

The George Stigler Center for the Study of the Economy and the State

George Stigler founded the Center for the Study of the Economy and the State at the University of Chicago in 1977. It has from the beginning been a joint enterprise of economists and legal scholars at the Graduate School of Business, Department of Economics and Law School of the University of Chicago. The Center was renamed in George Stigler's memory after his death in 1991.

The Stigler Center is dedicated to the study of the effects of political life on economic life and the reciprocal effects of economic life on political life. That is not a very restrictive program, since there are few areas of our lives where neither economics nor the state intrudes. To carry out its mission, the Stigler Center supports research of faculty at the University of Chicago and of visitors from other academic institutions. The Center publishes a Working Paper series, and it promotes the dissemination of this research to a wider audience via conferences and lectures.

The Stigler Center contributes importantly to the continuity and growth of 'Chicago Economics,' which is known worldwide for two attributes:

- A tough-minded professional style that views economic theory not as an end but as a tool to assist in understanding the real world
- A lively appreciation for the working of private markets

George J. Stigler

George Stigler joined the faculty of the Graduate School of Business and the Department of Economics at the University of Chicago in 1958. This event and the arrival two years later of Merton Miller is widely recognized as establishing the Business School as a world leader in academic research and making it a full partner in an extraordinarily fruitful cooperative research enterprise with the University's Department of Economics and Law School.

Stigler was one of the great economists of the 20th century. He made seminal contributions to the economic theory of information and oligopoly and to the economic analysis of government regulation and the public sector. Stigler received the profession's highest honors including the presidency of the American Economic Association and the Nobel Memorial Prize in Economic Science. His 1982 Nobel Prize was the first awarded to an economist whose primary appointment was in a Business School.

More information may be found at the Stigler Center's website:
<http://gsbwww.uchicago.edu/research/cses/>

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INTRODUCTION

This *Annual Report* summarizes the research of the Stigler Center's research community during the 2001/02 academic year. This community includes twelve University of Chicago faculty and three visitors. As usual, their work covers a wide range of topics.

Perhaps the largest set of projects summarized here deals with issues related to health and health care. This area has attracted considerable attention from our research community in recent years. The specific health related topics summarized in this report include: the nature of competition in pharmaceutical markets (Philipson), the payoff to medical research (Murphy and Topel), the connection between inequality and health (Becker, Greenstone, Philipson), the regulation of intellectual property in health markets (Philipson), the regulation of organ donations (Becker) and the long-run effects of medical advances (Peltzman).

Political economy, or the economic analysis of the institutions of government, has been a prominent part of the Stigler Center's research agenda since its establishment in 1977. This report summarizes several projects in this area. They include work on the growth of government (Becker and Mulligan), the impact of democracy on social security spending (Mulligan) and the long-run prospects for regulation or deregulation (Rajan and Zingales). There are also numerous studies of effects of specific types of government regulation that cover areas like banking and monetary system (Rajan, Kashyap) the environment (Greenstone) and liquor consumption and gambling (Strumpf) among others.

There has been increasing public discussion of issues surrounding the governance of corporations. Who should sit on boards of directors? How should the contracts for compensation of management be structured? What should be the allocation of rights and duties among a firm's principals and their agents? Policy questions like these can only be answered sensibly if we know how the underlying institutions actually work. That kind of basic analysis has long been on the Stigler Center's research agenda. Examples in this report include research on the structure of venture capital contracts (Kaplan) and on the private value of the control rights to publicly traded firms (Zingales).

Some of the research projects mentioned here and throughout the report are summarized in the Stigler Center's Working Paper series. Many of these Working Papers are available from the Center's website at

<http://gsbwww.uchicago.edu/research/cses/documents/GSCworkingPapersPDFs.htm>

The Stigler Center's mission includes bringing discussion of the issues that stimulate our research to a non-academic audience. In the 2001/02 academic year the Center sponsored a panel discussion of the corporate governance issues arising from the significant financial and accounting problems that have surfaced since the stock market peak in early 2000.

One outcome of these problems, as well as of the terrorist attacks on the US, has been a reexamination of the role of government regulation. The Center sponsored an all-day panel on the past, present and future of deregulation at the Graduate School of Business' Management Conference. This panel included members of the University of Chicago Business and Law faculties and prominent business leaders in several of the industries that have undergone significant deregulation, including airlines, electricity, railroads and financial services.

Both panels were held at the University's downtown Gleacher Center and attracted large and enthusiastic audiences.

The Center's Associate Director last year, Randy Kroszner, has vacated that post in connection with his appointment as Member of the President's Council of Economic Advisers. The President and the country will benefit from his sound advice just as the Stigler Center's research community has.

Our accomplishments could not have occurred without the generosity of our supporters. All of the Stigler Center's research community is grateful for that support.

Finally, thanks are due to Victoria Ryberg for excellent administration of the Center's operations and its website.

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University of Chicago Faculty

Gary Becker

Casey Mulligan and I are revising our paper on “Deadweight Costs and the Size of Government”. This paper examines critically the conventional wisdom that government should collect its revenues with a minimum of deadweight loss. That proposition presumes, incorrectly we believe, that the amount the government spends is unrelated to the efficiency of the tax system. Specifically, we argue that an increase in efficiency of the taxes used would increase government spending, and might even increase the total inefficiency associated with taxes! The reason for the expansion in government spending is that more efficient taxes, which reduce the cost per dollar of taxes paid, reduce the incentive of taxpayers to resist higher taxes. Our empirical work so far provides support for these ideas. We are currently expanding the empirical analysis to include cross-country regressions between size of government and the importance of flatter taxes in the tax structure.

Kevin Murphy, Michael Grossman, and I continue to work on the market for illegal drugs. The current system of supply interdiction plus penalties for possession has numerous costs – the explicit costs of enforcement and incarceration and the resources devoted by buyers and sellers to evading detection and securing ‘turf.’ We are comparing those costs to alternative methods of restraining the consumption of these drugs.

For example, one alternative that has been discussed is decriminalization plus a tax on consumption. This would replace the implicit non-monetary tax of the current system with an explicit tax. There would however be an important difference in social cost, because the current implicit tax requires an expenditure of resources by criminals and the government. Much of that expenditure would be converted to government revenue with an explicit tax. We are currently developing our analysis of the impact of the non-monetary taxes in this market and applying that analysis empirically.

Julio Elias and I have started to analyze the potential of using the price system to overcome the shortage of organs in transplant surgery. We are especially considering payment for live transplants. Almost half of all kidney transplants use live donors, and so does a growing number of liver transplants.

Under the present system, the queues for organ transplants have continued to grow, and many persons die while waiting for organs to become available. Buying organs for live transplants would eliminate the queues for transplants that can use live donors. Our preliminary calculations indicate that it would not be expensive-relative to the cost of the

surgery- to clear the markets for kidneys and livers with live donors. I gave a preliminary version of this paper at an international conference on live organ transplants held in Essen, Germany, June 6-7, 2002. Many of the world's leading transplant surgeons were at the conference. There was considerable interest in reducing the shortage of organs through using price incentives.

Michael Greenstone

During the past year, I have worked on the following projects.

The Effects of Mandated Disclosure Laws on Equity Markets. In this project, Annette Vissing-Jorgensen, Paul Oyer and I analyze the effects of laws that require publicly traded firms to disclose financial information to the public. The Securities Act of 1933 and the Securities and Exchange Act of 1934 required firms whose shares were traded on the American and New York Stock Exchanges to file detailed balance and income statements and report on insider trading. These disclosure requirements are controversial, because it is not understood whether they needlessly burden public companies or serve as a source of information that private markets would fail to produce on their own. Notably, George Stigler vociferously argued in favor of the former.

This project examines the Securities Act of 1964 that extended these reporting requirements to firms traded on over-the-counter exchanges. The aim is to test whether mandated disclosure limits the ability of management to expropriate firm assets from outside investors, thereby improving the profitability and stock market valuations of affected firms. Additionally, the project will examine whether the increased availability of reliable information about these firms reduced the variance of their equity prices. The project is currently in the data collection phase.

Environmental Regulations Project. Over the last three decades, the federal government has attempted to balance the dual and often conflicting goals of promoting economic activity *and* environmental quality. The tension between these goals arises because regulations that reduce environmental degradation are likely to hamper economic activity. This project analyzes one of the most important examples of such a tension – the federal government’s regulation of air pollution through the Clean Air Act (CAA).

