Economic Models of Legal Evolution

Nicola Gennaioli

May 2009

Background

- Economic role of the legal system (LLSV 1998)
  - Regulation
  - Torts
  - Contracts

- The law and courts' behavior (and biases)
  - Empirical: Brenner and Spaeth (1996), Bertrand et al. (2008), Chang and Scohar (2006)
  - Theoretical:
    * Corruption: Glaeser and Shleifer (2002), Bond (2006)
    * Biases: Gennaioli (2003, 2009), Gennaioli and Shleifer (2008)

- Role of legal evolution:
  - Does it reduce or amplify biases
  - Does the answer depend on the area of law
  - Implications for reform

The Evolution of Common Law

- Common Law: fields of law shaped by judicial precedents. Appellate courts follow past decisions but sometimes revise them.

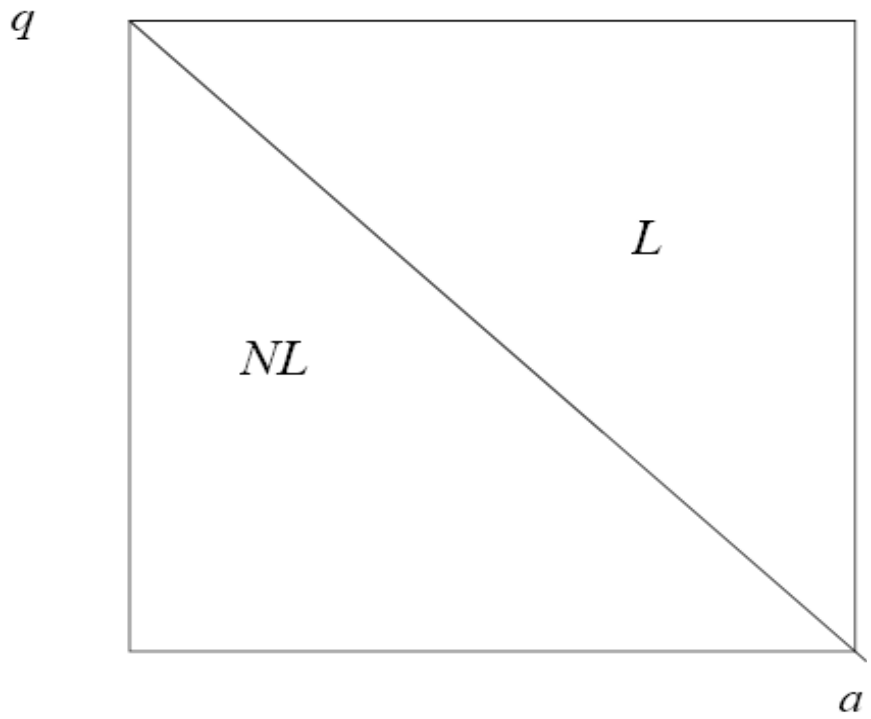
- Posner (1972): common law is efficient because judges seek to achieve economic efficiency

- What if judges follow their political, social, economic views?

  – Build model of rulemaking where potentially biased judges change precedents at some cost

Basic Idea

- Dog bites man. Dog was not on a leash. Efficient liability:

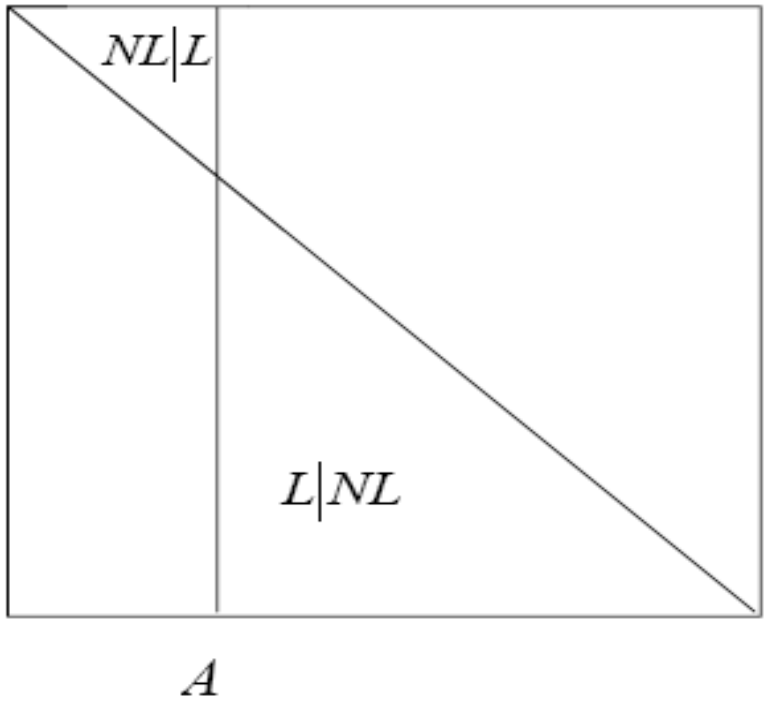


- a: dog's aggressiveness; q: density of people

- Judges adjudicate in sequence. In the first case,only a comes up. Later on, also q comes up.

