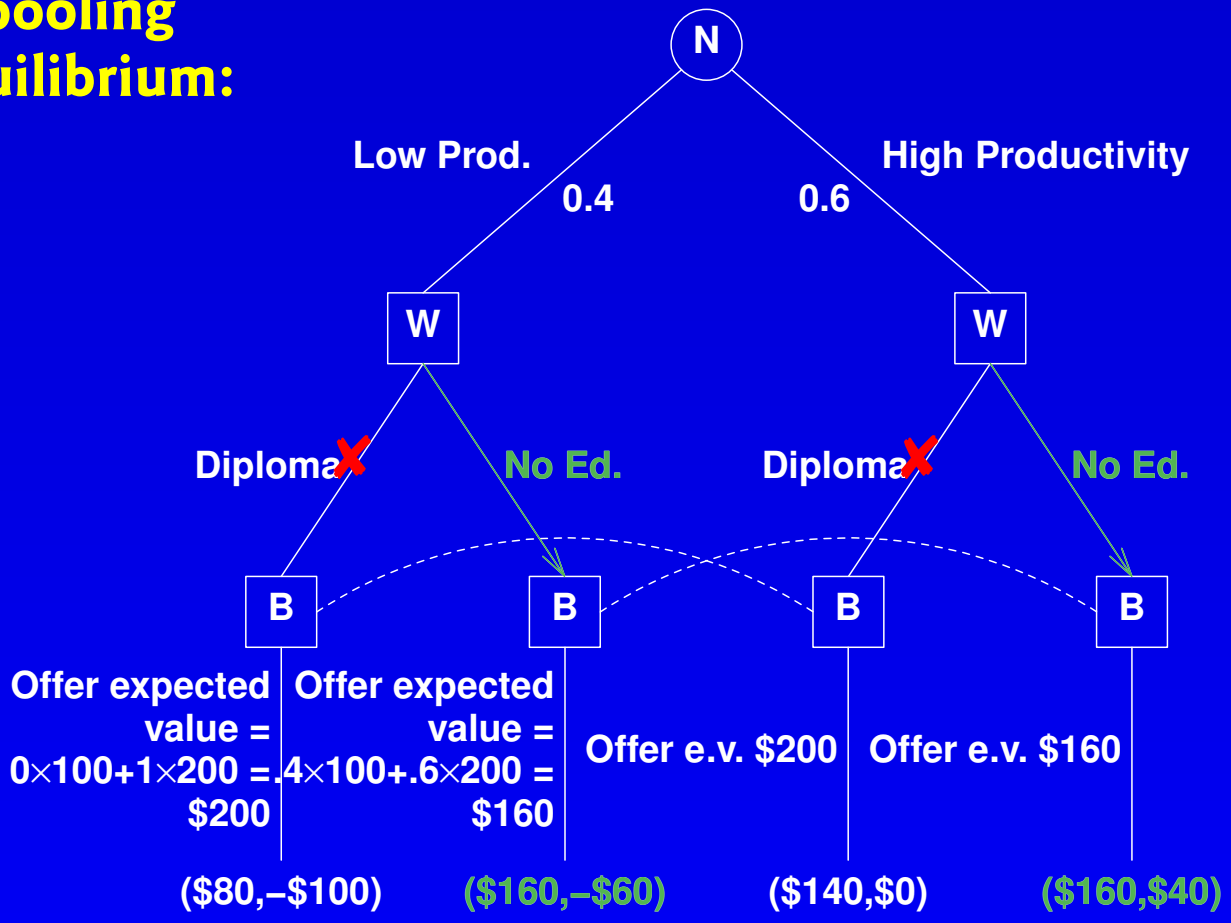

Education as Signalling, with Pooling. (W,B)

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Productivity	$200	$100
Cost of Diploma	$60	$120

(Bayesian Equilibrium in beliefs)

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How costly should signals be?

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Signals must be more costly (net of future earnings) for low-quality producers than for high-quality producers.

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Wasteful expenditures don't necessarily work as signals: opportunities for signalling don't ensure that signalling actually occurs in the market.

(See Betty's beliefs above.)

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"When you drive around in a [$900,000] Rolls Royce and seem to be spending all this money, everyone starts to prick their ears up about what's going on," says Jim Cousins, the chairman of the business lobby group, The Committee for Geelong. "All the way through I thought maybe he [Graeme Hay, former founder of the failed Ponzi scheme, Chartwell Enterprises, had] won one of those $40 million Tattslotto draws."

Chartwell quoted some returns up to 30% pa, and lost up to $70 million of more than 100 of their retail investors.

