

Legal Origins and Creative Destruction

*Luca Anderlini, Leonardo Felli, Giovanni Immordino, and Alessandro Riboni**

Abstract

Building on a model of endogenous innovation *à la* Romer, we analyze the link between legal institutions, innovation and growth. As in Anderlini, Felli and Riboni (2007), we suppose that law-makers are benevolent and we compare two legal systems: a rigid system, where an uncontingent law is written in a statute *ex ante* (that is, before knowing the state of the technology that will take place) and a flexible system where a state-contingent law is chosen *ex post*. In the context of our model, flexible legal systems dominate (in terms of welfare, amount of innovation and growth of the economy) in economies at intermediate stages of development – which are periods when legal change is more needed – while rigid legal systems are preferable at early stages of development. For advanced economies, the two legal systems are shown to be equivalent. Surprisingly, we show that rigid systems may induce over-investment (hence larger rates of growth) compared to the first-best. Over-investment never occurs under flexible legal regimes.

1 Introduction

This paper analyses the link between legal institutions, innovation and growth. In particular, it investigates how legal institutions deal with the challenges presented by technological change. An early example of technology that gave rise to legal problems is railroads. The

*Georgetown University, LSE, Università di Salerno, Université de Montréal. **PRELIMINARY AND INCOMPLETE (DO NOT QUOTE)**

railroad industry brought up a variety of novel cases and placed unprecedented demands on the legal system. Other technological inventions that also demanded legal innovation include medicine (e.g., in vitro fertilization and genetic testing), computing, and communication (e.g., the internet).¹

Beside their adaptability to technological change, legal systems are also to be judged by their capacity to provide better incentives to innovate: an adaptable legal system is of little use if in the absence of innovation, the economy does not change. Following the seminal contribution by Romer (1987, 1990), the new growth literature has endogenized technological progress by modeling the discovery of new ideas by profit-maximizing researchers. Building on a stylized model of endogenous innovation *à la* Romer, we analyze the effect of the law on private initiative.

We compare two legal systems: a rigid system, where the law is written in a statute *ex ante* (before knowing the state of the technology that will prevail) and a flexible system, where law-makers write the law *ex post*. We suppose that the law in a flexible system is state-contingent. We make this assumption because law-makers write the law after observing the state of the technology. Conversely, following Grossman and Hart (1986), we suppose that it is very costly *ex-ante* to describe future contingencies, so that in a rigid system the law is assumed to be uncontingent. Up to some approximation, the two systems can be thought as Statute Law (rigid system) and Case Law (adaptable system).² In Statute Law (*SL*) no discretion is left to future law-makers. Later on we will weaken this assumption and we will consider the possibility that the law in *SL* can be changed at a cost. In Case law (*CL*) the hands of future law-makers are not tied by statutes or past precedents.

The goal of a legal system is twofold. First, it has to select the best law for any given technology. Second, provided that innovations are welfare improving, it should encourage technological change. Leaving discretion to law-makers seems a sensible choice, especially in periods of rapid technological change. Are there instances where the lack of flexibility of *SL* is preferable? The answer will be affirmative since in our model law-makers suffer

¹See Bennett Moses (2007) for a discussion.

²We model Case Law and Statute Law as in Anderlini et al (2007). Here, however, we abstract from the rule of precedent in Case Law.

from credibility problems. In some cases, the ex-ante optimal law, which is the law that provides better incentive to innovate, is not time consistent ex-post (once innovation has been made). The *SL* regime does not suffer from commitment problems because statutes, which law-enforcers are bound to follow, are written ex ante. The drawback of *SL* is that it cannot perfectly adapt to changing conditions, because the statute prescribes the same law under all contingencies. On the other hand, *CL* is perfectly adaptable, but in some cases it cannot credibly foster innovation.

The choice of legal system involves a trade-off between commitment and flexibility. The literature on commitment problems has long analyzed this trade-off. However, that literature usually assumes that the degree of uncertainty, which is the crucial parameter to evaluate the trade-off, is exogenous.³ In this paper, the choice between commitment and flexibility is more complex because the degree of uncertainty (which is related here to the speed of technological change) is itself endogenous. We will argue that a rigid system, which has a comparative advantage in a certain environment, may end up choosing a law that reduces the underlying uncertainty in the economy.

The goal of this paper is to study which legal system is better suited to maximize consumers' payoff between the rigid *SL* regime and the flexible *CL* regime. In the context of our model, we show that flexible legal systems dominate (in terms of welfare, amount of innovation and growth of the economy) in economies at intermediate stages of development – where legal change is more needed – while rigid legal systems are preferable at the early stages of development. For advanced economies, the two legal systems are shown to be equivalent.

