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Sex, Drugs, and Catholic Schools

In the heated debate over the effectiveness of private schooling, most of the attention has focused on whether private schooling improves academic outcomes. In **Sex, Drugs, and Catholic Schools: Private Schooling and Non-Market Adolescent Behaviors** (NBER Working Paper No. 7990), **David Figlio** and **Jens Ludwig** examine the relationship between private religious schools and student behavior. They conclude that private religious schools reduce teen sexual activity, arrests, and cocaine use. Contrary to popular belief, private religious schools do not achieve these results by enrolling better-behaved students. In fact, the data suggest that poorly behaved children are more likely to be sent to private religious schools where they derive “substantial benefits” from attendance.

The authors use data from the National Education Longitudinal Survey (NELS) of 1988 to distinguish between the effects of family background and the effects of schooling. The NELS provides unusually detailed information about individual students, families, and individual schools. It includes rich measures of substance use, misbehavior, and sex-

ual activity along with complete information on family structure, socioeconomic status, behavior while in school, religious affiliation, and academic achievement. In many other data sets, information on family background comes from student

surveys. The NELS asked parents for those data.

The roughly 10,500 eighth graders that comprise the authors’ sample were those in the NELS who were interviewed again in 1990 and 1992, who lived in a metropolitan area, and who attended either a public school or a private religious one. Most of the private religious schools were Catholic. Students attending private non-religious schools, roughly 2 percent of the total, were not included.

Unadjusted for family background, students in public and private religious schools had similar rates of smoking, drinking, gang membership, and marijuana use. Private religious schools had much lower rates of sexual activity, arrest, and cocaine

use. The differences persisted even after family characteristics were taken into account. When the authors controlled for the possibility that parents likely to produce better-behaved children might also be more likely to enroll them in a pri-

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ivate religious school, they found that parents were more likely to choose religious private schools for children at greatest risk for problem behavior.

At present, these results have decidedly murky implications for public policy, in part because they show that private religious schools affect different groups of students differently. Private religious schools appear to reduce teenage sexual activity among girls, but not boys. They reduce arrests, smoking, and cocaine use among boys but not girls. Finally, their beneficial effects are “concentrated among teens who live in households with two parents or guardians.” They have no discernable effect on the behavior of students from single-parent households.

— Linda Gorman

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Stock Options For Undiversified Executives

Between 1992 and 1998, median CEO pay levels in S&P 500 industrial companies increased nearly three-fold, from less than \$2 million to over \$5 million. That increase largely resulted from a dramatic growth in stock option grants, which grew from 23 percent of total CEO compensation in 1992 to 44 percent of compensation in 1998. Indeed, in fiscal 1998, fully 97 percent of S&P 500 companies granted options to their top executives, compared to 82 percent in 1992.

Stock options accordingly have drawn increasing attention in recent years. But a new study by **Brian Hall** and **Kevin J. Murphy** suggests that attention has not included sufficient analysis of the distinction between the cost of options to companies and the value of options to executives. In **Stock Options for Undiversified Executives** (NBER Working Paper No. 8052), Hall and Murphy point out that both practitioners and academics routinely use standard option-pricing formulas, such as Black-Scholes, to approximate both the cost and value of options. Hall and Murphy, however, argue that while these formulas are appropriate for approximating the cost of options (subject to adjustments for early exercise and forfeiture), these formulas are not appropriate for measuring the value of non-tradable options held by risk-averse, undiversified executives who cannot easily hedge their holdings.

For this reason, the researchers develop an analytical framework for valuing stock options and measuring the incentives created by such options, with a special focus on dis-

tinguishing between the cost to the company and the value to the executive-recipient of options. Their risk-adjusted pay calculations use S&P 500 executive compensation data and take into account such factors as shares of company stock owned, executive non-firm related wealth, option grant size and characteristics, executive risk aversion, and company features such as stock price volatility.

Hall and Murphy derive the risk-adjusted “Executive Value” of a non-tradable option and compute the “value-cost” ratio by dividing

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executive value by the company’s cost of options. Their results show that value-cost ratios are lower for more risk-averse and less diversified executives, and that value-cost ratios are higher for options that are “in-the-money” or have provisions allowing early exercise. Understanding the divergence between the value and cost of options, the authors maintain, casts light on virtually every stock option practice, ranging from option design to executive behavior to stylized facts about executive pay trends.

Specifically, Hall and Murphy confirm executives’ claims that the Black-Scholes values are too high. Their analysis also helps explain why executives demand large premiums for accepting stock options in lieu of cash compensation. The study most markedly shows that although the cost of executive compensation has grown measurably in

recent years, after adjusting for the riskiness of equity-based compensation, pay increases (measured in terms of executive value) have arguably been much more modest.

Hall and Murphy use their framework to analyze the relative merits of restricted stock versus options as incentive instruments. Their analysis suggests that restricted stock may be preferable to options under certain circumstances. Specifically, while standard at-the-money options maximize incentives when grants are an add-on to existing pay packages, restricted stock is preferred when

options are granted instead of cash. Moreover, the results explain why both executives and shareholders benefit from early-exercise provisions, why executives routinely exercise options on their vesting dates, and why relatively short vesting periods are the norm.

The Hall and Murphy analysis has important implications for further research in the contentious matter of executive pay. There is a strong need, they say, for a framework for understanding and quantifying the value-cost efficiency in all forms of risky compensation, not just options. This need will continue to grow, Hall and Murphy assert, as long as companies increasingly put higher percentages of pay at risk for ever-larger numbers of employees, a trend that exists not only in the United States but abroad as well.

— Matt Nesvisky

How High are VC Returns?