The first part of this project estimates the costs that these regulations impose on polluters and workers. During this academic year, I began a paper, “The Trade-off Between Economic Activity and Environmental Quality: Evidence from Plant-Level Data,” that will estimate the effects of the CAA on plant level pollution emissions, employment, investment, and shipments. The results will allow for the calculation of the regulation-induced trade-off between environmental quality and employment; this trade-off has not been estimated previously but is central to policy debates on environmental regulations. The estimates will also provide insight into how firms adjust their production processes to mitigate the costs of regulation. Further, I will estimate the effect of environmental regulation on plant-level production in order to directly estimate the economic costs incurred by plants due to mandated reductions in pollution.

The second part of this project estimates the benefits of the CAA regulations. Kenneth Chay and I recently completed a draft of a paper, “Air Quality, Infant Mortality, and the Clean Air Act of 1970.” This paper examines the effects of total suspended particulates (TSPs) pollution on infant health using the air quality improvements induced by the 1970

CAA in the first year that it was in force. This legislation imposed strict regulations in “non-attainment” counties that exceeded the federal TSPs ceiling.

We find that TSPs non-attainment status is associated with sharp, large reductions in TSPs pollution and infant mortality. These reductions are also evident in nonattainment counties near the federal ceiling, relative to the counties that narrowly avoid the non-attainment designation, suggesting that the regulations are a causal factor. We estimate that a 1% reduction in TSPs results in approximately a 0.4% reduction in the infant mortality rate at the county level. Most of this effect is driven by a reduction in deaths occurring within one month of birth, implying that fetal exposure is a potential biological pathway. The estimates imply that roughly 1200 additional infants survived to 1 year of age in the first year that the CAA was in force.

Civil Rights, the War on Poverty, and Black-White Convergence in Infant Mortality in Mississippi. In this project, Doug Almond, Kenneth Chay, and I examine the impact of the passage and enforcement of Title VI of the 1964 Civil Rights Act on black health outcomes. This legislation prohibited discrimination and segregation in institutions receiving federal financial assistance. As a consequence of this legislation, many hospitals in the South changed their practices and we explore the effects of these changes on black infant mortality.

We document a large reduction in the nationwide black infant mortality rate (IMR) from 1965 to 1971 relative to pre-existing trends. This six-year reduction accounts for the greatest convergence in black-white IMRs in the entire post-World War II era. While the black-white IMR gap narrowed in all regions of the U.S., the convergence was particularly large in the rural South, where black access to hospital care, as measured by the relative fraction of black births occurring in hospitals, increased the most. These large improvements in the rural South are largely due to a reduction in deaths among black infants occurring 1-12 months after birth (a.k.a., post-neonatal mortality).

Since the changes are largest in rural Mississippi, we further investigate the role of minority medical care access in Mississippi using unique county-level data. The data indicate that before 1965 there was severe racial segregation in medical care access in the predominantly black counties in the Mississippi Delta. After 1965, there appears to have been a dramatic integration of public hospitals and improvements in access for black mothers and infants. The timing and location of these changes correspond well with large reductions in the black IMR. In the Mississippi Delta, for example, while the black IMR increased from 5-in-100 to 6-in-100 from 1955-65, it was cut nearly in half by 1971. This change was driven by a remarkable decrease in causes of post-neonatal death considered preventable by medical treatment, such as diarrhea and pneumonia. It appears that the integration of hospitals in Mississippi played a causal role in the dramatic improvement in black infant mortality.

Using Mandated Speed Limits to Measure the Value of a Statistical Life. In the past year, Orley Ashenfelter and I revised our study that attempts to infer the value of a statistical life from changes in state speed limits. In 1987 the federal government

permitted states to raise the speed limit on their rural interstate roads, but not on their urban interstate roads, from 55 mph to 65 mph for the first time in over a decade. Since the states that adopted the higher speed limit must have valued the travel hours they saved more than the fatalities incurred, this experiment provides a way to estimate an upper bound on the public's willingness to trade off wealth for a change in the probability of death. We find that the 65 mph limit increased speeds by approximately 3.5% (i.e., 2 mph), and increased fatality rates by roughly 35%. These estimates suggest that about 125,000 hours were saved per lost life.

When the time saved is valued at the average hourly wage, we find that adopting states were willing to accept risks that resulted in a savings of \$1.54 million (1997\$) per fatality, with a sampling error that might be around one-third this value.

We have submitted the paper to the *Journal of Political Economy* for a special issue that is in honor of the late Sherwin Rosen. Rosen, along with Richard Thaler, set out the theoretical underpinnings of the literature on the value of a statistical life. (Rosen was a long-standing member of the Stigler Center research community and served on the Center's Executive Committee. As noted in last year's *Annual Report* Rosen died in the 2000/01 academic year.)

Steven Kaplan

Last year, I worked on the following projects.

Financial Contracting Theory Meets the Real World. Per Stromberg and I revised our study that analyzes the structure of the contracts between venture capital firms and their clients. There is a large academic literature on security design, capital structure, and contracting in general. The papers in this literature often begin with a situation in which a principal negotiates with an agent over the financing of a project or company. These theoretical papers typically make a number of different assumptions and predictions concerning these negotiations. These assumptions concern how easy it is to observe the agent's actions and write contracts based on these actions, the ability to renegotiate these contracts and the nature of information and uncertainty.

Despite the large volume of theory, there is relatively little empirical work that compares the characteristics of real world financial contracts to their counterparts in financial contracting theory. In this paper, we attempt to inform theory by conducting a detailed study of actual contracts between venture capitalists and entrepreneurs. Venture capitalists (VCs) are real world entities that most closely approximate the investors of theory. VCs have strong incentives to maximize value, but, at the same time, they receive few or no private benefits of control.

The distinguishing characteristic of VC financings is that they allow VCs to separately allocate cash flow rights, voting rights, board rights, liquidation rights, and other control rights. We explicitly measure and report the allocation of these rights. This allocation has the following characteristics in our sample: (1) While convertible securities are used most frequently, VCs also implement a similar allocation of rights using combinations of multiple classes of common stock and straight preferred stock. (2) Cash flow rights, voting rights, control rights, and future financings are frequently contingent on observable measures of financial and non-financial performance. (3) If the company performs poorly, the VCs obtain full control. As company performance improves, the entrepreneur retains / obtains more control rights. If the company performs very well, the VCs retain their cash flow rights, but relinquish most of their control and liquidation rights. The entrepreneur's cash flow rights also increase with firm performance. (4) It is common for VCs to include non-compete and vesting provisions aimed at mitigating the potential hold-up problem between the entrepreneur and the investor.

This paper will be published in the *Review of Economic Studies*.

Characteristics, Contracts, and Actions: Evidence From Venture Capitalist Analyses. This paper, also with Per Strömberg, provides another perspective on the contractual relationships between entrepreneurs and VCs. It starts with the VCs analysis of a potential investment before any commitments have been made. We study the

analyses of 67 portfolio investments by 11 VC firms. In these analyses, VCs judge the attractiveness and risks of the business, management, and proposed deal terms as well as expected post-investment monitoring.

We then consider the relation of the analyses to the ultimate contractual terms. Greater internal and external risks are associated with more VC cash flow rights, VC control rights; greater internal risk, also with more contingencies for the entrepreneur; and greater complexity, with less contingent compensation. Finally, expected VC monitoring and support are related to the contracts. We interpret these results in relation to financial contracting theories.

Venture Capital Contracts Around the World. Frederic Martel, Per Strömberg, and I have begun a project that compares the characteristics of venture capital contracts in 19 countries. We describe the ways in which VC financings allocate cash flow rights, board rights, voting rights, liquidation rights, and other control rights.

One motivation for this project is to gain insight into the conditions that promote the growth of VC financing. Historically VCs have been more important in the US than in the rest of the world. Several of the largest US businesses, especially in the high-tech industries, have been spawned by VC financing. It is important to understand whether or to what extent this differential success has anything to do with the difference between the US and other countries' legal and regulatory institutions.

We look at a number of institutional features that could potentially affect the design of venture capital contracts. First, we relate the contracts to differences in a country's legal system. A large amount of recent work, starting with La Porta et al. (1997, 1998), show that the legal system, and in particular the extent to which the laws protect outside investors, affects the firm's access to and use of external financing.

Second, apart from the legal system, the efficiency of corporate governance will be affected by the efficiency and transparency a country's accounting system (see Bushman and Smith (2001), and Rajan and Zingales (1998)). Similar to legal rules, the accounting system can affect contracts in different ways.