— *AFR*, 5 May, 2008, p. 61, "Rolling in everyone else's cash".

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Nothing succeeds like the appearance of success.

— Christopher Lasch

5. The Market for "Lemons"

— see Reading 7 (The lemon dilemma).

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- **Market for used cars.**
- **Two qualities: high quality and "lemons".**
- **Sally knows the quality,**
- **but Burt doesn't before buying, although Burt does know the proportion of "lemons."**

George Ackerlof shared the 2001 Nobel for his work on markets with asymmetric information; he coined the "lemons" tag.

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- This is an example of *adverse selection.*

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- **A Gresham's law of cars: the "lemons" drive out the good.**
  Originally: "Bad money drives out good." How?

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- Sally knows the quality of the car she's selling ($\therefore$ asymmetric information).

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- If the market operates and potential Burts exceed the numbers of cars for sale, then this is the market price.

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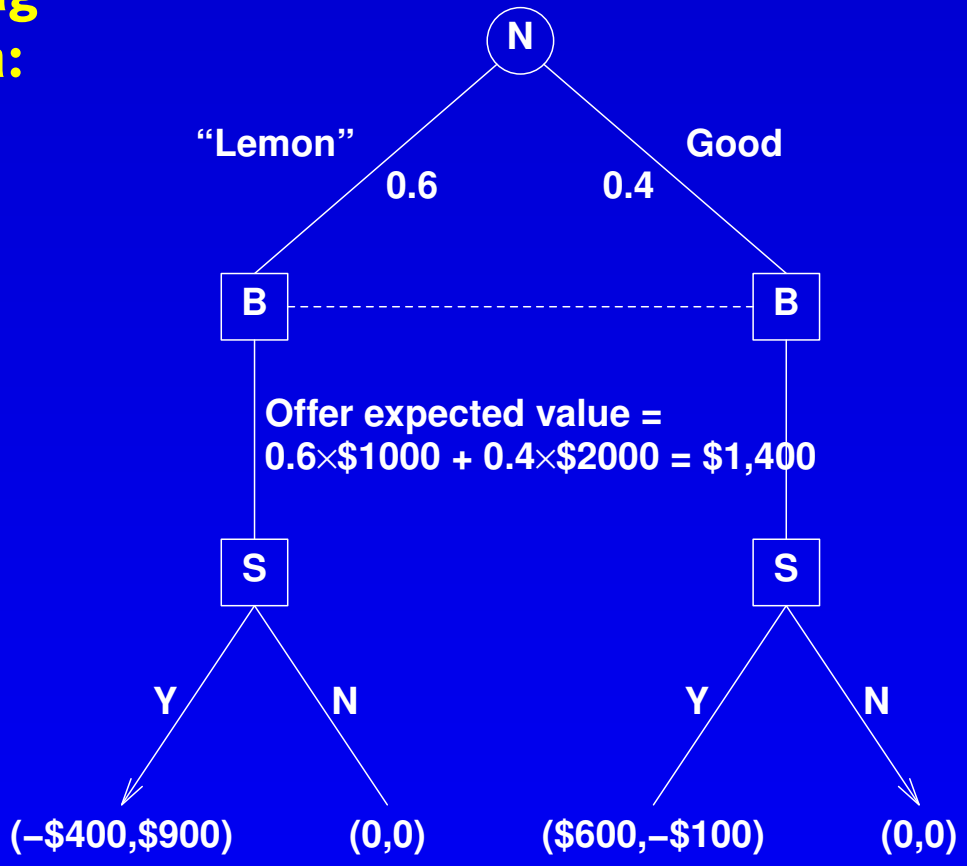