Initial legal rule: aggressiveness threshold

- Judge sets A_1 holding that owners of dogs with $a > A_1$ should be made liable:



Social welfare under initial legal rule

- Each judge i has pro-owner stance A_i. If judge i sets initial rule social losses are:

$$\Lambda(A_i) = (A_i - A^*)^2$$

  – where A^* is socially optimal rule

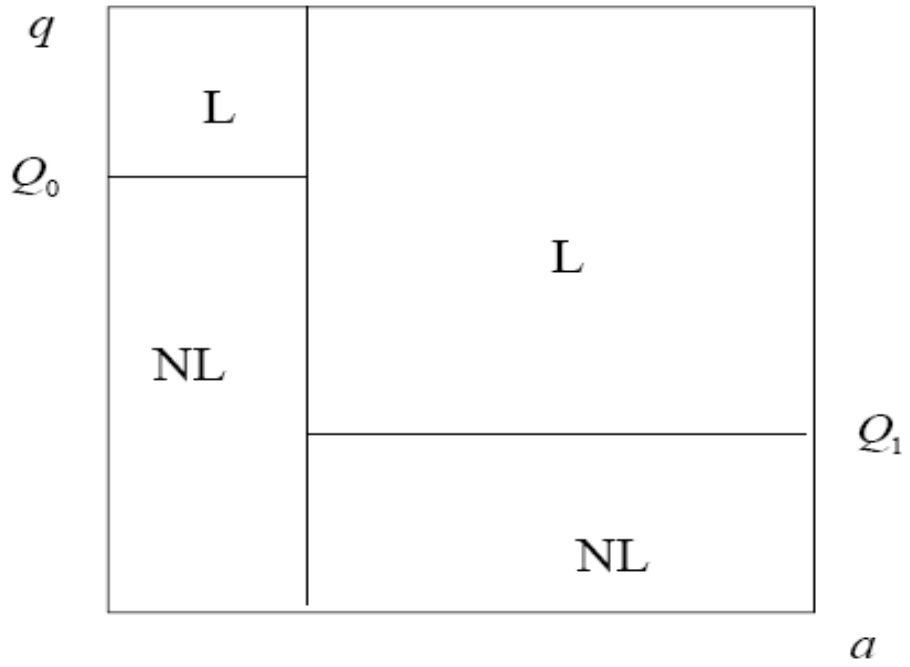
- Behind the veil of ignorance, expected social welfare under the first rule at $t = 0$ is:

$$E_i\left[\Lambda(A_i)\right] = E_i(A_i - A^*)^2$$

  – Costs: average bias and volatility

Legal evolution

- Initial precedent A_1 stays in place. Second judge sets two "density" thresholds Q_0 and Q_1.



Legal change and welfare: precision

- If judge j introduces q after judge i social losses are:

$$\Lambda(A_i, A_j) = \left[A_i^2 + (1 - A_i)^2\right] \Lambda(A_j)$$

- Increased precision of the law after one round of legal evolution:

$$\left[A_i^2 + (1 - A_i)^2\right] < 1$$

- The outcome triggered by judge j is better when he comes after another judge:

$$\left[A_i^2 + (1 - A_i)^2\right] \Lambda(A_j) < \Lambda(A_j)$$

  – the new rule embodies more information because it is conditional on two dimensions

Legal change and welfare: bias

- Along some path, legal change may be bad:

$$\left[A_i^2 + (1 - A_i)^2\right] \Lambda(A_j) > \Lambda(A_i)$$

  - Bias of judge j may be further from efficiency than that of i ($|A_i - A^*| < |A_j - A^*|$)

- Example: pro-dog (owner) lunatic takes density just as an excuse to let dogs bite with impunity

- But when does change occur? Judge j changes precedent A_i (approx.) when:

$$(A_j - A_i)^2 > k$$

  - Dilemma: judicial polarization is a main motivation for legal change

The benefit of legal change and judicial polarization

- If $k = \infty$, no judge changes the law. In this case, expected social losses are:

$$E_i \left[\Lambda(A_i)\right]$$

- If $k = 0$, all judges change the law. In this case, expected social losses are:

$$E_i \left\{ \left[A_i^2 + (1 - A_i)^2\right] \right\} E_j \left[\Lambda(A_j)\right]$$

- But then, since $E_i \left\{ \left[A_1^2 + (1 - A_1)^2\right] \right\} < 1$ legal change is always good on average!!

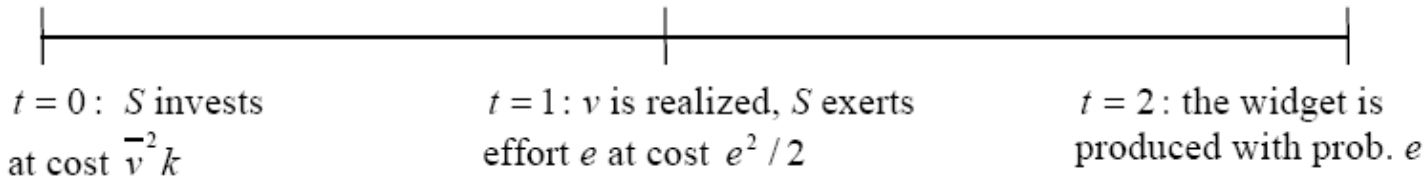
$$E_i \left\{ \left[A_i^2 + (1 - A_i)^2\right] \right\} E_j \left[\Lambda(A_j)\right] < E_j \left[\Lambda(A_j)\right]$$

  - Implications:
    - On average (in the long run) legal evolution is good: biases wash out, net gain is more info
    - Tradeoff between polarization and laziness. Beneficial evolution *thanks* to biases!!