Venture capital (VC) investments carry more risk than most investments in the broad public market and their returns are much more modest than commonly thought, according to a new paper by **NBER Research Associate John Cochrane**. He concludes that VC investments are not dramatically different from publicly listed small growth stocks.

Estimates of the returns to VC investments can be highly misleading because they typically reflect only those firms that have initial public offerings or are acquired by another company. Private companies are more likely to go public when they have achieved a good return. Those that do not achieve a good return are more likely to stay private or go bankrupt. Therefore, ignoring those companies that stay private only counts the winners; it induces an upward bias in the measure of expected returns for potential investors.

In **The Risk and Return of Venture Capital** (NBER Working Paper No. 8066) Cochrane includes those companies that stay private — the losers as well as the winners — so as to more accurately estimate the returns on VC investments. His analysis is based on 17,000 financing rounds in 8,000 companies, representing \$114 billion of VC dollars, between 1987 and 2000.

Before controlling for the selection problem, Cochrane finds very large average returns among companies that go public or are acquired. The average return is almost 700 percent. Returns in this sample are also very volatile, with a standard deviation of 3,300 percent. Underlying these averages, however, there are a few companies with astounding returns, and a much larger fraction with modest returns. About 15 percent of companies that go public/are

acquired achieve returns greater than 1,000 percent; yet 35 percent of the companies achieve returns below 35 percent; and 15 percent of the companies deliver negative returns. The most probable return is only about 25 percent.

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acquired increases as the value of the firm increases and the point at which companies go bankrupt, in order to estimate the overall underlying average return, volatility, and sensitivity to movements in the stock market (beta) of VC investments.

Adjusting in this way for the selection bias of firms that go bankrupt, the mean return on VC investments is 57 percent per year, still very large but less dramatic than the 700 percent mean before correcting for selection bias. VC investments are still extremely volatile, with an annual standard deviation of about 100 percent. This is much greater than the roughly 10 percent standard deviation for the S&P-500 in the same period, but similar to the volatility of small publicly traded NASDAQ stocks. The “beta” is close to one, indicating that VC investment returns move up and down one-for-one with the stock market as a whole.

The high volatility is necessary to explain the occasional spectacular successes. Only very volatile investments can occasionally attain 1,000 percent returns. The high average return is explained by the high volatility. If an investment has an even chance of doubling or halving in value, it has a 25 percent mean return. For each dollar invested, you could make a dollar, or lose 50

so a 57 percent return would not be that surprising with a beta of 2 to 3; the estimated beta of one implies that investors received an extra reward for holding the poorly diversifiable risks of venture capital in this period.

Cochrane finds that although typical health/biotech investments did better than typical information technology (IT) investments, the higher volatility for IT gives it a larger chance for occasional spectacular successes and thus a larger arithmetic mean return.

Cochrane also finds that second, third, and fourth rounds of VC financing are successively less risky than the first, as one might have guessed. They have progressively lower volatility and therefore lower mean returns. The betas of successive rounds also decline dramatically, from near one for the first round to near zero for fourth rounds, reflecting lower risk in the form of lower sensitivity to market conditions.

In closing, Cochrane cautions that his data sample ends in June of 2000, and most of the positive returns come from the late 1990s. As our sample extends to the NASDAQ decline and the wave of failed venture capital projects, the mean return estimates may decline, and the beta estimates may rise.

— Andrew Balls

Capital Mobility in Emerging Market Countries

If there is one aspect of a globalized, borderless economy that has the capacity to rankle everyone from street protestors in Prague to finance ministers in Santiago, it is the notion that investors and their money should be able to move around markets like ancient Bedouins and their camel, freely roaming their respective terrains in search of the next oasis. While sup-

“Although this analysis is preliminary,” he writes, “the results reported in this paper suggest quite strongly that the positive relationship between capital account openness and productivity performance only manifests itself after the country in question has reached a certain degree of economic development...A plausible interpretation is that countries can only take advantage, in net, of a greater mobility of capital once they have devel-

requires data that can capture the “subtleties of actual capital restrictions.”

It should be pointed out that his detailed probing, while raising questions about the affect of globalization on emerging economies, does offer some measure of comfort to those who advocate liberalization. Indeed, after looking at data from 20 advanced countries and 45 emerging markets, Edwards finds general support for the basic argument that, broadly speaking, “countries with a greater degree of integration with the rest of the world performed better than more isolated nations.”

But as Edwards points out, “many intellectually prominent” critics of globalization would readily agree that “account liberalization is not bad, per se.” For them, Edwards notes, this is not the issue. Rather, the core concern is that many emerging economies lack the institutions required to manage the dramatic inflows and outflows of investment that have become a matter of routine in today’s markets.

Edwards lends credence to this position. In a simple statement that has complex implications, Edwards concludes that when it comes to the affects of capital mobility, “emerging markets are essentially different from advanced nations.”

— Matthew Davis

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porters of open markets argue that unfettered “capital mobility” is essential to global economic growth, critics blame the unbridled investor for exacerbating or even precipitating the economic crises that roiled emerging market countries in the 1990s.

In **Capital Mobility and Economic Performance: Are Emerging Economies Different?** (NBER Working Paper No. 8076), **NBER Research Associate Sebastian Edwards** argues that this debate lacks a strong body of detailed empirical analysis on exactly what it means to have an unrestricted financial market and how this openness (or lack thereof) affects a country’s economy.

oped a somewhat advanced domestic financial market.” Furthermore, Edwards asserts that “at very low levels of local financial development a more open capital account may have a negative effect on performance.”

Edwards argues that his paper could offer new insights because, unlike other studies, it examines advanced countries and emerging economies with data that ranks their liberalization on a broad scale, rather than simply classifying them as open or closed. Edwards argues that, given the many ways countries regulate investment — and the myriad of tricks available to circumvent such laws — assessing how capital flows affect growth

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