Third, we consider the role of the tax environment that firms are facing, such as the corporate tax on profits, and the personal tax on dividends and capital gains. One area where taxation can lead to particularly large contractual distortions is the tax treatment of employee stock options and other equity-based incentives

Fourth, Black and Gilson (1998) argue that an active venture capital market relies heavily on the VCs' ability to exit their portfolio investments through a public offering. In support of this argument, Jeng and Wells (2000) show that venture capital investing is higher in countries with larger IPO activity.

Finally, we consider the experience and sophistication of venture capitalists and the maturity of the market.

We have collected and coded all the data for this paper, and we are now in the process of analyzing these data.

Do Bidders Overpay? Extracting Stock Price Information from Takeover Battles. In this paper Pekka Hietala, David Robinson and I analyze the amount of information that can be extracted from stock prices around takeover contests. This work is motivated by numerous studies showing that bidders tend to overpay for targets in takeover contests. In many of these studies the gains to the target minus the bidder's overpayment are taken to be the market's assessment of the net value created by the takeover. The first part of the paper shows that it is not possible in general to use target and bidder stock price movements to infer the market's estimates of synergies, bidder overpayment, and changes in bidder and target values. In two generic cases, however, we show that it is possible to use bidder and target stock prices to obtain market estimates of overpayment.

In the second part of the paper, we illustrate one of these two generic cases through a clinical study of the takeover contest for Paramount Communications. We find that the market estimated that Viacom, the eventual "winner" of the takeover battle, overpaid by approximately \$1.4 billion when it agreed to purchase Paramount in a \$9.2 billion acquisition in February 1994. We also find that the market believed that QVC, the eventual "loser" of the battle, had substantially larger synergies (on the order of \$1 billion more) with Paramount than Viacom. Viacom prevailed because of its willingness to overpay by much more than QVC. This overpayment occurred despite the fact that Sumner Redstone, the CEO of Viacom, owned roughly 2/3 of Viacom. We view the results for Paramount and Viacom as strongly consistent with Roll's Hubris hypothesis as well as the results in Morck, Shleifer and Vishny (1990).

Anil Kashyap

I spent much of the last year studying how monetary policy operates in the countries that have adopted the Euro. This project is of both theoretical and practical interest.

The practical appeal comes because although the European Central Bank (ECB) has been conducting monetary policy for the area as a whole for just about 3 years, there is relatively little known about the overall economy of the euro-currency area. For instance, full and comprehensive economic statistics for the area are still not available. And prior comparative studies of the member countries in the currency area looked at only a few countries at a time; there were no studies that analyzed all twelve countries using a comparable methodology.

The theoretical interest arises since some widely discussed economic theories make different predictions about how policy might operate in the currency union. I am particularly interested in theories that focus on the role of banks and the financial system in the transmission of monetary policy. The member countries of the European Monetary Union had wide differences in their financial structure and in the legal and regulatory institutions governing that structure. Accordingly, one might expect the effects of the ECB's monetary policy to differ across the different member states.

This work is part of a unique research project that brought together teams of economists from each of the 12 central banks that participate in the currency union and from the ECB. (This was the first collaborative research effort involving all the central banks and the ECB.) I served as an advisor to the group and helped write the summary document of the group findings for a conference that we organized.

Our summary paper was organized around three questions: (1) what are the stylized facts concerning the transmission of monetary policy to the euro area as a whole and to the individual countries? (2) Can these facts be attributed entirely to the effect of monetary policy on interest rates, without considering complications from the operation of financial institutions, such as credit constraints? (3) If not, specifically, how important is the effect of monetary policy on bank lending in the overall transmission of monetary policy? We drew on the work of the group to answer these questions.

On the first question, our central result is that an unexpected increase in the short-term interest rate temporarily reduces output, with the peak effects occurring after roughly one year. Prices respond more slowly, with inflation hardly moving during the first year and then falling gradually over the next few years. Despite the synthetic and somewhat artificial nature of historical data for the area as a whole, these findings are theoretically sensible and broadly consistent with a large body of empirical literature analyzing the other large currency area in the world, namely the US.

A further aspect of the assessment based on aggregate data at the area level is the importance of investment in driving output changes in the wake of a monetary policy

tightening. This feature distinguishes the transmission mechanism in the euro area from that in the US, where much of the output adjustment appears to be due to changes in consumption.

On the second question, we find that interest rates are a very important, though not dominant, channel by which monetary policy affects the macro-economy. In one group of countries, accounting for about 15% of the euro area GDP, interest rates are unambiguously the dominant transmission mechanism. In all other countries for which we have the evidence (covering, together with the first group, about 90% of the euro area GDP) interest rate effects are always a sizeable, and sometimes the only, source of investment movements. Our results are in conflict with a presumption that the direct effect of monetary policy on the volume of bank lending has an important effect on the macro-economy.

Nevertheless, we do find, in answer to the third question, that financial factors do complement the interest rate effects of monetary policy. And they do so in several ways. In some of the countries in which bank lending appears to play an important role the main effects are on business investment. But elsewhere, the more important effects are on household spending. Finally, there are also cases in which, financial factors are important, but the specific role of banks is small.

Overall the role of banks in the transmission mechanism is somewhat different, and perhaps smaller, than what might have been expected based on prior work. Bank lending has a significant role in transmitting monetary policy in Germany and Italy. But in several other countries bank lending appears to be irrelevant as a transmission mechanism. We suspect that government guarantees to support banks, the propensity of banks to operate in networks, and strong borrower-lender relationships may mitigate the strength of any loan supply effects.

We found that the characteristics affecting the importance of banks in transmitting monetary policy are not always those that we (and probably others too, based on our reading of the past literature) would have guessed. For example, bank size and bank capital seems not to play much of role in shaping loan supply responses to monetary policy. This means that the vast heterogeneity of bank size, both across and within countries, is probably not very important. In contrast, bank liquidity positions seem to be important in virtually all the countries where loan supply effects appear to be present.

Taken together this means that even though the banks dominate the supply of credit in all euro area countries, they do not appear to be uniformly important. This work raises some questions about regulatory policy, in which banks often receive much more attention than other financial institutions or markets.

Our group's work will appear in a book that I will be co-editing. I hope it will become a standard reference for economists and policymakers interested in Europe.

Casey Mulligan

Last year I continued research on the political economy of the size of government. This grows out of my previous work, which developed some techniques for measuring public sector behavior, and developed interest group models of that behavior.

This year I extended the analysis by looking more closely at the relation between democratic political institutions and public sector behavior. One potentially important feature of public decisions in a democracy is that any one of the voters may have essentially zero effect on the public decision. My “Empirical Frequency of a Pivotal Vote” with Chicago graduate student Chip Hunter documents this feature with data on almost 2 billion votes cast in 57,000 federal and state legislator elections and show that one of every 100,000 votes cast in federal elections, and one of every 15,000 votes cast in state elections, “mattered” in the sense that they were cast for a candidate that officially tied or won by one vote. We also find that the probability of a vote mattering is proportional to the inverse of the total number of votes cast.

With Chicago graduate student Ricardo Gil, I began a project relating the size and design of social security programs to the kinds of political institutions used to make public decisions. We have compiled a 30-year country panel data set on Social Security spending, the use of retirement and earnings tests in program benefit formulas, and the design of the Social Security payroll tax. We are in the process of compiling an analogous panel data set on political institutions, such as the conduct of elections, restrictions on executive power, etc.

We already have some interesting results based on detailed time series data for 8 countries experiencing substantial changes in their political institutions – Portugal, Spain, Italy, Greece, Argentina, Uruguay, Brazil, Chile, and Peru – namely that there is no systematic relation between democracy and Social Security policy. Portugal and Spain, for example, became democratic in the mid 1970’s, but this did not change the rate of pension or other social spending growth (in absolute terms, or relative to spending growth in Italy), the nature of benefit formulas, or the means by which Social Security obtains funds. In Greece we see little or no Social Security spending growth during its 1967-74 military regime, in contrast to the spending growth seen under the previous and subsequent democracies. On the other hand, it appears that dictatorships in Chile have increased the rate of spending more rapidly than did the Chilean democracies. We have reported these results in two working papers “Social Security” and “Social Spending and Democracy: Some Evidence from South America.”

“Labor Market Search and Optimal Retirement Policy” explores one of the motivations for social spending in many European countries: that it is a means for young, unemployed workers to “purchase” jobs from older employed workers. Using a standard model of labor market search, we argue that public retirement programs pay the elderly substantially more than search theory implies that their jobs are worth. An important effect, ignored in the political rhetoric but emphasized in econometric studies of search, is that the creation of a vacant job by a retirement reduces the value of other vacant jobs.