Regarding the amount of innovation, we show that in some cases innovation in *SL* is greater than first-best. To understand this point, note that *SL* has a comparative advantage in a certain environment. When innovation never occurs or it occurs with probability one, ex

³Rogoff (1985) compares rigid targeting systems and flexible monetary regimes: the key parameter in that comparison is the variance of aggregate productivity disturbances. Amador *et al.* (2005) study the optimal trade-off between commitment and flexibility in an intertemporal consumption/savings choice with time inconsistent preferences and show that the optimal amount of flexibility depends negatively on the degree of disagreement (which measures the severity of the commitment problem) relative to the dispersion of taste shocks. In both papers the underlying uncertainty is given.

post there will be a single state of the world. Then, even an incomplete statute can choose the optimal law. To exploit its comparative advantage, law-makers in *SL* may then choose to lower innovation or, under some other conditions, to induce over-investment (hence a larger rate of growth) compared to the first-best. We will argue that over-investment never occurs under *CL*.

The literature on the subject is scant, but flourishing. Comin and Hobijn (2006) analyze a model of lobbying and technology adoption and argue that countries where the legislative authorities have more flexibility, the judicial system is not effective, the regime is not very democratic or there is a military regime, new technologies replace old (and substitute) technologies more slowly. This happens because rigidity in lawmaking makes lobbying for protecting the old technology more difficult. The mechanism that explains why in their paper, rigid systems may favor technological progress relatively to a flexible system is completely different from ours. In our model, the channel is twofold. First, flexibility may harm technological progress because of time consistency issues, which explain why law-makers in a flexible system may choose ex-post a law that is less favorable to inventors than the one in the first-best solution. Second, for the reasons explained above rigid systems may choose a law that is more favorable to investors compared to the first best solution. Acemoglu et al. (2007) and Acemoglu (2006, p. 419) discuss a model of technology adoption with and without commitment (or contractual incompleteness).

This paper is also related to two different strands of the literature. Some papers compare Civil and Common Law.⁴ Finally, another related literature studies the effect of norm design on private initiative. Immordino, Pagano and Polo (2006) model an enforcement problem where firms can take a known and lawful action or seek a profitable innovation that may enhance or reduce welfare. The legislator sets fines calibrated to the harmfulness of unlawful actions. The range of fines defines norm flexibility. With loyal enforcers, maximum norm flexibility is optimal, with corrupt enforcers, instead, the legislator should prefer more rigid norms that prevent bribery and misreporting, at the cost of stunting private initiative. As already mentioned, in our setting, a rigid system is one where the law is written in a statute ex ante before knowing which technology will prevail and a flexible system one where the

⁴Glaeser and Shleifer (2002) and Anderlini et al (2007).

Bibliography

- Acemoglu, Daron (2006), "Introduction to Economic Growth," (book manuscript)
- Acemoglu, Daron, Pol Antràs, and Elhanan Helpman (2007), "Contracts and Technology Adoption," *American Economic Review*, 97(3), 916-943.
- Aghion, Philippe and Peter Howitt (1992), "A Model of Growth Through Creative Destruction," *Econometrica*, 60(2), 323-351.
- Amador, Manuel, Werning, Ivan and Angeletos, George-Marios, "Commitment vs. Flexibility," (November 15, 2003). MIT Economics Working Paper No. 03-40.
- Anderlini, Luca, Leonardo Felli, Alessandro Riboni (2007) "Statute Law or Case Law?" mimeo.
- Bennett Moses, Lyria, "Recurring Dilemmas: The Law's Race to Keep Up With Technological Change," (April 11, 2007). UNSW Law Research Paper No. 2007-21.
- Comin, Diego and Hobijn, Bart (2005), "Lobbies and Technology Diffusion," NBER wp # 11022.
- Grout, Paul A. (1984), "Investment and Wages in the Absence of Binding Contracts: A Nash Bargaining Approach," *Econometrica*, 52(2), 449-60.
- Immordino, Giovanni, Marco Pagano and Michele Polo (2006), "Norms Flexibility and Private Initiative," CSEF wp # 163.
- Rogoff, Kenneth (1985), "The Optimal Degree of Commitment to an Intermediate Monetary Target," *The Quarterly Journal of Economics*, 100(4), 1169-1189.
- Romer, Paul (1990), "Endogenous Technological Change," *Journal of Political Economy*, Vol. 98...