Legal evolution in a contractual transaction

- Buyer (B) purchases a customized widget from Seller (S)

- Widget's market value is 0. For B, the value is $v \rightsquigarrow \mathrm{U}[0,1]$. Timing:



- Economic problem: ex-post holdup at $t = 1$. For S to invest ex-ante, need long term contract

Optimal contracting

- Socially optimal effort level at $t = 1$ solves

$$\max_{e(v)} ev - (1/2)e^2$$

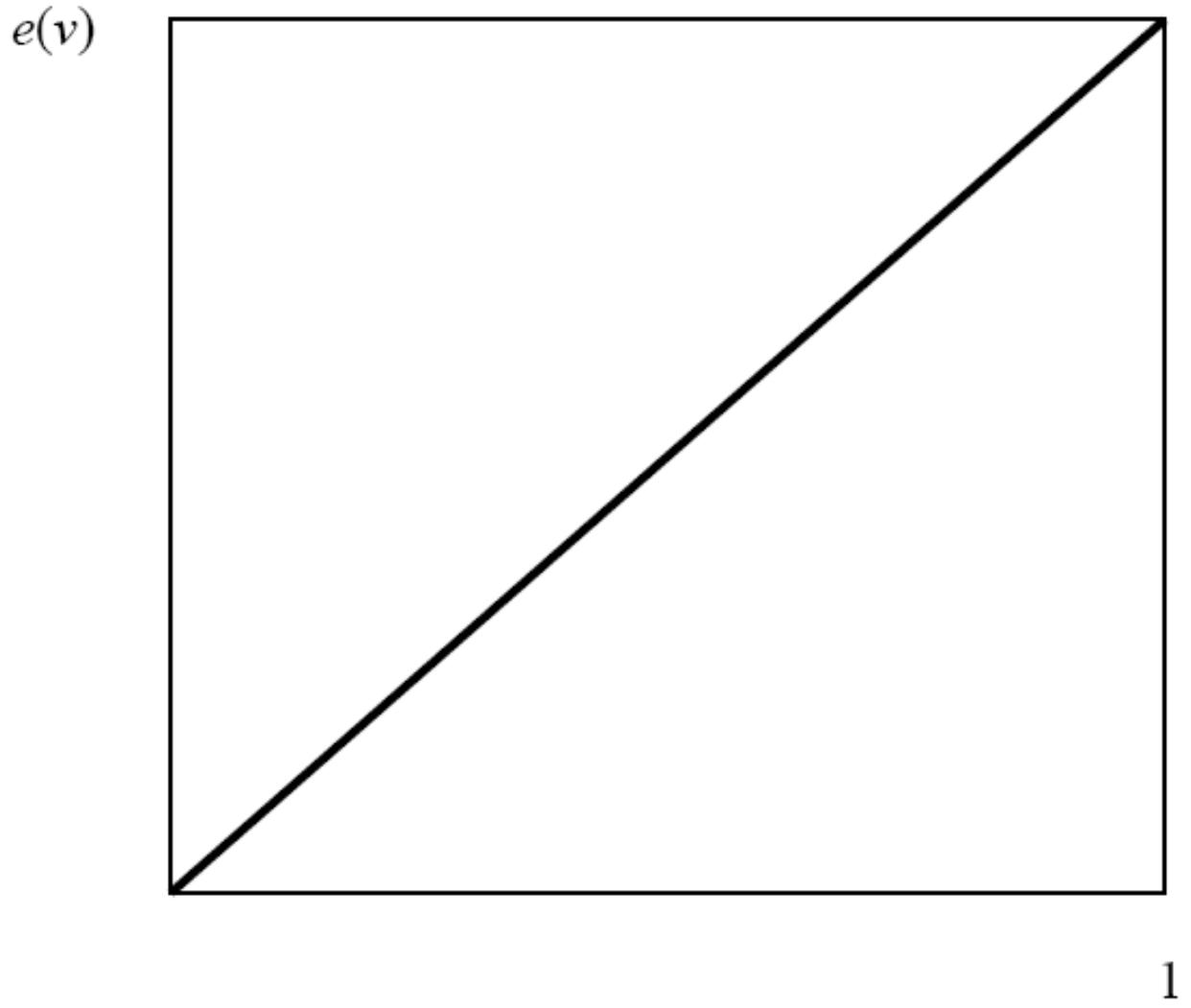
- The optimal effort level is $e(v) = v$. If v is perfectly verifiable, this is implemented by specifying:

$$p(v) = v$$

- Expected social welfare is then equal to:

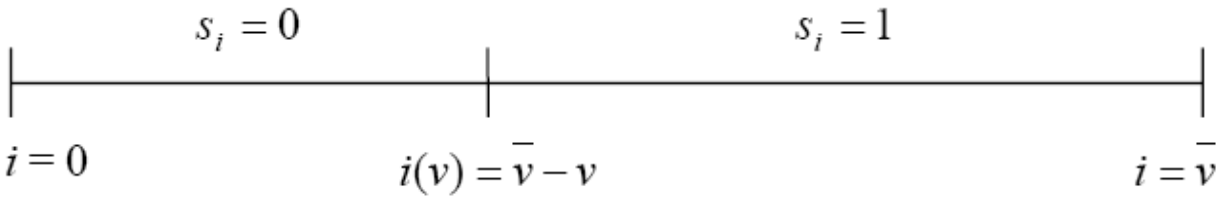
$$\int_0^{\bar{v}} \left[e_{fb}(v)v - (1/2)e_{fb}(v)^2 \right](1/\bar{v})dv - \bar{v}^2 k = \bar{v}^2 \left(\frac{1}{6} - k \right)$$

The first best



State verification problems: complexity and judicial lack of expertise

- Measure 1 of binary signals $s_i \in \{0, 1\}$. In each state v:



- Signal $i(v)$ is "critical". If judges recognize it, they can verify v. Parties attain first best with $p = 1 - i(v)$

- Limited judicial expertise:

  – Do not recognize the index of "novel" signals (i.e. signals they have not seen before)

  – Cannot use more than one novel signal at the time

    $*$ Key role of judicial learning: increase number of signals judges can use

Contract adjudication

- In each v, buyer collects a measure $x_B(1-v)$ of zero signals, seller a measure $x_S v$ of one signals