Kevin M. Murphy

My research over the past year has focused on three main research projects, (1) The Economic Value of Medical Research, (2) The Effects of Actual and Potential Entry on Product Price and Innovation, and (3) The True Costs of the War on Drugs. In addition, I have several more minor projects underway including the interplay of content and advertising in media markets (with Ignacio Palacios) and the economics of less than replacement fertility in developed nations (with Gary Becker).

The Economic Value of Medical Research. Bob Topel and I have been studying the economic value of Medical research for the past several years. As more fully detailed in Topel's summary in this *Report*, this research documents very large social gains to medical advances. Our more recent work has focused on providing updated (through 1997) and improved estimates of our initial model. The data have been completely reworked and now reflect the best available estimates on death rates by disease and overall mortality.

We are writing a paper on the consequences of health care regulations for innovation and social welfare. The starting point for the analysis is the large social gains from improvements in health that we have identified. As a consequence, the impact of regulations on the speed of diffusion of an advance can be even more important than the impacts of these regulations on static efficiency. Developments like prescription drug programs, the shift from fee-for-service to health maintenance organizations and efforts at cost containment have significant and sometimes perverse effects on the amount and nature of innovation. We attempt to quantify these impacts using the results of our research on the value of medical improvements.

A non-technical version of our research on medical advance will appear in a volume that we are editing for publication by the University of Chicago Press. Another version of this research is scheduled to be published in a special issue of the *Journal of Law and Economics*.

Bob Topel and I have extended our analysis of the value of increased longevity and health to look at racial disparities. Our work, which will be published as part of an NIH sponsored conference on racial disparities in health outcomes shows that there has been substantial progress against disease for both blacks and whites and that the size of the racial gap has declined over the past several decades. Over the 30-year period covered by our data we find that the economic value of the progress in longevity was enormous. Measured at birth, the gains for white males were about \$245,000 per person while the gains for black males were far larger, about \$390,000 per person. The gains for women were somewhat smaller with white females gaining about \$150,000 per person and black females gaining about \$305,000 per person. Measured at 40 years of age (an age somewhat before the onset of death from the major diseases) the gains for white and black men were roughly \$350,000 and \$500,000 respectively while the gains for white and black women were roughly \$180,000 and \$400,000. Our data imply that all race and

gender groups have gained significantly from reductions in mortality over the past three decades.

The Effects of Actual and Potential Entry on Product Price and Innovation. This research (with Bob Topel and Steve Davis) attempts to answer a relatively simple question – how do actual and potential competition compare in terms of their effectiveness in promoting low prices and rapid innovation? The traditional view is that actual competition will lead to lower prices, but there is no consensus about the effects of competition (both actual and potential) on innovation.

We argue that the effects of competition on price are less clear than one might think. This is particularly true when an incumbent who has been successfully deterring entry faces changed circumstances that no longer make it worthwhile to keep the entrant at bay. In this case we show that actual entry can raise prices. While the ideas we develop are much more general, our current work focuses on the case where the firms are selling heterogeneous goods to heterogeneous consumers.

We also show how potential entry and actual entry provide very different product design incentives. Making products less different can be an effective way of deterring entry, since it reduces the potential profits of the entrant. In contrast, once entry has occurred a strategy of product differentiation is likely to be profit maximizing.

A major theme of our work is that the important effects of moving from potential to actual competition are often on the direction rather than the level of innovation. We argue that the beneficial effects of potential competition have not been sufficiently recognized in the literature. In many ways, such competition may be even more effective than actual entry at leading to low prices and steering innovation in a desirable direction.

The True Costs of the War on Drugs. Gary Becker and I have continued our work on the true costs of the war on drugs. The paper starts with a very simple idea – when the demand for drugs is inelastic, efforts to reduce consumption by reducing supply have the perverse effect of drawing resources into the drug business. The harder the war is fought, the greater will be the aggregate criminal activity devoted by the other side. Essentially, with inelastic demand revenues rise as the war on drugs pushes up prices to consumers. In a competitive marketplace, these revenues will be dissipated as drug suppliers compete against each other and against those trying to enforce drug laws.

Empirical estimates place the elasticity of demand for drugs at somewhere in the neighborhood of $-.40$. Others have estimated that the price of drugs may have been increased by about 400% relative to what they would be in an unconstrained competitive market. This would reduce consumption by about 48% relative to what it would be at the competitive price but would increase the resources devoted by drug producers and suppliers to 2.6 times their level under competition. In addition this 160% increase in resources reflects only the private costs to those engaged in the criminal activity and ignores the social costs associated with the switch from legitimate to criminal business activity. These latter costs may be as large or larger than the private costs calculated

here. If the external costs were roughly equal to the internal costs, the total cost would be increased by roughly 420%.

Sam Peltzman

I have been working on a project on the behavioral consequences of medical breakthroughs. This is an empirical investigation of whether large, unexpected improvements in medical technology lead to changes in risky behavior. Thus, suppose there is a significant invention, such as a cure for cancer. Once implemented, this will substantially reduce mortality rates. But, I argue, this advance will also induce changes in behavior that can affect mortality.

One kind of effect, identified by Dow, Philipson and Sala-I-Martin ('Longevity Complementarities under Competing Risks,' *American Economic Review*, December, 1999) is favorable – the breakthrough permits resources formerly devoted to cancer research and treatment be shifted to mitigating other health risks. But other responses can work the other way. For example, resources (including time, effort, etc.) formerly devoted to avoiding or treating cancer can also be shifted to other activities that people enjoy but which also entail health risks. My project focuses on these latter sorts of responses.

The first phase of the project has focused on mortality data from the period surrounding the introduction of antibiotics and other anti-bacterial drugs. This was arguably the most important medical advance of the 20th century. So this period should show whether the possibility that medical advances encourage risky behavior has any empirical content. Indeed, the behavior of aggregate mortality in this period suggests the possibility is worth exploring.

Specifically, the breakthrough drugs are introduced over a period from the late 1930s through the early 1950s. By the mid 1950s, age-adjusted mortality in the US is substantially below where it would be if pre 1940 trends had persisted. However, this progress essentially stops for the next 15 years. In this period the decline in mortality is substantially less than in the pre-antibiotic era. Indeed, by around 1970, there is little difference between actual mortality and a projection of pre-1940 trends. (After 1970, progress re-accelerated for a decade and then resumed its pre-antibiotic trend.)

These trends hint that there may have been an offsetting behavioral response to the antibiotic revolution in the period roughly from 1955 to 1970. So far, I have pursued that hint in the following directions:

- I found that the age groups with the most favorable (relative) impact of antibiotics – generally those under 45 - had the most unfavorable mortality experience from 1955 to 1970.
- The unfavorable 1955-70 response tends to be larger for 'external causes' (accidents, suicides, homicides) than internal causes. One explanation is that the former causes are more immediately responsive to behavioral changes than the latter, which often involve life-style changes that take time to affect mortality.
- Geographically, every age group tends to have worse 1955-70 mortality experience in those States where the same group had unusually high benefits from antibiotics.

- Though the strength of the relation varies, the basic US pattern – age groups with relatively high antibiotic benefits having relatively poor 1955-70 mortality experience- holds in 6 of 7 high-income countries for which I have requisite data. Interestingly, this pattern does not hold – indeed the opposite pattern prevails – in all three low-income (at the time of the antibiotic innovation) countries that I have been able to examine. However, these three countries (Italy, Japan and Chile) really did not have the same antibiotic revolution as the high-income countries. They show a much more gradual diffusion of the advance that continues well beyond the mid 1950s.

The first two findings are documented in a Stigler Center Working Paper (No. 169 ‘Offsetting Behavior and Medical Breakthroughs’). The next phase of the project will examine mortality experience in the wake of more recent medical advances.

Kevin Murphy and I completed a study of the impact of changes in public school performance, as measured by average scores on standardized tests on changes in the labor market experience of young workers. The study focuses on the period from 1970-1990.

We found that in this period wages of young (19-23 year old) high school graduates grow significantly more in states with improving relative school performance. Probably more than half the difference in wage growth is attributable to job quality – i.e., the industry/occupation mix of the jobs obtained by the young workers – rather than the pay received for a given job.

Wages also grow more where the initial level of school performance was highest. We interpret this level-effect as reflecting the increased demand for skill characteristic of the 1970-1990 period.

A related issue concerns the decision to enter the labor force or go on to college. Here we find that the fraction of 19-23 year olds who went on to college grew significantly more in states with improving relative school performance.

