Introduction
This chapter surveys the existing empirical literature on whether capital punishment deters crime. I briefly discuss standard economic theory’s predictions of capital punishment’s impact on crime and provide a concise history of the death penalty in the United States. Then I extensively review both the early and recent empirical literature testing the relationship between capital punishment and crime. Most recent empirical studies of capital punishment find evidence supporting the deterrence hypothesis. However, a few recent studies have raised questions about the sensitivity of some of the previous results. Other recent research also shows that deterrence does not occur in many states and for many types of executions. Indeed, in a substantial number of states, executions may instead increase crime.

Although the heated debate over capital punishment raises many moral, legal, and religious issues, economists’ greatest contribution has been an extensive analysis of whether capital punishment deters crime. This chapter reviews the growing empirical literature that examines this deterrent effect.

Because almost all Western industrialized nations have abolished capital punishment, the recent empirical literature focuses exclusively on capital punishment’s effect in the United States.¹ In this chapter, I briefly discuss theoretical predictions of capital punishment’s impact on crime, provide a concise history of the death penalty in the US, and review both the early and recent empirical literature.

1. Theoretical predictions
According to standard economic theory, the possibility of being executed is one of many potential costs that criminals consider when they are deciding whether to engage in crime. When the use of capital punishment

¹ There are a few early studies of the deterrent effect in other countries. For example, Wolpin (1978) found evidence of deterrence in England. Avio (1979) found no evidence of a deterrent effect in Canada, but Layson (1983) found evidence of deterrence in Canada.
increases, the costs of committing murder increase, and, according to the theory, some potential criminals will refrain from committing murder.

Although the basic theory is straightforward, three alternate theories suggest that, instead, capital punishment may have no effect on crime, or may even cause crime to increase. First, executions are rare. In 2006, there were 16,692 homicides, but only 60 executions. Because recent literature suggests that many individuals treat events with low probability as having a zero probability (Cooter and Ulen 2004, p. 351), executions might be expected to have little impact on crime. On the other hand, the substantial publicity surrounding many executions may exaggerate criminals’ perceptions of the probability of being executed.

Second, for some criminals, the existence of state-sanctioned executions may reduce the moral aversion or social stigma associated with committing a murder. By reducing the moral and social costs of committing murders, executions may cause some criminals to murder more people than they would otherwise. This possibility has been called capital punishment’s ‘brutalization effect’ (Bowers and Pierce, 1975; Shepherd, 2005).

Third, the threat of execution may induce some criminals to commit more murders in order to avoid being executed. A person who has already committed a murder that would subject him to execution may have an incentive to murder potential witnesses who could provide incriminating evidence against him and increase the likelihood of a death sentence.

Whether capital punishment deters murder is ultimately an empirical question.

2. History of the death penalty
In order to provide a context for my discussion of the empirical studies, I now briefly discuss the history of the death penalty in the United States in the twentieth century.

During the first half of the twentieth century, executions were frequent. For example, more executions occurred during the 1930s than in any other decade in American history: an average of 167 executions each year. However, over the next few decades, various social forces combined to reduce capital punishment’s use. Two primary concerns were, first, that capital punishment was applied in a racially discriminatory way and, second, that its application was arbitrary. Echoing these concerns, the US Supreme Court declared current capital statutes unconstitutional in three cases in 1972: Furman v. Georgia, Jackson v. Georgia, and Branch v. Texas, collectively referred to as the Furman decision (408 US 238). The Court held that the statutes resulted in arbitrary sentencing, constituting cruel and unusual punishment under the Eighth Amendment to the US Constitution. The decision’s effect was to void 40 states’ death
penalty statutes and to commute the sentences of more than 600 death row inmates.

After *Furman*, the states quickly began to draft new death penalty laws. The Supreme Court approved several of the new statutes in 1976 in *Gregg v. Georgia*, *Jurek v. Texas*, and *Proffitt v. Florida*, known collectively as the *Gregg* decision (428 US 153). After the enactment of the new death penalty statutes that satisfied the Constitution, death rows quickly filled. The moratorium on executions ended in January, 1977, with the execution of Gary Gilmore in Utah. The number of annual executions steadily increased after 1977, peaking in 1999 with 98 executions. After 1999, as questions about capital punishment’s fairness have again surfaced and as capital punishment has lost some public support, the number of executions has declined. Between 1977 and 2006, there have been a total of 1,057 executions.