- Judge awards the case to party presenting more signals. Buyer wins when:

$$\begin{aligned} x_B(1-v) &\geq x_S v \Leftrightarrow \\ v &\leq \frac{1}{1+\sigma} \equiv \beta \end{aligned}$$

  - buyer wins when: i) facts are favorable (v is low), ii) he is powerful (β is high)
  - key role of inequality in distorting contract enforcement

- After each case is adjudicated, the signal used by judges becomes a precedent
  - Formally, future judges recognize such signal at zero cost

First contracting round

- Parties write a baseline price p and a bonus Δ awarded to seller if latter wins. Optimal effort:

$$e(v) = \begin{cases} p & v \leq \beta \\ p + \Delta & v > \beta \end{cases}$$

- Optimal contract solves:

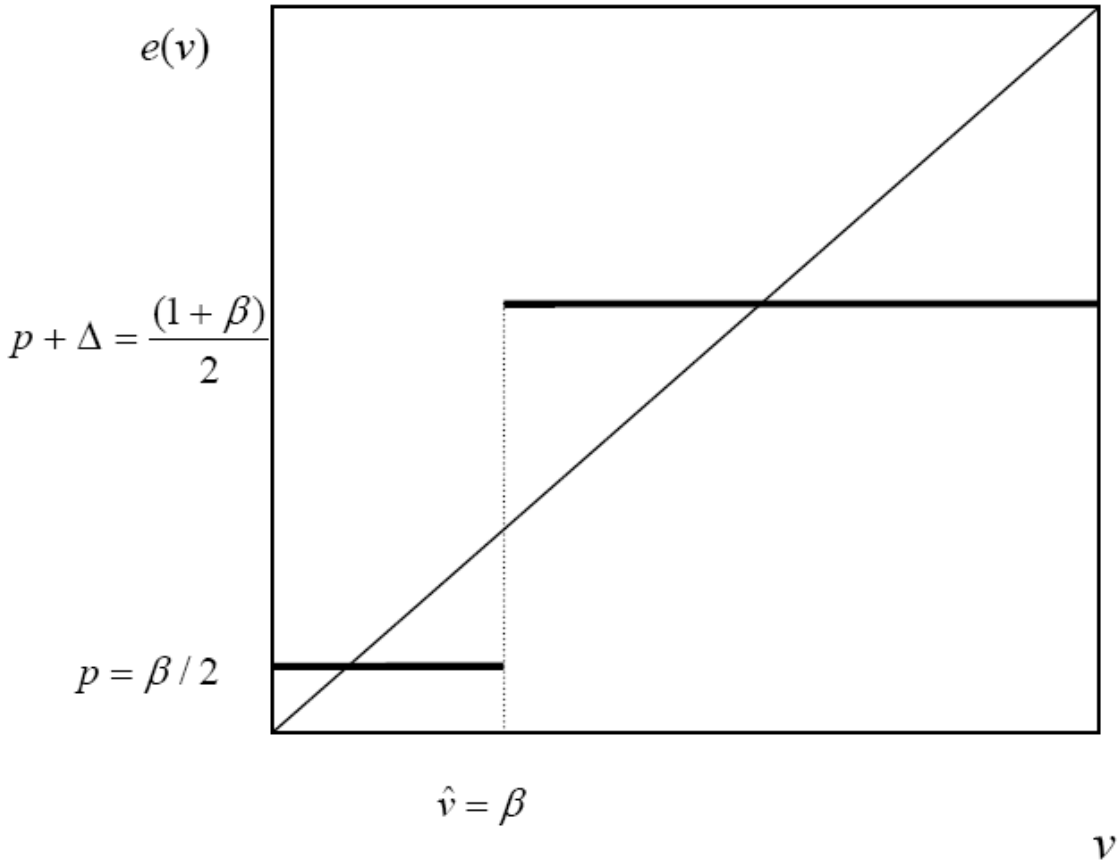
$$\max_{p,\Delta} \int_0^{\hat{v}} \left[pv - p^2/2 \right] (1/\bar{v}) dv + \int_{\hat{v}}^{\bar{v}} \left[(p+\Delta)v - (p+\Delta)^2/2 \right] (1/\bar{v}) dv$$

- Optimal contract terms are:

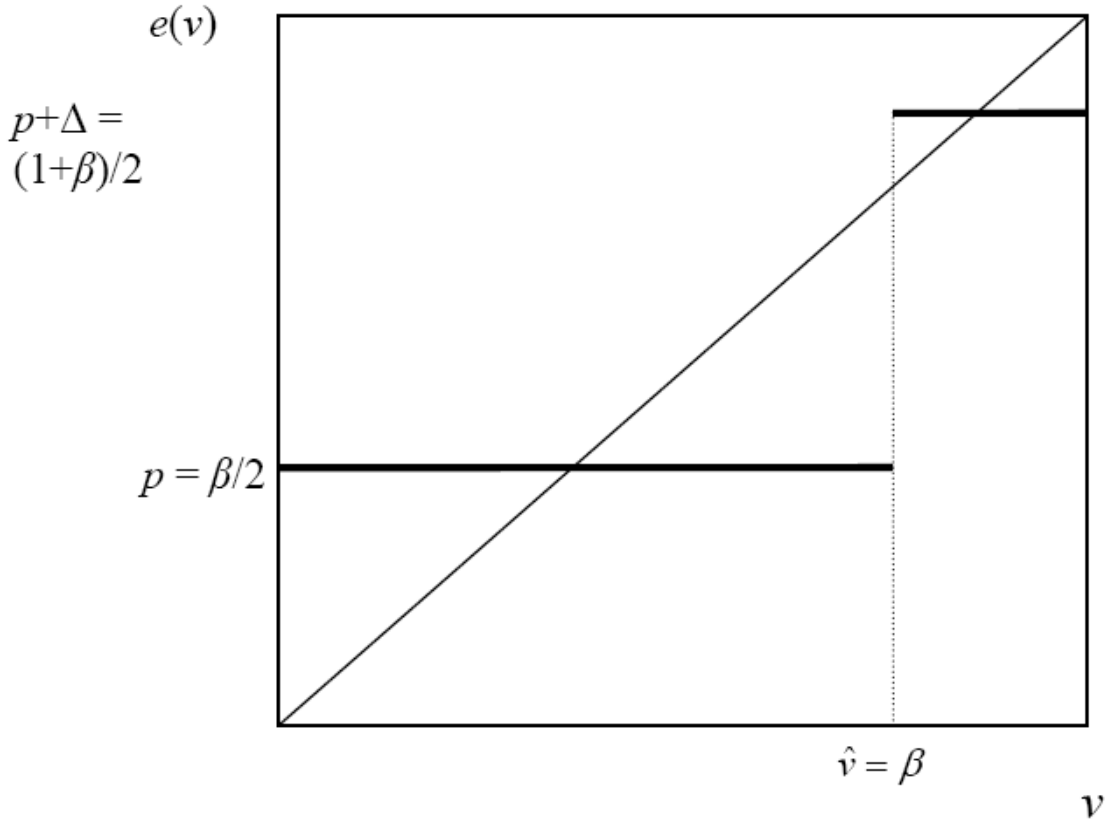
$$p = \beta/2, \, \Delta = 1/2$$

  – optimal base price enhances power of party strong in litigation

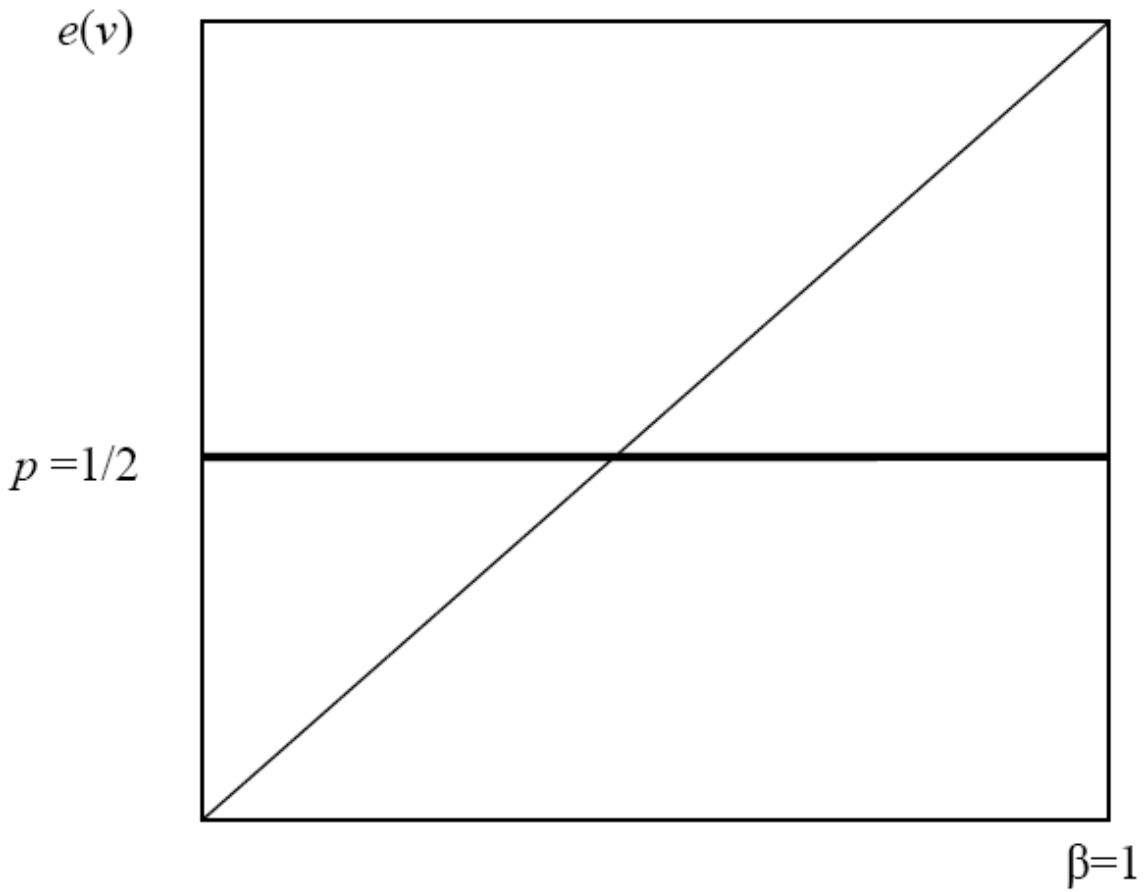
Powerful seller



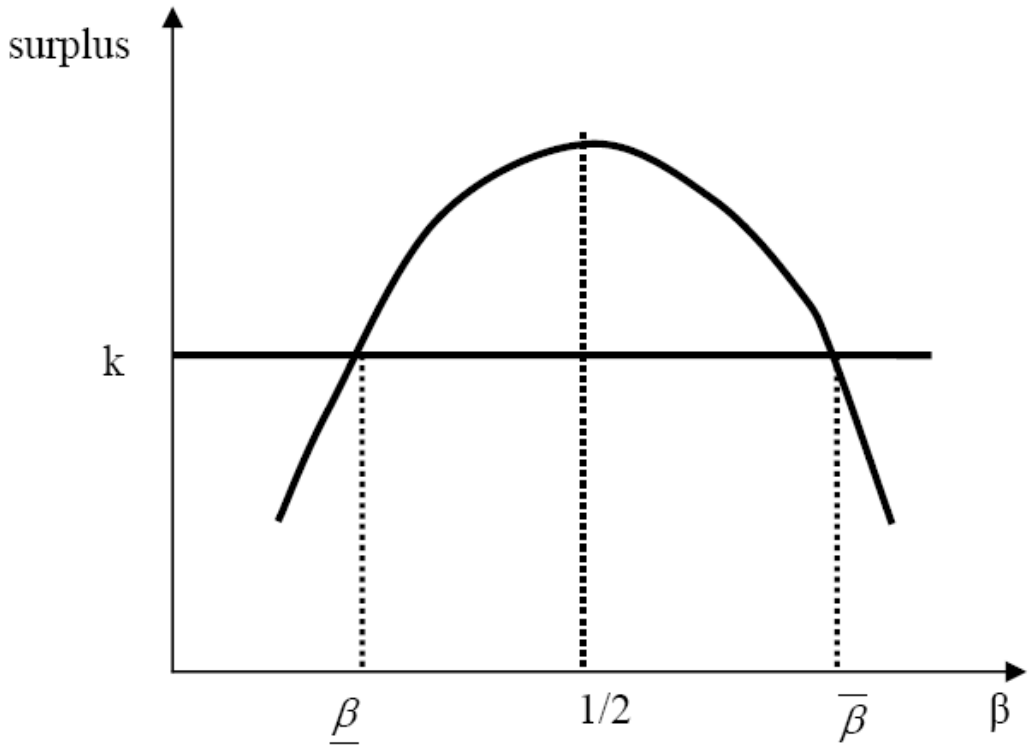
Powerful buyer



Powerless seller: no information used



Social welfare and contracting



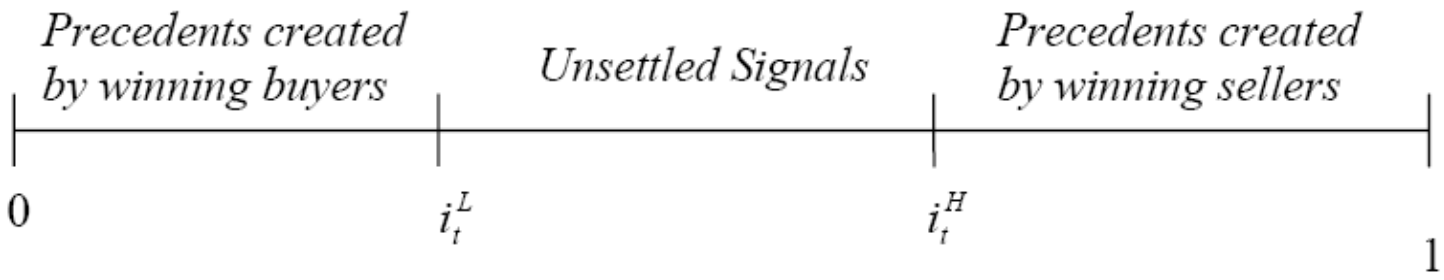
- Despite ex-ante contractual reaction, adjudication and incentives remain distorted
  - Inequality $|\beta - 1/2|$ undermines incentives and welfare