Finally, we found a (statistically weak) tendency for the wage effects of school quality to wear off as the young workers acquire experience and, presumably, exposure to non-schooling sources of work skills.

This paper will be published in the *Journal of Labor Economics*

Tomas Philipson

I have been engaged in a number of health-economic projects this year.

I organized a conference partly sponsored by the Stigler Center on "The Regulation of Medical Innovation and Pharmaceutical Markets". As part of that conference, Frank Lichtenberg and I presented our paper "The Dual Effects of Intellectual Property Regulations: The Effects of Within- vs. Between Patent Competition in the US Pharmaceutical Industry." The paper provides new evidence on competition in the market for patented new drugs.

Previous research has focused only on the effects of intellectual property regulations on 'within-patent' competition, such as the competition from generics when the patent expires. The emphasis of this research is on how legal protection of innovative returns from imitators affects R&D incentives. However, in pharmaceuticals and other high-tech industries 'between-patent' competition – the kind arising from new products aimed at the same customers as an initial innovation - can be especially important. Thus, if we want to understand of how intellectual property regulation affects progress, we need to understand the effects of the regulation on between-patent competition.

Our findings for pharmaceuticals suggest that between-patent competition is important. Indeed, we show that the competition from follow-on new patented drugs typically has more substantial competitive effects than competition from generics. This finding has implications for the effects of intellectual property regulations on R&D. For example, a regulation designed to stimulate R&D may have limited effects if it also stimulates between-patent competition: a research 'pioneer' will have to take account of the business that might be lost to follow-on patents in deciding how vigorously to pursue the current research project.

This paper is scheduled to appear in the conference volume published by *The Journal of Law & Economics*.

I have completed a paper on "Pricing and R&D when Consumption Affects Longevity" (with Pierre-Yves Geoffard) that appears in *The RAND Journal of Economics*. This paper analyzes goods for which the amount of current consumption determines the duration of consumption. Our main application is consumption of health care as it affects longevity. Some health care expenditures today will generate increased expenditures on the same good in the future by contributing to longevity. Maintenance type drugs are one example. We argue that the characteristics of the demand for such goods lead to unique predictions regarding pricing and investment in R&D. Our analysis of the nature of demand for these goods has important implications for components of public budgets that depend on longevity, such as Medicare and Social Security in the United States.

I have begun work, with Gary Becker and Rodrigo Soares, on a paper "World Inequality and Health". This paper incorporates value of life estimates into the computation of the international evolution of welfare. Most international comparisons of welfare focus on

the level or growth of current income or consumption. A shortcoming of this approach is that it ignores increases in longevity. If per capita income did not grow at all, but people live longer there is a gain in welfare just as surely as if per capita grew and longevity remained unchanged.

Our work is attempting to value the longevity gains experienced by 90 countries between 1962 and 1995. Our approach is to estimate the income gains that would represent the same welfare improvement as the observed longevity gains. We then consider how the growth in the full income – the growth of material per-capita income plus the value of the increase in longevity - changes the traditional results of cross-country welfare comparisons.

For example, these comparisons sometimes show a widening gap between high and low-income countries. However, life expectancy tends to increase more in low-income countries than in high-income countries. Our initial results suggest that this difference is important enough to eliminate or reverse the conclusion that the gap between rich and poor countries is widening. Future work will attempt to better understand the sources behind this discrepancy between material versus full income inequality over time.

I have begun work on a paper “Intellectual Property for Goods with External Effects in The Pharmaceutical Industry” with Stephan Mechoulan. Some pharmaceutical innovation affects non-users as well as users of the innovation. For example, a drug that cures a communicable disease would benefit non-users. An opposite example – a negative externality - would arise when an antibiotic that leads to more resistant organisms. This makes it more difficult to treat future infections.

The classical approach to correcting the inefficiencies engendered by an externality entails so called Pigouvian subsidies or taxes that align private and social incentives. However, one shortcoming of this mode of analyzing externalities is that it ignores the effect of the subsidies and taxes on the incentive to engage in R&D to develop new technologies. This project will try to show how the optimal policy is affected when technological change responds to Pigouvian measures aimed at correcting externalities. Specifically, the standard analysis of optimal intellectual property rights or of other R&D incentives usually assumes that an innovation has value only to the consumer of a drug. This analysis may be inadequate if there are external effects as well.

We will apply our analysis to several current pharmaceutical issues in which the connection between externalities and R&D seem to be important. The first application concerns the aforementioned antibiotic resistance. The standard analysis would imply a tax or other limitation on current antibiotic consumption to slow down the spread of resistance. But this ignores the effects of the tax on R&D into new drugs that are to replace those becoming resistant.

A second application concerns the provision of merit goods. These are goods that some people would like others to consume. An important current example is the provision of AIDS drugs in Africa. Few consumers there could afford these drugs, but there is much

pressure from concerned citizens within the developed world to have them provided at low or no cost. This has resulted in much discussion about the optimal extent of such provision and who should bear the cost.

A recent WHO report of a commission of experts in economics and medicine, entitled *Macroeconomics and Health: Investing in Health for Economic Development*, is implicitly concerned with the problem of intellectual property for goods with external effects. It advocates R&D subsidies coupled with cost-based pricing for the diseases of the poor countries. The problem of providing AIDS drugs to the third-world is in essence a problem of efficiently providing technological change and consumption for a good with positive external effects. The rich may want to increase drug consumption of the poor, but they must take into account how subsidies or price controls affects R&D into new drugs.

For example, consider the issue of whether the increased consumption of the poor should be financed by the drug industry (through low prices) or by the government (through subsidized consumption). One drawback to having the pharmaceutical industry pay for the socially valued consumption of the poor is the reduced incentive for future R&D. Another drawback is the lack of incentives for efficient provision of the drugs when an important group of beneficiaries – the concerned citizens of rich countries – does not pay for the benefit. An efficient system of providing AIDS drugs to the third world will likely involve more publicly financed provision and less pressure for price controls than currently contemplated.

I am applying this analysis to other areas where policy on external effects has implications for intellectual property issues intellectual property in the pharmaceutical industry. For example, the debate about Medicare coverage of drugs deals with issues that may be similar to those in the debate about providing drugs to poor countries.

I have completed empirical work analyzing the forces contributing to the worldwide long-run rise in obesity and the role of public interventions in affecting its continued growth. In “Technological Change and Obesity: A theoretical and Empirical Examination” Darius Lakdawalla and I attempt to estimate the importance of technological change on the upward trend in obesity. We analyze individual-level data from 1976 to 1994. An important finding is that technological change, which reduced both food prices and job-related exercise, has significantly contributed to the growth of obesity. In particular, we find that about forty percent of the recent growth in weight seems to be due to agricultural innovation that has lowered food prices, while sixty percent may be due to factors such as declining physical activity from technological changes in home and market production. This paper appears as a Stigler Center working paper.

Raghuram Rajan

I worked on three broad areas. The first is my work on the microeconomics of banking with Douglas Diamond. What we have attempted to do over the year is to place our theory of the banking firm (Diamond and Rajan (JPE, 2001)) in a general equilibrium setting. By examining the links between aggregate liquidity and banks, we obtain results on the kind of regulatory intervention that might be warranted in a banking crisis.

Another aspect of this work concerns the interaction between monetary policy and regulation of the banking system. A conventional argument for regulatory interventions such as reserve requirements and government deposit insurance is that they enhance the effectiveness of monetary policy. We now have developed a theory of how monetary policy might work through banks, without having to rely on regulatory frictions like reserve requirements or deposit insurance.

The second area is that of organizations. I and four co-authors (listed below) have a paper on how organizational form can affect function. It is an empirical examination of bank lending practices to small firms. We explore the frequently discussed idea that small organizations may do better than large organizations in activities that require the processing of soft information. Bank lending to small firms is an activity that is typically thought of as relying heavily on soft information. We find that large banks are less willing than small banks to lend to informationally “difficult” credits, such as firms that do not keep formal financial records. Moreover, large banks lend at a greater distance, interact more impersonally with their borrowers, have shorter and less exclusive relationships, and do not alleviate credit constraints as effectively. All of this is consistent with small banks being better able to collect and act on soft information than large banks. Finally, we find that large banks can obtain some of the advantages small banks have in lending to small firms by decentralizing decision-making. We think this work will contribute to the ongoing discussion of the substantial changes in the structure of the banking system that has occurred since the removal of regulatory restrictions on bank consolidation.