Despite the recent resurgence in executions, the use of the death penalty varies widely across states. As of 2007, 13 states do not have statutes that permit capital punishment: Alaska, Hawaii, Iowa, Maine, Massachusetts, Michigan, Minnesota, New York, North Dakota, Rhode Island, Vermont, West Virginia, and Wisconsin. Of the 37 states that currently have capital-punishment statutes, three have performed no post-moratorium executions: Kansas, New Hampshire, and New Jersey. Moreover, the use of the death penalty varies widely across regions. Executions have been concentrated in the South for most of this century, and the concentration there has recently become even stronger. Southern states accounted for approximately half of the 3,859 executions between 1930 and 1968 (Zimring and Hawkins 1986, p. 30). Of the executions since 1977, over 75 percent have occurred in the South. Researchers exploit the variation in the frequency of executions both in the states and over time to distinguish capital punishment’s effect on murders from other influences.

### 3. Early empirical studies

The empirical debate in the economics literature began with Isaac Ehrlich’s two papers in 1975 and 1977. Ehrlich was the first to examine deterrence using regression analysis. His 1975 paper examines US time-series data for the period 1933–69. Controlling for other deterrent variables, demographic variables, economic variables, and a time variable, Ehrlich finds a statistically significant negative relationship between the murder rate and execution rate. He estimates that each execution results in approximately seven or eight fewer murders. Ehrlich’s later paper, from 1977, studies cross-sectional data from the 50 states in 1940 and 1950. Again, with similar control variables as in his 1975 paper, his findings indicate a substantial deterrent effect of capital punishment on murder.
Ehrlich’s finding triggered an avalanche of econometric analyses of capital punishment and deterrence. The papers that immediately followed Ehrlich use his original data (national time-series for 1933–69 or state-level cross-section data for 1940 and 1950) and variants of his econometric model. The results were mixed. Many find that capital punishment has a deterrent effect, but others do not. For example, using Ehrlich’s data, the following find a deterrent effect: Yunker (1976), Cloninger (1977), and Ehrlich and Gibbons (1977). In contrast, Bowers and Pierce (1975), Passel and Taylor (1977), and Hoenack and Weiler (1980) find no deterrence when they use the same data with alternative specifications. Similarly, McAleer and Veall (1989), Leamer (1983), and McManus (1985) find no deterrent effect when different variables are included over the same sample period. Finally, Black and Orsagh (1978) obtain mixed results depending on which cross-section year they use.

In the late 1980s and 1990s, a second generation of econometric studies extended Ehrlich’s national time-series data or used more recent cross-sectional data. As before, some of the papers find deterrence while others do not. For example, Layson (1985) and Cover and Thistle (1988) use an extension of Ehrlich’s national time-series data, covering up to 1977. Although Layson finds a significant deterrent effect of executions, Cover and Thistle correct for data flaws – non-stationarity – and find no deterrent effect. Chressanthis (1989) employs national time-series data covering 1966 through 1985 and finds a deterrent effect. In contrast, Grogger (1990) uses daily data for California during 1960–63 and finds no deterrent effect.

Most of the early studies, both the first wave and the second generation, use the same types of data: either national time-series or cross-section data. However, these aggregated data have limitations. Analyses of national time-series data may suffer from aggregation bias; whenever several states are grouped together, changes in the murder rates of one state within the group may dilute opposite changes in the murder rates of another state. Likewise, cross-sectional data do not allow for fixed-effects estimation to control for jurisdiction-specific characteristics that could be related to murder. Moreover, both time-series and cross-section data have few observations, which may produce spurious results or make strong statistical conclusions impossible.

Noting these possible limitations, several authors (Cameron, 1994; Avio, 1998) and a specially convened National Academy of Sciences panel called for new research using more disaggregated data, and, ideally, panel data.

4. Recent empirical studies
Since the mid-1990s, researchers have conducted studies that attempt to fix flaws in the earlier studies. Most recent studies have overcome many
of the fundamental problems associated with national time-series and cross-section data by using panel data. The panel data that are normally used are a combination of time-series and cross-section data, looking at the experiences of each of many states or counties over time. Use of panel data often enables researchers to estimate any deterrent effect more precisely because panel data produces more observations, allows fixed-effects estimations to control for important jurisdictional differences among US states or counties, and minimizes aggregation bias.

Many papers have recently been published in economics journals, law and economics journals, and law reviews. The methodology of many of the recent empirical studies resembles other empirical studies of crime. The new studies typically measure capital punishment's effect by estimating a murder supply equation that has some measure of murders as the dependent variable. Independent variables include the relevant capital punishment variables, along with a host of other control variables that typically include economic, demographic, political, and law enforcement variables. Moreover, most of the panel data studies include time and state fixed effects that both control for any factors that affect all states but vary over time and control for any unobservable variables that systematically differ among states.