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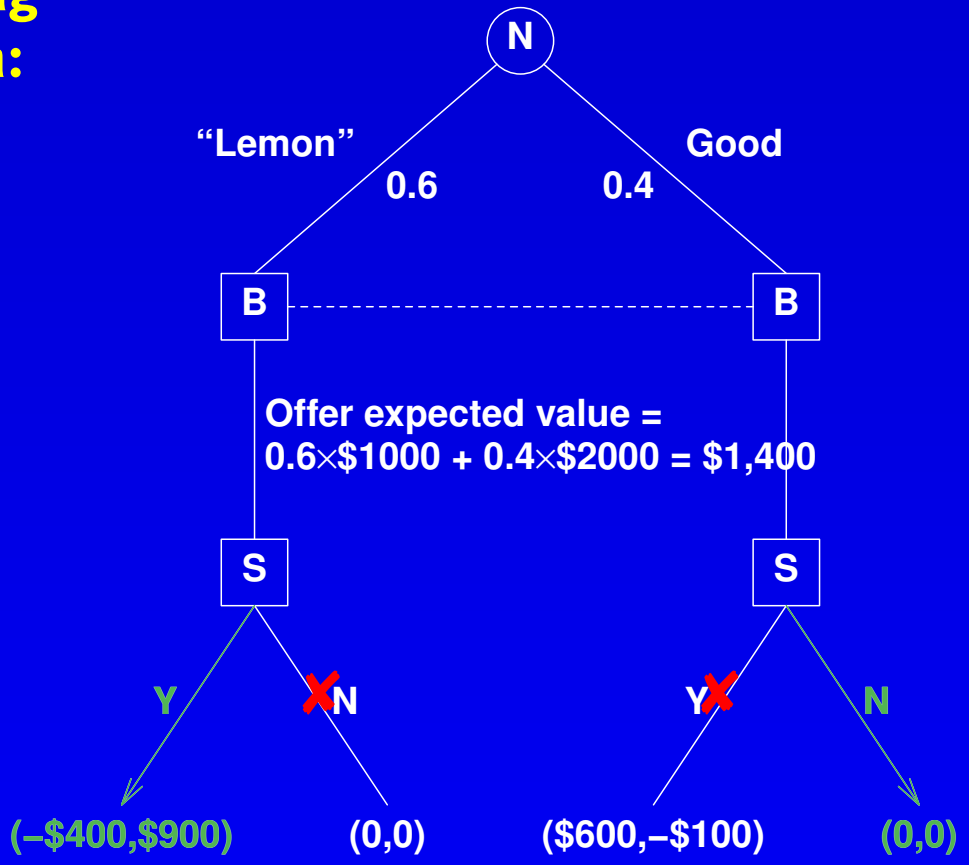

The Market for Lemons with Separating. (B,S)

	"Lemon"	Good
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Sally the seller will accept down to	$500	$1,500

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What if there are fewer "lemons:" 40% instead of 60%?

- **if the proportion of "lemons" is 40% and is common knowledge,**
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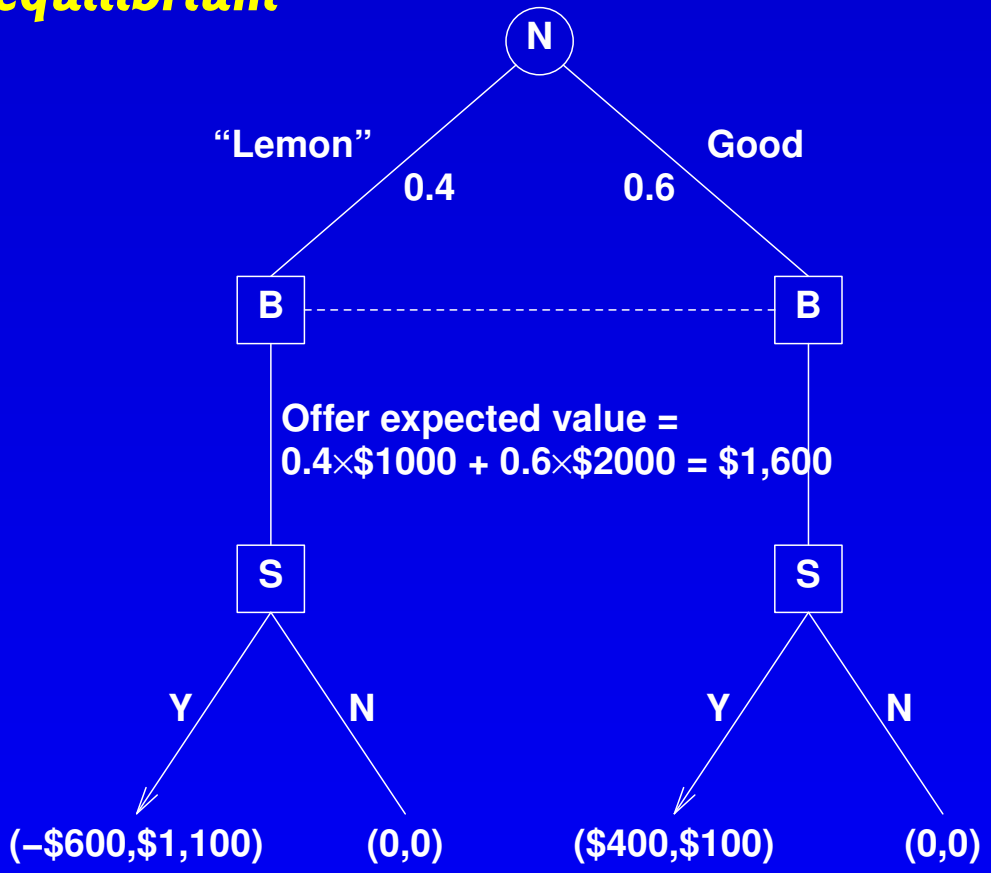
A pooling equilibrium game tree.