Finally, Luigi Zingales and I have worked on completing our book *Saving Capitalism from the Capitalists*. The book is in the Chicago tradition, examining the political economy of markets, and is due to be published by Random House in February 2003. An extensive summary of the book may be found under Luigi Zingales’ entry in this report.

Relevant Papers

"Liquidity Risk, Liquidity Creation and Financial Fragility: A Theory of Banking " with Douglas Diamond, *Journal of Political Economy*, April 2001

“Bank Bailouts and Aggregate Liquidity”, with Douglas Diamond, forthcoming, *American Economic Review (Papers and Proceedings)*, May 2002.

“Liquidity Shortages and Banking Crises”, 2001, with Douglas Diamond, mimeo, University of Chicago

“Money in a Theory of Banking”, 2002, with Douglas Diamond, in progress, University of Chicago

“Does Function Follow Organizational Form? Evidence From the Lending Practices of Large and Small Banks.” 2001, with Allen Berger, Nathan Miller, Mitchell Petersen, and Jeremy Stein, mimeo, University of Chicago.

Lester Telser

Much of the overall inequality in wealth arises from extreme inequality of ownership of equities. In my study 'The Wealthiest One Percent' I examine the distribution of the returns to stock portfolios of various sizes and among households. The data imply that households own relatively few stocks. In general more diversified stock portfolios have less variable returns. Hence the observed high concentration of equity across households suggests that they do not pursue the safer course of holding diversified stock portfolios. It seems plausible that luck plays a bigger role than skill in determining the return from stock holdings. This essay supports this conclusion with a variety of evidence.

In 'The Reconstruction Finance Corporation and the Great Depression: How Good Intentions Led to Calamity' I argue that the RFC deepened the depression. This Federal agency had large resources it could lend to distressed banks. I show how John Nance Garner, who became Vice-President-elect in November 1932 but was still Speaker of the House in January 1933, set in motion events that made the RFC the unwitting spring of economic disaster. Afterwards the RFC's preferred stock program with substantial control over private banks made them unduly conservative, and thereby retarded economic recovery.

In "Higher Member Bank Reserve Ratios in 1936 and 1937 Did Not Cause the Relapse into Depression" I argue against the claim that the Federal Reserve's increase in member bank reserve requirements in 1936 and 1937 caused the relapse of the U.S. economy into depression. Member banks responded by selling some of their U.S. Treasury paper and did not reduce their loans to business. This was published in the *Journal of Post Keynesian Economics*

Robert Topel

I worked on the following projects last year:

The Economic Value of Medical Research. Kevin Murphy and I have continued our work on the social benefits of medical research. In general, basic scientific research is a public good, for which social returns may greatly exceed private ones. Our work has focused on medical research and develops an economic framework for evaluating the social benefits of this type of research.

We begin with a model of the economic value of health and life expectancy, which we apply to US data on overall and disease-specific mortality rates. We calculate (i) the social value of increased longevity that took place from 1970 to 1990 and, (ii) the social value of potential future progress against various major categories of disease.

The historical gains from increased longevity have been enormous, on the order of \$2.8 trillion annually from 1970 to 1990. The reduction in mortality from heart disease alone has increased the value of life by about \$1.5 trillion per year over the 1970 to 1990 period. The potential gains from future innovations in health care are also extremely large. Eliminating deaths from heart disease would generate approximately \$48 trillion in economic value while a cure for cancer would be worth \$47 trillion. Even a modest 1 percent reduction in cancer mortality would be worth about \$500 billion. Unless costs of treatment rise dramatically with the application of new medical knowledge, these estimates indicate that the social returns to investment in new medical knowledge are enormous.

These findings will appear in *Measuring the Gains from Medical Research: An Economic Approach*, Kevin Murphy and Robert Topel, eds. University of Chicago Press, 2002.

In “Black-White Differences in the Economic Value of Improving Health” Murphy and I analyze the distribution of the gains from medical research across racial and gender groups. Our approach uses data from the economic literature on the willingness to pay to reduce the risk of death together with the lifecycle valuation framework we developed to study the value of medical advances. We are able to estimate the dollar value people place on differences in longevity across groups at a point in time. We can also measure the value of changes in longevity over time.

Over the 30-year period covered by our data we find that the economic value of the progress in longevity was enormous for all groups. Measured at birth, the gains for white males were about \$245,000 per person while the gains for black males were about \$390,000 per person. White females gained about \$150,000 per person and black females gained about \$305,000 per person. Measured at age 40 the gains for white and black men were roughly \$350,000 and \$500,000 respectively while the gains for white and black women were roughly \$180,000 and \$400,000. Thus our data imply that all race and gender groups have gained significantly from reductions in mortality over the

past three decades, with the gains tending to be largest for blacks and males. Our research also suggests that large gains have been a key part of economic progress for far longer, dating back to at least 1900. Much of this gain is associated with the enormous decline in deaths from heart disease over the 1968-1998 period.

We presented this paper at a National Institutes of Health Symposium on Health Disparities. NIH has nominated it for the Inaugural Eugene Garfield Economic Impact of Medical and Health Research Award. The paper will be published in the NIH conference volume.

Unemployment. In a paper entitled “Current Unemployment, Historically Contemplated” I study the evolution of unemployment, labor force withdrawal, and total joblessness among prime-aged men in the United States. During the late 1990s unemployment in the United States fell to 30-year lows, which evoked comparisons to the strong labor market conditions of the late 1960s. This paper shows that such comparisons are inapt. While unemployment – which measures the fraction of individuals that have looked for work during the last four weeks – was falling, the fraction of men who withdrew from the labor force continued to rise. For example, the unemployment rate at the business cycle peak in 1999-2000 was about 1.5 percentage points lower than at the previous peak of 1988-89. But this entire decline in unemployment was offset by an increase in the fraction of men who left the labor force, so that total joblessness was unchanged. In addition, durations of jobless spells increased dramatically during the 1990s, while the incidence of such spells declined to record lows. We argue that the “natural rate” of joblessness is higher today, because of fundamental changes in labor demand, in spite of low measured unemployment. These changes have led less-skilled men to withdraw from the labor force, so that unemployment is a flawed measure of labor market conditions. This paper appears in *Brookings Papers on Economic Activity*.

Monopoly, Competition and Innovation. In “Entry, Pricing, and Product Design in an Initially Monopolized Market” Steve Davis, Kevin Murphy and I analyze entry, pricing and product design in a model with differentiated products. Under plausible conditions, entry into an initially monopolized market leads to higher prices for some, possibly all, consumers. Entry can induce a misallocation of goods to consumers, segment the market in a way that transfers surplus to producers and undermine aggressive pricing by the incumbent. Post entry, firms have strong incentives to modify product designs so as to raise price by strengthening market segmentation. Firms may also forego socially beneficial product improvements in the post-entry equilibrium, because they intensify price competition too much. Multi-product monopoly can lead to better design incentives than the non-cooperative pricing that prevails under competition.

We think this paper has important implications for legal attempts to promote entry into markets where segmentation by product design is important. The paper has been published in the *Journal of Political Economy*.

Luigi Zingales

My main activity this year was to finish a book with Raghuram Rajan entitled *Saving Capitalism from the Capitalists*. The main point of this book, which is intended for both academics and non-academics, is that free markets, perhaps the most beneficial economic institution known to humankind, rest on fragile political foundations. For even though everyone collectively benefits from the better goods, the services, and the equality of access that competitive markets make possible, no one in particular makes huge profits from keeping the system competitive and the playing field level. Thus everyone has the incentive to take a free ride and let someone else defend the system. In fact, every participant would be very happy if the apparatus of the government would protect their own particular corner of the market from competition so that they could enjoy the easy life, while others continued to be subject to the improving but rigorous discipline of competition.

The incentives to exert political pressure to limit the market are particularly powerful in two groups: the incumbents, who benefit from the status quo and thus have a strong incentive to suppress any potential threats from outsiders, and the distressed, who lose in the competition and see the free market as responsible for their condition. Incumbents tend to be a small, well-endowed group, who can easily resolve coordination problems and successfully lobby the government. The distressed tend to be dispersed. Thus they do not generally represent a major threat, except in bad times, when their numbers increase, as does their political awareness.

In good economic times, markets may offer incumbents new, profitable, opportunities, which compensate for some of the costs of competition. And the distressed are relatively few. Thus, free markets are more likely to expand during good economic times.