  - Very unequal parties do not contract
- Measure 1 of parties with $\beta \rightsquigarrow F[0,1]$. Total measure of contracting parties:

$$F(\overline{\beta}) - F(\underline{\beta})$$

Second round of contracting

- At $t = 0$, each litigation episodes is adjudicated by judges picking a different signal

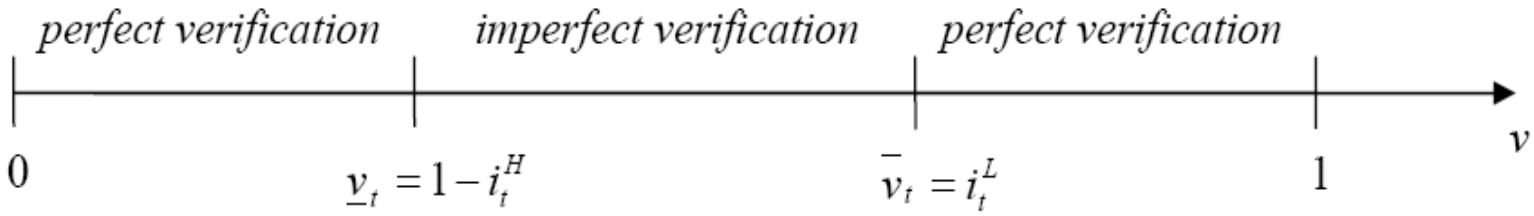
- The stock of signals incorporated into precedents is:



  - Two key ideas:
    - parties present extreme signals
    - judges adjudicate using those signals and incorporate them into precedents