Many of the estimations address the potentially endogenous relationship between executions and murders; it is conceivable not only that the number of executions could affect the number of murders, but also that more murders could cause governments to respond to a public outcry for more executions. Accordingly, scholars often estimate a system of equations to minimize potential bias.

In the following review of the recent empirical studies, I group articles by their primary focus.

4.1 Testing for deterrence

Many of the recent papers focus on whether capital punishment deters crime. In contrast to earlier papers, the recent papers use both new datasets that offer more disaggregated data and more sophisticated empirical methods.

In the earliest of the recent papers, Brumm and Cloninger (1996) use cross-sectional data covering 58 cities in 1985 to test for a deterrent effect. They estimate a covariance structure model in which the perceived risk of punishment is treated as an endogenous latent variable, with two measures of sanctions as its indicators. Their results provide support for the deterrence hypothesis: they find that the perceived risk of punishment, including the probability of execution, is negatively and significantly correlated with the homicide rate.
A paper by Dezhbakhsh et al. (2003) takes a different approach. It examines whether deterrence exists using county-level panel data from 3,054 US counties over the period 1977 to 1996. This is the only study to use county-level data, significantly increasing the number of observations and allowing the researchers to control for the demographic, economic, and jurisdictional differences among US counties that can affect murder rates. The estimation of a simultaneous-equations system to control for endogeneity between murders and executions produced results supporting the deterrence hypothesis; both death row sentences and the executions themselves are associated with decreases in the murder rate. Moreover, the results are robust to many different ways of performing the statistical analysis.

In another study of the deterrent effect, Mocan and Gittings (2003) use state-level panel data from 1977 to 1997 to examine the relationship among executions, commutation and other removals from death row, and murder. Controlling for a variety of state-level characteristics in a series of estimations, their results strongly support the deterrence hypothesis. The findings suggest that each additional execution decreases homicides by about five, and that both commuting death-row prisoners’ sentences and removing them from death row cause more murders. Specifically, each commutation results in approximately five extra murders and each removal from death row generates one additional murder. Moreover, further supporting their conclusions, they find that executions, commutations, and removals have no impact on other crime rates. Their results are robust to a series of alternative specifications.

Another recent paper by Katz et al. (2003) uses state-level panel data covering the period 1950 to 1990. Although their primary focus is on the relationship between prison conditions and crime rates, they also test for a relationship between the execution rate and murder rates. They find only limited evidence of a deterrent effect: some specifications show no relationship between murders and executions, but other estimations do indicate a deterrent effect.

Similarly, Lott and Landes (1999) use state-level panel data from 1977 to 1995 to examine whether right-to-carry concealed handgun laws deter multiple-victim public shootings. Included in their analysis are tests of the deterrent effect of executions on murder. The authors find that right-to-carry concealed handgun laws do result in fewer multiple-victim public shootings. They also find that executions have a significant deterrent effect on the overall murder rate. Specifically, a 1 percent increase in the execution rate is associated with a 7 percent decline in the overall murder rate.

Zimmerman (2004) uses state-level panel data from 1978 to 1997 to test for a deterrent effect. His simultaneous-equations system uses instrumental
variables that are motivated by the theory of public choice as it relates to the criminal justice system and bureaucratic behavior. The results strongly support the deterrence hypothesis: Zimmerman’s estimates imply that a state execution deters approximately 14 murders on average.

4.2 The impact of moratoriums

Other papers have attempted to isolate the deterrent effect from other factors affecting murders by examining state and federal moratoriums on executions. Many factors that affect crime – for example, law enforcement, judicial, demographic, and economic variables – change only slightly over a short period of time. Therefore, changes in a state’s murder rate quickly following a change in its death penalty law are likely the result of the legal change.

Cloninger and Marchesini (2001) exploit Texas’s unofficial moratorium on executions during 1996 to analyze both the moratorium’s effect on murder rates and the effect on murder rates of ending the moratorium. They conduct a portfolio analysis that is similar to the event-study methodology used in the financial literature. They find both that the moratorium appears to have caused additional homicides and that murder rates significantly decreased after the moratorium was lifted.

Cloninger and Marchesini (2006) apply a similar methodology to explore the impact of Illinois’s unofficial moratorium on executions in 2000 and the commutation of all death sentences in the state in 2003. They find that these two actions substantially increased Illinois’s homicide rate. Specifically, they estimate that there were 150 additional homicides in Illinois during the years immediately following these two events.