It is in bad times that the market has to particularly fear the unholy coalition of the incumbents and the distressed. Since there is little scope for expansion, incumbents turn to defending their economic turf. This means suppressing the competition fostered by the free market, which almost inevitably necessitates the suppression of the free market itself. Of course, some amongst the public and even some incumbents may want to preserve the benefits of the market. Unfortunately, bad economic times impose losses on numerous citizens. If these – the unemployed worker, the bankrupt business owner, the disgruntled investor -- do not see a robust future for themselves in the system, they may come to believe that political action provides the only buffer between them and their harsh fate dictated by economics. Once the distressed in the economic arena organize, their ire turns against the forces they see as responsible for their plight.

Incumbents, of course, are all too willing to make common cause with the distressed against the market. Under the cover of obtaining security for the disaffected, the incumbents also obtain security for themselves. Even though the majority may desire a free market, they are at a disadvantage in competing politically with the onslaught of a determined and focused minority. The victim is the free market, and all those who look to

it for opportunity. We show that much of the legislation passed after the Great Depression has these characteristics.

How can we ensure a future for free markets? Since in a democracy there is a natural tendency toward redistribution, we advocate some measures that minimize the damage this natural tendency inflicts on the working of the capitalist system. We propose a new form of welfare system whose objective is to protect distressed people, not distressed firms. This system does not really change the degree of protection distressed people receive (in a democracy they will receive protection anyway), but protects the capitalist system from the vested interests of the capitalists, who will use a false sense of compassion to advance their own interests.

We are finishing the last draft of the book, which will be published at the beginning of next year by Random House.

I have begun a project with Alexander Dyck of Harvard Business School that attempts to measure directly the importance of private benefits of corporate control across countries. The idea that the controlling stockholders of a corporation may reap private benefits at the expense of other stockholders has become a centerpiece of the recent literature in corporate governance, both theoretical and empirical. For example, the literature on investor protection and its role in the development of financial markets (La Porta et al., 2000) focuses on the amount of private benefits that controlling shareholders extract from companies they run. The earlier literature, going back to Berle and Means in the 1930s, tended to focus on the conflict between the interests of stockholders and management, and it generally ignored conflicts between controlling and non-controlling stockholders.

In spite of the importance of the concept, there are remarkably few estimates of how big these private benefits of control are. There are even fewer attempts to document empirically what determines their size, and there is no direct evidence of their impact on financial development. All of the evidence on this later point is indirect, based on the (reasonable) assumption that better protection of minority shareholders is correlated with higher financial development via its curbing of private benefits of control (La Porta et al. (1997)).

The lack of evidence is no accident. A controlling party can appropriate value for himself only when this value is not verifiable (i.e., provable in court). If it were, it would be relatively easy for non-controlling shareholders to stop him from appropriating it. Thus, by their very nature private benefits of control are difficult to observe and even more difficult to quantify in a reliable way.

We try to overcome this difficulty by attempting to infer the value of private benefits of control from the terms of sales of publicly traded companies in which there was a transfer of control. We study such transfer-of-control sales in 39 countries with a wide variety of legal systems. We find that the value of control ranges between -4% and $+65\%$, with an average of 14 percent. As predicted by theory, in countries where private benefits of control are larger capital markets are less developed, ownership is more concentrated, and

privatizations are more likely to take place as transfer of control sales rather than as a public offerings.

We also analyze what institutions are most important in curbing these private benefits. A high degree of statutory protection of minority shareholders and high degree of law enforcement are associated with lower levels of private benefits of control, but so are a high level of newspaper circulation, a high rate of tax compliance, and a high degree of product market competition. A crude statistical test suggests that these “extra-legal” mechanisms have at least as much explanatory power as the legal ones commonly mentioned in the literature. In fact, in a multivariate analysis newspapers circulation and tax compliance seem to be the dominating factors. We advance an explanation why this might be the case.

This paper (entitled “Private Benefits of Control: An International Comparison”) is available as a Stigler center working paper.

As part of this project Dyck and I have also written a chapter entitled “The Corporate Governance Role of the Media” for a forthcoming World Bank book. Here we discuss the role of the media in pressuring corporate managers and directors to behave in ways that are “socially acceptable”. Sometimes this coincides with shareholders’ value maximization, others not. We provide both anecdotal and systematic evidence that media affect companies’ policy toward the environment and the amount of corporate resources that are diverted to the sole advantage of controlling shareholders. Our results have important consequences for the focus of the corporate governance debate and for the feasibility of reforms aimed at improving corporate governance around the world.

In another project, entitled “Does Local Financial Development Matter?” Luigi Guiso (Bank of Italy), Paola Sapienza (Northwestern University) and I set out a new way to measure the importance of financial development for economic development.

Much of the evidence that economic growth is enhanced by the development of financial markets and institutions comes from a period when cross-border capital movements were very limited. In the last decade, international capital mobility has exploded. Private capital flows to emerging market economies have grown from close to nothing in the 1970s to about \$170 billion in the 1980s to around \$1.3 trillion in the 1990s. In light of these dramatic changes, the question of whether national financial institutions and markets still matter for growth once domestic agents have access to foreign markets has become very important from a policy perspective.

Unfortunately, it is a difficult question to answer empirically. The integration of national financial markets is so recent that we lack a sufficiently long time series to estimate its impact on the data. At the same time, the pace of integration is so fast that even if we can show that national financial development mattered for national growth during the last decade, we could not confidently extrapolate this result to the current decade.

To try and assess the relevance for growth of national financial institutions and markets in an increasingly integrated capital market we follow a different approach. Rather than studying the effect of financial development across countries we study the effect of local financial development within a single country – Italy - which has been unified, from both a political and a regulatory point of view, for the last 140 years. Thus Italy today has attained a level of financial integration that probably represents an upper bound for the level of integration international financial markets can reach in the future. Accordingly, if we find that local financial development matters for growth within Italy, we can safely conclude that national financial development will continue to matter for national growth in the foreseeable future. Of course, the converse is not true. If we do not find the effect within Italy, it is still possible that the effect is present across countries.

We find strong effects of local financial development within Italy. For example, all else the same, an individual's odds of starting a business increases by 33 percent if he moves from the least financially developed region to the most financially developed one. Furthermore, he is able to do so at a younger age: on average entrepreneurs are 5.6 years younger in the most financially developed region than in the least financially developed one. Similarly, the ratio of new firms to population is three percentage point higher in the most financially developed provinces than in the least financially developed, and the number of existing firms per capita is 50 per cent higher. In more financially developed regions firms grow faster than the rate of growth that can be financed internally 75 per cent more frequently than in the least financially developed areas. Interestingly, this effect is entirely concentrated among small and medium firms. This is consistent with the view that larger firms can easily raise funds outside of the area they are located in. Finally, in the most financially developed region per capita GDP grows 1 percent per annum more than in the least financially developed one.

Overall all the evidence suggests that local financial development plays an important role even in a perfectly integrated market. Hence, finance effects are not likely to disappear as the world become more integrated or as Europe becomes unified.

This paper has appeared as a Stigler center working paper.

Visitors

Serguey Braguinsky

During my visit I continued working on problems of industrial development, industrial organization and investment with imperfect property rights.

I finished a paper (with Atsushi Ohyama and David C. Rose) entitled "Cooperative Technology Adoption under Global Competition: the Case of the Japanese Cotton Spinning Industry" (Stigler Center paper No. 176). In this paper we investigate how cooperation between competing firms may help accelerate the rate of adoption of new technologies by examining the development of the Japanese cotton spinning industry in the late 19th to early 20th century. Japanese firms in that industry and time seemed willing to share information and pool resources to improve the global competitiveness of the industry as a whole. This presents a "puzzle" from the point of view of some conventional theories that emphasize the incompatibility of competition and sufficient incentives for costly innovation that benefits all firms in an industry.

We show that in the case of an infant industry open to global competition, firms have incentives to share new knowledge in the sense that this increases the firm's private value. We also show how institutional mechanisms can overcome the incentive of one firm to 'free-ride' on the innovations developed by another firm. We describe the specific institutional mechanisms devised by Japanese firms for this purpose.

I also wrote (joint with Boyan Jovanovic) "Bidder Discounts and Target Premia in Takeovers" (Stigler Center working paper No. 175, also NBER working paper No.w9009). When a takeover is announced, the sum of the stock-market values of the firms involved often falls, and the value of the acquirer almost always does. The literature has tended to view the acquirer's loss as evidence of some kind of value dissipation, for example the kind that occurs because of conflicts between the interests of shareholders and managers.

We show how the facts can be consistent with value maximization. Therefore, we develop a model in which mergers are always value maximizing. Specifically, we treat mergers as reallocating valuable assets from managerial teams of lower quality to managerial teams of higher quality who found themselves (perhaps temporarily) without worthwhile projects. Yet, upon news of a takeover, a target's price rises, the bidder's price falls, and, most of the time the joint value of the target and acquirer also falls.