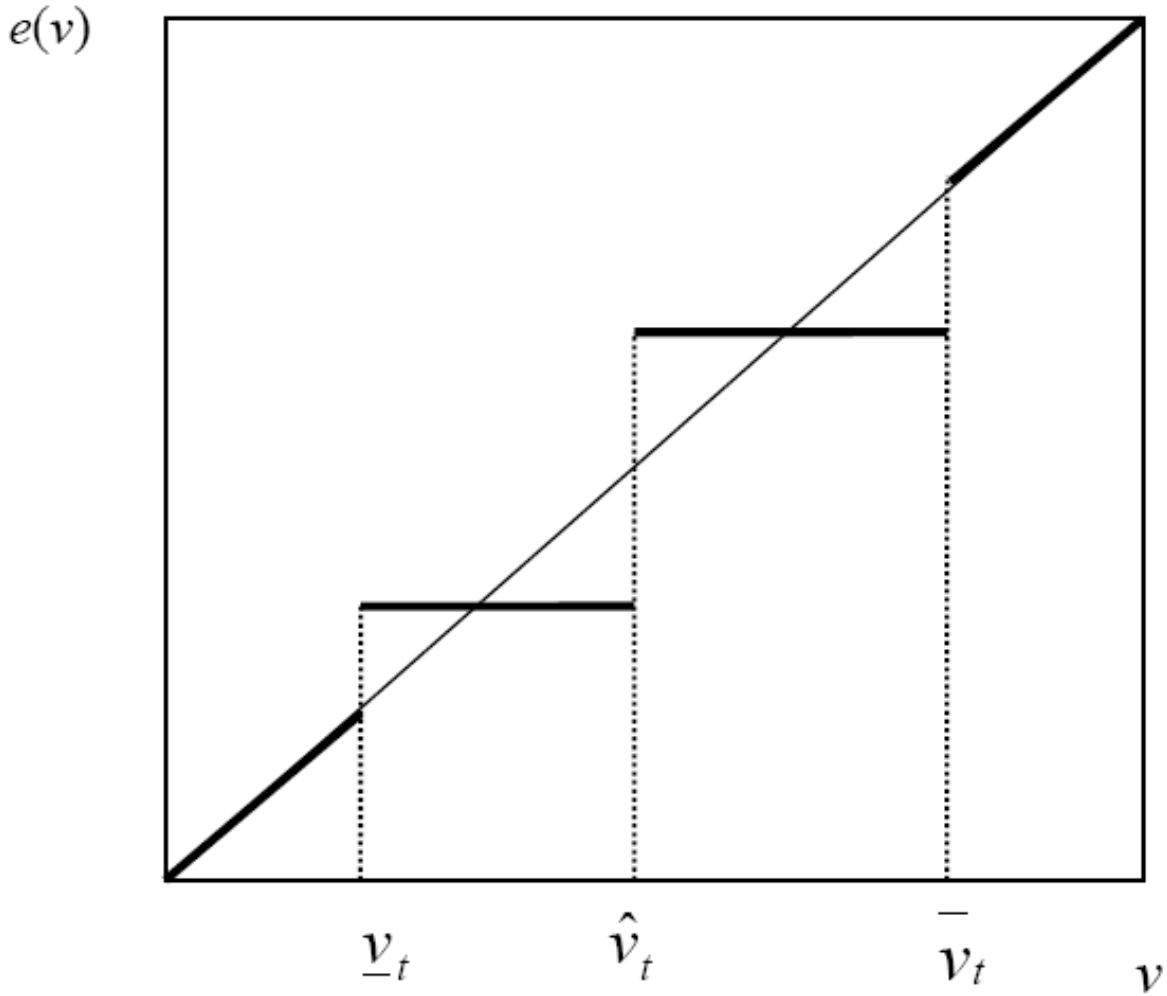
Precedents and state verification

- Judges now have the technology (signals) to verify as follows:

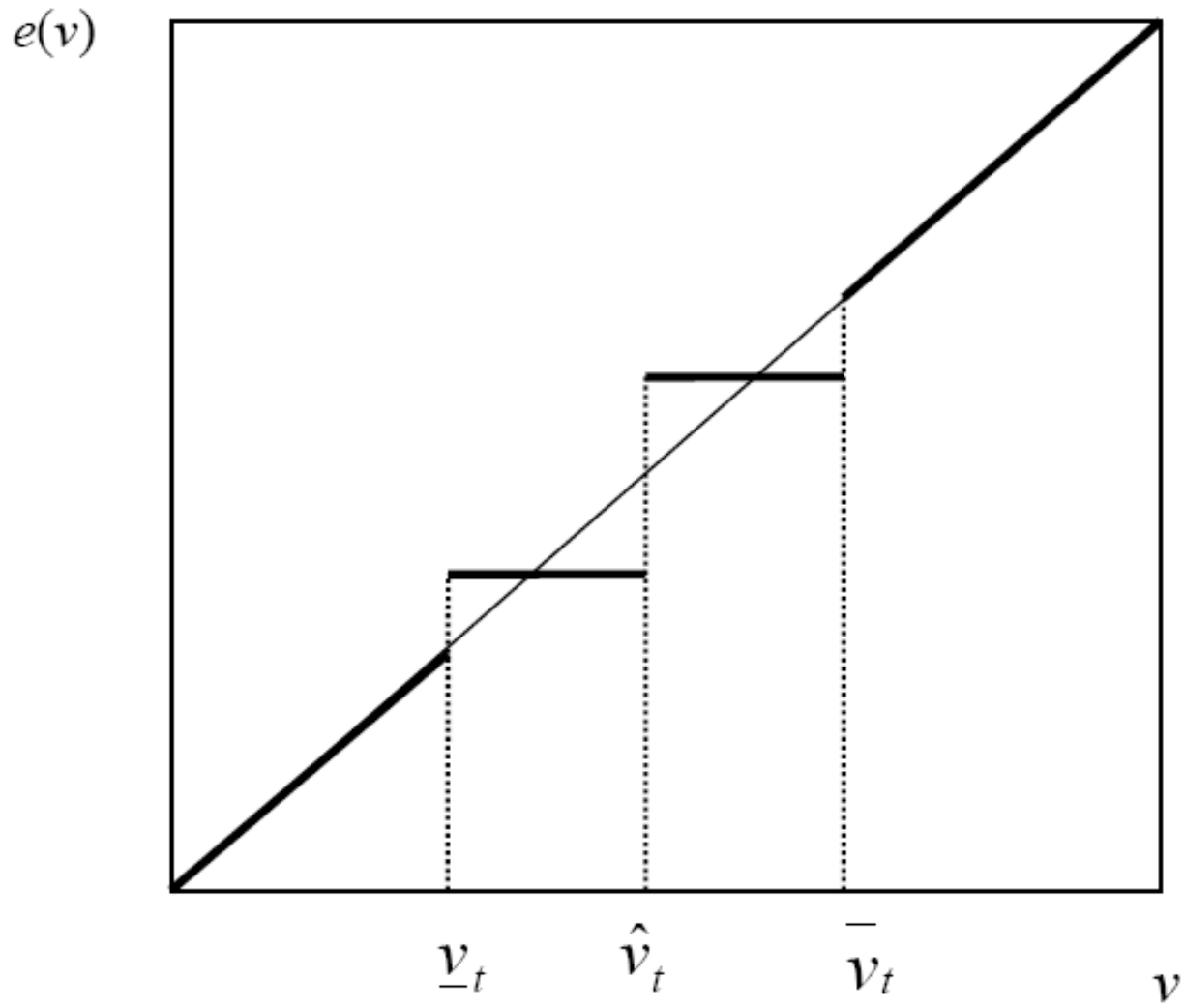


- The contract among the parties "instructs" judges to use the signals in precedents correctly
  - $*$ Key difference with torts: contracting around precedents reverses judicial errors
  - $*$ Now predictability is much more important than precision

Initial stages of evolution



Mature evolution



Law of motion of law and contracts:

- The law evolves according to equation:

$$\dot{g}_t = -g_t \left[F(\overline{\beta}_t) - F(\underline{\beta}_t) \right]$$

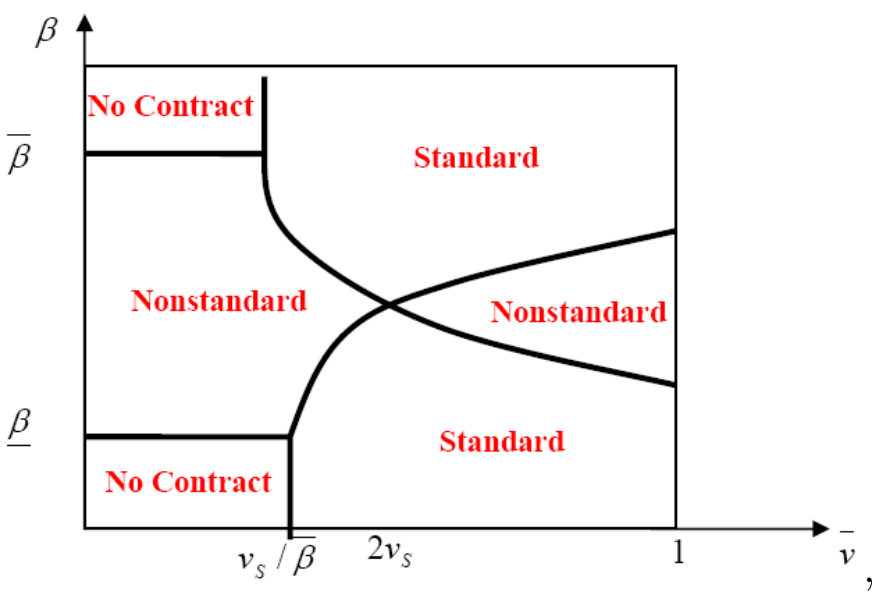
- If some parties contract at t=0, the law eventually converge to the first best $g = 0$

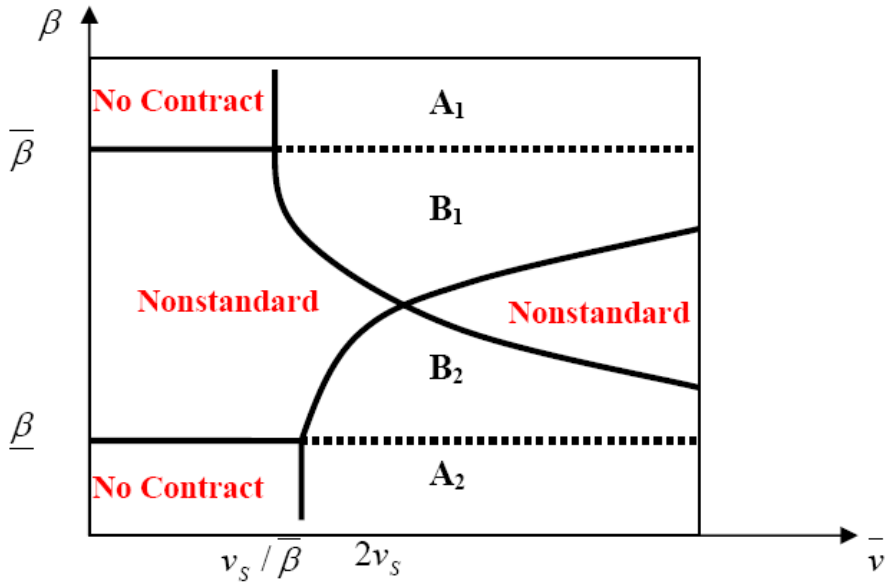
- The volume and efficiency of trade improves over time. Effect is stronger for contracts than torts

- Key role of legal and contractual innovation: they foster the accumulation of precedents, improving future outcomes

Reform: standardization and innovation

- Standardizing a signal can improve contracting in the short run...





- but it might also entail long run losses from under-innovation