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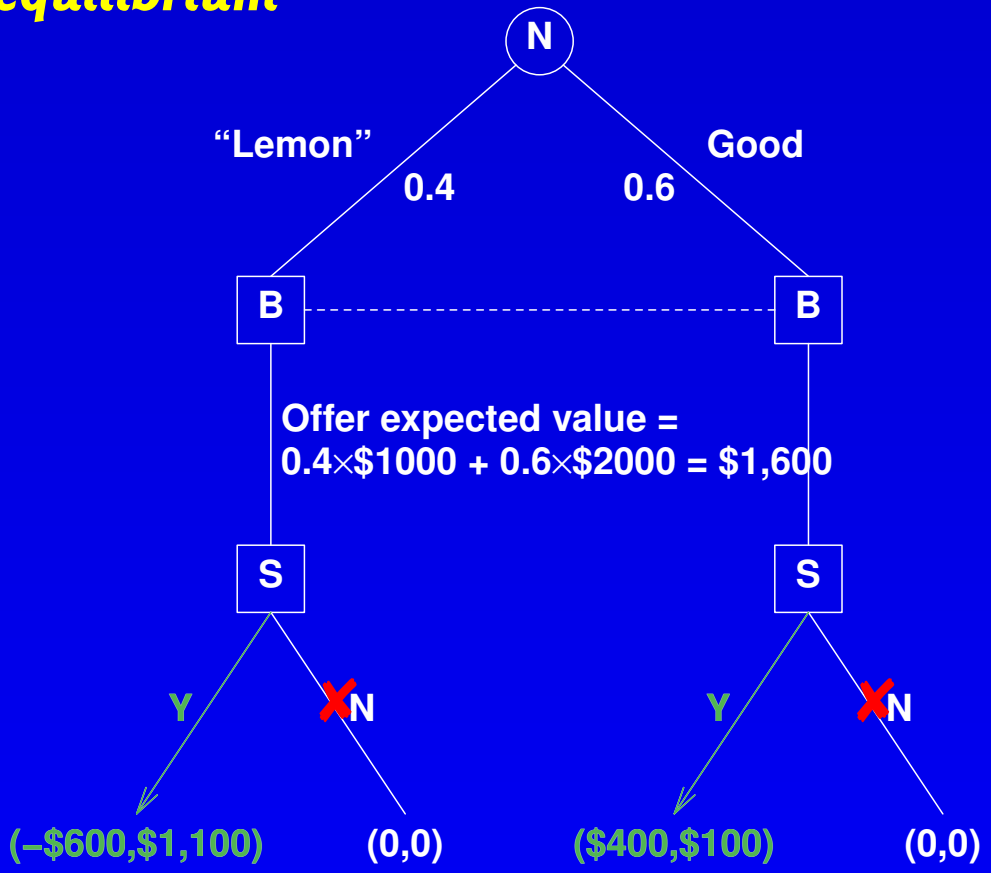

The Market for Lemons with Pooling. **(B,S)**

	"Lemon"	Good
Burt the buyer will pay up to	$1,000	$2,000
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Asymmetric Information & the Sub-Prime Crisis

"... nothing stopped the banks selling lemon bonds. Like used cars that break down right after they are sold, the seller could reduce the quality of the product and cut costs without the buyer's knowledge. As low-quality products sell at the same price as high-quality products, the latter disappear from the market.

In capital markets, the information asymmetry between buyers and sellers of securities is even more extreme, making it hugely tempting for banks to issue securities to increase their expected profits by reducing the repayment probability below what buyers expect."

— Hans-Werner Sinn, "Lemon Banking and the Subprime Crisis," April, 2008. (Reading 24.)

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- ***Signalling.*** **Strategies to exploit your own informational advantage (Wally's diploma & Betty)**

Signalling is *credible communication* of private information. Signalling must not only cost you to undertake it, but the other party must know that your cost is higher if you're misrepresenting yourself than if you're being truthful.

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Another way of reducing your informational handicap is to play one bidder off against another — using competition — to induce them to reveal at least part of what they know, see Bidding and Auction Design. (Lecture 18.)

Evidence of Signalling and Screening

- Insurance companies
- Venture capitalists
- Quality of durable goods
- Borrowing
- Health insurance
- Others?