Similarly, Dezhbakhsh and Shepherd (2006) test for deterrence by exploiting the natural experiment offered by the moratorium on executions in all states from 1972–6 resulting from the US Supreme Court’s decisions. They use a state-level panel dataset from 1960–2000 that includes data from before, during, and after the moratorium. Comparisons of murder rates before and after the moratorium reveal that about 91 percent of states experienced an increase in murder rates after they suspended the death penalty, and about 70 percent of states experienced decreases in murder rates after reinstating the death penalty. Moreover, regression analyses that disentangle the impact of the moratorium on murders from the impact of executions on murders also support the existence of deterrence. The results suggest that the moratorium was associated with increases in murders, while executions are associated with decreases in murders.

4.3 Variations of the murder-execution relationship

A group of studies have extended the basic deterrence studies and focused on the details of the relationship between murders and executions. Several
studies have focused on which execution method provides the most effective deterrent, and other studies have examined the types of murders that are deterred.

Ekelund et al. (2006) use state-level panel data for the period 1995–99 to explore the relationship between executions, single murders, and multiple murders. They find that executions strongly deter single murders. Moreover, they find that executions by electrocution are associated with greater reductions in murders than executions by lethal injection. In contrast, they find that executions have no statistically significant impact on multiple murders, suggesting that these murders are not deterrable.

In another analysis of which execution methods have the strongest deterrent effects, Zimmerman (2006) employs state-level panel data from 1978–2000. His results suggest that the deterrent effect of capital punishment is driven primarily by executions conducted by electrocution, as these executions are associated with significant decreases in murder rates. In contrast, none of the other four methods of execution has a statistically significant impact on murder rates.

Shepherd (2004) uses state-level, monthly panel data from 1977–99 to examine both the types of murders deterred by capital punishment and the impact on deterrence of execution delays. Despite beliefs that certain types of murder are not deterrable because they are products of uncontrollable rage, this study’s empirical analysis indicates that the combination of death row sentences and executions is associated with decreases in all types of murders: murders between intimates, acquaintances, and strangers, crimes-of-passion murders and murders committed during other felonies, and murders of both African-American and white people. Moreover, the results also suggest that shorter waits on death row increase deterrence. The results indicate that, on average, a 2.75-year reduction in the death-row wait before each execution is associated with the deterrence of one extra murder.

Fagan et al. (2007) explore the impact of capital punishment on a subset of murders in Texas: homicides that have been defined statutorily as death eligible. Using state-level panel data over the years 1976–2003, they found no evidence of a deterrent effect on such murders.

4.4 Sensitivity analysis

As most of the recent papers have found some evidence of deterrence, they have generated substantial interest in the sensitivity of the deterrence findings. In addition to the extensive sensitivity analyses that appear in several of the papers themselves, other recent papers have focused either on the robustness of previous studies’ results or on the nuances of capital punishment’s deterrent effect. These papers focus on deterrence findings in both early and recent papers.
The first of the recent sensitivity analyses was Ehrlich and Liu (1999), which tested the robustness of Ehrlich’s deterrence findings from the 1970s. Using Ehrlich’s original state-level, cross-section data from 1940 and 1950, the paper tests for improper functional form, heteroscedasticity, heterogeneity, measurement errors, simultaneity, and contemporaneous correlation. All of the results support the deterrence hypothesis.

Liu (2004) investigates the endogenous nature of states’ decisions to enact death penalty laws, and the resulting selection bias in many econometric models. He presents a theoretical model that shows that the effect of deterrent variables will differ between states with and without death penalty laws, and proposes an econometric model that will control for this selection bias. Using Ehrlich’s original state-level, cross-section data, a system of equations, and switching regression techniques to minimize simultaneity, the results confirm the deterrent findings of Ehrlich’s earlier study. The results are also consistent across several alternative specifications.

Narayan and Smyth (2006) explores whether the results of early studies that used national time-series data are spurious because they did not account for the data’s stationarity properties. Using national-level time-series data over the years 1965–2001, they employ a cointegration and error-correction framework that allows estimation of both the short-run and long-run elasticities between capital punishment and murder. They find only limited support for the deterrence hypothesis. In both the short run and the long run, only the probability of receiving a death sentence explains national variations in the homicide rate; the probability of execution is statistically insignificant in all but a few specifications.

Fagan (2006) addresses the reliability of both early and recent studies. After discussing several technical and conceptual problems that could be present in all early deterrence studies, he undertakes his own sensitivity analysis of the estimation in a recent paper, Mocan and Gittings (2003). Although he is able to replicate their results perfectly, he finds that the results do not hold when he performs the same analysis on different data sources, excludes Texas from the estimation, includes different variables, or uses alternate functional forms and econometric methods. He concludes that the impact of capital punishment on murders is still uncertain.