The reason why the acquiring firm's value declines is that the acquisition bid reveals to the market that the acquiring firm did not have as many good projects in its pipeline as previously thought and therefore needs to pay for acquiring a new project. The value of the target rises because having been selected as a target reveals that the target firm is the

best prospect for the acquirer. This simple story can explain most of the puzzles pointed out in the literature on mergers entirely within the context of value maximization by managers acting in the interest of shareholders.

I have been working (with Roger Meyerson) on an analysis of international investment flows, with particular reference to the recent experience of transition economies. Students of economic development have long wondered why capital does not flow from rich to poor countries where supposedly the return to capital is higher. Recently, this question has acquired new dimensions with the start of transition from socialism to capitalism. Although some countries (notably China and also former East Germany) experienced large inflows of capital, others (especially Russia and most other countries of the former Soviet Union) have been net suppliers of capital outflows.

The reasons examined in the literature include the idea (originating with Lucas) that physical and human capital are complements, so that the lack of skilled labor reduces the return to capital in less developed countries. Another view (due to Tornell and Velasco) is that lack of well-developed property rights creates a "tragedy of the commons" that reduces the incentive to invest by allowing non-investors to treat capital as common property.

Although helpful in explaining the experience of some developing nations, these models do not do a good job to explain the case of transition economies. We set up a model in which capital outflows are driven by an imperfection in property rights. However, the imperfection we emphasize is not the kind that makes capital a common pool. Instead, there is a small probability that the asset will be expropriated in the future. The current return from the asset is otherwise fully appropriated by its private owner. This model generates the patterns of disinvestment and capital outflow that are very similar to those actually experienced in many transition economies, including Russia.

Claire Friedland

Last year I continued maintaining the Stigler archives at the University of Chicago, and I replied to numerous requests for information about them and about George Stigler's work.

I presented a paper at a session at the History of Economics Society meeting that honored George Stigler's work. My paper traces the evolution of Stigler's thinking on the political economy of government regulation. The paper introduces some un-Stigler-like late thoughts that Stigler had not shared with a broad audience. I also provided some rare photos of Stigler. These photos and my paper will both be published in the *American Journal of Economics and Sociology*.

Koleman Strumpf

During my visit to the Stigler Center, I initiated and completed one major project and began two others. This work is part of my recent research agenda, which utilizes law and economics tools to better understand illicit activities.

The completed project is the first empirical evaluation of illegal sports bookmaking. Legal gambling is becoming increasingly ubiquitous in the United States through the spread of state lotteries and casinos. In large part this growth is not new but rather a displacement of illegal gambling. An important exception is sports gambling, which is only legal in the state of Nevada. As a result, recent estimates suggest that the volume of sports wagers placed with illegal bookmakers is one hundred times the legal betting in Nevada. Sports gambling is growing annually at a double-digit rate and currently generates well over \$100 billion per year in wagers. At the same time, a growing share of such wagers is being placed over computers at off shore bookmakers (which under current doctrine are considered illegal). Sports gambling provides an interesting case study of how illegal entrepreneurs deal with the twin challenges of growth and new competition. To undertake such a study it is essential to understand the behavior and objectives of illegal sports bookmakers.

An obvious difficulty is obtaining the necessary data. I was able to obtain a rather rich set of sports bookmaking records from the Kings County (Brooklyn) District Attorney's Office. The records include all of the information used in and generated from the daily operation of the bookmaking organizations including data for individual bets, bettors and employees (the records themselves range from computer tape backups to paper slips to address books). I have information for six New York area bookmakers that the District Attorney's Office prosecuted over the period 1995 to 2000. A wide span of bookmaker sizes are represented with weekly bet totals ranging from \$100,000 to \$4 million.

The main results relate to the structure and operation of illegal sports bookmakers. Geographically, neighborhoods are the relevant market, and only a few bookmakers serve each neighborhood. While this indicates market power, even the largest bookmaker has a citywide share below five percent and is significantly smaller than current Internet bookmakers. Because legally binding contracts are not possible in the illegal sector, I show that several institutions have developed which enhance trust between the bookmaker and the bettors. Small bookmakers tend to have the same clientele over time. The clients all typically live in the same small neighborhood and come from the same ethnic group. Bookmakers with fifty or more bettors have employees called sheetholders whose contracts with the bookmaker have incentives to recruit high quality customers. These are customers who are those likely to generate high revenues and whom the bookmaker can trust not to expose the organization to legal authorities. This trust in turn allows the existence of other institutions, such as financial credit, which minimize cash exchanges and so reduce the probability of arrest. I also perform an analysis of bookmaking balance sheets and find that annual profits range from one quarter to one million dollars.

The more quantitative analysis focuses on risk management and price setting. Despite conventional wisdom that they are just intermediaries many bookmakers gamble and take positions on games. The resulting variation in net revenues is substantial, with one large bookmaker winning or losing roughly \$100,000 per day. I use these variations to estimate the capital requirement that ensures solvency. The large bookmaker needs access to roughly three quarters of a million dollars. While the rate of return on this capital is quite high, there is a one third chance annual profits will be negative. The return-risk tradeoff is less favorable than in legal financial markets.

This extreme volatility and the choice not to utilize a relatively cheap hedging instrument imply the bookmaker cannot be risk averse. Smaller bookmakers do partially hedge their positions but still take on some financial risk. (A rather profitable, moderate-sized bookmaker has a one-quarter probability of losing money.) This characterization of bookmaking entrepreneurs as risk-loving individuals who receive low compensation is consistent with the equilibrium entry model of crime developed by Gary Becker in his seminal 1968 work.

In terms of price setting, illegal bookmakers set gambling odds in almost perfect lock step with the contemporaneous legal odds. There are two exceptions. First, the hometown team odds are unfavorable. Second, larger bookmakers use their knowledge of previous betting patterns to price discriminate with bettors having strong team loyalties frequently wagering at adverse odds (New York Yankees loyalists are willing to pay an extra 4.2 cents for each dollar bet). These deviations are somewhat surprising because bettors are free to wager on either side of an event, and unfavorable odds for one team immediately implies favorable odds for the other. This is one explanation for why it would be difficult for a bookmaker to substantially deviate from the legal odds even if his bettors do not have access to Nevada or offshore bookmakers.

I also initiated two other projects (both joint with Felix Oberholzer of the Wharton School). The first is an attempt to empirically evaluate one aspect of the effect of legal prohibitions on the consumption of certain goods. It is difficult to understand the rationale for most prohibitions in an economic framework. While a stated goal is to eliminate consumption of a harmful good, this is clearly unrealistic. The prohibition will encourage development of an illegal supply sector, which will satisfy some of the demand (narcotics is an obvious current example.) The actual consumption level which occurs could also be generated in the free market with an appropriate set of taxes and presumably without the well known negative externalities associated with government crackdowns on illegal activities. One possible justification for prohibitions is that they create social stigma: having the government state an activity is illegal may lead some individuals to not partake in it. This effect would not exist if the government tried to reduce consumption by taxing legal sales. Of course the reverse effect is possible. Government prohibition might increase consumption through a negative stigma or forbidden fruit effect. Clearly understanding the direction and magnitude of such stigma is important for guiding future policy.

In this project we build upon our previous work to consider the case of liquor control in the post-Prohibition period. Several states permitted local governments to regulate liquor sales and as a result there have been literally thousands of local prohibitions since the 1930s. Our estimates of the stigma effect are identified from cases in which a local community changes policy. Consider a place that moves from wet to dry (such a change is always the result of a public and often boisterous election). Typically there is a lag between the policy change and the actual closing of liquor stores. We can therefore compare consumption in the period immediately prior and after the election to empirically evaluate the stigma effect. A similar story holds when a community initially decides to permit liquor sales. To implement this framework we are currently assembling a data set for the states that have government-run liquor stores (and so detailed historical records on sales) and also permit local determination of liquor control.

The second project evaluates the impact of file sharing on the Internet. While it is often argued that such technology leads to pirating of copyrighted material and lost profits, some downloaders would never have bought the good because they do not value it so highly. If such downloaders are a substantial majority, the additional social surplus generated from their extra consumption could dwarf the lost profits. In this project we attempt to empirically evaluate the size of both the lost profits and the extra social surplus in a successor network to the Napster music sharing community. We are currently in the process of establishing a server that will allow us to monitor individual downloading behavior that can then be used to approximate the size of the surplus and lost profits.