Berk (2005) explores whether the small number of executions in most states and years influences the earlier deterrence findings. He asserts that, because the majority of states perform few, if any, executions each year, any deterrent effect must be driven by a few individual states and years. To confirm this, he examines the 1977–97 state-level, panel data from Mocan and Gittings (2003) to compare the relationship between murders and executions when a state has very few executions with when there are
several executions. He finds that the negative relationship between executions and murders exists only when there are several executions in a state each year. In addition, when he eliminates from the data states such as Texas with especially large numbers of executions, he finds no evidence of deterrence.

Shepherd (2005) also recognizes the relevance of state-specific deterrence, in the first study to measure the different deterrent effects among the US states. Using three different datasets – annual county-level data from 1977–96, annual state-level data from 1960–2000, and monthly state-level data from 1977–99 – the paper finds that the impact of executions differs substantially among US states. Executions deter murders in some states, but actually increase murders in many others. In general, a deterrent effect exists only in the few states with a large number of executions since the end of the 1970s Supreme Court moratorium. In contrast, in the many states with few executions since the moratorium, executions generally increase the number of murders or have no significant impact. Shepherd concludes that, in most states, executions do not deter crime, but instead induce additional murders.

A later study by Donohue and Wolfers (2005) also analyzes the state-by-state variation in capital punishment’s deterrent effect and concludes that there is no deterrent effect in most states. In addition, this study critiques the empirical analyses of several previous papers. Although Donohue and Wolfers find that they were able to replicate the results from the previous papers perfectly, they find that some of the previous results are not robust to alternative specifications, including different sample periods, comparison groups, control variables, functional forms, or estimators. They assert that executions are so rare that it is impossible reliably to distinguish their effect on the murder rate from the effects of the other factors that influence murder rates. They therefore conclude that whether capital punishment deters murder is still an unanswered question.

5. Responses to criticisms
Several of the authors whose work was challenged by Donohue and Wolfers (2005) have written responses. Mocan and Gittings (2006) argue that Donohue’s and Wolfers’s re-analysis of their original 2003 article (Mocan and Gittings 2003) errs by assuming that an execution or commutation occurs in the same year that a prisoner receives his death sentence. Mocan and Gittings perform the same sensitivity analyses that Donohue and Wolfers used to critique their paper, but with an econometric model that allows for a several-year lag between death sentences and executions or commutations. They find that the results of these sensitivity analyses confirm their earlier findings that deterrence exists.
Similarly, Dezhbakhsh and Rubin (2007) respond to Donohue’s and Wolfers’s criticisms of two of their previous papers (Dezhbakhsh et al., 2003; Dezbakhsh and Shepherd, 2006). Dezhbakhsh and Rubin argue that econometric tests indicate that Donohue and Wolfers made an important statistical error in the primary sensitivity analysis that Donohue and Wolfers used to criticize Dezhbakhsh et al. (2003).

Dezhbakhsh and Rubin also repeat all of the sensitivity analyses that Donohue and Wolfers used to challenge the 2006 study (Dezbakhsh and Shepherd 2006). Donohue and Wolfers reported the results for only a subset of the sensitivity analyses, most of which showed no deterrent effect. In contrast, Dezhbakhsh and Rubin report the results from all 80 alternative specifications that Donohue and Wolfers discuss, finding that almost 75 percent of the results provide statistically significant evidence of a deterrent effect.

Cloninger and Marchesini (2007) is also a brief response to Donohue and Wolfers. The paper claims that the homicide measure that Donohue and Wolfers used to critique the portfolio analysis in the authors’ previous two papers (Cloninger and Marchesini, 2001; Cloninger and Marchesini, 2006) is invalid (Cloninger and Marchesini, 2007, p. 6).

6. Current state of the literature
Most recent empirical studies of capital punishment find evidence supporting the deterrence hypothesis. However, a few recent studies have raised questions about the sensitivity of some of the previous results. Other recent research also shows that deterrence does not occur in many states and for many types of executions. Indeed, in a substantial number of states, executions may instead increase crime.

Because findings on deterrence continue to evolve, it is likely that future research will continue to focus on the issue. Regardless of the state of the literature on deterrence, it should be recognized that even were there a strong, consistent deterrent effect, this would appropriately contribute only a small piece to the puzzle of whether the US should join the rest of the Western world in abolishing the death penalty. Issues of morality, justice, constitutionality, racial and gender discrimination, and arbitrariness are equally important considerations.

References


